Cross-Cutting

Contents

Government Contracting with Monopoly in Infrastructure Provision: Regulation or Deregulation

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Abstract：This study characterizes the optimal contracts for providing public infrastructure and service that involve the choices of investment timing, price, quality, subsidy/tax and franchise fee in regulation or deregulation regimes, and compares the two regimes under demand uncertainty and information asymmetry. The results suggest that regulation regime under information symmetry dominates the regulation regime under information asymmetry and the deregulation regime. Whether deregulation dominates regulation under information asymmetry depends on the interplay of a variety of factors including the shadow cost of public funds, the demand volatility, the government's imperfect information on the firm's cost structure, and the franchise fee.

Key words: regulation; contract design; real option

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收费公路 PPP 项目政府补偿方式研究

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摘 要： 随着 PPP 项目的不断推行，由于相关政策的不完善，政府提供补偿存在盲目性等问题不断显现，建立一个切实可行的方法来评估补偿的数额和风险等情况势在必行。在实物期权理论的基础上，建立了收入补偿和交通量补偿模型，并结合实际案例，利用蒙特卡洛仿真得到了不同的补偿方式下政府提供补偿的次数和金额的均值、概率，在此基础上分析了初始交通量和交通增长率的波动性对政府补偿和投资者净现值产生的影响。其研究结论可为政府选择合理的补偿方式，权衡补偿风险，制定补偿政策提供理论指导。

关键词： 交通运输经济；补偿方式；蒙特卡洛；收费公路；PPP 项目

Research on Government Subsidies of Toll Road PPP (Public-Private-Partnership) Projects Based on Real Option

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Abstract：

With the continuous implementation of the PPP projects, due to the imperfection of relevant policies, the blindness of government subsidy is constantly emerging. Thus, it is important to put forward a practical approach for valuing the subsidies and risk. In this paper, the revenue subsidies model and traffic subsidies model are established based on real option. Then combined with practical cases, Monte Carlo simulation is used to get the value and probability of government subsidies under different compensation ways. On this basis, the influence of initial traffic volume and traffic growth rate on government subsidies and net present value of investors is analyzed. The research findings can provide theoretical guidance for the government to choose a reasonable way of subsidies, balance the risk of compensation, and formulate subsidies policies.

keywords: transportation economy; subsidies; Monte Carlo; toll road; PPP (Public-Private-Partnership) project

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公私合作（PPP）的基本范式及其选择

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摘 要：在分析 PPP 项目产权分布、组合方式的基础上研究其基本范式的界定问题，结果发现，根据剩余控制权的归属不同，PPP 项目可以划分为三种基本范式，现行 PPP 项目的很多运作模式本质是相同的，且均可以归纳为三种基本范式之中。从实践来看，日本 PPP 项目主要选择风险较低的基本范式Ⅰ，而我国的 PPP 项目则主要选择风险较高的基本范式Ⅱ，这增加了项目的风险，不符合我国的客观实际。我国 PPP 项目的范式选择必须根据制度建设等情况进行，适度发展。

关键词：公私合作（PPP）；产权分布；产权组合；基本范式

The Research on Normal Form and Choice of Public-Private Partnership

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Abstract：

In our research on normal form of PPP projects which are on the ground of property distribution and property combination, we have illuminated that the PPP projects can be identified as three normal forms according to the owner of residual rights of control. To date many operations of PPP projects are constitutionally same, and belong to the same form. In practice , the PPP projects in Japan are mostly the type of low risks(Normal formI) ， but to the contrary high risks in China(Normal formII) which means high risk of projects and doesn't answer the reality. The way worked out is to choose normal form in the light of system construction of PPP projects in China and develop reasonably.

keywords: Public-Private Partnerships(PPP);property distribution;property combination; ormal form

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Monte Carlo Simulation Based Assessment of Risks Associated with PPP Investments in Toll Highway Infrastructure

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Abstract：The demands for delivering highway services keep growing worldwide. However, funding from government and public agencies alone cannot cover the capital needed to operate and maintain existing highway systems, much less to construct new ones. Public-Private Partnerships (PPPs) are an innovative funding mechanism for highway agencies to utilize private capital and expertise in transportation infrastructure projects, so as to increase funding options to bridge the budget gap. Even though parties involved in PPPs take different roles and responsibilities, there are still risks taken or shared by the public and private sectors. In particular, assessing risks associated with the potential returns of investments is of great importance to both the private and public sectors. This paper presents a methodological framework for assessing the investment risks of PPP toll highway projects, which may help decision makers. The financial viability associated with the components of a project is considered and analysed, and the Monte Carlo Simulation technique is applied to evaluate the overall project risks. Finally, a numerical case study is conducted to demonstrate the application of the proposed methodology. The risk analysis provides statistical distribution of investment returns for the project under analysis, which will supply decision makers with direct information to estimate the project's overall financial risks and develop corresponding risk control measures. The risk simulation results are interpreted so that quantitative information can be provided to agencies to establish investment decision criteria.

Key words：Public-Private Partnerships (PPPs); risk analysis; viability of PPP investments; Monte Carlo Simulation

Concession Period Adjustment to Cope with Uncertainties in Public-Private Partnerships

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Abstract : Public-private partnerships (PPPs) have been widely used in delivering infrastructure projects. One of the most important parameters in PPP projects is the concession period that is normally predetermined by governments. However, to cope with uncertainties of project surroundings, the contractual terms should be flexible, which allows project parties adjust concession period at the post-contractual stage. Adjustment of the length of the concession period should consider not only the profits of project parties, but also the influence of the length of the concession period in risk control, which has not been studied by previous research. This paper develops a concession period adjustment method based on expanded net present value analysis, as well as the stochastic analysis of the uncertain project parameters. The project risk for project parties is expected to be controlled via concession period adjustment. Referring to a real toll road project in Australia, a numerical example is used to validate the model proposed in this research. The adjustment outcome shows that the concession period is extended by 3.2 years if the adjustment occurs at the fifth operational year, which implies that at the point of the fifth operational year, the private investors need to require for extending concession period to control the risk of suffering loss in a downturn market surrounding. The adjustment process proposed in this paper demonstrates the strong effectiveness and ability to adjust the length of the concession period at the post-contractual stage of a PPP project.

Key words : concession period adjustment; risk control; public-private partnerships; real option

Research on Cooperation Efficiency Evaluation of PPP Project Based on Grey Clustering Model: Taking Beijing Metro Line 4 as an Example

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Abstract：PPP model is an important model which provides public products or services based on the coordination between the public sector and private sector. The implementation of PPP model is helpful for relieving the stress of insufficient funding for public sector, developing the funding, technology and management benefits of private sector, and improving the efficiency of resource allocation. Comparing with traditional infrastructure project, PPP project involves many stakeholders, and the cooperation efficiency during the different stakeholders impact the results of the project directly. Thus, it is important to explore the cooperation efficiency of PPP project. Based on grey clustering model, this paper evaluates the cooperation efficiency of PPP project. An evaluation indicator system including 36 indicators is established based on the aims and objectives of three stakeholders (public sector, private sector, and passengers). A case study of Beijing Metro Line 4 PPP project is implemented to verify the validity and applicability of the evaluation model. And the results showed that the cooperation efficiency of Beijing Metro Line 4 PPP project is relatively high. The model also provided insights into the shortage of the cooperation efficiency of Beijing Metro Line 4 PPP project. As such, the results can assist all stakeholders in adjusting the cooperation efficiency.

Key words: cooperation efficiency; urban rail transit; PPP; grey clustering model

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Spontaneous Punishment Promotes Cooperation in Public-Private Partnership

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Abstract：Punishment widely exists in social and biological systems and it has been proved to be an effective way to promote cooperation in evolutionary game in previous work. In this paper, we introduce a new mechanism of punishment that the punishment fine can be multiplied if there are several punishers decide to punish a defector in the process of a public-private partnership, which leads to a low payoff of defector and promotes the level of cooperation. This phenomenon can be explained by that the ability of punishment is multiplied by investors cooperating with each other to carry out the punishment. Interestingly, we find that this mechanism can dramatically promotes the level of cooperation when we compare the simulation result with traditional evolutionary public good game. In order to figure out how our new mechanism of punishment promotes the cooperation, we have drawn several figures below to explain the mechanism. Our work simulates a widely existing phenomenon in biological and social systems and reveals some essential principles in the process of evolution.

Key words：cooperation；spontaneous punishment；evolutionary game theory；public-private partnership

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完善地方政府公路专项债券融资的几点思考

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摘　要：通过对《地方政府收费公路专项债券管理办法（试行）》及其实施流程的分析和对相关省市实际发行等的调研，指出了该试行办法及实施过程中的相关缺陷和不足，在此基础上，针对性地提出了后续完善的具体建议。

关键词：政府收费公路；地方政府专项债券；融资；政策研究

Research the Improvement Financing Method of the Local Government Toll Roads Special Bonds

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Abstract：

　　Through studying "the trial implementation policy of the local government toll roads special bonds" and the practical proceeding of some provinces, based on the surveying and investigating of the real financing practices according on this strategy, some imperfect points of this strategy are pointed out, then some suggestions of improving this strategy are also provided.

keywords: government toll roads；local government special bonds；financing；strategy research

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Pavement Preservation Short-Term Effectiveness in IRI Change-An Empirical Analysis

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Abstract : Accurate information about benefit effectiveness of pavement preservation treatments is essential and fundamental for a sound, effective pavement management system because pavement management decisions are often based on treatment effectiveness. short-term effectiveness is useful because they are not only providing the pavement surface condition resetting information but also allows researchers to integrate the treatment effectiveness and further assist long-term effectiveness analysis with incremental short-term benefit. In this research, the authors find that short term IRI change due to preservation treatments follows a polynomial relationship with pre-treatment condition. Hot mill overlay offers average reductions in IRI of 1.44 m/km, chip seal offers average reductions of 0.72 m/km, aggregate seal offers average reductions in IRI of 0.31 m/km and crack sealing offers the least IRI reduction of 0.27 m/km.

Key words： preservation; international roughness index

Effects of Temperature and Precipitation on Skid Resistance: A Dynamic Panel Model Approach

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Abstract： This paper analyzes the short-term effects of temperature and precipitation on pavement skid resistance. Our panel dataset of asphalt pavement sections in Texas covers two years of skid observations and allows us to use various temperature and precipitation measures. A dynamic panel GMM estimation method was applied to analyze the effects of environmental factors while taking the dynamic aspects of the skid resistance deterioration process and unobserved individual section's heterogeneity into considerations. The estimation results provided empirical evidence for the significance of the temperature and precipitation effects.

Key words： pavement performance; seasonal effect; panel data; pavement management；GMM

停车收费政策研究——以中山大学为例

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摘 要： 由于大学校园的公共属性，其停车场的相关使用者可以分为服务对象和非服务对象两大类群体。为了解决收费对象模糊、收费目的不明确的问题，本文运用价格歧视理论，通过参考国外成功的收费政策，提出一种以人群、时间为主要划分因素的新的差异化收费模式。并以双方共赢为基础提出了新方案。以中山大学南校区的收费政策进行案例分析，调查表明一刀切的收费模式不适用于校园停车；同时临时停车三小时封顶制度也与校园停车收费目的不符。再讨论其高收费的可行性、原因以及对实际情况的影响。表明新的差异化收费模式能够满足校园收费政策的要求。

关键词： 交通政策；校园停车；差异化收费；双方共赢

Research on University Parking Charge Policy-Taking Sun Yat-Sen University as an Example

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Abstract：

Due to the public property of the university campus, the users of the parking lot can be divided into two major groups: service objects and non-service objects. In order to solve the problem that the object of charging is ambiguous and the purpose of charging is not clear, this paper uses the theory of price discrimination to propose a new differentiated charging mode with population and time as the main factors, with reference to the successful foreign charging policy. And propose a new plan that is based on mutual benefit. Case study was conducted with the charging policy of Sun Yat-sen University South Campus. The survey showed that the one-size-fits-all charging model is not suitable for campus parking. At the same time, the temporary parking three-hour capping system is also inconsistent with the purpose of campus parking charges. Discuss the feasibility, reasons and impact on the actual situation. It shows that the new differentiated charging model can meet the requirements of the campus charging policy.

keywords: transportation policy; campus parking; price discrimination; win-win situation

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乡村振兴背景下农村交通运输基础设施及物流、空间溢出效应与农产品供给

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摘 要： 主要探讨农村交通运输基础设施及物流促进农业经济增长的背后机制。选取农产品供应量为角度展开分析，提出农村交通运输基础设施及物流通过农产品的扩张效应、城乡农产品的竞争效应以及对于降低农产品运输成本效益的三条路径假设，进而通过中介效应模型验证以上三条路径假说。研究结果显示：农产品市场的扩张路径的显著性最强，农村交通运输基础设施及物流分别达到 0.83%和 1.02%；在农产品的交通运输成本路径层面，城乡交通运输基础设施的经济显著性分别达到 0.046%和 0.032%；在城乡农产品市场竞争效应层面，则显著性为 0.053%和 0.034%。同时，三条路径都存在着显著的城乡空间溢出效应，并测度了各个层面的空间溢出效应。

关键词： 交通运输基础设施

Rural Transportation Infrastructure, Logistics, Spatial Spillover Effect and Agricultural Product Supply Under the Background of Rural Revitalization

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Abstract：

This paper mainly discusses the underlying mechanism of rural transportation infrastructure and logistics promoting agricultural economic growth. Selecting the supply of agricultural products as the angle of analysis, the paper puts forward three path hypothesis of rural transport infrastructure and logistics through the expansion effect of agricultural products, the competitive effect of urban and rural agricultural products and the reduction of the cost-benefit of agricultural transport, and then verifies the above three path hypothesis through the intermediary effect model. The results show that: the most significant expansion path of agricultural products market is rural transport infrastructure and logistics, which reach 0.83% and 1.02% respectively; the economic significance of urban and rural transport infrastructure is 0.046% and 0.032% respectively at the level of transport cost path of agricultural products; and in the level of market competition effect of urban and rural agricultural products, the significance is 0.053% and 0.034%. At the same time, there are significant spatial spillover effects between urban and rural areas in the three paths, and the spatial spillover effects at all levels are measured.

keywords: transportation infrastructure

基于 Kalman 算法的 ZPW-2000 轨道电路调谐区滤波研究

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摘 要: 针对现有调谐区设备故障诊断技术中由于噪声及谐波导致的诊断正确率降低的问题，本文建立 ZPW-2000A 型无绝缘轨道电路室外调谐区设备的 Kalman 滤波模型，以发送端远端钢轨引接线电流为研究对象，实现测量信号中过程激励噪声及观测噪声的滤除，并对牵引电流中通带内奇次谐波具有良好的抑制作用，即上述滤波模型提高了调谐区设备故障诊断的正确率，减小了现场维护人员的工作强度。除此之外，该模型能实现调谐区的故障诊断，当设备发生故障时，实际测量值与模型输出值间产生偏差，根据不同偏差值实现调谐区设备的故障诊断。仿真实验中采用的信噪比为 33.7dB，运行结果表明该滤波方式具有良好的滤波效果。

关键词: 轨道电路；调谐区；Kalman 算法；数据滤波

Research on Tuning Zone Filtering of ZPW-2000 Track Circuit Based on Kalman Algorithms

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Abstract:

Aiming at the problem that the diagnostic accuracy of existing fault diagnosis technology for tuning zone equipment is reduced due to noise and harmonics, this paper establishes a Kalman filter model for ZPW-2000A type of outdoor tuning zone equipment of non-insulated track circuit. Taking the current of rail lead at the far end of the transmitter as the research object, the process excitation noise and observation noise in the measurement signal are filtered out, and the odd harmonics in the passband of the traction current are suppressed well. That is to say, the above filtering model improves the correct rate of equipment fault diagnosis in tuning zone and reduces the work intensity of field maintenance personnel. In addition, the model can realize fault diagnosis in the tuning zone. When the equipment fails, there is a deviation between the actual measured value and the output value of the model. According to different deviation values, the fault diagnosis of the equipment in the tuning zone can be realized. The signal-to-noise ratio (SNR) is 33.7dB in the simulation experiment, the operation results show that the filtering method has good filtering effect.

keywords: track circuit; tuning area; kalman algorithm; data filtering

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浅析构建四川智慧高速的数据引擎

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摘 要：针对四川智慧高速建设的现状，本文以"大数据+"的各类新技术为手段，对道路养护、收费稽查、公众服务和交通畅行等方面进行重点研究，以构建业务数据引擎为核心，探讨推动四川高速智慧管理和服务的新思路和方法，让数据资源变为真正有价值的"数据资产"，为四川省高速路网管理和运营提供数据支撑和决策服务。

关键词：四川高速；大数据+；道路养护；收费稽查；公众服务；交通畅行

The Analysis on the Development of Data Engine in Sichuan Intelligent Expressway

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Abstract：

 according to the status of construction of Sichuan intelligent expressway, this paper mainly studies the road maintenance, toll auditing, public service and comfortable trip with various new technologies of "Big Data+". With the development of data engine as the core, some new methods are discussed to promote the management and service of Sichuan's expressway, and make original data resources become valuable "data assets", and provide data supporting and decision-making services for the management and operation of Sichuan expressway.

keywords: Sichuan expressway; big data+; road maintenance; toll auditing; public service; comfortable trip

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基于近场通讯（NFC）和可视化二维码技术搭建全寿命周期工程质量信息化追溯系统研究

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摘 要：本文主要从工程质量管理角度，阐述了质量追溯的概念、原理以及发展历程。结合当前工程信息化管理技术，将近场通讯（NFC）和可视化二维码技术引入到工程质量追溯管理中，提出了基于上述技术的工程信息化质量追溯系统架构设计和流程设计方法，并对未来发展方向进行了展望。

关键词：近场通讯；RFID；二维码；质量追溯；工程信息化系统

Research on Construction of Life-Cycle Engineering Quality Information Tracing System Based on Near Field Communication (NFC) and Visualized QR Code Technology

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Abstract：

From the angle of project quality management, this paper expounds the concept, principle and development course of quality tracing. Combined with the current project information management technology, the near field communication (NFC) and the visual two-dimensional code technology are introduced into the project quality tracing management, and the architecture design and process design method of the engineering information quality tracing system based on the above technology are put forward, and the future development direction is looked forward.

keywords: near field communication; RFID; two-dimension code; key words: quality tracing; engineering information system

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基于数据压缩的路网交通流短时预测

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摘 要：针对路网交通流数据的特征，提出了一种基于数据压缩的路网交通流预测方法。利用路网交通流数据的空间相关性对数据进行压缩，建立了路网数据与压缩数据的映射关系；对压缩数据通过支持向量回归模型进行预测，利用选择的道路和整个路网之间的映射关系推算出整个路网的交通流预测结果。美国 Pe MS 数据的测试结果表明：本文的算法能在保证预测精度的前提下，有效减少运算量，是一种有效的大规模路网交通流预测方法。

关键词：交通信息工程；交通流预测；数据压缩；相关分析

Short Term Flow Prediction for Traffic Network Based on Data Compression

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Abstract：

According to the characteristics of traffic network flow data, this paper proposed a prediction method of traffic network based on data compression. The traffic flow data is compressed based on spatial correlation, mapping relations is established between the road network data and compressed data, and then compressed data is predicted by support vector regression model. The forecasting results of traffic network can be calculated using the mapping relationship between the choose roads and entire roads in traffic network. The test results with PeMS data in the United States show that proposed algorithm can ensure the prediction accuracy, effectively reduce computation cost, and it is a kind of effective traffic flow prediction method for large-scale road network.

keywords: traffic information engineering; traffic flow prediction; data compression; correlation analysis

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A Drunk Driving Detection Model Based on the Deep Learning and Wavelet Analysis

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Abstract：In view of a continuously rising traffic accident rate caused by a drunk driving behaviour in recent years, this paper proposes a radial basis function-extreme learning machine (RBF-ELM) based drunk driving detection model for accurate real-time drunk driving detection. The multi-feature motion information of a vehicle, including the speed, acceleration, steering and lane-based position, collected by a driving simulator is used for model training. Drunk driving is detected based on the driving behavioural cues which correspond to seven typical abnormal driving behaviours: weaving, drifting, swerving, turning with a wide radius, accelerating rapidly, decelerating rapidly, and speeding behaviour. The drunk-driving detection problem is converted to the detection of the seven abnormal driving behaviours, where the probability of drunk driving increases, as the number of observed cues increases. The wavelet transform is used to preprocess the collected data and extract the statistical features of the seven driving behaviours, and the RBF-ELM is used to detect the driving behaviours. Compared with the seven most commonly used detection algorithms: rule-based (RB), logistic regression (LR), k-nearest neighbor (KNN), support vector machine (SVM), transductive support vector machine (TSVM), back propagation (BP), and extreme learning machine (ELM), the proposed method is more accurate and sharp, achieving the detection rate of 93.7%.

Key words：drunk driving detection; abnormal driving behaviour; information fusion; wavelet transform; RBF-ELM; deep learning

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基于驾驶行为数据的道路交通安全评价方法展望

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摘 要： 驾驶行为是驾驶者在交通环境影响下做出的反应，也是道路交通事故产生的直接原因。针对目前道路交通安全评价大多选取车辆状况、道路条件等驾驶行为影响因素作为道路交通安全评价指标，且指标权重值大多通过主观方法确定的局限。结合车联网 OBD 数据包含车辆行为，且数据丰富、精度高等优势，基于系统信息熵理论，提出通过异常驾驶行为表征道路交通运行混乱程度评价道路交通安全状态的思路，并提出评价体系构建流程及有待进一步研究的关键技术。以重庆市学府大道为对象，对比分析异常驾驶行为高发位置与交通事故发生位置。结果表明，该方法具有预先、客观评价道路交通安全状态的可行性。

关键词： 安全评价；OBD 数据；异常驾驶行为；信息熵

Prospect of Road Traffic Safety Evaluation Method Based on Driving Behavior Data

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Abstract：

Driving behavior is the reaction of the driver under the influence of traffic environment, and it is also the direct cause of road traffic accidents.. In view of the current road traffic safety evaluation, most of the driving behavior influencing factors such as vehicle condition and road conditions are selected as road traffic safety evaluation indicators, and the index weight values are mostly determined by subjective methods. Combining the vehicle network OBD data includes vehicle behavior, and the advantages of rich data and high precision, Based on the theory of system information entropy, this paper proposes an idea of characterization of road traffic operation chaos by abnormal driving behavior, and proposes the evaluation system construction process and key technologies to be further studied. Taking the Xuefu Avenue in Chongqing as the object, the comparative analysis of the location of abnormal driving behavior and the location of traffic accidents. The results show that the method has the feasibility of pre- and objective evaluation of road traffic safety status.

keywords: safety Evaluation; OBD data; abnormal driving behavior; information entropy

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ARIMA and SVM Combination Forecast for Holiday Subway Passenger Traffic

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Abstract：To explore the distribution regularity of urban passenger traffic during the holiday, this article selected the National Day holiday passenger flow of the subway station on Lines 3 in Xi'an as the basis for data analysis., and adopted the ARIMA(Autoregressive Integrated Moving Average) model, the SVM(support vector machine) model and the mixed model of the two methods to predict the holiday hourly passenger flow of the subway. The research results show that the relative error between the prediction results of the ARIMA&SVM combined model and the actual results is much smaller. So, the combined model (ARIMA&SVM) has strong practicability and generalization and is suitable for the forecast of subway passenger flow, which can provide a foundation of quantification for reasonably carrying out the station passenger transport organization, management, etc during the holiday.

Key words：urban rail transit; holiday passenger flow; SVM; ARIMA; combined model prediction

基于 SCATS 数据的城市短时交通流组合预测模型

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摘 要： 实时准确的短时交通流量预测是城市交通控制的前提条件。现有研究往往不能充分考虑交通流时间序列间的时空相关性，且提出的单一预测模型通常仅能利用数据中的部分有用信息，导致模型预测精度不高。本文提出了一种基于悉尼协调自适应交通控制系统(SCATS)数据的城市短时交通流组合预测模型。通过对预测断面及其相邻区域内的断面组应用多维标度法，找出与预测断面相关性较高的一些断面，再对由这些断面的不同时滞形成的时空特征进行特征选择，最后确定出最佳输入特征。同时，将卡尔曼滤波模型与支持向量回归机(SVR)模型线性加权得到的组合预测模型能够利用两个模型的各自优势取得更佳的预测效果。实验结果表明：与其他常用模型及其模型的变体相比，本文提出的组合预测模型的预测精度最高。

关键词： 短时交通流预测；组合预测模型；时空特征选择；卡尔曼滤波；支持向量回归机

Urban Short-Term Traffic Flow Combined Forecasting Model Based on SCATS Data

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Abstract：

Real-time and accurate short-term traffic flow forecasting is a prerequisite for urban traffic control. Current studies often fail to fully consider the spatio-temporal correlation between time series of traffic flows. Besides the proposed single prediction model can only use part of the useful information in the data, resulting in low prediction accuracy of the model. An urban short-term traffic flow combined forecasting model based on Sydney Coordinated Adaptive Traffic Control System (SCATS) data is proposed in this study. By applying the multi-dimensional scaling method to the predicted section and its adjacent sections, some sections with higher correlation with the predicted section are found, and then the spatio-temporal features formed by the different time lags of these sections are selected. Finally, the best input features are determined. At the same time, the combined forecasting model obtained by linearly weighting the Kalman filter model and the support vector regression machine (SVR) model can utilize the respective advantages of the two models to achieve better prediction results. The experimental results show that compared with other common models and variants of the model, the combined forecasting model proposed in this paper has the highest prediction accuracy.

keywords: short-term traffic flow forecasting; combined forecasting model; spatio-temporal feature selection; kalman filter; support vector regression machine

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基于 OLS 模型的网约车出行需求影响因素分析

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摘 要：本文采用实证研究的方法，对专车出行需求进行量化分析。研究的目的在于找出对专车出行影响最大的因素，帮助网约车出行平台合理评估城市需求潜力，科学匹配供需两侧，提高运营决策的科学性，降低风险。

关键词：网约车；影响因素

Analysis of Influencing Factors on Demand of Online Car-Hailing Trip Based on OLS Model

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Abstract：

This article uses the empirical research method, carries on the quantitative analysis to the chauffeured car travel demand. The purpose of the study is to find out the factors that have the greatest influence on the chauffeured car travel, to help the online car-hailing platform to reasonably evaluate the urban demand potential, to match the supply and demand scientifically, to improve the scientificity of the operation decision-making and to reduce the risk.

keywords: ride-hailing; influencing factors

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Regional Economic Development and the Efficiency Performance of Expressway Transportation Operation in China

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Abstract：Expressway transportation is a pillar industry of social and economic development. This paper uses the additive DEA to incorporate the super-efficient DEA model to comprehensively evaluate the efficiency performance of expressway operation details and the regional economic development of 31 administrative regions in China. The model fully considers the interactions between the regional economic development, operational benefit and capacity of the expressway. The evaluation result shows that the whole operation efficiency of expressway in China is low and there are great differences among regions. Meanwhile, the economic strength of some areas are not coordinated with the development of expressway operation.

Key words：economy development; expressway operation efficiency; additive DEA; super-efficient DEA

Dynamic Signal Control and Route Choice Equilibrium on Mixed Networks

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Abstract：The dynamic signal control and route choice equilibrium are usually integrated into a noncooperative game between the network authority and the road users. There are mainly two problems in most existing optimization methods. Firstly, the authority is often placed in the upper level in bi-level programming models, such a pure system-optimization-oriented framework may increase the difficulty in obtaining an equilibrium flow distribution. Secondly, the impact of drivers' compliance rate on the control strategy has not been fully investigated，which makes the problem intractable in real time， especially in a connected vehicle (CV) environment. This paper proposes a modified Stackelberg Games Model to change the format of authority-user and user-authority dynamically. The direct communication between authority and users is established, the drivers' compliance rate is applied as the level-change threshold index. Considering the difference between drivers' realized travel time and the predicted travel time on Variable Message Sign (VMS), a logit model is formed to calibrate the compliance rate in every time step. Based on a modified Wavelet Neural Network algorithm, the model predictive control (MPC) fulfills the level-change procedure through the software Matlab 2018b. Six benchmarks are applied in a numerical example. The results show that the proposed model with the centralized framework obtains the minimum total travel cost compared with benchmarks. Combined with the real-time mutual feedback between drivers' response and control strategy, the level-change procedure potentially maintains the compliance rate within a certain level.

Key words：signal control;route choice;stackelberg games;model predictive control; centralized control framework; network modelling and optimization

基于节点转向比例的最优路径选择研究

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摘　要：浮动车的 GPS 数据对于分析出行者的路径选择行为具有重要作用。已有的路径选择模型大多是基于路径属性及各方面因素来构建的，但由于现实因素的复杂性，难以准确衡量。基于浮动车 GPS 数据，本文提出一种基于节点转向概率的最优路径选择方法。该方法根据浮动车的 GPS 数据，寻找历史选择概率最大的路径，并将其作为最优的路径。该方法的思想是不考虑路径的任何属性以及现实因素，而是将历史数据直接作为决策的依据。通过广州市的具体案例验证，发现该模型具有一定的合理性，对于路径选择领域的研究具有补充和完善的意义。

关键词：最优路径选择；转向比例；最大概率路径搜寻法

Research on Optimal Route Choice Based on Node Turning Probability

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Abstract：

GPS data of floating car plays an important role in analyzing the traveler's route choice behavior. Most of the existing route choice models are based on the attributes and various factors of the paths. However, it is difficult to accurately measure the realistic factors due to the complexity of them. Based on the collected GPS data of floating cars, an optimal route choice method based on turning probability of nodes is proposed. The new method is to find the route with the greatest probability according to the GPS data of the floating car, and regard it as the optimal one, which is not to consider any attributes, but to directly use historical data for decision-making. Through the verification from the example of Guangzhou, the model is found to be reasonable, which is of positive significance for the research of route choice.

keywords： optimal route choice; turning probability; algorithms for searching maximum probability path

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An Improved Short-Term Traffic Flow Prediction Model Based on LSTM

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Abstract：With the development of economy, the number of vehicles is increasing gradually and traffic congestion and traffic safety problems are increasingly serious. Intelligent traffic system is one of the effective ways to solve traffic problems. Real-time and efficient short-term traffic flow prediction is the key technology to realize advanced traffic control and guidance in intelligent traffic system. As a powerful method, deep learning can mine the distribution features hidden in the data and combine low-level features to form more abstract high-level representations of attributes or features. In this paper, referring to the operation mode of extracting features of convolution kernel, we proposed a CRNN (Convolution Recurrent Neural Network) module based on Long Short-Term Memory (LSTM) which is a specially designed Recurrent Neural Network (RNN) architecture. The CRNN module is used to extracted spatial and temporal feature of traffic flow data. Then, we establish a multi-branch model based on the CRNN module to predict short-term traffic flow. Four models are chosen for comparison. They are single-layer LSTM model, single-layer Simple Recurrent Network (SRN), three-layer Multilayer Perception (MLP) and Support Vector Regression (SVR). The experiment results show that the proposed prediction model achieves higher accuracy.

Key words：short-term traffic flow prediction; deep learning; RNN; LSTM; multi-branch

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基于网约车数据的定制公交站点选址研究

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摘 要：按照出行高峰期判断、空间异常点筛查、交通出行小区划分、OD 特征鉴定和公交站点选址的流程，基于滴滴公司的网约车数据进行了北京市定制公交选址研究。根据选址结果，对传统定制公交公司采取的问卷调查及网络征集等收集渠道进行了补充，并为开展定制公交路线优化工作提供参考。

关键词：定制公交；站点选址；交通出行小区

Research on the Location Selection of Customized Shuttle Bus Stations Based on the Mass Data of Online Taxi-Hailing Service

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Abstract：

In accordance with the judgement of the peak travel, spatial outlier detection, traffic travel zone division, OD structure identification and station's location selection, the research on the station's location selection of CCBS was completed based on the mass data of Didi's taxi-hailing data. According to the result of the location selection, complementation is proposed for the traditional CCBS company besides questionnaire investigation and online acquisition, meanwhile provides the reference of CCBS's routing optimization..

keywords: customized shuttle bus; location selection; traffic travel zone

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基于智能方法的路面行车特点和路面性能特征的初步研究

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摘　要：目前，路面性能检测实现了自动化、统一化和标准化，但由于智能化信息化程度有待提高，路面性能检测存在覆盖面小、频次少、实时性差等问题。本研究旨在利用智能手机作为手段，研发利用智能手机检测行车过程中振动的 APP，通过振动数据变化规律的分析获得路面性能技术状况。本文研究表明，智能手机 APP 可以比较真实地采集路面行车振动，对行车加减速、不同路面特征具有较好的分辨能力。利用合成加速度指标可以比较好的解决手机放置姿势带来的不确定性问题。本文初步研究表明，尚需开展大量的实验研究才能建立振动加速度与路面性能关系，以满足实用化需要。

关键词：智能方法；振动信号；路面性能；行车特点

Preliminary Study on Road Driving Characteristics and Road Performance Characteristics Based on Intelligent Method

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Abstract：

At present, pavement performance detection has realized the automation, unification and standardization, but due to the lack of intelligent and information method, pavement performance detection meet the problems such as small coverage, less frequency and poor real-time testing. The purpose of this study is develop a smart phones APP that uses smart phones to detect the vibration during driving, and to obtain the technical index of pavement performance through the analysis of the vibration data. The research results of this paper show that the smart phone APP can collect vibration of driving vehicle truly, and has good resolution ability to traffic acceleration and deceleration, and different pavement performance characteristics. Using the synthetic acceleration index can solve the uncertainties caused by the position of the mobile phone. The preliminary study shows that a large number of experimental studies are needed to establish the relationship between vibration acceleration and pavement performance in order to meet the practical needs.

keywords: intelligent method; vibration signal; pavement performance; driving characteristics

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浅谈 BIM 技术在高速公路服务区结构设计中的应用

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摘 要：BIM 技术目前已在各工程领域中得到广泛应用，但 BIM 技术的普及依然需要经验的积累，本文将以服务区房建工程实例为依据，着重介绍 BIM 设计软件 Revit 和结构分析软件 YJK 在服务区房建结构设计中的应用，并借此寻求适用的 BIM 结构设计方式。

关键词：BIM

Dicussion on the Application of BIM Technology in Building Structural Design of Highway Service Area

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Abstract：

BIM technology has been widely used in various engineering fields, but the popularization of BIM technology is still on the basis of the accumulation of experience.Based on an example of service area Building，this paper will focus on introducing the application of BIM design software—Revit，and structural analysis software—YJK in design of service area　building structure, and seek one applicative BIM structural design method.

keywords: BIM

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基于滴滴轨迹数据挖掘的网约车与城市道路交通出行时空分布规律对比分析

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（西南交通大学）

摘 要：本文基于滴滴订单轨迹数据，提出了一种结合 python 与 ArcGIS 提取网约车出行时空分布规律与城市整体道路交通出行时空分布规律的数据挖掘方法，以成都二环内部分区域的滴滴轨迹数据为例进行了实际处理，对所获得的时空分布规律进行分析，阐述了网约车与城市道路交通出行时空分布规律的相关关系。结果显示，在时间分布规律上，网约车与城市道路交通存在较大的差异性；而空间分布规律方面，网约车与城市道路交通的热点区域大致重合。

关键词：智能交通系统；数据挖掘；GPS 轨迹；时空分布规律

Comparative Analysis of Temporal and Spatial Distribution of E-Hailing Vehicles and Urban Roads Traffic Based on DiDi Trajectory Data

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Abstract：

This paper introduces a data mining method combining Python and ArcGIS to extract the temporal and spatial distribution of E-hailing cars and urban road traffic. At the same time, we take the actual trajectory data of DiDi Chuxing in Chengdu Second Ring Rd as an example to analyze the temporal and spatial distribution of e-hailing vehicle and further expound the correlation between DiDi and urban road traffic. The results show that in the time distribution law, there is a big difference between the network car and the urban road traffic. In terms of spatial distribution law, the network car and the urban road traffic hotspot area are roughly coincident.

keywords: Intelligent transportation system; GPS trajectory; data mining; temporal and spatial distribution

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一种基于 MLP 神经网络的新型集料粒径计算方法

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摘 要：在道路施工及养护领域中高效而准确地测量沥青混合料中集料的级配长期以来备受重视，随着数字图像处理技术的发展，基于图像的粗集料颗粒特性研究迅猛发展，但仅基于图像的研究例如等效椭圆、基于二阶矩的方法等都和真实分档存在一些误差，尤其在对9.5mm 以上集料颗粒分档时，准确度无法满足施工要求。因此，本文提出了一种基于 MLP 神经网络的集料颗粒粒径测量方法来完成对集料颗粒粒径的计算，从而实现对集料颗粒的准确分档。首先，采用 LabVIEW 软件的视觉助手对相机采集到的集料颗粒图像做集料特征提取建立样本数据集，之后通过相关性分析，提取出与集料粒径相关性较大特征因子。最后，通过构建 MLP 神经网络模型对数据集进行训练，实现对集料粒径的准确计算。

关键词：集料级配；MLP 神经网络；粒径测量；特征提取；相关性分析

A New Method for Particle Size Calculation Based on MLP Neural Network

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Abstract：

In the field of road construction and maintenance, the efficient and accurate measurement of aggregate gradation in asphalt mixture has long been attached great importance. With the development of digital image processing technology, based on image characteristics of coarse aggregate particle research developed rapidly, but only based on the research of image such as equivalent ellipse, the method based on second order moment and real step there are some errors, especially in the more than 9.5 mm particles aggregate step, the accuracy can meet the construction requirements. Therefore, this paper proposes a method of measuring aggregate particle size based on MLP neural network to complete the calculation of aggregate particle size, so as to achieve accurate grading of aggregate particles. Firstly, the visual assistant of LabVIEW was used to extract the aggregate features of the aggregate particle images collected by the camera to build the sample data set, and then the feature factors with large correlation with the aggregate particle size were extracted through correlation analysis. Finally, the MLP neural network model is constructed to train the data set and realize the accurate calculation of aggregate particle size.

keywords: aggregate grading; correlation analysis; diameter measurement; MLP Neural Network; feature extraction

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Subway Passenger Flow Forecasting Using Deep Long Short-Term Memory Recurrent Networks

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Abstract： Subway passenger flow forecasting is one of the most important research issue in subway system. Based on the multi-source data, this paper utilizes the Deep Long Short-term Memory (DLSTM) Recurrent Networks to forecast inbound and outbound passenger flow of subway stations. Firstly, the input features are selected including Month, Day, Hour, Interval, Holiday, Average temperature, Maximum temperature, Minimum temperature, Rainfall, Atmospheric pressure, Wind Speed, Cloud, and the six-interval passenger flows before the predict passenger flow. Then, different DLSTM architectures are constructed and the hyper-parameters are optimized based on Genetic Algorithm in the training phase. Toward a fair evaluation, the performance of the DLSTM is compared with four other methods (i.e., ARIMA, BPNN, RNN, SVR). Using different measurement criteria, the empirical results demonstrate that with the increasing of the depths, the performance of DLSTM is improved. Moreover, DLSTM outperforms other models in terms of accuracy. The accurate forecasting and performance indicate that DLSTM is eligible to be applied in the subway passenger flow forecasting.

Key words： deep long short-term memory; subway; passenger flow; forecasting

基于灰色关联法的合肥市特色制造业与物流业联动发展评价

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摘 要：当前，合肥正站在"中国制造 2025"试点示范的新起点上，制造业聚集迅速，对物流提出了更高的要求。为探究合肥市物流业与特色制造业联动发展关系，选取合肥市 2008 年至 2017 年 10 年间物流行业和合肥市特色制造行业指标，利用灰色关联模型，计算出合肥市地区特色制造业与物流业间的灰色关联度，得到两业相互影响的主要因素与次要因素，定量地评估合肥市特色制造业与物流业联动发展状况。

关键词：灰色关联法；联动发展分析

Evaluation of Linkage Development of Hefei Characteristic Manufacturing Industry and Logistics Industry Based on Grey Relational Method

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Abstract：

At present, Hefei is standing at the new starting point of the "Made in China 2025" pilot demonstration. The manufacturing industry is gathering rapidly and puts forward higher requirements for logistics. In order to explore the relationship between the logistics industry and the characteristic manufacturing industry in Hefei, we selected the logistics industry and manufacturing industry indicators in Hefei from 2008 to 2017, and used the gray correlation model to calculate the gray correlation degree between the regional manufacturing industry and the logistics industry in Hefei. Finally, the main factors and secondary factors that influence each other, quantitatively evaluate the joint development of Hefei's characteristic manufacturing industry and logistics industry were found.

keywords: grey correlation method; linkage development

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Data Ming for Pavement Performance Monitoring with Missing Data: Imputation and Prediction

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Abstract：Accurate assessment and prediction of the current and future pavement condition is essential to the development of pavement maintenance and rehabilitation (M&R) strategies. In China, from time to time, pavement condition data of a road system was either incorrectly collected or miss recorded. This prevented the use of even the most common methods and models for pavement condition prediction in China. Currently, models for managing missing data of existing pavements are still constrained by the inadequate consideration of characteristics associated with the missing values of road pavements at the network level, for instance, stochastic nature over time, ubiquitous temporal-dependences, and correlations among multiple condition indices. As a result, the obtained estimation values for the missing data are usually biased, and subsequent predictions of pavement condition are not reliable in practice. Therefore, there is an urgent need to develop systematic methodologies to provide simultaneous imputation for multiple missing data of pavement conditions effectively and efficiently. This study will first propose a methodological framework for missing pavement condition data, which consists of a fine set of statistical models, a set of statistics for evaluation and comparison of the models, and data simulation that serves to uncover the underlying performance of the models. Finally, a case study will be employed to demonstrate the application of the proposed methodology. The results of this study recommended cubic spline model for its high accuracy and robustness over the other models. It also showed that proper data imputation for missing data would significantly improve the accuracy of pavement condition prediction, therefore lead to better pavement maintenance and rehabilitation (M&R) planning and scheduling in the management of roadway pavements.

Key words：pavement performance; statistical models, missing data techniques, statistical tests; data simulation

线阵相机拍摄路面图像的灰度校正及应用

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摘 要：路面图像处理的效果通常受到不均匀光照带来的灰度不均匀背景的影响，对于线阵相机，这种不均匀特性仅存在于横向。提出一种针对此不均匀背景问题的方法，分析了线阵相机拍摄路面图像在横向的分布特性，通过对各列分别平均的方法提取路面的精确掩膜，进行掩膜校正和图像拉伸后获得了较理想的效果。与常用的方法相比，本文提出的方法可以消除灰度的突变，并保留图像的细节信息，因此对采用线扫相机的路面病害检测系统具有适用性。将提出方法应用于路面图像处理，并通过卷积神经网络进行多标签分类的裂缝识别，子块识别精度达到 95% 以上，各标签查准率（0.955，0.936，0.926，0.905），查全率为（0.895，0.912，0.934，0.952），F-Macro 为 0.926，F-Micro 为 0.927。

关键词：路面病害检测；线扫相机；图像处理；灰度校正；卷积神经网络

A Grey-Level Correction Approach for Pavement Image Processing Based on Line Scan Camera and Application

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Abstract：

The effect of pavement image processing is influenced by unevenly distributed grey-level background resulting from inhomogeneous illumination. For line scan pictures, this inhomogeneity only exists in transverse direction, and a new method for this problem was proposed in this paper. The method analyzed the distribution of uneven illumination and extracted a precise correction mask by processing every pixel column respectively. After correcting with the mask and stretching, the result exhibited sound processing effect. Compared with the available correction algorithms, the proposed method eliminates the abrupt changes of grey value and retains most of the information after image processing, and is proved to be suitable for pavement distress detection system with line scan camera. The method was applied for dataset of CNN (multi-label), and the trained network recorded accuracy of 95%, precision of (0.955, 0.936, 0.926, 0.905), recalls of (0.895, 0.912, 0.934, 0.952), F-macro of 0.926, F-micro of 0.927.

keywords: pavement distress detection; image processing; grey-level correction; line-scan picture; convolutional neural network

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Route Travel Time Estimation Using Markov Chains

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Abstract：Travel time is a critical measure for road network traffic conditions, and travel time estimation provides available information for travelers and traffic management. Based on Markov Chains, this paper proposes an improved method to estimate route travel time from spatiotemporally correlated link. The model is mainly described in three steps. Firstly, in the light of information collected by fixed loop detectors, Gaussian mixture model (GMM) has been developed to cluster 2-D travel time data from consecutive links, and thus capture the underlying states. Next, a transition probability matrix is proposed to estimate variations of traffic states over time. Then, link travel time distributions conditioned on the traffic conditions of current link can be estimated from historical observations. Consequently, we can estimate route travel time distribution by aggregating weighted link travel time distribution. Estimation of experiments are compared with field-measured travel time. In addition, the results indicate that the model is practicable.

Key words：route travel time estimation

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基于人地多源大数据的城市核心区边界识别

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（高德地图）

摘 要：城市核心区有别于传统国家划分的行政区和规划建成区，它是一座城市政治、经济、文化等公共活动最集中的区域，具有空间动态蔓延的特征，对其实时准确的界定是其他研究的基础。目前，学界对于城市核心区边界的识别尚无统一的认识和标准，研究较多的是利用 OD 调查、手机信令等人流数据分析城市空间布局和联系强度，数据维度和分析方法相对单一，在多源动态数据融合来量化核心区边界的研究上尚处于空白。在此基础上，本研究通过互联网技术利用高德地图驾车导航轨迹数据和开放平台位置大数据相结合，从城市流动的人流和车流两个动态维度结合静态 POI、AOI 数据，利用网格分割法对动态数据做量化处理，并基于网格的点目标空间聚类来反映和勾勒城市空间辐射的核心区和发展边界。通过建立统一的计算标准，对全国 50 个主要城市做核心区测算和横向对比，进而反映不同城市的边界扩张和功能蔓延，为城市发展规划、交通状态评价和综合预测分析奠定量化的数据基础。

关键词：交通大数据；位置大数据；城市核心区；城市边界；空间识别

Urban Core Area Recognition Based on Integration of Multi-Source People-Geography Feature Data

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（高德地图）

Abstract：

Different from traditional administrative division areas and traditional planned built-up areas, the urban core area not only spreads spatially and dynamically, but also it is the most concentrated area with various public activities related to politics, economy, and culture. Therefore, how to accurately identify urban core area boundaries in real-time and accuracy is the foundation to further study other features of the urban core areas. At present, there is no unified understanding and standard for identifying urban core area boundaries. Most researches rely on the use of O-D survey, mobile phone data and other human traffic flow data to analyze urban spatial layout and the linking relationship with other cities. In other words, the data dimension and the analysis method are relatively simple, and there are few studies on using the integrated multi-source dynamic data to quantify the boundaries of core regions. Based on this fact, by combining the dynamic navigational trajectory data reflecting population migration and traffic flow, and the static location data from open platform with POI and AOI information, this paper has adopted the grid-based division method using dynamic trajectory data, and then, quantified the dynamic data with the spatial clustering method to reflect and outline the locations, developments and boundaries of core areas,. By building a unified computing standard, horizontal comparisons can be made for the core areas of 50 major cities in China to reflect the boundary expansion and the functional spread between different cities.

The research results presented in this paper can be referenced as a foundation to make contributions on urban development planning, traffic evaluation and comprehensive forecast analysis.

keywords: traffic big data; location big data; urban core area; urban boundary

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基于高阶多元马尔可夫链和环境影响因子的城市路网交通流预测

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摘 要： 随着经济的快速发展，机动车持有量随之激增，城市有限的道路与数量庞大的车流量之间的矛盾日益增长，交通管理的问题已经成为了社会热点问题。城市路网的交通流预测作为交通管理中的一个重要问题，引起了国内外许多学者的关注。本文利用高阶多元马尔可夫模型对上下游路口的交通流进行分析预测，同时利用 EM 算法寻找出上下游路口交通流量之间的隐藏关系，将这种的隐藏关系定义为城市路网环境影响因子，有效的利用到交通流预测中，使得预测准确率提高了 30%左右。

关键词： 交通流预测；高阶多元马尔可夫链；EM 算法；环境影响因子

Urban Road Network Traffic Flow Prediction Based on High-Order Multi-Variable Markov Chain and Environmental Influential Factor

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Abstract：

   With the rapid development of the economy, the number of motor vehicles is increasing rapidly. The contradiction between the limited roads of the city and the huge number of traffic flows is increasing. The problem of traffic management has become a hot issue in society. As an important issue in traffic management, traffic flow forecasting of urban road network has attracted the attention of many scholars at home and abroad. In this paper, the high-order multivariate Markov model is used to analyze and predict the traffic flow at the upstream and downstream intersections, and the EM algorithm is used to find the hidden relationship between the traffic flow at the upstream and downstream intersections, this hidden relationship is defined as an environmental impact factor of urban road network and is effectively utilized in traffic flow prediction, increased prediction accuracy by about 30%.

keywords: traffic flow prediction; higher order multivariate markov chain; EM algorithm; environmental impact factor

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Study on Transverse Profile Shapes of Rutting on Asphalt Pavement Using LTPP Data

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Abstract： The present study aims to analyze transverse profile shapes (TPSs) of rutting on asphalt pavement and the distribution of rutting indexes based on the long-term pavement performance (LTPP) program online database. The optimization of original detection data was conducted. The TPSs were divide into five typical shapes and an irregular shape in this study to analyze the evolution of various TPSs. Rutting depth (RD), positive area (PA), negative area (NA) and width-height ratio (WHR) were used as indexes to statistically analyze its distribution. Finally, the correlations between them were analyzed. Results show that the proportion decreases with service life for type 1 and 2. For type 3, the proportion increases slowly with service life from 10% to 45% at 14 years, then entering a fluctuation stage. For type 4, the proportion rapidly increases to 56%, and then enters a relative stable stage. The rutting depth for 1.8% TPs is higher than 20mm. When the value of filling area is larger than 28800mm2, pavement distresses should be attracted an attention from road administrations. The values of positive area, negative area and width-height ratio for 97% TPs are less than 20000mm2, 22800mm2 and 305, respectively. TPS of rutting on asphalt pavement should be by the index system, including that RD (or FA or NA), PA, WHR1, WHR2, WHR3, WHR4. It is beneficial for helping the road administrations to objectively conduct maintenance decision-making for asphalt pavement.

Key words： road engineering; asphalt pavement; rutting; transverse profile shape; LTPP

基于舆情数据的大型综合客运枢纽多模式交通系统服务水平

评价体系设计

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摘 要：大型综合客运枢纽是服务航空、铁路出行的主要交通设施，是城市中大规模集散及换乘的交通节点。其城市端多模式交通系统的服务能力直接影响居民出行体验及交通运行效率。然而，已有的多模式交通系统服务评价方法以考虑基础设施配置为核心，针对用户体验的评价方法研究较少，难以指导交通服务改善。本文基于网络爬虫技术，采集了大型综合客运枢纽旅客出行舆情数据，基于自然语言处理、数据关联等技术，构建了面向出行服务的综合客运枢纽多模式交通系统评价体系，利用词频分析、关联关系技术确定了多种场景下评价体系的指标权重。研究成果为综合客运枢纽服务水平评价提供技术支撑，也为综合客运枢纽多模式交通系统服务质量改善提供参考。

关键词：综合客运枢纽；多模式交通；评价体系；舆情数据；自然语言处理

Design of Multi-Modal Transportation System Service Level Evaluation System for Large-Scale Comprehensive Passenger Transportation Hub Based on Public Opinion Data

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Abstract：

The large-scale comprehensive passenger transportation hub is the main transportation facility for air and railway transportation. It is a large-scale distribution and transfer transportation node in the city. The service capability of the urban multi-modal transportation system directly affects the residents' travel experience and traffic operation efficiency. However, the existing multi-modal transportation system service evaluation method takes the infrastructure configuration as the core, and the evaluation method for the user experience is less studied, and it is difficult to guide the improvement of the transportation service. Based on the web crawler technology, this paper extracts the travelers' public opinion data of large-scale comprehensive passenger transportation hubs. Based on natural language processing and data correlation technology, this paper constructs a multi-modal transportation system evaluation system for comprehensive passenger transportation hubs, which is determined by word frequency analysis and correlation technology. The index weights of the evaluation system in various scenarios are caculated too. The research results provide technical

support for the evaluation of service level of comprehensive passenger transportation hubs, and also provide reference for the improvement of service quality of multi-modal transportation system in comprehensive passenger transportation hubs.

keywords: comprehensive passenger transportation hub; multi-modal transportation; evaluation system; open source public opinion data; natural language processing

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基于无人机轨道点云特征信息的建模新技术研究

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摘 要：采用无人机获取的点云数据进行细节化的精细建模需要有针对性的高精度建模技术支持。研究利用超轻型大疆 MAVIC 无人机获取的点云数据实现新的铁路线路轨道建模技术。利用通用软件和 PCL 点云库，进行现阶段点云信息处理方法的优劣分析和对比，提出一种以保留轨道点云在平面模型上的信息特征为基础且能够精简点云数据量的方法，通过设计轨面误差收敛条件，筛选轨道点云重新建立轨道模型。在通用软件中将新的轨道模型与参考轨道模型进行对比分析可知，利用该技术生成的新的轨道模型满足轨面宽度误差要求，满足从海量数据中快速建立精确、平滑的轨道模型技术要求。

关键词：点云特征

Research on New Modeling Technology Based on Feature Information of UAV Orbit Point Cloud

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Abstract：

　　Detailed modeling of UAV Based on point cloud data acquired by UAV requires high precision modeling technology support. A new railway track modeling technology is studied by using point cloud data obtained from ultra light MAVIC. Using general software and PCL point cloud library to analyze and compare the advantages and disadvantages of point cloud information processing methods at present stage, a method based on information characteristics of reserved track point cloud in plane model and a method of simplifying the amount of cloud data are proposed. Comparing the new track model with the reference orbit model in general software, we can see that the new track model generated by this technology meets the orbit accuracy error requirement, and meets the technical requirements of rapidly establishing accurate and smooth track model from mass data. Research on new modeling technology of road point cloud feature information.

keywords: point cloud features

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基于 BP 神经网络和专家系统的无人车故障诊断

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摘 要：为了增强无人车行驶的安全性，有必要使其能够进行故障自诊断，为此提出了一种用于无人车故障诊断的神经网络与专家系统结合在一起的新方法，有效地融合了神经网络和专家系统，使二者优势互补，更好地应用于无人车的故障诊断领域。在 BP 神经网络的基础上融合了无人车故障诊断专家系统，根据无人车各种有可能出现的具体系统故障情况，通过专家提供的无人车故障情况样本规则，对故障诊断的神经网络进行训练，在网络训练完成后，对无人车不同故障的数据作出处理后就可以得到无人车不同故障的具体情况。

关键词：无人车；故障诊断；BP 神经网络；专家系统

Unmanned Vehicle Fault Diagnosis Based on BP Neural Network and Expert System

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(Chang'an University)

Abstract：

In order to enhance the safety of unmanned vehicles, it is necessary to make the fault self diagnosis，a new method combining neural network with expert system for fault diagnosis of unmanned vehicle is proposed, the neural network and expert system are effectively integrated, which makes the two complementary advantages, and is better used in the field of fault diagnosis for unmanned vehicles. On the basis of BP neural network, the fault diagnosis expert system of unmanned vehicle is fused, according to the specific system failures that may occur in unmanned vehicles, the neural network of fault diagnosis is trained by the sample rule of the unmanned vehicle fault condition provided by the experts, after the network training has been completed, the different fault data of the unmanned vehicle can be processed to get the specific situation of the different faults of the unmanned vehicle.

keywords:unmanned vehicle; fault diagnosis; BP neural network; expert system

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A Deep Reinforcement Learning Based Car Following Model for Electric Vehicle

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Abstract：Car following (CF) models are an appealing research area because they fundamentally describe longitudinal interactions of vehicles on the road, and contribute significantly to an understanding of traffic flow. There is an emerging trend to use data-driven method to build CF models. One challenge to the data-driven CF models is their capability to achieve optimal longitudinal driven behavior because a lot of bad driving behaviors will be learnt from human drivers by the supervised learning manner. In this study, by utilizing the deep reinforcement learning (DRL) techniques trust region policy optimization (TRPO), a DRL based CF model for electric vehicle (EV) is built. The proposed CF model can learn optimal driving behavior by itself in simulation. The experiments on following standard driving cycle show that the DRL model outperforms the traditional CF model in terms of electricity consumption.

Key words：autonomous electric vehicle, car following model, deep reinforcement learning, trust region policy optimization

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Research on Early Warning Method of the Collapse of High Slope Based on Deep Neural Network

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Abstract： Taking the high-slope monitoring project of K1393+300—K1393+600 in the ZhouZhi section of national highway G108 as an example, the DNN (Deep Neural Network) early warning model is established. Five factors including the measurement change value, the measurement average value, the maximum temperature, the minimum temperature and the frequency difference of the crack gauge are selected as the input unit of the network. The DNN training is completed by using the collected 422 sets of sample data. The well-trained early warning model successfully predicted a medium-sized collapse and issued an early warning to avoid casualties and minimize the damage caused by the disaster. The early warning method is reasonable and has the value of promotion and application.

Key words： deep neural network; high slope collapse; early warning method; DNN classifier

基于核函数嵌入和注意力机制的细粒度分类

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摘　要：在交通监视任务中，目标识别是常用手段，而现实生活中目标种类具有多样性和相似性，给分类任务带来巨大挑战。对这类目标的分类可以称为细粒度分类，其在视觉上的细微差异通常存在于局部区域，因而细粒度视觉分类是一项具有挑战性的工作。通过高度非线性表达来找出具有区分度的区域仍然是个未解决的问题。在本文中，针对细粒度分类，我们提出了一种基于核函数嵌入和注意力机制的编码网络（AKEN）。具体来说，AKEN 将最后一个卷积层的输出特征图通过纵向和横向的傅立叶嵌入网络，从而实现紧凑并且具有高度描述性的特征表示。此外，我们还集成了一个级联注意模块，以突出区分从属类别的本地区域，使 AKEN 能够提取最具辨别性的特征。结合注意机制，AKEN 结合了非线性特征学习的 convnets 和 kernels 的强度，能够为细粒度图像分类建立识别性和描述性特征表示。三个基准数据集的实验结果表明，所提出的 AKEN 具有很高的竞争力，超过了大多数最先进的方法。

关键词：核函数；注意力机制；卷积神经网络；细粒度分类

Attentional Kernel Encoding Networks for Fine-Grained Visual Categorization

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Abstract： Target recognition is a common method in traffic surveillance tasks. The diversity and similarity of targets in real life make it difficult to classify. The classification of such objects is called fine-grained classification. Fine-grained visual categorization is a challenging task due to subtle visual differences, which usually reside in high localized regions. Identifying discriminative regions while achieving highly non-linear compact representation for FGVC remains unsolved. In this paper, we propose the Attentional Kernel Encoding Network (AKEN) for fine-grained visual categorization. Specifically, the AKEN aggregates feature maps from the last convolutional layer of ConvNets from both longitudinal and transverse directions via Fourier embedding, which achieves compact but highly descriptive feature representations. Moreover, we incorporate a cascaded attention module to highlight local regions that distinguish between subordinate categories, enabling the AKEN to extract the most discriminative features. Working in conjunction with the attention mechanism, the proposed AKEN combines the strength of ConvNets and kernels for non-linear feature learning, which is able to establish discriminative and descriptive feature representations for fine-grained image categorization. Experimental results on three benchmark datasets show that the proposed AKEN delivers highly competitive performance, surpassing most state-of-art methods.

keywords: kernel method; attention; ConvNets; fine-grained

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基于 CNN 与交通监控视频的城市道路拥堵识别方法

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摘 要：为了实现交通图像拥堵状态的自动识别，克服在实际交通环境中，由于天气条件、背景干扰及其他因素对交通拥堵图像的影响，本文提出了一种基于深度卷积神经网络的交通图像拥堵识别方法。该方法采用深层卷积神经网络的有监督学习模型，将采集的视频切割成帧图像经预处理和二值化后作为输入，通过卷积和池化的多层处理，自动学习并提取拥堵图像的特征，最后利用特征提取层的网络实现拥堵图像的分类。实验结果表明，该方法利用卷积神经网络的深度学习能力，卷积神经网络以单个车辆作为单独的检测对象，自动提取图像拥堵的特征，避免了传统的人工特征提取，具有较高的准确率和效率。

关键词：交通拥堵，深度学习，卷积神经网络，透视转换，拥堵分类

Congestion Identification Method Using CNN and Traffic Monitoring Video in Urban Road

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Abstract：

In order to realize automatic identification of congestion state using traffic images, and overcome the influence of weather conditions, background interference and other factors on traffic congestion images in the actual traffic environment, the traffic congestion identification method based on deep convolution neural network is presented. In this paper, the supervised learning model of deep convolution neural network is adopted. Video is cut into frame images, which are preprocessed and binarized as input. The inputs are conducted multi-layer process of convolution and pooling, the characteristics of congestion images are automatically learned and extracted. Finally, the extra feature layers are used to classify congestion images. The experimental results show that the method can extract the features of congestion image using deep learning ability of CNN, the single vehicle as a separate detection object in CNN, the traditional artificial feature extraction is avoided, and that has high accuracy and efficiency.

keywords: traffic congestion，deep learning，congestion identification，convolutional neural network，perspective transform

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人工智能应用场景所涉法律问题浅析

——以香港地铁"10.16"事故为例

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摘 要：人工智能是引领新一轮科技革命和产业变革的战略性技术，在产业和社会生活的结合越来越紧密。本文以 2018 年 10 月 16 日发生的香港铁路大面积瘫痪事故及 2019 年 2 月公布的事故调查为例，在分析了人工智能技术对于不同的应用层级的法律适用相关问题的基础上，主要针对人工智能在赋能应用层面的相关管理和规范问题进行了探讨，并提出了一些建设性意见，希望籍此对目前普遍关注的人工智能在发展过程中的管理、伦理、法律等方面有所促进。

关键词：人工智能

A Preliminary Study on the Legal Issues in the Field of Artificial Intelligence Application

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Abstract：

Artificial intelligence is a strategic technology leading a new round of scientific and technological revolution and industrial change. It is increasingly closely integrated with industry and social life. Taking the Hong Kong Metro Massive Paralysis Accident on Oct.16, 2018 and the accident investigation published in February, 2019 as examples, this paper, based on the analysis of the relevant problems of the application of AI technology to different application levels, mainly discusses the relevant management and norms of AI in the application level of enabling, and puts forward some constructive suggestions, hoping that the application level of AI will be improved. Secondly, it promotes the management, ethics, law and other aspects of AI in the process of development.

keywords: artificial intelligence

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Short-Term Traffic Flow Prediction Considering Spatio-Temporal Correlation: A Hybrid Model Combing Type-2 Fuzzy C-Means and Artificial Neural Network

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Abstract：Traffic flow data is an integral part of ITS. This paper proposes a combined model based on highway detector group traffic data to establish a combination of type-2 FCM clustering method and neural network. First, consider the historical data of other detections around the target detector in terms of model input, making the input structure more stereoscopic. Then the spatio-temporal correlation between the detectors is introduced to simulate the process of the traffic flow being affected by time and space. Finally, by optimizing the spatio-temporal correlation, the improved FCM clustering method with the ability to identify abnormal data is closely combined with the neural network. Comparing the improved model with other models, the following results are obtained: the prediction model will decrease with the increase of the prediction step size; the RMSE shows that the prediction accuracy of the improved model is significantly higher than that of the FCM and NN models; it is more stable than other models in terms of prediction error.

Key words: traffic forecast; spatio-temporal correlation; type-2 fuzzy c-means; combined model

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Distribution of Intersection Approach Spillover with Spatial Consideration

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Abstract：Generally an arterial road consists of one channelized section and upstream section. Channelized section spillover is the phenomena that certain turning direction movement is blocked at upstream, due to the excessive queues in channelized section. Since the arrivals are random in nature, the resulting channelized section spillover (referred to CSS hereafter) is random either. Given the arrival flow, the distribution of CSS, including the probability of the occurrence and the distribution of CSS duration are valuable information for the intersection management and control. Furthermore, the joint distribution of CSS occurrence and duration can be used to investigate the evolution of traffic flow operational states. Given that the research of this topic is lacking, this paper derives the probabilistic distribution of CSS, including the probability of occurrence and the distribution of CSS duration. The model can be applied to a vast scope of scenarios, such as signal optimization, traffic flow operational state prediction and evaluation, delay and travel time analysis etc.

Key words: spillover; signal; joint distribution; traffic flow

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Evaluating Shanghai's Non-Local Vehicle Restriction Policy Using the Empirical Macroscopic Fundamental Diagram

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Abstract：To alleviate traffic congestion in the city center, many cities in China restrict non-local vehicles using expressways or entering the central area during the morning peak and the evening peak, such as Shanghai, Beijing, and Shenzhen. However, no relevant research has been found to empirically evaluate these policies from the perspective of macroscopic traffic performance. In this study, the macroscopic fundamental diagram (MFD) approach is used to evaluate the performances of Shanghai's macroscopic traffic under four different restriction policy stages. The macroscopic effects of the restriction policy on the restricted expressways are compared with the surface roads. The results show that the first adjustment of the restriction policy on April 15, 2015, did not achieve the expected results, the second adjustment of the restriction policy on April 15, 2016, alleviate the traffic congestion in Shanghai central area effectively, from the perspective of macroscopic traffic performance. This study is one of the first empirical findings of the counter-clockwise hysteresis phenomenon. The possible reasons for the phenomenon are the interactions between the extremely unbalanced traffic within the surface network and the moderately unbalanced traffic within the highway network, due to the effect of the restriction policy. The unbalanced traffic within the network decreases the maximum flow significantly, which should be taken seriously in the future policy implementation process.

Key words:non-local plate;vehicle restriction policy; MFD; macroscopic traffic performance; counter-clockwise hysteresis loop

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Determining Acceleration Lane Length on Expressway Weaving Area Using Microscopic Traffic Simulation

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Abstract：As the inter-junction section of main line and ramp, expressway weaving area is one of the major bottlenecks within the urban expressway system. In addition to various behaviors of drivers, the acceleration lane length of expressway weaving area is generally short, which makes it more prone to trig traffic disorder and become a traffic accident blackspot. Increasing the acceleration lane length of expressway weaving area can provide larger buffer space for the merging process of vehicles, however longer length generally means high infrastructure investment. Consequently, reasonable length of acceleration lane is essential for the expressway road infrastructure development. This paper uses the empirical survey data and the microscopic simulation system, Traffic Parallel Simulation System (TPSS), as the simulation platform to build and verify the lane-changing model in expressway weaving area. By means of the developed weaving area simulation model, the impacts of various acceleration lane length on the traffic flow service levels were investigated, so as to obtain the recommended value of acceleration lane length under different levels of service. This further provides the guidelines for traffic management departments to formulate strategies and technical supports to relieve traffic congestions.

Key words:expressway weaving area；acceleration lane length；microscopic traffic simulation；design method

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高铁枢纽建设背景下的中小城市交通设施配置研究

——以建湖县城为例

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摘 要： 高铁枢纽在中小城市的落地，极大提升了城市对外交通能级，在交通系统构建中，应注重城市交通与高铁枢纽区域交通的融合。文章以建湖县城为例，首先分析了高铁枢纽对中小城市枢纽体系的影响，提出通过组合枢纽形式保障高铁枢纽及汽车客运站的客流支撑；其次，考虑到随着区域高铁网络的完善，区域出行总时间缩短，居民出行的时间价值得到提升，高铁枢纽区域需要构建快速联系通道，便捷进出，文章提出通过准快速路、快速公交的形式，打造高铁枢纽区域快捷的集疏运交通系统。

关键词： 高铁枢纽；枢纽重构；集疏运系统

Research on Urban Traffic Facilities Configuration of Small and Medium-Sized Cities Under the Background of High-Speed Railway Hub Construction

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Abstract：

The landing of high-speed rail hub in small and medium-sized cities greatly improves the level of urban external traffic. In the construction of transportation system, we should pay more attention to the integration of urban traffic and regional traffic of high-speed rail hub. Taking Jianhu County as an example, this paper firstly analyses the impact of high-speed rail hub on the hub system of small and medium-sized cities, and puts forward that the passenger flow support of high-speed rail hub and bus passenger station should be guaranteed through the combination of hub forms. Secondly, considering that with the improvement of regional high-speed rail network, the total travel time of the region is shortened, and the time value of residents is enhanced, the high-speed rail hub area needs to build fast connection channel. This paper proposes to build a fast collection and distribution transportation system in the high-speed railway hub area by means of quasi-expressway and rapid bus, it provides reference for similar cities.

keywords: high-speed Railway Hub; hub reconstruction; gathering and dispatching system

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靖江市老城区交通改善思考

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摘 要：随着机动化水平快速发展，中小城市交通拥堵问题也逐渐显现，老城区受制于基础设施限制，往往是交通拥堵"重灾区"。本文以靖江市老城区为例，对其在城市发展过程中出现的交通问题进行分析，研判交通发展阶段，并基于以人为本理念，通过源头治理、基础设施扩容和精细化管理提出老城区交通改善相关措施与建议，以期为国内类似老城区的交通改善提供参考。

关键词：老城区；交通改善；精细化管理

Research on Traffic Improvements of the Old Town of Jingjiang

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Abstract：

With the rapid development of motorization, traffic congestion is also gradually emerging in small or medium-sized cities. The old town is the hardest hit of traffic congestion among the city due to the limitations of infrastructure. This paper takes the old town of Jingjiang city as an example, the traffic problems and periods in the process of urban development are analyzed. Based on the people-oriented ideology, Emission source treatment, infrastructure expansion and delicacy management are proposed to improve city traffic, in order to provide some reference for traffic improvements in the same type of old town.

keywords: the old town; traffic improvement; delicacy management

ITDP-Robot: Design of an Intelligent Transport Dispatch Parking Robot

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Abstract：In this paper, a novel electric autonomous parking robot prototype was proposed, which aims to address the parking hassle caused by the imbalance between the vehicle ownership and the amount of the parking spaces. The mechanical structure was elaborately designed to allow the parking robot to adapt to vehicles with different wheelbases and tracks. The electrical structure was constructed with the aim of X-by-wire and distributed component-based control concept. To be capable of autonomous driving, the parking robot software system based on ROS was designed with the capability of environment perception, self-localization and path planning. Furthermore, a simulation environment based on Gazebo was built in order to simplify the development of the parking robot's autonomous driving algorithms and validate those algorithms' robustness. Though this parking robot is under the prototype stage, the dispatch strategy and the convenience for parking were also considered. Compared with the state-of-art parking robot, this parking robot is not only capable of working indoor parking lots but also the complex outdoor environments.

Key words:parking robot；mechatronic design；autonomous driving； system simulation；application

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基于 TransCAD 的中心城区停车泊位供给研究

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摘 要：城市中心区域停车问题是诸多城市的难题，合理的泊位设置能起到一定的需求调控效果。文章以 TransCAD 平台为基础，对比分析了以传统的交通吸引量进行泊位需求预测和以道路运行进行停车泊位预测的差异，综合得到各交通分区的泊位供给量。之后将规划布置的停车场作为新的交通生成源进行四阶段的需求预测，定量分析停车场设置对于城市道路运行的影响，对于影响较大的停车场，调整其位置。文章最后以丹阳市中心城区为例，对其停车设施规划进行了该方法的应用，期望为城市同类静态交通设施规划提供一定的参考借鉴。

关键词：停车规划；需求预测；容量限制

Study on Parking Facilities' Supply in Core Built Area Based on TransCAD

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Abstract：

　　Parking in the core area of city is a difficult problem, reasonable berth setting can play a certain effect of demand control. Based on the TransCAD platform, the paper analyses the parking demand forecasting methods which based on traffic attraction and road running, then giving the parking facilities' supply for each zone. Treating the planning park as a new source of traffic generated for the four stage of the demand forecast, the influence of city road running is analyzed with the quantitative point of view in this paper, the park which has great impacts will be adjusted. At last, the method has applied in the planning of parking facilities'supply in the center of Danyang, it has provided a basis for static traffic planning in our country.

keywords: parking planning; demand forecast; road running

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Application of Intelligent Transportation Technology Under the Background of Intelligent Transportation Development Strategy

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Abstract：With the advancement of the times, new technologies such as big data, cloud computing, artificial intelligence, and Internet of Things have been rapidly developed and applied, effectively promoting the development of intelligent transportation. The state attaches great importance to the top-level design of intelligent transportation development, vigorously promotes the development strategy of intelligent transportation, and promotes the development of intelligent transportation technology. Based on the background of intelligent transportation development strategy, this paper briefly summarizes the development of intelligent transportation in China and expounds three key technologies of intelligent transportation. Then the paper analyzes the specific application of intelligent transportation technology in public transportation, traffic safety management, parking lot management and logistics management, and forecasts intelligent transportation such as driverless technology, new energy vehicle technology, vehicle road coordination and vehicle networking technology. The development of technology. The development and application of intelligent transportation technology is an important link in the process of social development and economic development. The effective use of intelligent transportation technology will also effectively promote the all-round development of intelligent transportation systems, thus laying a good foundation for the construction and development of smart cities in the future.

Key words：intelligent transportation; transportation technology; driverless; new energy; vehicle networking

智慧公路多源异构数据下公众出行演化模型

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摘 要：为探索智慧公路对公众出行路径选择行为的影响，将网络可靠性和经验学习理论引入出行者的路径选择过程中，提出智慧公路多源异构数据下公众出行演化模型。运用交通流理论对智慧公路采集的多源异构数据进行量纲转化，进一步采用最小方差加权平均方法融合多源数据，智慧公路上的出行者根据融合信息实时决策自己的出行路径；普通公路上的出行者根据前一天路网状况和自己历史出行经验选择出行路径。采用不动点理论证明了模型解的等价性、存在性、唯一性和稳定性条件。通过算例表明道路流量行为系数和感知时间误差的增大均会导致模型进入不稳定状态，风险规避的出行者演化模型稳定区域往往更小。研究对交通均衡理论和经验学习理论在智慧公路中的应用具有重要的促进意义。

关键词：智慧公路；出行演化；数据融合；不确定性；不动点

Public Travel Evolution Model with Multi-Source Heterogeneous Data of Intelligent Highway

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Abstract：

To explore the influence of intelligent highway on path choice behavior, the public travel evolution model with multi-source heterogeneous data of intelligent highway is presented by introducing the network reliability and experiential learning theory into travelers' route choice decision process. The traffic flow theory is used to transform the multi-source heterogeneous data of intelligent highway to a uniform format. Moreover, the method of minimum variance weighted average is proposed to fuse the multi-source data. Based on the fuse information, the travelers on intelligent highway choose their travel paths. While the travelers on the ordinary road make their travel decision through considering the road network conditions on the last day and the historical travel experiences. The fixed point theory is adopted to prove the equivalency, existence, uniqueness, and stability of the solutions of the built model. Numerical examples demonstrate that the increase of road traffic flow behavior coefficient or perception travel time error will make the model reach to the unsteady state; and the built model with risk-averse travelers has smaller region of stability. This research has significant promoting effects on applying the traffic equilibrium theory and experiential learning theory to intelligent highway.

keywords: intelligent highway; travel evolution; data fusion; uncertainty; fixed point

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论中国新型智慧城市的规划发展逻辑

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摘　要：本文首先简要回顾智慧城市的发展历程，接着基于智慧城市的概念与内涵，指出生态宜居、健康安全、创新科技为新型智慧城市的本源特性。然后提出宜在新时代里通过借助国家发展战略、城市规划机制、创新科技企业以及智慧家庭构筑等四大助推力和紧握空间规划的贯通整合、产业发展的科学落位、基础设施的综合管控、公共服务的良正提供的四大核心抓手，来构建共生合作、持续迭代的中国新型智慧城市的规划发展逻辑。最后以深圳最新实践为例，初步探索智慧城市规划与智能交通规划的协同共建之道，希冀能对未来中国城市规划与发展的理论与实践有所助益。

关键词：新型智慧城市；国家发展战略；城市规划；创新企业；发展逻辑

Study on the Planning Development Logic of China's New Intelligent City

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Abstract：

Firstly, this paper is briefly reviewed the development process of smart city (SC), and points out that the original attributes of China's New Intelligent City (NIC) includes health and safety, ecological livability and technological innovation based on the concept and connotation of SC, and then proposes the method of building the logic of planning and development of NIC. The construction of this logical method needs to be realized through taking advantages of the four major thrusts of national development strategy, urban planning mechanism, innovative technology enterprises and smart family establishment and master four core initiatives of integration of space planning, scientific positioning of industrial development, comprehensive control of infrastructure, and good provision of public services.

keywords: new intelligent city;ational development strategy; urban planning; innovative enterprise; development logic

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Bicycle Route Choice Behavior Analysis Considering Both Absolute and Relative Utility Differences

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Abstract：In order to promote the shares of cycling travel and develop a more sustainable transport system, it is essential to better understand cyclists' route choice behavior. The widely used logit-based models in the context of bicycle route choice modeling have the drawback that only considers the absolute utility difference between each pair of alternatives, while the recently developed Weibit model only considers the relative difference. As a methodology contribution, this paper develops several combined models to simultaneously alleviate the drawbacks of Logit and Weibit models following and combining two ways: generalized utility function and latent class model. The current empirical studies on Logit-Weibit combined models are very limited. This paper also contributes to literature by comparing the performances of the proposed models and revealing cyclists' behavior mechanisms on the considerations of two types of utility differences in a real world application. The proposed models are estimated based on the GPS and survey data collected in The Tel Aviv metropolitan area with choice sets explicitly generated on a huge network comprising 127053 links. The results show the significant effects of route length, number of intersections, compositions of routes, and external environments on cyclist' route choice behavior. The Weibit model works better than Logit model, at least in this case. The combined structures can significantly improve model fits. Cyclists' considerations on different types of utility differences are related to their ages, origin-destin.

Key words:bicycle route choice, logit, weibit, combined choice models, absolute utility differences, relative utility differences

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Hybrid Route Choice Models Considering Both Absolute and Relative Utility Differences

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Abstract：In the Weibit based route choice models, the relative differences of observed utilities can be captured, while the Logit based models capture the absolute differences of observed utilities. In this study, to simultaneously considering both the relative and absolute differences of observed utilities, four hybrid model are proposed based on different assumptions on the specifications. To test the performances of proposed models, the proposed models are estimated based on the route choice observations extracted from the GPS data collected by private vehicles in Toyota, Japan. The results show that, the latent class model has the best performance. Based on the signs of estimated parameters, drivers will be more affected by the relative differences of observed utilities in longer distance trips. The PSW model works better than PSL only for trips longer than 3 km.

Key words：choice modeling, weibit model, SUE, random utility

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Travel Demand Spatiotemporal Patterns and Prediction: An Empirical Study of Dynamic Internet Based Ride-Hailing

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Abstract：The rapid growth of internet based ride-hailing brings great changes to residents' travel and traffic, while there are still limited studies examine the travel demand spatiotemporal patterns of such internet based ride-hailing trips by using empirical data. In this paper, we attempt to analyze the spatiotemporal patterns of internet based ride-hailing travel demand distribution from a month traffic order data in Chengdu, Sichuan Province, China, that provided by DiDi company. The statistical characteristics of data, OD spatiotemporal distributions, as well as location based travel distance are analyzed. We further present a deep learning approach for the demand prediction of ride-hailing service. To combine the complex non-linear spatial and temporal relations, a spatiotemporal model is proposed which consists of two views: modeling spatial correlations via Convolutional Neural Network (CNN), and modeling correlations between future demand values with historical time points via Long Short Term Memory networks (LSTM). Results depicted that our approach have effective prediction accuracy over traditional methods.

Key words：ride-hailing, spatiotemporal patterns, travel demand prediction, deep learning

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智能海绵公路

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摘 要： 每逢降雨量较为集中或者强降雨期间，我国许多城市的内涝问题，成为了制约经济社会发展的一个顽疾。对此，在海绵城市建设的基础上，结合人工智能，提出智能海绵公路的技术方案。简单来说，就是在公路两侧修建连接排水管道的地下蓄水池，用以收集雨水。智能控制系统对分布的各类传感器反馈的温度、湿度、污染等数据进行汇总，并接入天气预报数据以及往年天气水文地质数据进行统一分析处理，自动调控蓄水池内的存水量。结合交通监控数据，适时开启、关闭水泵并切换通过管道连接的各类喷头，实现对路口处违章行为的喷雾警示或者预防性喷雾隔离；道路路面的喷洒、清洗以及消解积雪及路面冰冻；对道路区域空间进行降尘（降低 PM2.5）、降汽车尾气污染；保持道路绿化带土壤含水量和增加地下渗水量，促进植物生长并涵养地下水；实现公路应急消防用水等功能，以充分发挥蓄水池的调节作用，提升雨水利用效率，有效解决城市内涝问题。

关键词： 智能；海绵公路

Intelligent Sponge Highway

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Abstract：

Whenever the rainfall is concentrated or heavy, the waterlogging problem in many cities of our country has become a stubborn disease that restricts the economic and social development. Based on the construction of sponge city and artificial intelligence, the technical scheme of intelligent sponge highway is put forward. Simply put, it is to build underground reservoirs connecting drainage pipes on both sides of the highway to collect rainwater. Intelligent control system collects temperature, humidity, pollution and other data fed back by distributed sensors, and integrates weather forecast data and weather hydrogeological data of previous years to conduct unified analysis and processing. It can automatically regulate the water storage in the reservoir, open and close pumps in time, and switch all kinds of sprinklers connected by pipelines, so as to realize spraying, cleaning and road surface. Dispel snow and road frost; carry out dustfall (PM2.5 reduction) and vehicle exhaust pollution in Road area space; maintain soil moisture content in road greenbelt and increase underground seepage, promote plant growth and conserve underground water; realize the functions of highway emergency fire fighting water, so as to give full play to the regulating role of water storage pool, improve rainwater utilization efficiency and effectively solve urban waterlogging problems.

keywords: intelligence; sponge Highway

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Vehicle Identification Technology Based on YOLO Model

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Abstract： Aiming at the problems that the vehicle recognition accuracy and the real-time characteristic are poor on account of complex vehicle background, large size difference and serious occlusion， a vehicle identification method based on YOLO model is proposed. The original model is optimized with the YOLOv3 model to overcome the limitations of the YOLO model. In this study, the YOLO model is used to quickly detect multiple moving vehicles, and the identification neural network is established for data analysis. Then, the intercepted image features are extracted layer by layer and fused with gradient histogram (HOG). At the same time, norm normalization method is adopted to improve the robustness of light change and weaken the influence of shadow details. Finally, the trained YOLOv3 network model is used for recognition and comparison. The experimental results show that using the residual network structure for reference, YOLOv3 forms a deeper network layer, improves the accuracy of target vehicle location identification, and reduces the false alarm rate in the identification process.

Key words： vehicle identification

重庆市共享汽车发展对策分析

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摘　要：汽车共享起源于上世纪中期的欧洲，在经历了各种尝试后，随着智能终端、移动通讯、电子支付等技术的发展，其服务得到了提升，在欧洲、北美和亚洲全面开始发展。在中国，2013 年提出分时租赁的概念，在电动汽车国际示范区的推动下，开展了新能源汽车分时租赁的服务，并迅速在全国推广开来。目前在重庆运营的共享汽车有 6 个平台，运营情况不佳，停车位、充电桩等公共资源短缺，成为制约行业快速发展的瓶颈。通过分析重庆目前运营的共享汽车存在的问题，展望共享汽车发展前景，提出在政策、规划、城市管理等各方面的对策，为共享汽车的发展提供更好的环境。

关键词：重庆；共享汽车；分析

Analysis on The Development of Shared Automobile in Chongqing

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Abstract：

Automobile sharing originated in Europe in the middle of last century. After various attempts, with the development of technology such as intelligent terminal, mobile communication, electronic payment and so on, its service has been promoted, and has been fully developed in Europe, North America and Asia. In China, the concept of timesharing was put forward in 2013. Under the impetus of the international demonstration area of electric vehicles, the new time sharing service of new energy vehicles has been launched and has been widely promoted across the country. At present, there are 6 platforms for sharing vehicles in Chongqing, which are running poorly, and the shortage of public resources such as parking lots and charging piles has become a bottleneck restricting the rapid development of the industry. By analyzing the existing problems of Chongqing's current shared cars, and looking forward to the prospects of shared cars, we put forward countermeasures in policy, planning and urban management, so as to provide better environment for the development of shared cars.

keywords: Chongqing； shared vehicles； analysis

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G524 常熟段智慧公路建设及关键技术应用研究

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摘 要：本文以国家、部、省的智慧公路建设要求为指导，重点介绍 G524 常熟段智慧公路科技示范工程项目，包括研究意义及主要研究内容，构建了智慧公路总体架构，形成以"全面感知"为核心，以"管理决策"为关键，以"综合服务"为龙头的业务体系，打造"安全、效率、服务、绿色"的智慧公路，为全国智慧公路建设提供新标杆，为智慧公路建设推广提供经验。

关键词：智慧公路；建管养服；示范工程

Study of G524 Changshu Smart Highway Development and Key Technology Application

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（Jsti）

Abstract：

Under the guide of development requirements of smart highway from national, ministerial and province departments, this paper focuses on the purpose, significance and the research contents of G524 Changshu Intelligent Highway Technology Demonstration Project. This paper describes the main framework of intelligent highway, and supposes to build a safe, efficient, people first and environmental-friendly smart highway which can detect all data in need, generate integrated decision making strategies and provide humanizing services. In addition, the experience in this paper can be an advanced benchmark for the development of smart highway, promoting the concept the smart highway.

keywords: smart highway; infrastructure management; construction-management-maintenance-service

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智慧公路框架设计及其系统研究

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摘　要： 本文基于智慧城市、智能汽车飞速发展的背景下提出了一种系统的智慧公路建设方案，明确了智慧公路的设计原则、逻辑结构以及功能特点。结合先进的物联网、大数据、云计算等信息化技术、地理信息系统以及建筑信息模型等三维可视化平台以及光伏发电的能源系统，将智慧公路分为五个子系统进行研究，构建出来的人、车、路、物、环境等信息要素相互映射、适时交互、高效协同，从而全面实现公路的健康、和谐、可持续发展，为今后的智慧公路研究工作提供参考。

关键词： 智慧公路；信息化；养护管理；光伏发电

Frame Designs and System Researches of Smart Highway

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Abstract：

Based on the rapid development of smart city and intelligent vehicle, this paper proposes a systematic construction scheme of smart highway and the design principle, logical structure and functional characteristics of smart highway are defined. Combined with advanced information technology (Internet of Things, Big data, Cloud computing, etc), three-dimensional visualization platform such as Geographic Information System (GIS) and Building Information Modeling (BIM) and the energy system of photovoltaic power generation, the smart highway is divided into five subsystems for research which are used to construct the information elements of individuals, vehicle, highway, materials, environment that are mapping, communicating and cooperating to each other. This research is conducted to comprehensively realize the healthy, harmonious and sustainable development of highways, which provides the reference of the future research for smart highway.

keywords: smart highway; informatization; maintenance and management; photovoltaic power generation

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基于交通出行的电动汽车充电需求识别与充电设施布局方法研究

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摘　要：电动汽车是全面贯彻新能源汽车发展战略部署重要载体，然而充电设施的滞后建设制约其发展。本文对不同类型电动汽车的充电特征进行调研分析，发现公共充电需求是最不易确定的。通过构建经典的交通出行"四阶段法"与电动汽车停车充电需求的关系，并通过出租车的出行数据与用地匹配性分析，结合交通便利性分析和安全条件筛选，实现学科融合，通过交通出行分析方法和数据得到未来年充电需求分布和用地供给适宜性评价，以进一步指导充电设施的规划布局。

关键词：电动汽车；交通出行；充电

The Charging Demand Identification of Electric Vehicles and Research on the Layout Methods of Charging Facilities Based on Transportation Theory

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Abstract：

　　Electric vehicle is an important carrier to fully implement the development strategy of new energy vehicles. But the construction delay of charging facilities limits electric vehicles' development. By investigating and analyzing the charging characteristics of different kinds of electric vehicles, we found the public charging demand is the most difficult to identify. This article established the relation between classical transportation four-stage method and the parking and charging demand for electric vehicles. Using taxis' travel data we do a matching analysis between taxis' travel paths and land usage, combined with traffic convenience analysis and safety condition screening, can realize subject merger. With transportation analyze methods and data we can get future charging demand distribution and land supply adaptation evaluation, which can further guide the planning layout of charging facilities.

keywords: electric vehicles; transportation theory; charging

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共享物流设施使用意愿研究：基于绿色价值调节作用

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摘 要：以共享智能快递柜为研究对象，探讨智能快递柜感知因素、绿色价值和顾客使用意愿之间的关系，通过文献梳理，将智能快递柜感知因素划分为功能价值、情感价值、价格感知、服务质量感知四个方面，并构造了结构方程模型。实证研究发现功能价值、情感价值和价格感知对顾客使用意愿有直接正向影响。此外，绿色价值会调节功能价值和价格感知对顾客使用意愿的影响。

关键词：绿色价值；共享经济；顾客感知；使用意愿

Research on the Willingness to Use Shared Logistics Facilities Under the Background of Sharing Economy: Based on the Model of Moderating Effects

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（上海大学）

Abstract：

The relationships between smart express cabinet perceived factors, green value and behavioral intentions were revealed. Through literature review, the perceived factors for smart express cabinets were measured using functional value, emotional value, price perceived value and service quality perceived value. A structural equation model (SEM) was then developed to describe those correlations and effects. The results show that functional value, emotional value and price perceived value have direct positive impacts on behavioral intentions. In addition, green value adjusts the relationship between functional value, price perceived value and behavioral intentions.

keywords: green value; sharing economy; customer perception;behavioral intentions

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基于系统动力学的路内停车动态收费机制研究

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摘 要： 随着经济的发展，交通问题尤其是停车供需矛盾日益凸显。路边停车场是城市停车设施的重要组成部分，同时也是停车问题比较多的地方，特别是一线城市中心区。现有的路边停车收费政策在解决停车难、停车分布不均匀的问题时效果甚微，制定新的停车收费机制迫在眉睫。本文总结国内外的成功经验，基于系统动力学原理，提出浮动价格停车收费对策。在国外已有的浮动价格理论体系下利用 Vensim PLE 软件建立 SD 模型，通过模拟不同的价格体制下停车场运行状况，探求最优的价格设置，以此提高停车周转率，缓解停车分布不均匀的问题，使真正有停车需要的车主有位可停。

关键词： 路边停车；系统动力学；浮动价格

Research on Dynamic Parking Charge for On-Street Parking Based on System Dynamics

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Abstract：

With the development of economy, traffic problems, especially the contradiction between supply and demand of parking, have become increasingly prominent. On-street parking lot is an important part of urban parking facilities with lots of parking problems, especially in the first-tier city center. The existing on-street parking fee policy has little effect in solving the problems of parking difficulty and uneven distribution of parking. It is urgent to develop a new parking fee mechanism. This paper summarizes the successful experience at home and abroad, based on the theory of system dynamics, puts forward the dynamic parking fee countermeasures suitable for the current situation of our country. Based on the existing floating price theory system, using Vensim PLE software established a SD model. By simulating the parking operation under different price systems, the optimal price settings are explored, so as to improve the parking turnover rate, alleviate the uneven distribution of parking, and make the drivers who really need parking have parking space available.

keywords: On-street parking; system dynamics; floating price

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A Smart Routing Algorithm for Emergency Evacuees

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摘 要：以往研究证明，在高人口密度的建筑环境中，对所有逃生人员分配距离最短路径会导致拥堵，进而造成不必要的伤亡。针对这种情况，本文提出一种基于认知分组网络的智能灾难导航系统。该系统基于随机神经网络(Random Neural Network)进行路由优化，能根据人员自身身体状况和外部周围环境分配合适的疏散路径(距离最短路径，时间最短路径，最安全路径等)。本系统通过多路径路由算法，能根据逃生人员年龄等信息估算移动速度，对火灾的耐受程度，从而提供不同的逃生路径。该系统硬件由温度传感器，指挥节点和疏散人员携带的智能手机组成。温度传感器用于感知周围环境温度等危险信息。指挥节点实时发送智能数据包(Smart Packets)来寻找路径。当逃生人员临近一个指挥节点时，指挥节点会将当前最优路径通过智能手机发送给逃生人员，从而发挥路径导航作用。算法层面上，系统采用随机神经网络作为快速优化算法，通过仿生学原理，模拟大脑神经元工作方式，极大的减小了运算量，提高了寻路效率。

关键词：emergency navigation; cognitive packet Network; disaster management; smart routing

A Smart Routing Algorithm for Emergency Evacuees

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（Beijing University of Technology）

Abstract：

Providing optimal and safe routes to evacuees in emergency situations requires fast and adaptive algorithms. The common approaches are often too slow to converge, too complex, or only focus on one aspect of the problem, e.g. finding the shortest path. This paper presents an adaptation of the Cognitive Packet Network (CPN) concept to emergency evacuation problems. Using Neural Networks, CPN is able to rapidly explore a network and allocate overhead in proportion to the perceived likelihood of finding an optimal path there. CPN is also flexible, as it can operate with any user-defined cost function, such as congestion, path length, safety, or even compound metrics. We compare CPN with optimal algorithms such as Dijkstra's Shortest Path using a discrete-event emergency evacuation simulator. Our experiments show that CPN reaches the performance of optimal path-finding algorithms. The resulting side-effect of such smart or optimal algorithms is in the greater congestion that is encountered along the safer paths; therefore, we indicate how the quality of service objective used by CPN can also be used to avoid congestion for further improvements in evacuee exit times.

keywords: emergency navigation; cognitive packet network; disaster management; smart routing

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基于视频大数据的智能交通分析平台在车路协同产业中的应用

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摘　要：车路协同是建立在以人、车、路互联的交通系统之上，车联网从仅支持车载信息服务的传统车联网向车联一切（V2X）的新一代车联网发展，然而在这个过程中并不是所有车辆都具备高精度定位、低延迟通信和自动驾驶功能，此外单个车辆所能探测和分析到的数据在空间范围上是有限且存在盲区的。本文创新性地提出了以人工智能技术为支撑、以交通监控视频大数据为突破口的智能交通解决方案，其能够及时有效地识别交通事件、获取监控点以及监控点之间的车流状态量化数据，能够有效弥补上述车路协同发展过程中存在的问题，为车路协同平台的多元数据融合，综合分析决策机制提供更多保障。该系统相继在全国多个省市得到了部署，在一定程度上提升了交管部门在工作效率、改善了交通状况，但也存在诸如深度学习泛化性不够、过度依赖大量训练样本等问题。

关键词：车路协同；智能交通；车联网；V2X；视频大数据；人工智能

Application of Intelligent Transportation Analysis Platform Based on Video Big Data in Vehicle-Road Cooperative Industry

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Abstract：

　　Vehicle-infrastructure coordination is based on the transportation system with people, vehicles and roads interconnected. Vehicle-road network is developing from the traditional vehicle network which only supports vehicle information service to the new generation of vehicle network which supports vehicle-connected everything (V2X). However, in this process, not all vehicles have the functions of high precision positioning, low delay communication and automatic driving. In addition, a single vehicle can detect and analyze it. The data are limited in spatial range and have blind areas. This paper innovatively proposes an intelligent transportation solution based on artificial intelligence technology and big data of traffic surveillance video. It can identify traffic incidents timely and effectively, acquire quantitative data of traffic flow status between surveillance points and surveillance points, effectively remedy the problems in the process of vehicle-road cooperative development, and provide multi-data for vehicle-road cooperative platform. Fusion, comprehensive analysis and decision-making mechanism provide more protection. The system has been deployed in many provinces and municipalities throughout the country. To a certain extent, it improves the work efficiency of traffic management departments and improves the traffic situation. However, there are still some problems, such as insufficient generalization of in-depth learning, over-reliance on a large number of training samples, and so on.

keywords: vehicle- infrastructure collaboration; intelligent transportation; vehicle networking;

V2X; video big data; artificial intelligence

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集成巡检制度的公路桥梁养护管理系统的设计与开发

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摘 要：在对国内外桥梁管理系统进行调研分析的基础上，设计了公路桥梁养护管理系统的数据库和功能模块，并将巡检制度引入公路桥梁养护管理系统中，研发了集成巡检制度的公路桥梁养护管理系统和巡检终端，为规范开展公路桥梁养护管理工作提供参考。

关键词：桥梁工程；养护管理；巡检制度；巡检终端

Design and Development of Highway Bridge Maintenance Management System Integrated with Inspection Regulation

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Abstract：

In this paper, the trend of development of Bridge Management System in China and abroad are investigated. The database and the system functions of highway bridge maintenance management system are designed and the Inspection regulation is introduced to the system. Highway Bridge Maintenance Management System integrated with Inspection Regulation and the inspection terminal are developed, which provides the reference of highway bridge Maintenance management normatively.

keywords: bridge engineering;maintenance management; inspection terminal;inspection regulation

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智能铺面体系架构研究

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摘　要：对智能铺面体系架构进行诠释与定义，明确其构成的基本要素为物理架构、逻辑架构与服务架构。基于智能铺面内涵与特征，借鉴智慧交通系统架构方法，从三个层面对支撑铺面智能化的技术体系进行架构设计。其中，物理架构是代表铺面信息立体感知网络实体的点式结构；逻辑架构是代表各功能系统组织模式和信息流向的线性结构；服务架构是代表用户服务需求的面域结构。成果对指导智能铺面技术的研究与应用具有参考意义。

关键词：智能铺面；物理架构；逻辑架构；服务架构

Research on the Framework of Smart Pavement

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Abstract：

The framework of smart pavement is interpreted and proposed in this paper. The definition of the framework for smart pavement is given based on the basic elements of physical framework, logical framework and service framework. On the basis of the definition and function characteristics of smart pavement, drawing on the intelligent transportation system framework design method, the framework of technology supporting smart pavement is classified into three typical aspects. Among them, the physical framework is the point structure representing the entity of stereoscopic monitoring network. The logical framework is the linear structure standing for organization patterns and information flow of each function. The service framework is a faceted structure that represents service requirements of users. The framework can be used as the guide for smart pavement research and application.

keywords: smart pavement; physical framework; logical framework; service framework

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Commercial Vehicle Dynamic Third Party Safety Supervision of Based on GPS / Beidou Technologies

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Abstract：Based on GPS/Beidou technologies, dynamic safety supervision of commercial operating vehicles has played an important role in transportation industry safety. From the serious traffic accidents occurred in recent years, the major reasons were the improper safety supervision of vehicles. The traditional dynamic safety supervision mode and applications are insufficient. To make up for the lack of traditional dynamic supervision and realize the traceability and visualization of the supervision process, it is necessary to innovate the road transportation safety monitoring, with new management concepts and technologies. Based on the practical understanding of the traditional monitoring status of the industry, this paper proposes the third-party safety supervision of commercial vehicles. We successfully incorporate the application of third parties in other fields world widely and combine it with the development of vehicle dynamic monitoring technology. Through the innovative application of empirical applications in certain areas, the government bureau, enterprises, and monitoring operators all recognized the new model. The overall safety level indicators and accident data before and after the application are compared and analyzed. The results indicate that the new model has largely improved the safety level of transportation within the region. At the same time, it has broadened the scale of supervision, practically reducing the corporate costs and operating investment. The new model greatly improves the dynamic security monitoring effect, which satisfies all parties'　demands without increasing the input. At present, this model has been promoted and applied in Xinjiang Uygur Autonomous Region, which was proved to have important social and economic significance for modern transportation industries.

Key words: third party；safety supervision；dynamic；GPS / Beidou；transportation safety

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Exploring Spatio-Temporal Patterns of Motor Vehicle Collisions with Semantic Transformation

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Abstract: Motor vehicle collision events are often recorded in the form of text documents owing to the various case-by-case basis of traffic incidents. This paper introduces Latent Dirichlet Allocation (LDA), a text mining technique, as an effective means to explore implicit spatio-temporal patterns on traffic crash documents. External semantic descriptions (e.g., land use) should be attached to raw GPS coordinates of collision events. The K-means clustering algorithm is firstly applied to determine land use characteristics of collision points by grouping surrounding Points of Interests (POIs). Then, each collision incident record is transformed into a formalized label consisting of land use and time stamps, thus allowing the analysis of massive traffic collision data as document corpora. Finally, LDA model is conducted to generate latent topics on those meaningful documents. Such topics are referred as collision patterns with the specific probability value, which can quantitatively reflect patterns of collision more than just the spatial clustering of road networks. The approach is verified using motor vehicle collision data in Manhattan County of New York City. The results indicate that collision events have obvious temporal and spatial characteristics associated with land use. For example, collisions are prone to appear in transportation-oriented areas on weekdays other than weekends. The identification of spatial-temporal patterns on motor vehicle collisions would give insights into underlying traffic behaviors and urban phenomena for intelligent policy-making and resource allocation.

Key words: motor vehicle collision; points of Interests (POIs); text mining; latent dirichlet allocation (LDA)

基于深度学习的路网运行状态评价方法

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摘 要： 随着汽车保有量的增加，交通需求也迅速扩张，不仅给道路交通系统带来了巨大的压力，也造成了一系列拥堵问题和安全问题。因此，能够实时地对路网运行状态进行准确的评价与预测显得尤为重要。基于深度学习理论，提出了路网运行状态评价模型，包括基于 FCM 算法的路网运行状态划分模型、基于 LSTM 算法的路网运行状态预测模型和基于 K-Means 算法的路网运行状态判别模型。以河北省交调系统中分方向、分车道及分车型的且时间间隔为 5 分钟的流量、车速数据为基础，选取 12 个连续式观测站 2016 年 9 月 4 日到 9 月 12 日的数据进行实验，共 31104 个数据进行实例分析。结果表明，本文提出的模型对路网运行状态的评价起到了很好的效果，与实际数据的评价结果是一致的。

关键词： 路网运行状态；深度学习；FCM；LSTM；K-Means

Method of Road Network Operation Status Based on Deep Learning

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Abstract：

    With the increasing in the number of car parc, the demand for transportation has also expanded rapidly, which not only brought great pressure to the road traffic system, but also caused a series of congestion problems and safety issues. Therefore, it is particularly important to be able to evaluate and predict the operational status of the road network accurately in real time. Based on the deep learning theory, the evaluation model of road network operation state was proposed, which includes the FCM algorithm-based operational state partition model, the LSTM algorithm-based operational state prediction model and the K-Means algorithm based operational state discriminant model. Based on the traffic and speed data of different vehicle models, lanes, sub-directions and time intervals of 5 minutes in the Hebei Provincial Traffic Survey System, 12 consecutive observatories which including 31104 data from September 4 to September 12, 2016 were selected for case analysis. The results showed that the model proposed in this paper had a good effect on the evalution of the running state of the road network, which was consistent with the discriminant result of the actual data.

keywords: the road network operation status; deep learning; FCM; LSTM; K-Means

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城市道路跟车状态下行驶扰动对机动车污染物扩散的影响

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摘 要： 为揭示城市道路气流在车身周围绕行和跟车状态下后车行经前车污染物场引起的行驶扰动对机动车污染物扩散的影响，揭示多点源与简化线源的具体差异，用 CFD 数值模拟方法进行微观尺度机动车污染物扩散仿真。通过实地交通调查，获得时间平均车速和饱和车头时距，建立机动车模型和 CFD 微观跟车系统几何模型，以 CO 为标的物在 FLUENT 中进行数值模拟。使用静态网格仿真，获得车体对气流的屏蔽阻塞作用对污染物在空间中扩散的影响，使用动网格技术进行瞬态模拟仿真，研究后车行经前车污染物场对污染物扩散随时间变化的影响，并将交通调查 CO 实测浓度与 CFD 仿真浓度进行对比，以验证仿真结果有效性。结果表明，行驶扰动对机动车污染物扩散的影响范围有限，集中在机动车行经路径的车身周边，对距行驶路径较远处扰动影响微弱，将交通流排放简化为线源可有效模拟路侧的污染物时空分布。

关键词： 跟车；机动车污染物扩散

Influence of Cruising Disturbance on the Diffusion of Urban Motor Vehicle Pollutants

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Abstract：

In order to reveal the influence of the cruising disturbance caused by the air flowing around and the lag vehicles passing through the front one's pollutant field during car-following state, as well as the discrepancy between the multi-point sources and the simplified line source, the CFD numerical simulation is used to investigate the diffusion of urban motor vehicle pollutants on a micro scale. By field traffic survey, time average speed and saturation headway were obtained, contributing to establishing CFD microscopic car-following model when vehicle model was settled. CO emissions were simulated in FLUENT software. Static mesh was used in simulation to obtain influence of vehicle body's blockage on airflow dispersion in space, and dynamic mesh was used for transient simulation to study the influence of the rear vehicle going through the front car's pollutant field on the time-varying diffusion of pollutants. The measured CO concentration is compared with the CFD simulation concentration to verify the simulation results. It was found that the influence of cruising disturbance on the diffusion of motor vehicle pollutants is limited and concentrated in the periphery of the vehicle body and motor vehicle running space. Running disturbance has a weak influence on the concentration at certain distance from the driving lane. Simplifying the traffic flow emission into a line source is effective, through which the spatially and temporally distribution of roadside pollutant can be approximated with rather good accuracy.

keywords: cruising disturbance; car-following state; vehicle emissions;CFD numerical simulation; line source

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港区空气质量优先控制污染物筛选研究

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摘 要： 针对当前船舶尾气中有机化合物污染现状和监测控制的需求，本文参考国内外相关研究经验，以急性毒性、致畸作用、致癌作用、致突变作用、生物积累性、长距离迁移性和环境总持久性为筛选因子，采用层次分析法结合加权评分法，对船舶尾气优先控制有机污染物进行了定量筛选。利用本筛选方法，尝试性的提出了 38 种船舶尾气优先控制有机污染物名单，为后续的船舶尾气有机污染物排放控制和监测管理提供了科学的参考依据。

关键词： 优先控制有机污染物；船舶尾气；层次分析法；定量筛选

Screening of Priority Control Organic Pollutants in Ship Exhaust

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Abstract：

The priority organic pollutants by ship exhaust were screened based on foreign and domestic research experience to meet the demand of monitoring and assessment of shipping emissions. Actue toxicity, teratogenicity, carcinogenicity, mutagenicity, bioaccumulation, Long-range transportion and the overall persistence of pollutants were selected as assessment indicators. Analytic Hierarchy Process combined with Weighted Mark Method was used in quantitative screening of priority organic pollutants in ship exhaust. As a result, a list of 38 chemicals were proposed as priority control organic pollutants. We wish that the present list may help to evaluate hazard potential of organic pollutants and to provide a guidance for ship exhaust pollutants.

keywords: priority control organic pollutants；ship exhaust; analytic hierarchy process; quantitative screening

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城市地铁废气排放监测及分析-以成都轨道交通 7 号线为例

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摘 要：为评价城市地铁废气污染物影响程度，探究治理地铁废气治理技术。选择成都轨道交通 7 号线部分车站的地铁风亭、风井作为测试对象，分别测量地铁废气中 PM2.5, PM10, HCHO, VOCs 的浓度。测试结果表明，成都轨道交通 7 号线部分站点废气主要污染物为 PM2.5，超过标准中的二级监控浓度限值的要求。为解决地铁废气排放问题，汇总目前常用的废气治理技术，提出对未来发展趋势提出一些想法。

关键词：城市地铁；废气污染物；废气排放；治理技术；PM2.5

Monitoring and Analysis of Exhaust Gas Emission from Urban Metro-Taking Chengdu Rail Transit Line 7 as an Example

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Abstract：

Abstract: In order to evaluate the impact of impact of urban subway exhaust pollutants and explore the subway exhaust gas treatment technology, the concentrations of PM2.5, PM10, HCHO and VOCs in subway exhaust gas were measured at some station of Chengdu Rail Transit Line 7. The test results show that the main pollutant in some stations of Chengdu Rail Transit Line 7 is PM2.5, which exceeds the requirement of the second-level monitoring concentration limit in the standard. In order to solve the problem of Metro exhaust emission, this paper summarizes the commonly used exhaust gas treatment technologies, and puts forward some ideas for the future development trend.

keywords: city tunnel; exhaust gas pollutants; exhaust emission; treatment technology; PM2.5

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基于 LID 的公路路面径流绿色净化技术研究

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摘 要：为控制水环境敏感区的公路路面径流造成的水体污染，研发了具有种植土壤层、渗透过滤层、蓄水层等层叠结构的生态种植槽技术，并提出了基于初期雨水净化与导排的设计方法，开展了锯末与砂子体积比分别为 1：3、1：4、1：5 的 3 种室内试验模型对比试验，分析了结构对水体中富营养化主要物质氮、磷去除的影响，三种生态种植槽对 TN 的平均去除率为 80.13%、83.87%、84.38%，对 NH3-N 的平均去除率为 80.71%、83.40%、85.63%，对 TP 的平均去除率为 91.93%、89.97%、88.62%，研究筛选出了最优的填料为体积比 1：4 的锯末：沙子，在此基础上依托云南大理东环洱海公路开展了工程应用，现场监测显示，经生态种植槽净化后出水优于地表水Ⅲ类水水质标准，有助于保护洱海水体环境，为绿色公路和海绵城市建设提供技术支撑。

关键词： LID；路面径流；生态种植槽；水质净化；洱海

Research on Green Purification Technology of Highway Runoff Based on LID

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Abstract：

In order to control road runoff's impact on adjacent water environment, this paper developed an ecological planting groove with multi-layer structure including planting soil layer, infiltration purification layer, and aquifer layer. Also, a design method based on initial runoff purification and drainage was proposed. A series of indoor experiments with different sawdust-sand mixing volume ratio in 1:3, 1:4, 1:5 were conducted to analyze the impact of the ratio on nitrogen and phosphorus removal effect. The removal efficiency in this three ratios are 80.71 %, 83.40 %, 85.63 % for NH3-N, 80.13 %, 83.87 %, 84.38 % for TN and 92.06%, 91.03%, 88.55% for TP. Results show that optimal purification effect of different mixed packing ratio was 1:4 (sawdust: sand). Based on Erhai Lake East Ring Road, a field test showed that water quality purified by ecological planting groove is superior to the value of grade-III standard of surface water.

keywords: LID; road runoff; ecological planting groove; water purification

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Exposure Assessment of Cyclists to UFP and PM on Urban Routes in Xi'an, China

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Abstract：With the promotion of bicycle sharing, cycling as an active transportation mode is a matter of public interest. However, cyclists' recurrent exposure to traffic-related air pollution is associated with the potential health risks. Quantification of the health risks associated with daily exposure of commuting cyclists to atmospheric pollutants is vital, but barely reported. In this study, real-time mobile measurement campaigns were performed with high time-resolution portable instruments, along two commuting routes in Xi'an, China. We investigated personal exposure and inhaled dose of particulate matter and ultrafine particle (UFP) for cyclists. The results showed cyclists' exposure to average pollutants concentrations: fine particulate matter (PM2.5, 38.6±17.1 μg m-3) and UFP (18,172±11,282 particles cm-3). The exposure "hotspots" of cyclists were identified: intersections, diesel engines, etc. Cyclists' exposure to the highest PM2.5 (46.9μg m-3) concentrations were observed in morning periods; these were ~36%/42% higher compared to the afternoon or evening, while the latter periods corresponded to higher UFP concentrations (18,342/18,502 particles cm-3). The measurements of PM2.5 and UFP were clearly higher during autumn months, when compared to summer months. In multivariate models, wind speed was not significant, temperature and local urban background concentrations explained 70.9% the variation of PM2.5, the 67.8% of UFP was explained by temperature, traffic and relative humidity, and each 100 increase in on-road vehicles were associated with increase of 1,328 particles cm-3 for UFP exposure in cyclists. Cycling in bike boulevards decreased exposure concentrations by 31.5% for PM and 36.6% for UFP compared to traffic roadsides, moving vehicles were identified as key contributors to PM0.25-0.3 and PM2.0-10 of cyclists' exposure. The potential health risks deserve attention under the mobility and air pollution challenges faced by many metropolitan areas in emerging economies. Our findings could serve to promote better design for low-exposure network of separated bike boulevards.

Key words：bike-sharing; mobile monitoring; traffic pollutions; influence factors; personal exposure dose

基于电学特性的污染场地工程特性评价方法综述

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摘 要： 随着工业化和城市化的发展，环境污染愈加严重，污染场地勘察作为污染场地环境管理监控、健康风险评价以及修复治理与保护的重要环节，其勘察技术与方法在污染场地研究中愈加重要。本文从污染场地研究概况、土体电学特性、电学勘测新技术的原理进行分析，对国内外污染场地电学现场测试方法的研究现状进行总结，详细介绍了孔压静力触探、高密度电法、探地雷达等原位测试与地球物理方法，有效适用于污染场地污染物检测、污染区域确定、污染土层分布以及地下水污染，并结合国外几个成功的案例进行分析总结。最后，对未来勘察与监测技术的发展应用进行了展望。

关键词： 污染场地勘察；静力触探技术；地球物探技术；污染检测；地下水污染

Survey of Electrical Testing Methods for Contaminated Sites

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Abstract：

With the development of industrialization and urbanization, the problem of environmental pollution has been increasingly serious. As a crucial link in monitoring and control of environmental management, health risk assessment and remediation and protection of contaminated sites, the investigation of contaminated sites has become the focus of research on contaminated sites. This article analyzes the general situation of contaminated sites, soil characteristics and the principle of electrical detection methods, summarizes the current research status of electrical testing methods for contaminated sites at home and abroad, as well as introduces in detail CPT, ERT, GPR and other survey methods in situ, which are effectively applied to the detection of pollutants in contaminated sites, the determination of contaminated areas, the distribution of contaminated soil layers and the pollution of groundwater. Moreover, analysis and summary has been worked based on several successful cases abroad. Finally, the development and application of investigation and monitoring technologies in the future are also prospected.

keywords: investigation of contaminated site; risk assessment; CPT; geophysical prospecting techniques; pollution detection; groundwater pollution

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浅谈高速公路服务区加油站地下油罐防渗改造

陈俊

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摘 要：比较分析了各种加油站地下油罐防渗改造方式的特点，阐述了双层罐的优势，并结合工程实例分析了如何选择油罐防渗改造方式，最后为高速公路服务区加油站地下油罐防渗改造方式的选择给出了建议。

关键词：防渗

Research on Seepage Control Reconstruction of Gasoline Station Underground Storage Tank in Expressway Service Area

Chen Jun

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Abstract：

The characteristics of three kinds of seepage control reconstruction methods are compared and analyzed, the advantages of double tank are also expounded, the selection of seepage control reconstruction method is analyzed with an engineering example. This paper gives suggestions for selection of seepage control reconstruction method, according to the actual situation of the gasoline station in the expressway service area.

keywords: seepage control

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在用柴油车加载减速法排放检测分析

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摘　要： 为了分析研究在用柴油车烟度排放的规律。依据西安市各个检测站提供的大量加载减速法检测数据，使用 SQL Server 结构化查询语言进行筛选查询，分析了柴油车排气检测的总体排放情况、不同车辆类型的平均光吸收系数以及最大轮边功率和车辆的各种参数之间的关系。总不合格率的数值往往大于单个系数的不合格率，而小于各个系数不合格率之和。排气烟度不合格率一般高于最大轮边功率的不合格率。光吸收系数是影响柴油汽车合格率的主要因素，随着车龄、行驶里程的增加，光吸收系数不断增大。发动机排量小于 6 升的光吸收系数比排量大于 6 升以后要明显高出很多。随着使用时间和行驶里程的增加，要更加注意其排放情况，做好汽车的及时维护和适时报废。

关键词： 柴油车尾气；排气检测；影响因素

Emission Detection and Analysis of in-Use Diesel Vehicles Base on Lug-Down

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Abstract：

To analyze the law of smoke emission from diesel vehicles. According to the large load deceleration method detection data provided by various testing stations in Xi'an, the SQL Server structured query language was used to conduct the screening query. The overall emission of diesel exhaust detection and the average light absorption coefficient of different vehicle types were analyzed. The relationship between the maximum wheel power and various parameters of the vehicle. The value of the total failure rate is often greater than the failure rate of a single coefficient, and less than the sum of the failure rates of the individual coefficients. The exhaust smoke rejection rate is generally higher than the maximum wheel side power failure rate. The light absorption coefficient is the main factor affecting the pass rate of diesel vehicles. The trend is that as the vehicle age and mileage increase, the light absorption coefficient increases. The light absorption coefficient of engine displacement less than 6 liters is significantly higher than the displacement of more than 6 liters. With the increase of usage time and mileage, more attention should be paid to the discharge situation, and the timely maintenance and timely scrapping of the vehicle should be done.

keywords: diesel exhaust; exhaust gas detection; influencing factors

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跟车状态下行驶扰动对机动车污染物扩散的影响

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摘　要： 为揭示气流在车身周围绕行和跟车状态下后车行经前车污染物场引起的行驶扰动对机动车污染物扩散的影响，寻找多点源与简化线源的具体差异，用 CFD 数值模拟方法进行微观尺度机动车污染物扩散仿真。通过实地交通调查，获得时间平均车速和饱和车头时距，建立机动车模型和 CFD 微观跟车系统几何模型，以 CO 为标的物在 FLUENT 中进行数值模拟。使用静态网格仿真，获得车体对气流的屏蔽阻塞作用对污染物在空间中扩散的影响，使用动网格技术进行瞬态模拟仿真，研究后车行经前车污染物场对污染物扩散随时间变化的影响，并将交通调查点处 CO 实测浓度与 CFD 仿真浓度进行对比，以验证仿真结果有效性。结果表明，行驶扰动对机动车污染物扩散的影响范围有限，集中在机动车行经路径的车身周边，对距行驶路径较远处扰动影响微弱，将交通流排放简化为线源可有效模拟路侧的污染物时空分布。

关键词： 线源；行驶扰动；跟车状态；机动车排放；CFD 数值模拟

Influence of Cruising Disturbance on the Diffusion of Motor Vehicle Pollutants

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Abstract：

In order to reveal the influence of the cruising disturbance caused by the air flowing around vehicles＇surrounding and the rear car going through the front car＇s pollutant field in car-following state, as well as find the specific difference between the multi-point source and the simplified line source in simulation, the CFD numerical simulation method is used to simulate the diffusion of vehicle pollutants on a micro scale. By field traffic survey, time average speed and saturation headway were obtained, contributing to establishing CFD microscopic car-following model when vehicle model was settled. CO emissions were simulated in FLUENT software. Static mesh was used in simulation to obtain influence of vehicle body＇s blockage on airflow dispersion in space, and dynamic mesh was used for transient simulation to study the influence of the rear vehicle going through the front car＇s pollutant field on the time-varying diffusion of pollutants. The measured CO concentration is compared with the CFD simulation concentration to verify the simulation results. It was found that the influence of cruising disturbance on the diffusion of motor vehicle pollutants is limited and concentrated in the periphery of the vehicle body and motor vehicle running space. Running disturbance has a weak influence on the concentration at a distance from the driving lane. Simplifying the traffic flow emission into a line source is effective, through which the spatially and temporally distribution of roadside pollutant can be obtained accurately.

keywords: cruising disturbance; car-following state; vehicle emissions; CFD numerical simulation;

line source

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基于 GIS 技术的绿道网选线方法研究——以玉溪为例

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摘 要：绿道作为一种改善步行与自行车出行环境、引导绿色低碳出行，改善城市环境条件，提升城市品位的重要手段，在我国越来越受到重视。绿道网络规划通常需要考虑多种因素，如河道水系、道路交通、地形坡度、人口分布、历史文物和景区分布、气候及 植被等等，采用传统的规划方法，往往存在调查和踏勘费时费力、精度不高，规划方案针对性不足等问题；利用 GIS 强大的地理空间数据分析功能，可以极大程度提高绿道选线的效率和准确性。本文以玉溪市市域绿道网络规划为例，详细说明了利用 ArcGIS 软件辅助开展绿道网选线的方法。

关键词：绿道

Research on Greenway Network Selection Method Based on GIS Technology-Taking Yuxi City as an Example

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Abstract：

As an important means to improve the environment of walking and cycling, guide green and low-carbon travel, improve city's environmental conditions and quality, Greenway has received more and more attention in China. Greenway network planning usually needs to consider a variety of factors, such as river, traffic, terrain slope, population, the distribution of historical relics and scenic area, climate and plant, etc. Traditional planning methods have some disadvantages in some aspects. The survey would take much time and sometimes are insufficient. The planning program are lack of pertinence. The geospatial data analysis function of GIS can improve the efficiency and accuracy of greenway network planning. This paper takes Greenway Network Planning of Yuxi City as an example, and explains in detail how to use ArcGIS software to assist in the greenway network selection.

keywords: greenway

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对高速公路建设管理新模式的探讨——以青海省循隆高速为例

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摘 要：近年来我国的高速公路发展取得了长足进展，随着我国高速公路通车里程数的快速增加，对如何高效、高质量的完成高速公路建设与管理，本文以青海省循隆高速为例，提出了项目建设管理中的新模式，期望通过行之有效的方法和手段，建设更多符合青藏高原特殊环境的绿色生态品质工程。

关键词：高速公路；新型建设管理模式；生态公路

Discussion on the New Mode of Expressway Construction Management-Taking Qinglong Expressway in Qinghai Province as an Example

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Abstract：

In recent years, China's expressway development has made great progress. With the rapid increase of the number of expressways in China's expressways, how to efficiently and high-quality highway construction and management under the environment of ecological and environmental protection, this article is in Qinghai Province. Taking the Xunlong Expressway as an example, a new model in project construction management is proposed, and it is expected that through the effective methods and means, more green ecological quality projects conforming to the special environment of the Qinghai-Tibet Plateau will be built.

keywords: highway; ecological road; new construction mode

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Research on the Construction of Green Transportation City Strategy

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Abstract：In order to effectively address urban environmental protection issues, implement a sustainable green economy, build a regional transportation and ecologically civilized city, and build a "smart, green, safe and efficient" green transportation system, how to give full play to "high efficiency and low energy" The comprehensive advantages of green transportation with low consumption and low pollution have increasingly become the focus of common concern of all sectors of society. On the basis of the existing transportation development, this paper proposes a green transportation system creation model that focuses on broadening urban space, taking green transportation development as the concept and using technology application as the guide, and strives to build a green transportation demonstration city and realize the urban economy. The organic integration and coordinated development of benefits, social benefits and ecological and environmental benefits.

Key words: green transportation; strategy; energy saving

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绿色公路评价体系研究

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摘 要:为了对绿色公路进行科学合理的评价,分析研究了国内外关于绿色公路的研究成果,构建了包括4个一级指标、21个二级指标的绿色公路评价指标体系;介绍了层次分析法(AHP)和模糊综合评判理论,利用层次分析法(AHP)确定了各评价指标权重,并基于AHP-模糊综合评判方法建立了绿色公路模糊综合评价模型;以某高速公路绿色示范项目为例进行了实例分析,结果表明:构建的绿色公路评价指标体系科学合理,建立的绿色公路模糊综合评价模型能够公正准确地评价绿色公路建设项目。

关键词:绿色公路；层次分析法；模糊综合评判模型；评价指标体系

Study on Green Highway Evaluation System

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Abstract:

In order to evaluate the green highway scientifically and reasonably, the research results of green highway at home and abroad are analyzed, and the index system of green highway is constructed, which includes 4 first-level indicators and 21 second-level indicators. The theory of AHP and fuzzy comprehensive evaluation are introduced. The weight and the fuzzy comprehensive evaluation model of green highway are established based on AHP-fuzzy comprehensive evaluation method. Taking a green demonstration project of expressway as an example, the results show that the index system of green highway is scientific and reasonable, and the fuzzy comprehensive evaluation model of green highway can evaluate green highway fairly and accurately.

keywords: green road; analytic hierarchy process; fuzzy comprehensive evaluation model; evaluation index system

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自然保护地公路建设绿色管理研究

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摘 要：通过开展我国典型自然保护地分布与公路网规划关系分析，提取典型区域，开展建设现状调查，收集与整理相关资料，系统梳理当前涉及自然保护地的公路建设环境管理问题。立足当前管理现状和未来自然保护地公路建设发展趋势，形成环境保护对策建议及对应的保障对策。明确自然保护地公路建设环境保护管理保障机制。提高涉及自然保护地公路规划、建设、运营管理环境保护管理水平和决策能力，有效遏制自然保护地生态退化趋势。

关键词：自然保护地；路网规划；环境管理体制；对策建议

Research on Green Management of Highway Construction in Nature Reserves

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Abstract：

The study analyzes the relationship between the distribution of typical nature reserves in China and the planning of road network, and selected typical areas for the following surveys on construction status, collects and collates relevant materials, systematically sorts out current environmental protection management issues of road construction in nature reserves. Based on current management status and the development trend of highway construction in nature reserves areas, the research has proposed environmental protection measures and corresponding safeguard measures, which clarify the environmental protection management and guarantee mechanism for highway construction in natural reserve areas. The results of this study will improve the environmental protection management level and decision-making ability of highway planning, construction, operation and management in nature reserve areas, and prevent the ecological degradation trend of natural reserve areas.

keywords: natural reserve areas; road network planning; environmental management system; countermeasures

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Research on Influence Mechanism of Public Bike User Loyalty Based on Structure Equation Modeling

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Abstract：This paper aims to build a reasonable and effective model of influencing factors on public bike user's loyalty, which is expected to provide more effective guidance and suggestions for the formulation of development strategies and operation plans of public bike system. In this paper, we explore eight (potential) impact factors associated with loyalty, consisting of perceived service quality, perceived facilities level, perceived cost, customer satisfaction, perceived value, riding safety perception, environmental perception and loyalty. This article aims to study the interaction between the factors and to understand how to establish loyalty via these factors based on the structural equation model. The empirical research shows that the three factors that have the greatest influence on loyalty are perceived service quality, perceived facility level and perceived cost. User satisfaction ranks only the fourth, which also explains the phenomenon that some users are satisfied with public bikes but do not use them frequently.

Key words：public bike system; user loyalty; structure equation modeling

伦敦、巴黎、上海绿色交通相关政策比较研究

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摘 要：本文以欧洲典型城市伦敦、巴黎制定的绿色交通相关政策与上海进行比较。具体来看，以"伦敦市长交通战略（MTS）""大巴黎区城市出行方案（PDUIF）"和上海"十三五"相关交通规划为主要对比依据，聚焦相关城市的交通施政举措、理念、实施环境及推进现状等，从两座国际城市政策实施成效的正反两面，总结得失、展望未来，并从中提出今后绿色交通发展的导向型建议。

关键词：世界大都市；交通可持续；公共交通；规划；政策；比较研究

A Comparative Study of Green Transport Policies in London, Paris and Shanghai

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Abstract：

The article compares the green transport policies formulated by London and Paris, the typical European cities, with those of Shanghai. Specifically, based on "London Mayor's Transport Strategy" "Greater Paris City Travel Plan" (PDUIF) and Shanghai's "13th Five-Year Plan" related traffic planning, this paper focuses on the relevant city's traffic policy measures, concepts, implementation environment and status quo, and summarizes the gains and losses for the implementation of the two metropolis' related policies and looks forward to the future. Finally, some suggestions for the future development of green transportation are put forward..

keywords: world metropolis; sustainable transport; public transportation; planning; policy; comparative study

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基于 DEMATEL-ISM 集成方法的城市绿色交通发展影响机理研究

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摘　要：采用 PSR 模型系统识别选取 22 个影响因素分析城市绿色交通发展过程，构建 DEMATEL-ISM 集成模型研究城市绿色交通发展影响机理。建立 DEMATEL 模型分析城市绿色交通发展影响因素之间的相互关系、动态联系以及影响程度，结合 ISM 模型构建影响因素之间的多级递阶结构模型，研究关联因素之间的影响层次、影响路径以及影响机理。结果表明：影响因素之间的复杂关系决定城市绿色交通发展，而环境质量是今后应该重点关注的关键因素。

关键词：城市绿色交通；PSR 模型；DEMATEL-ISM；多级递阶结构模型；影响机理

Research on the Risk Assessment and Counter Measures of Nanjing No.4 Yangtze River Bridge in Operation Period

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Abstract：

The paper uses the PSR model system to select 22 factors to analyze the urban green transportation development process, and establishes the DEMATEL-ISM integration model to study the mechanism of urban green transportation development,. Using DEMATEL model to analyze the relationship, dynamic connection and influence degree of urban green transportation development influencing factors, combined with ISM　model to construct multi-level hierarchical structure model between influencing factors Further research the level of influence, the path of influence and the mechanism of influence between related factors. The results show that the complex relationship between the influencing factors determines the development of urban green transportation, and environmental quality is the key factor that should be paid attention to in the future.

keywords: urban green transportation; PSR model; DEMATEL-ISM; multi-level hierarchical structure model; influence mechanism

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基于地域文化的景观提升在高速公路建设中的实例研究

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摘 要：随着全国高速公路建设数量的不断增多，其景观的一致性也随之出现，往往会带来"千路一面"的景观效果，造成视觉疲劳。人们对沿途具有独特地域文化氛围的高速公路景观往往更加情有独钟，不仅能展示和传承当地文化，也能发掘更多景观元素，提高景观内涵，满足人们精神文化需求，从而实现交旅融合，带动沿线旅游经济发展，打造美丽生态走廊。通过对成都市第二绕城高速公路西段沿线路域景观绿化品质的提升改造，对主体景观走廊和附属景观节点的设计内容进行了分析探讨，挖掘成都历史、二绕沿线区县文化、风土人情，并通过不同的景观形式予以体现，提出了结合生态文明建设与地域文化建设的景观提升思路，为高速公路景观提升中体现地域文化元素、注入地域文化内涵提供了借鉴与方法。

关键词：交旅融合；景观提升；地域文化；生态走廊；旅游经济

Case Study of Landscape Improvement Based on Regional Culture in Expressway Construction

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Abstract：

With the increasing number of highway construction in China, the consistency of its landscape also appears, which often brings the landscape effect of "one side of a thousand roads" and causes visual fatigue. Highway landscape with unique regional cultural atmosphere along the road is often more fond of, not only to display and inherit local culture, but also to explore more landscape elements, improve landscape connotation, meet people's spiritual and cultural needs, so as to achieve the integration of travel, promote the development of tourism economy along the line, and create a beautiful ecological corridor. Through the improvement and transformation of landscape greening quality along the western section of Chengdu Second Ring Expressway, the design contents of main landscape corridor and accessory landscape nodes are analyzed and discussed. The history of Chengdu, the culture of counties along the Second Ring Expressway, local customs and customs are excavated, which are embodied through different landscape forms. The landscape combining the construction of ecological civilization with the construction of regional culture is put forward. It provides a reference and method for embodying regional cultural elements and injecting regional cultural connotations into highway landscape upgrading.

keywords: integration of transportation and tourism; landscape upgrading; regional culture; ecological corridor; tourism economy

基于出行者体验的"最后一公里"交通方式选择研究

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摘 要：城市居民出行普遍会面临"最后一公里"的接驳难题，城市交通"最后一公里"的出行效率深刻影响着交通的便利程度。在"最后一公里"情境下，出行者选择的交通方式主要有：乘坐出租车、乘坐摩的出行、骑共享单车出行以及步行。以广州市为例，本研究意在揭示出行者在"最后一公里"交通方式的选择的影响因素，找出策略以提高出行者"最后一公里"出行体验。通过建立多项 logit 模型，研究发现出行者性别、年龄、职业、月收入等出行者特征，交通方式便利性与安全性，出行路程长度都与出行者"最后一公里"交通方式的选择密切相关。步行、骑共享单车出行是"最后一公里"情境下最重要的两种出行方式，乘坐摩的及出租车出行是这两种方式的补充。促进城市慢行交通发展，改善慢行交通出行体验是缓解城市"最后一公里"问题的关键。一个结合四种交通方式优势的出行系统会是人们面对"最后一公里"问题更好的解决方案。

关键词：最后一公里；交通方式；多项 logit 模型；影响因素

Analysis of the Choice Behavior Towards the Last Kilometer Traffic Modes Based on Travelers' Experience

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Abstract：

Urban residents generally face the "last kilometer" problem and the convenience of urban transportation is deeply affected by the travel efficiency of the "last kilometer". There are four travel modes available when facing the "last kilometer" situation: taking a taxi, taking a motorcycle taxi, riding a shared bicycle and walking. Based on a case study of Guangzhou, this study aims to reveal the user choice behaviors for these four kinds of travel modes and to find strategies to improve user travel experience. The multinomial logit model is employed to identify the impact factors of the choice behaviors. It is found that traveler characteristics plays a key role in the choice of the travel mode, including factors such as sex, age, occupation and monthly income. In addition, the convenience and safety of transportation, and the length of travel are closely related to the choice of the travel mode. Supplemented by taking a motorcycle taxi and taxi, walking and riding a shared bike are the two most important modes of travel in the "last kilometer" situation. Promoting the development and improving the experience of non-motorized traffic are the key to alleviating the "last kilometer" problem. A travel system that combines the advantages of four travel modes would be a better solution for travelers facing the "last kilometer" problem.

keywords: last kilometer; traffic mode; multinomial logit model; impact factor

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A Multi-Level Mixed Logit Method for the Generalized Overlapping Problem in Multi-Modal Route Choice Modeling

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Abstract：In this paper, a structure of super-network is designed to represent the multi-modal transport system in a unified network. When modeling the route choices in the context of multi-modal networks, alternative routes are corrected not only because of the overlapping of physical links, but also because of the overlapping of modes. We define this problem as the generalized overlap problem. To address the generalized overlap problem, a multi-level mixed logit model is proposed to explicitly consider the correlations of unobserved utilities of generalized routes. Based on this model, the stochastic user equilibrium on multi-model transport networks is represented as a fixed point problem. The solution algorithm is also proposed for this problem. Numerical studies are designed to illustrate the effects of incorporating generalized overlap problem on disaggregated route choice prediction and aggregated traffic flow assignment. With different settings of physical link and mode specific error terms, the variations of disaggregated route choice predictions and aggregated traffic flows are discussed. It is found that, the generalized overlap problem can be captured by the proposed model and significantly affect both the route choice predictions and equilibrated traffic flows.

Key words: multi-modal network; multi-level mixed logit model; route choice; stochastic user equilibrium

基于站点分割聚类算法的定制公交站点和线路规划研究

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摘 要：定制公交作为一种新兴的通勤方式，为乘客提供了舒适便捷的通勤体验，不仅有助于减缓常规公交出行乘客添置私家车的意愿，同时也能够有效吸引私家车出行乘客向其转移。定制公交的站点和线路规划，应在考虑运营方运营成本的同时，考虑乘客的出行体验。本文结合定制公交实际运营情况，建立了考虑乘客步行距离，乘客车内时间，车辆行驶距离以及车辆数目的站点和线路规划模型，提出了一种考虑乘客分布和线路方向的站点分割聚类算法，以最大最小蚁群算法进行求解。通过需求算例对所提出的算法进行验证，结果表明，这种站点分割聚类算法可以在总成本下降的同时，有效减少乘客的步行距离和车上时间，从而提升定制公交的乘坐体验。

关键词：定制公交；站点设计；线路规划；最大最小蚁群算法

The Study of Customized Bus Site and Route Planning Based on Site Segmentation Clustering Algorithm

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Abstract：

As an emerging commute mode, customized bus provides passengers with a comfortable and convenient commute experience, it not only helps to decrese the willingness of those who take regular bus to purchase private cars, but also effectively attracts private driver to travel by customized bus. Customized bus site and route planning should consider not only the operating costs, but also the passenger travel experience. Based on the actual operation of customized bus, this paper propose a site and route planning model considering passenger walk distance,in-vehicle distance, route length and vehicle number. A clustering algorithm for station segmentation consider passenger weight and route direction is proposed, which is solved by the max-min ant colony algorithm. Finally, The proposed algorithm is validated by some benchmarks. The results show that the proposed site segmentation clustering algorithm can effectively reduce passenger's walk distance and in-vehicle distance while decresing the total cost, thus improving the travel experience of customized bus.

keywords: customized bus; site planning; route planning; max-min ant colony algorithm

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基于电力损耗预测的共享纯电动汽车路径优化方法研究

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摘 要：如何基于低碳环保、低本高效的多样化智能特性为用户提供更好的出行服务则是共享纯电动汽车运营管理的一个重要研究问题。电力的损耗是纯电动汽车的一个关键因素，如电池使用年限、天气状况及空调使用等问题都会影响共享纯电动汽车预计行驶里程，出现提早电量不足所导致的车辆半路抛锚及电池过度放电情况，严重降低共享纯电动汽车的服务质量。本文对纯电动汽车在不同情况下的电力损耗进行分析，通过改进平均能耗法循环迭代计算纯电动汽车不同情况的电力损耗进行电量剩余预测，结合既有路线及共享纯电动汽车的充电桩或换乘站点位置建立动态路径优化模型，改进传统 Dijkstra 算法适应共享电动汽车，并得出用户最优路径的选择方案，使用户更准确把握出行路线，最后结合在线地图、C#等技术进行系统开发，得到一套较为完善的适用于共享电动汽车多路径选择的动态路径诱导系统。

关键词：共享纯电动汽车；电力损耗；平均能耗；Dijkstra 算法；路径诱导系统

Research on Path Optimization Method of Shared Pure Electric Vehicle Based on Power Loss Prediction

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Abstract：

How to provide users with better travel services based on low-carbon environmental protection, low cost and high efficiency of diversified intelligent characteristics is an important research issue in the operation and management of shared pure electric vehicles. Power loss is a key factor of pure electric vehicles, such as battery life, weather conditions and air conditioning usage, which will affect the expected driving mileage of shared pure electric vehicles, and lead to vehicle half-way breakdown and battery overdischarge caused by insufficient early power, which will seriously reduce the service quality of shared pure electric vehicles. In this paper, the power loss of pure electric vehicles under different conditions is analyzed. The power loss of pure electric vehicles under different conditions is calculated iteratively by improving the average energy consumption method to predict the power surplus. Combining the existing routes and the location of charging piles or transfer stations of shared pure electric vehicles, the dynamic path optimization model is established, and the traditional Dijkstra algorithm is improved to adapt to shared electric vehicles. Finally, combined with online map and C# technology, a more perfect dynamic route guidance system suitable for multi-path selection of shared electric vehicles is developed.

keywords: shared pure electric vehicle; power loss; average energy consumption; dijkstra algorithm; path guidance system

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Review on Life Cycle Economic and Environmental Impacts Assessment for Transportation Infrastructure

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Abstract：The comparison and decision of pavement alternatives is of great importance to road engineers and managers. At current stage, Life Cycle Cost Analysis (LCCA) and Life Cycle Assessment (LCA) methods are commonly applied in decision making. Considering that existing domestic research on LCCA and LCA is still independent, it is necessary to combine the two methods together so as to get more sustainable pavement solutions. This paper summarizes the development of LCCA and LCA for pavement, then reviews the research status of LCA in China. Based on the existing problems in current research, the idea of an integrated evaluation method combining LCA and LCCA is proposed, which provides a useful reference for the application of the life cycle methods in the transportation infrastructure field.

Key words：life cycle assessment; life cycle cost analysis; transportation infrastructure

柴油燃料 HCCI 燃烧过程及控制技术

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摘 要：均质充量压缩燃烧（Homogeneous Charge Compression Ignition, HCCI），已经被公认为是一种具有广阔潜力的燃烧方式。尽管 HCCI 燃烧方式具有众多优点，但是均质压燃技术的应用仍然存在着严峻的挑战。当前在 HCCI 燃烧控制方面取得了很大的进展。HCCI 燃烧控制技术大体上可分为两类：一类是改变空气/燃料的混合特性；另一类是改变发动机的工作和设计参数。本文结合近年来世界各国研究人员的试验研究结果，对 HCCI 燃烧间接控制技术的建立、改进及发展进行综述。

关键词：柴油机；均质压燃（HCCI）；燃烧过程；控制技术

HCCI Combustion Process and Control Technology for Diesel Fuel

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Abstract：

Homogeneous Charge Compression Ignition (HCCI) has been recognized as a combustion method with broad potential. Although the HCCI combustion method has many advantages, the application of homogeneous compression ignition technology still has serious challenges. Great progress has been made in HCCI combustion control. HCCI combustion indirect control technology can be broadly divided into two categories: one is to change the air/fuel mixture characteristics; the other is to change the engine's operating and design parameters. Based on the experimental research results of researchers from all over the world in recent years, this paper reviews the development of HCCI combustion indirect control technology.

keywords: diesel engine; HCCI; combustion process; control technology

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Identification of the Potential for Carbon Dioxide Emissions Reduction from Highway Maintenance Project Using Life Cycle Assessment: A Case in China

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Abstract：This paper investigates the neglected potential of carbon dioxide (CO_2) emissions reduction from highway maintenance projects. Conventional assessment (CA) on fuel combustion of off-road equipment during construction, and a comprehensive life cycle assessment (LCA) on the materials production, fuel production, traffic delay and construction equipment were conducted for four typical maintenance schemes in a real highway project in China, through spreadsheet model, VISSIM and CMEM model. The focus of the case study was to understand the magnitude and source of the gap of CO_2 emissions assessment results between LCA and CA. This study also checks scenarios that apply a few mitigation options from several industrial sectors in four typical maintenance schemes to investigate how significant potential for decarbonization of the highway maintenance might be neglected without using LCA. Results suggest that there exists an obvious gap between the total CO_2 emissions per lane per kilometer of CA and that of LCA, and the gap is even up to 22 times of CA results in this specific case-study. Traffic delay caused by lane closure has the largest contribution to the gap, while the shares of materials production and fuel production is matched. The scenarios analysis of mitigation strategies associated with transport sector and other industrial sectors indicates that the LCA model could effectively identified the dominant source inputs and CO_2 emissions outputs of individual construction process in the complicated transport system, while CA may neglect or underestimate the potential for adopting some mitigation strategies, especially for mitigation options from other industrial sectors.

Key words: CO_2 emissions; life cycle assessment; highway maintenance; China

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交通运输行业节能减排政策综合分析

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摘 要：本文从《"十三五"节能减排综合工作方案》相关规定入手，通过收集我国 1998—2018 年间与交通运输行业相关的节能减排政策，总结我国节能减排政策的演变历程和发展趋势，系统分析我国节能减排政策各个阶段的主要政策。考虑国际节能减排趋势和我国现阶段基本国情的基础上，归纳总结我国节能减排政策发展趋势。

关键词：节能减排；政策演变；发展趋势

Analysis on the Evolution of Energy Saving and Emission Reduction Policy in Transportation Industry

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Abstract：

Starting with the requirements of the 13th five-year Plan of Comprehensive work Plan for Energy Saving and Emission reduction, this paper collects the energy saving and emission reduction policies related to the transportation industry in China from 1998 to 2018, and summarizes the evolution process and development trend of the energy saving and emission reduction policies in China. The main policies of energy saving and emission reduction policy in China are analyzed systematically. On the basis of considering the international trend of energy saving and emission reduction and the basic national conditions of our country at present, the development trend of China's energy saving and emission reduction policy is summarized.

keywords: energy saving and emission reduction; policy evolution; development trend

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Study on the Carbon Emission Performance of Urban Road Construction Based on Life Cycle Analysis

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Abstract：The transportation infrastructure could emit a large amount of carbon dioxide during its whole life cycle. Research about the life cycle carbon emissions of infrastructure such as highway, railways, and subways have been explored, but research on urban roads is still rare.

Taking the No.8 roads of the Caotang Science and Technology Industrial Base of Xi'an High-tech Zone as a case, this paper builds urban road life cycle carbon emission evaluation system to measure the carbon emissions of urban road construction. Three important conclusions are drawn here: among six sub-project, pipeline engineering is the main contributor to carbon emissions; among all constructing materials, steel and cement contributes most of the carbon emission; among all mechanical work, the transportation of materials occupies a dominant position. The conclusion obtained by this paper can contribute to proposes some efficient emission reduction opinions.

Key words: urban road; whole life cycle analysis; construction project; carbon emission

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Heterogeneous Choice of Home Energy Facilities Conditional on Electric Vehicles Decisions

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Abstract：New mobility tools like electric car and e-bike have been an important strategy in many cities for the reduction of traffic problems and transport environmental pollution. The choice of individuals on mobility tools however may depend on the magnitude of a comparable cost. Home energy facilities like solar panel which generates energy at home may potentially reduce the electricity expenditure of e-mobility. This paper therefore aims to investigate the choice behavior of individuals on their home energy facilities conditional on the choice of mobility tools. More specifically, we identify the differences among individuals in their preferences and the latent groups. Using the stated preference data collected in the city of Weiz, Austria, we estimated a latent class choice model with social demographics representing the user group membership. Results show that the synergy effect between EV and solar panels and self-sufficient home energy system is more attractive to people with low income although their willingness to buy are lower than people with high income.

Key words: mobility tool; solar panel; home energy facilities; electric car

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Eco-Speed Control for the Mixed Battery Electric Vehicles and Gasoline Vehicles on a Single Signalized Intersection

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Abstract：Although electric vehicle has been regarded as a promising method to reduce tailpipe emissions and energy consumption, the mixed traffic flow of electric vehicle and internal combustion engine vehicles make the energy/emission reduction objective more difficult, because electric vehicle and internal combustion engine vehicles have general various characteristics. This paper proposed a low emission-oriented speed guidance model to address the energy/emission reduction issue for mixed traffic flow at an isolated signalized intersection, which achieve the object of reduce emission and total energy consumption while reduce vehicle delay and travel time. The totally energy/emission under different electric vehicle market penetration rates with various traffic volumes are analysed and compared. Numerical examples demonstrate that the proposed speed guidance model has better performance than without considering the impact of the queue. With a certain traffic volume, the energy/emission reduction effects under speed guidance will increase with the share of electric vehicle. This paper also explores the impact of the guidance time interval on vehicle's emissions in order to obtain results with have practical guidance.

Key words： electric vehicle; speed guidance; vehicle queues; emission reduction

道路基础设施生命周期碳排放量化分析

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摘 要：本文提出以道路基础设施为主体的碳排放分析框架，将碳排放划分为基础设施的直接排放与间接排放，并提出生命周期各阶段的碳排放计算方法。以 G321 国道的一段路面为案例，设计了三种生命周期情境：自然衰退情境、普通养护情境和预防性养护情境，对路面生命周期碳排放量进行了计算与对比分析，为道路建设与养护方案决策提供节能减排方面的理论支撑。

关键词：道路基础设施；生命周期评价；碳排放；情境分析

Quantitative Analysis of Road Infrastructure Life Cycle Carbon Emissions

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Abstract：

This paper proposes a carbon emission analysis framework based on road infrastructure, which divides carbon emissions into direct and indirect emissions of infrastructure, and proposes carbon emission calculation methods at various stages of the life cycle. Taking the road surface of G321 national road as a case for case analysis, three life cycle scenarios were designed: natural recession situation, general maintenance situation and preventive maintenance situation. The calculation and comparative analysis of road life cycle carbon emissions in three scenarios were carried out to provide theoretical support for energy conservation and emission reduction in road construction and maintenance program decision-making.

keywords: road infrastructure; life cycle assessment; carbon emission; situation analysis

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Traffic Signal Coordination Control Optimization for Reducing Traffic Emissions of Intersection with Contraflow Left-Turn Lane

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Abstract： To reduce the traffic pollution caused by the existing Contraflow left-turn lane (CLL) intersections and to promote the sustainable development of the traffic system, this paper proposes a coordination control optimization scheme between the CLL main signal and pre-signal to reduce the pollutant emissions caused by the second parking. While keeping the existing CLL basic control model unchanged, the signal control scheme is adjusted by analyzing the vehicle operation process step by step. The delay model of CLL system is established by analysing different arrival-departure and queuing conditions. In order to reduce delay and emission for the intersection at the same time, this paper established a two-layer optimization model with the goal of delay and emission minimization. Meanwhile, particle swarm optimization (PSO) algorithm is used to optimize cycle time, green split and length of CLL. A case study based on the field data of Beidajie-Xiwulu intersection in Xi'an is used to verify the proposed optimization framework. The results show that the delay of the intersection and the main pollutants are reduced. Furthermore, cycle time and the green time duration of the left-turn phase obtained by the PSO algorithm are reduced, which leads to smaller delay for other movements at the intersection.

Key words： contraflow left-turn; delay minimization; emission minimization; traffic signal optimization

典型温拌技术环境效益评价研究

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摘 要：为了精确评估沥青路面温拌技术的环境效益，采用寿命周期评价方法，建立了节能减排评价指标体系，通过现场调查及数据分析，分别测算了热拌及典型温拌沥青混合料的能耗及温室气体排放，评价了节能减排效益。结果表明，不同温拌技术的环境效益差异较大，且与热拌沥青混合料相比，沸石添加剂类温拌技术并不具有节能减排效益，而机械发泡类节能减排效果最突出，其次为化学添加剂类和有机添加剂类。

关键词：沥青路面；温拌技术；能耗；温室气体；节能减排

Research on Environmental Benefits Analysis of Warm Mix Asphalt Technologies

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Abstract：

Life cycle assessment (LCA) method was adopted for accurate analysis of environmental benefits of warm mix asphalt technologies. The evaluation index system of energy conservation and emission reduction was established. Through field investigation and data analysis, the energy consumption and greenhouse gas emission(GHG) of asphalt produced by hot and warm mix technologies were calculated. The environmental benefits of warm mix were evaluated. The results show that, the environmental benefits of typical warm mix technologies were significantly different. Compared with hot mixture, the Zeolite warm mix technology does not have the benefit of energy conservation and emission reduction, while the mechanical foaming technology has the most prominent environmental benefit, followed by chemical and organic additives warm mix.

keywords: asphalt pavement; warm mix technologies; energy consumption; greenhouse gas emission; energy conservation and emission reduction

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智能网联车冲突区时序与轨迹协同优化模型

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摘　要： 智能网联车的大规模应用为交通冲突区域的优化与管理提供了新的机遇和挑战。以车辆延误和燃油消耗最小为优化目标，构建了智能网联车冲突区域时序与轨迹两阶段优化模型。第一阶段首先引入优化时间区间概念，以车辆平均延误为优化目标，车辆通过冲突区域的最小安全时间间隔为约束条件，构建了车辆进入冲突区域时序的0-1混合整数线性规划模型，并探讨了模型求解算法参数的设置要求。基于第一阶段的车辆最优时序，第二阶段以车辆平均油耗为优化目标，车辆始末状态、速度、加速度和车辆之间的最小安全间距为约束条件，构建了多车最优控制模型。为降低模型求解难度，引入微元法将该最优控制模型转化为非线性规划模型。同时，考虑模型实际应用需求和求解复杂度，提出滚动优化策略；该策略每隔固定时间间隔对控制区域的车辆进行优化，且优化时需要考虑前后两次优化时间区间之间的车辆安全时间间隔约束。最后，为研究不同流量状态对模型结果的影响，设计了不同流量场景的数值仿真实验。结果表明：与不优化时序相比，本文模型和算法能够有效地减少车辆延误和燃油消耗，且最大能够减少 54.23%的车辆延误和 34.36%的燃油消耗。参数敏感性分析表明：滚动优化时间间隔越长，该模型优化效果越好；且车辆通过冲突区域的最小安全时间间隔对模型优化结果影响较大。

关键词： 智能网联车；最优时序；混合整数线性规划；冲突区域；轨迹优化

Integrated Optimization of Scheduling and Trajectories for Connected Automated Vehicles in a Conflict Zone

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Abstract：

　　The large-scale application of connected automated vehicles (CAVs) provides new opportunities and challenges for the optimization and management of traffic conflict zones. A two-level optimization model of scheduling and trajectories for CAVs in a conflicted zone was developed to minimize the vehicles' delay and fuel consumption. In the first level, the concept of planning time interval was introduced. With the average vehicle delay as the optimization objective and the minimum safety time interval of vehicles passing through the conflict zone as the constraint, a 0-1 mixed integer linear programming (MILP) model for the scheduling of vehicles entering the conflict zone was proposed. In addition, the setting requirements of the parameters in solution algorithm of the MILP model was discussed. Then, based on the optimal vehicle schedule in the first level, a multi-vehicle optimal control (MOC) model was developed in the second level, with the average vehicle fuel consumption as the optimization objective and the constraints include vehicle start-end

state, speed, acceleration, and minimum safety distance between vehicles. In order to reduce the difficulty of solving the model, the infinitesimal method was introduced to transform the MOC model into a non-linear programming (NLP) model. In addition, considering the practical application requirements and solving complexity of the proposed model, a rolling optimization strategy was proposed. With the constraints of vehicle safety time intervals between the two optimization time intervals, the vehicles in the control area were optimized at fixed time intervals based on this strategy. Finally, to study the influence of different traffic volumes on the proposed model, the numerical simulation experiments of different traffic scenarios were designed. The results showed that the proposed model and algorithm can effectively reduce vehicle delays and fuel consumption compared with the vehicle schedule without optimization. The maximum reduction is 54.23% of vehicle delays and 34.36% of fuel consumption. Moreover, the sensitivity analysis results indicated that the performance of the proposed model was improved with the increase of the minimum time interval in the rolling optimization strategy. In addition, the performance of the proposed model dependent on the minimum safety time interval of vehicles passing through the conflict zone.

keywords: connected automated vehicle; optimal scheduling; MILP; conflict zone; trajectories planning

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智能网联车环境下的混合交通流稳定性和基本图模型

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摘　要： 考虑到智能网联车辆普及过程中，道路上交通流普遍存在人工驾驶车辆和智能网联车混合行驶的情况，采用全速度差（FVD）模型和由加州大学伯克利分校 PATH 实验室实车验证的 CACC 模型来描述人工驾驶车辆和智能网联车辆的跟驰驾驶行为，构建了混合交通流稳定性解析公式，得出了不同智能网联车渗透率下的稳定性条件：1）当智能网联车辆渗透率小于 77%时，混合交通流存在不稳定速度区间，且随着渗透率的增加，不稳定速度区间逐渐减小；2）当渗透率大于等于 77%时，混合交通流一直处于稳定性状态。随后，推导了不同智能网联车渗透率下的混合交通流基本图模型，并分析了模型参数对基本图的影响：1）自由流速度越大，对应的通行能力也越大；2）最小安全间距和期望车间时距越大，道路通行能力越小；3）与自由流速度和最小安全间距相比，设计较小期望车间时距，能够更大程度上提升混合交通流的通行能力。最后，设计仿真实验，验证了本文模型的有效性。仿真结果表明：不同智能网联车渗透率下，仿真数据与理论曲线有一定的差异，仿真数据虽然有波动，但均在理论曲线两侧，整体上趋势与理论结果一致，证明了文中混合交通流基本图解析结果的正确性和有效性。

关键词： 交通工程；基本图；跟驰模型；智能网联车；稳定性；渗透率

Stability Analysis and Fundamental Diagram for Mixed Traffic Flow in Connected Automated Vehicles Environment

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Abstract：

Considering the popularity of connected automated vehicles, the traffic flow on the road is generally mixed with human-driven vehicles and connected automated vehicles. The full velocity difference (FVD) model and cooperative adaptive cruise control (CACC) model validated by PATH laboratory of University of California, Berkeley, were used to describe the car-following driving behavior of human-driven vehicles and connected automated vehicles. An analytical formula for the stability of mixed traffic flow is constructed and the stability conditions under different penetration rate of connected automated vehicles are obtained: 1) when the penetration rate is less than 77%, the mixed traffic flow has an unstable velocity interval; and with the penetration rates increased, the unstable speed interval gradually decreases. 2) when the penetration rate is greater than or equal to 77%, the mixed traffic flow is always in a stable state. Then, the fundamental diagram model of mixed traffic flow under different penetration rates is derived, and influence of the proposed model parameters on the fundamental diagram is analyzed: 1) the greater the free velocity is, the greater

the traffic capacity will be. 2) The greater the minimum safe gap distance and desired time-gap are, the smaller the road capacity will be. 3) Compared with the free velocity and the minimum safe gap distance, the design of the smaller desired time-gap can increase the capacity of the mixed traffic flow to a greater extent. Finally, the simulation experiment is designed to verify the effectiveness of the proposed model. The simulation results show that there are some differences between the simulation data and the theoretical results under different penetration rates. The simulation data are fluctuating, but they are both on the theoretical curve. The overall trend is consistent with the theoretical results, which proves the correctness and validity of the fundamental diagram analysis results.

keywords: traffic engineering; fundamental diagram; car following; connected automated vehicles; stability; penetration rate

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Dynamic Platoon Dispersion Model Based on Real-Time Link Travel Time

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Abstract：With the advances in intelligent transportation technology, a new challenge for adaptive signal control systems rises. The parameters of the traditional Robertson's platoon dispersion model are based on historical data, which cannot effectively describe the dynamic characteristics of traffic flow and be further applied to adaptive signal control systems. Yet, nowadays there is an unprecedented availability of real-time travel time data with the connectivity provided by the intelligent transportation system (vehicle-to-infrastructure and vehicle-to-vehicle communication). Consequently, this paper realizes the opportunity of real-time travel time data in order to calibrate Robertson's model and further develop a dynamic platoon dispersion model. Then, based on field observations the prediction of the traditional Robertson's model, the proposed model, and the observed data are compared and analyzed. The results show that the proposed model can better capture the law of dynamic dispersion for traffic flow. The reduced average mean square error of prediction can be as much as 16.86% compared with the traditional Robertson's model.

Key words: traffic engineering; platoon dispersion; time-dependent; intelligent transportation; signal coordination

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An Exact Trajectory Optimization Model for a Connected Automated Traffic Stream

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Abstract：Trajectory optimization, a critical problem in connected autonomous vehicle control, has been intensively studied recently. A number of fast heuristic algorithms, such as shooting heuristics (SH) [1], have been developed to meet required time efficiency for real-time applications, but the optimality of their solutions is yet to be quantified. This paper aims to bridge this gap and compare the performance between fast heuristics and exact optimization models. Firstly, we investigate a core trajectory optimization problem as a building block for a variety of trajectory optimization problems, To enable the SH algorithm applicable to this, we adapt it to a fast-simplified shooting heuristic (FSSH) model that can solve the trajectory smoothing problems with different arrival and departure velocities. Then an exact trajectory optimization (ETO) model is formulated as a nonlinear programming problem, which takes vehicle position and velocity profiles as the decision variables, and the fuel consumption and the driving comfort of the whole platoon as the objective function. The constraints of the model are constructed based on vehicle dynamics limits and safety between consecutive vehicles. We prove the convexity of the ETO objective function, which ensures that the ETO model can be solved to the true optimum with the gradient descent algorithms supplied by the Matlab optimization toolbox. Further, 11 groups of numerical experiments with different input parameters and two experiments with real NGSIM data and China's traffic data are conducted. It is found that compared with FSSH, ETO can improve the objective values by a magnitude ranging from a few percent to tens of percent. However, FSSH far outperforms ETO in solution efficiency: the average solution time of FSSH is less than 1 second yet that of ETO is around 500 seconds.

Key words: connected automated vehicle; fuel economy; speed control; trajectory optimization; nonlinear programming

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融合车路交互信息的公路交叉口碰撞风险识别预警方法

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摘　要：现有先进驾驶辅助系统（ADAS）只能依靠车载传感器检测一定范围内的目标，不能满足高速、长距离碰撞预警的要求；此外，它不能用于复杂交叉口的碰撞警告和车辆部分覆盖时的冲突。在车路协同系统（CVIS）的框架下，本研究提出并实现了车辆与路边设备数据的信息交互和目标融合。基于 CVIS 技术信息交互的便利性，设计了车辆与路边传感数据相结合的车载信息交互框架。在提出的基于 CVIS 的 ADAS 预警系统中，车载和路边设备可以根据各自的检测算法分别检测障碍车辆；车载系统接收多源障碍物信息并处理数据融合和地图匹配。基于统一坐标系统中的数据融合，车载识别车辆碰撞风险并实现车辆碰撞预警。该框架的实现可以扩展碰撞警告的范围，提高 ADAS 系统在复杂环境中的适应性。

关键词：车路协同系统；ADAS；碰撞预警；数据融合；地图匹配

Highway Intersection Collision Risk Identification and Warning Method Based on Vehicle-Infrastructure Interaction Information

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Abstract：

The existing advanced driver assistance systems (ADAS) can only detect targets in certain range while relying on in-vehicle sensors, which cannot meet the requirement of collision warning at high speeds and long distances; Moreover, it is incapable for collision warnings at complex intersections and conflict when vehicles partly covered. Under the framework of Cooperative Vehicle Infrastructure System (CVIS), the study proposed and realized the information interaction and targets fusion of vehicles and roadside devices data. Based on the convenience of information interaction of CVIS technology, the in-vehicle information interaction framework integrating vehicle and roadside sensing data is designed. In the proposed CVIS-based ADAS, in-vehicles and roadside devices can separately detect obstacle vehicles based on their respective detection algorithms; the in-vehicle system receives multi-source obstacle information and processes data fusion and map matching. Based on data fusion in a unified coordinate system, the on-board identifies vehicle collision risk and achieves vehicle collision warning. The implementation of this framework can expand the scope of collision warning and improve the adaptability of ADAS system in complex environment.

keywords: cooperative vehicle infrastructure system; ADAS; collision warning; data fusion; map matching

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基于支持向量机的车辆典型行为识别方法及评估

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摘　要： 智能车辆环境感知作为智能车辆的关键技术受到国内外学者的广泛关注。智能车辆的行为识别作为智能车辆环境感知的重要组成部分，能够为智能车辆的控制和决策提供必要的数据支撑，是智能车辆可以安全、可靠运行的前提和基础。因此，准确无误地识别出车辆行为具有十分重要的意义。论文以智能车辆的典型行为识别作为切入点，对车辆姿态和速度特征的提取方法进行研究，基于支持向量机算法完成智能车辆典型行为的识别，并对提出的智能车辆典型行为识别方法进行了实验验证，对智能车辆的实际工程应用有一定的理论意义。

关键词： 智能车辆；环境感知；行为识别；车辆姿态估计；车辆速度估计；支持向量机

Vehicle Behavior Recognition and Evaluation Method Based on Support Vector Machine

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Abstract：

Environment perception of Intelligent Vehicle is the key technology of intelligent vehicle, and the study of the technology grows concern of scholars. The behavior identification of intelligent vehicle is an important part of the intelligent vehicle environment perception. It provides the necessary data for intelligent vehicle control and decision-making, and it's the foundation of intelligent vehicle safety, reliable operation. Therefore, it is of great significance to accurately identify the behavior of the vehicle. The paper takes the typical behavior recognition of intelligent vehicles as the starting point, studies the extraction methods of vehicle pose and speed characteristics, and based on the support vector machine algorithm to complete the identification of typical behaviors of intelligent vehicles, and experimentally verifies the proposed typical behavior recognition method of intelligent vehicles. This has certain theoretical significance for the practical engineering application of intelligent vehicles.

keywords: intelligent vehicle; environment perception; behavior identification; vehicle pose estimation; vehicle speed estimation; support vector machine

基于移动平均方法的混合车流匝道合流控制方法研究

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摘 要：以车辆匝道合流为情景，在匝道汇聚最优控制模型基础上，往受控车流中加入符合 Newell 跟驰模型的模拟人类驾驶行为的车辆，形成混合车流，研究混合车流环境下车辆在匝道安全、高效的合流的策略。提出基于移动平均方法的减速防碰撞控制策略，对该模型的防碰撞效果进行仿真验证，结果表明，移动平均方法可以使得要改变的状态较为平稳地变化，参数的调整可以影响状态改变的快慢。该方法在总油耗及旅行总时间上相比直接停车避让策略也占有优势，可作为混合车流匝道合流控制中，受控车辆改变自身状态防止碰撞的参考。

关键词：混合车流；交口合流控制；移动平均方法

Research on Merging at Highway on Ramps of Hybrid Traffic Flow Based on Moving Average Method

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Abstract：

In the scenario of merging at highway on ramps, a hybrid traffic flow model is proposed to explore a safe, efficient vehicle-merging strategy, based on the optimal cooperative merging model and Newell model is applied to simulate the behavior of human drivers. Moving average method is used as the control strategy to avoid collisions between vehicles and its effectiveness is validated by simulation. The simulation result also shows that this method can change vehicle's state smoothly. Further its superiority in total fuel consumption and total travel time is shown by the comparison between itself and the "stop-go" model. Therefore, moving average method can be the reference of collision-avoidance strategy in the situation of hybrid traffic flow merging on ramps.

keywords: hybrid traffic flow; merging-control at intersection; moving average method

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Architecture Design of Road Safety Transient Early Warning System Under Connected Vehicles Environment

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Abstract：The untimely response and improper disposal of drivers are the main causes of traffic accidents. If dangerous events in the process of vehicle driving can be accurately identified and real-time warning information can be provided to relevant drivers in time, traffic accidents can be effectively reduced. In view of the insufficiency of current studies on real-time discrimination and instantaneous early warning of road dangerous events, this paper designs a general system architecture based on connected vehicles environment for instantaneous warning of different dangerous events. The dangerous event identification scheme based on initiative sending and passive detection, the dangerous event classification method based on chronergy and risk assessment, the interface design of vehicle terminal and the safety early warning method are introduced in detail.

Key words: traffic safety; connected vehicles; traffic hazards; instantaneous warning system; architecture design

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基于路面图像特征匹配的车辆高精度定位

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摘 要： 车辆高精度定位是智能交通运输系统（ITS）的基础性关键技术. 它需要实时适应复杂的道路环境。目前，常用的车辆定位技术有 GPS 定位技术和捷联惯性导航（SINS），但是它们的定位精度、可靠性和实时性都很差，不能满足其在碰撞、视觉增强和自动停车等关键领域的要求。针对上述问题，提出了一种基于路面图像匹配的车辆定位方法，包括 4 个步骤：1）标定：基于张的标定方法，获得摄像机的内外参数。 2）图像预处理：从摄像机参数角度修正路面图像的桶形失真，然后对修正后的图像进行逆透视映射(IPM)运算，获取垂直视图图像。3）特征点的提取：经过预处理，采用改进的 SURF 算法提取路面图像的局部特征。4）匹配：特征点的匹配和轨迹的生成。通过对局部特征点的匹配和验证，计算两个连续路面图像之间的相对平移和旋转偏移量，最终生成车辆的轨迹。为了验证算法的准确性，设计了三种场景。实验结果表明，该算法具有一定的精度，在某些关键的 ITS 应用中，它完全满足定位的要求。他所研究的算法具有分米水平的精度，完全满足车道水平的定位要求。

关键词： 特征提取、图像匹配、智能交通系统、智能车辆和位置测量

Precise Vehicle Ego-Localization Using Local Feature Matching of Pavement Images

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Abstract：

Precise vehicle localization is a basic and critical technique for various ITS applications. It also needs to adapt to the complex road environments in real time. The Global Positioning System (GPS) and the Strap-down Inertial Navigation System (SINS) are two common techniques in the field of vehicle localization. But the localization accuracy, reliability and real-time performance of these two techniques can not satisfy the requirement of some critical ITS applications such as collision avoiding, vision enhancement and automatic parking. Aiming at the problems above, a precise vehicle ego-localization method based on image matching was proposed, which included 4 steps, 1) Calibration. Based on Zhang's calibration method, the internal and external parameters of the camera were acquired. 2) Image Preprocessing. From the camera parameters, the barrel distortion of the pavement images was corrected, and then the Inverse Perspective Mapping (IPM) operation was executed to the corrected images to get the vertical-view images. 3) Extraction of Feature Points. After preprocessing, the local features in the pavement images were extracted using an improved SURF algorithm. 4) Matching of Feature Points and Trajectory generation. Through the matching and validation of the extracted local feature points, the relative translation and rotation offsets between two consecutive pavement images were calculated, eventually the trajectory of the vehicle

was generated. Three scenarios were designed to verify the accuracy of the proposed algorithm. The experimental results show that, the studied algorithm has an accuracy at decimeter-level, and it fully meets the demand of the lane-level positioning in some critical ITS applications.

keywords: feature extraction; image matching; intelligent transportation systems; intelligent vehicles, and position measurement

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Actual Trajectory Planning Method for Mixed Vehicles Considering Traffic Stability and Fule Consumption at the Signalized Intersection

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Abstract： Traffic lights always force the vehicles to stop frequently at the signalized intersection, it leads to excessive fuel consumption, emissions and travel delay. To address these issues, this research firstly takes the IDM (Intelligent Driver Model) car-following model to analyze the string stability of the traffic flow at the upstream of the signalized intersection. Secondly, we proposed a mixed vehicle trajectory planning method based trigonometric model at the signalized intersection of pre-fixed traffic signals. This method takes the PID controller to simulate the actual trajectory when the connected vehicles follow the optimal advisory speed. Essentially, only connected vehicles' trajectories need to be controlled and the normal vehicles just follow connected vehicles with IDM. The model aims to make all vehicles pass the signalized intersection without stopping and minimize traffic oscillation. The results of the MATLAB simulation indicate that the method can make the fuel consumption, NOx, HC, CO_2, and CO decrease 16.1%, 22.2%, 12.9%, 15.4%, 13.3% respectively.

Key words： signalized intersection; traffic oscillation; car-following model; optimal method; traffic simulation

基于实车数据的 CACC 车辆队列纵向控制测试平台

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摘 要：随着电子商务的发展和网络购物需求的增加，道路物流运输压力不断增大。车辆队列技术是解决这一问题的关键，该技术能够有效提高道路交通的安全性与通行效率，是当前缓解交通拥堵、减轻污染与节约能源的重要手段。协同式自适应巡航控制(Cooperative Adaptive Cruise Control, CACC)利用车辆间无线通信技术为车辆编队提供了有效的编队方法。然而，由于该技术的实地测试成本过高、场景受限并具有一定的危险性，CACC 车辆队列纵向控制的测试是一个难题。因此，本文搭建了 CACC 车辆队列纵向控制半物理测试平台，实现了真实车辆数据，真实无线通信传输与车辆队列仿真平台的结合，在尽可能贴近真实的交通状况和网络状况下降低了测试成本与风险，并在此平台上研究多种交通场景下不同的通信延时对车辆队列纵向控制性能的影响。结果表明，该测试平台利用实车数据得出的测试结果，与理论推导的结果相吻合。

关键词：车辆队列；协同式自适应巡航控制；实车数据；纵向控制

CACC Platoon Longitudinal Control Test Platform Based on Real Vehicle Data

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Abstract：

With the development of e-commerce and the increasing demand for online shopping, the pressure of logistics transportation continues to rise. Vehicle platoon is the key to solve this problem. This technology can effectively improve the safety and efficiency of road traffic, which is an important means to alleviate traffic congestion, reduce pollution and save energy. CACC provides an efficient method for vehicle platooning by using inter-vehicle wireless communication technology. However, due to the high costs, limited scenarios and certain risks of field test, the CACC platoon longitudinal control test is still a difficult problem. Therefore, this paper builds a CACC platoon longitudinal control semi-physical test platform, which succeed in combining real vehicle data, real wireless communication transmission and vehicle platoon simulation platform, reducing the costs and risks of the experiment as closer as possible to the real traffic and network conditions, and do research on the effects of different communication delays on the longitudinal control performance of the vehicle platoon in various traffic scenarios. The results show that the test results obtained by the test platform using real vehicle data are consistent with the theoretical derivation results.

keywords: vehicle platoon; CACC; real vehicle data; longitudinal control

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Improving Bus Schedule Adherence Based on Dynamic Intersection Signal Control and Speed Guidance

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Abstract：With the help of GPS equipments, dynamic bus control can be achieved in real time; i.e., control bus operating speed through bus drivers on road sections and adjust signal timing plans through signal controllers to improve the schedule adherence. In this paper, the bus route is partitioned into three types of sections: stop, road section and intersection. The optimization objective is developed based on the weighted sum of bus punctuality at the downstream stop and saturation degree deviations of intersections. We develop a new dynamic programming model that jointly optimize the bus operating speeds at road sections and signal timing plans of multiple cycles at intersections. An illustrative case study is performed to verify the proposed model. It reveals that based on the proposed strategy, the objective value could be reduced by 69.13%, which indicates that the punctuality is highly improved but not to incur excessive negative effect for other normal vehicles.

Key words: bus schedule adherence; speed guidance; signal control; dynamic programming

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Characteristics and Model of Vehicle Flow Fluctuation Based on Molecular Dynamics

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Abstract：Vehicle following behavior is affected by the leading vehicle and road environment, Its operating speed and acceleration present random fluctuations. Abstract the vehicle into interacting molecules, Construct molecular following model based on molecular dynamics. Collect the traffic flow characteristic data of test section sample points, Study vehicle speed and acceleration fluctuation characteristics, Derive acceleration wave exponent model from the molecular following-up model. Based on the acceleration wave index characteristic, Analyze the relationship between acceleration fluctuation and vehicle flow status systematically, Study the evolution law of traffic flow in free flow state, synchronous flow state and blocking flow state. Traffic flow fluctuation is the spontaneous behavior of driving vehicles to restore dynamic balance by the driving or stimulation of traffic events, It provides theoretical basis for dynamic characteristics of traffic flow under the background of intelligent network traffic.

Key words: transportation system engineering; molecular dynamics; following theory; fluctuation characteristic

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智能网联车环境下考虑反应时间影响的基本图模型

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摘 要： 随着智能网联车的普及，道路上将普遍存在智能网联车与人工车混行的状况。由于对这两种车辆操控的对象不同，车辆应对突发情况需要的反应时间也不同。因此为研究反应时间影响时智能网联车环境下异质交通流的性质，采用智能驾驶员模型模拟人工车和智能网联车的跟驰行为，在此基础上考虑不同跟驰模式的反应时间，首先推导出了包含智能网联车比例的混合交通流宏观基本图模型；其次，分析了模型中参数对混合交通流通行能力的影响，其中：1）自由流速度越大，混合交通流的通行能力越大；2）最小车头间距越大，混合交通流的通行能力越小，且最小车头间距每增加 0.2m，混合交通流的最佳密度减小量约为 0.15veh/km，对应的最大流量减小量约为 10veh/h；最后，设计仿真实验验证了本文模型的有效性。仿真结果表明：不同智能网联车比例下仿真数据的分布虽与理论曲线略有差异，但总体在理论曲线两侧，整体上与理论结果一致，从而证明了本文宏观交通流基本图模型的正确性。

关键词： 智能网联车；异质交通流；反应时间；跟驰模型；宏观基本图

Macroscopic Fundamental Diagram Model of Heterogeneous Traffic Flow Under the Impact of Reaction Time in Connected Automated Vehicles Environment

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Abstract：

With the popularization of connected automated vehicles, the situation will be common that human-driving vehicles and the connected automated vehicles will drive on the road simultaneously. Since the drivers in those two kinds of vehicles are different, their reaction times differ too. Therefore, to study the characteristic of heterogeneous traffic flow under the impacts of reaction time in connected automated vehicles environment, the intelligent driver model is employed and the reaction time is considered too. Firstly, the macroscopic fundamental diagram for mixed traffic flow which considers the ratio of connected automated vehicles is formatted under the influence of reaction time. Secondly, the influence of parameters in the model on the capacity of mixed traffic flow is analyzed: 1) The greater the free flow speed is, the greater the capacity of the mixed traffic flow will be; 2) The smaller the minimum head spacing is, the smaller the capacity of the mixed traffic flow will be, and the minimum headway spacing is increased by 0.2 m, the optimum density of the mixed traffic flow is reduced by about 0.15veh/km, and the corresponding flow reduction is about 10veh/h; Finally, the design simulation experiments verify the validity of the model. The simulation results show that the distribution of simulation data under different connected automated

vehicles ratios is slightly different from the theoretical curve, but it is consistent with the theoretical results on both sides of the theoretical curve. This proves that the basic traffic flow model of this paper is correct.

keywords: connected automated vehicles; mixed traffic flow; reaction time; car following model; macroscopic fundamental diagram

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智能汽车硬件在环测试台转向随动系统研究

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摘 要： 为了解决智能汽车硬件在环测试台架的转向随动问题，实现不解体检测智能汽车的转向性能。在传统的车辆综合性能检测台的基础上，提出了以伺服电机系统为控制对象的转向随动系统，研究了基于距离传感器的前馈复合控制策略对于转角跟随的影响，实现了转向台转角趋近于轮胎转角的目的。首先，被测智能汽车置于转向随动系统的转向台上，轮胎转向带动转向台转动实现被测智能汽车的转角采集。其次，在左右转向台上分别安装一对激光传感器作为控制系统的前馈信息采集器采集转角差，降低转向随动系统中轮胎转角传递给转向台的延迟。然后，将前馈转角差和驱动转向台的伺服电机转速与比例系数 Kp 建立两输入单输出的模糊控制关系，以实现不同类型车辆与台架转向随动系统的匹配。最后，依据传感器采集的数据和仿真实验调整参数，实现模糊控制器的优化控制。将被测智能汽车在改进的测试台上进行不同角速度实验。实验结果表明，无人车方向盘角速度为 $\pi/6$ 时，90%的误差数据分布在 2.3001° 以内；无人车方向盘角速度为 $2\pi/9$ 时，90%的误差数据分布在 2.0256° 以内；无人车方向盘角速度为 $5\pi/18$ 时，90%的误差数据分布在 1.8933° 以内；无人车方向盘角速度为 $\pi/3$ 时，90%的误差数据分布在 2.4633° 以内。

关键词： 智能汽车检测；硬件在环测试；底盘测功机；转向随动；模糊自适应 PID 控制

Research on Turn Following System of Intelligent Vehicle Hardware-in the Loop Test Bed

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Abstract：

In order to solve the problem of steering follow-up of intelligent vehicle hardware-in-the-loop test bed and realize the non-disassembly steering performance test of intelligent vehicle, a steering follow-up system with servo motor system as control object is proposed on the basis of traditional vehicle comprehensive performance test bench. The influence of angle following of feed forward compound control strategy based on distance sensor is studied, in order to make the turning angle of steering platform approach to the tire angle. Firstly, the intelligent vehicle is placed on the steering platform of the steering follow-up system, and the tire steering drives the steering platform to realize the angle acquisition of the tested intelligent vehicle. Secondly, a pair of laser sensors are installed on the left and right steering platforms as feed-forward information collectors of the control system to collect the angle difference, so as to avoid the delay of tire angle transmission to the steering platforms in the steering follow-up system. Then, a two-input-one-output fuzzy control relationship is established between the feed-forward angle difference and the rotational speed of the servo motor driving the steering platform and the proportional coefficient Kp, so as to realize the matching

between different types of vehicles and the steering servo system of the platform. Finally, the parameters are adjusted according to the data collected by sensors and simulation experiments to realize the optimal control of the fuzzy controller. Different angular velocity experiments are carried out on the improved test bench. The experimental results show that when the steering wheel angular velocity of the UAV is pi/6, 90% of the error data are distributed within 2.3001 degrees. When the steering wheel angular speed of UAV is 2 pi/9, 90% of the error data are distributed within 2.0256 degrees. When the steering wheel angular speed of UAV is 5 pi/18, 90% of the error data are distributed within 1.8933 degrees. When the angular speed of steering wheel of unmanned vehicle is pi/3, 90% error data are distributed within 2.4633 degrees.

keywords: intelligent vehicle detection; hardware in the loop test; chassis dynamometer; steering servo; fuzzy adaptive PID control

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Optimal Variable Speed Limit Control in Connected Autonomous Vehicle Environment for Relieving Freeway Congestion

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Abstract：This study presents an optimal variable speed limit (VSL) strategy in a connected autonomous vehicle (CAV) environment for a freeway corridor with multiple bottlenecks. The VSL control is developed by using an extended cell transmission model (CTM) which takes capacity drop and mixed traffic flow (including traditional human-driven cars and heavy vehicles, and autonomous vehicles (AVs)) into account. A multiple-objective function is formulated which aims to improve the operational efficiency and smooth the speed transition. Genetic algorithm (GA) is adopted to solve the integrated VSL control problem. A real world freeway stretch is selected to test the designed control framework. Sensitivity analyses are performed to investigate impacts of both the penetration rate of CAVs and communication range. Simulation performances demonstrate that the developed VSL control not only improves the overall efficiency, but also reduces the tailpipe emission rate. Simulation results also show that the VSL control integrating vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and infrastructure-to-vehicle (I2V) outperforms the VSL control only. In addition, as the penetration rate of CAVs increases, better performances can be achieved.

Key words: variable speed limit; connected autonomous vehicle; optimization; multiple bottlenecks

封闭测试场条件下基于 DSRC 的车联网通信性能测试

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摘 要： 近年来，车联网通信成为新一代智能交通系统的关键技术，在大规模的应用及推广之前，其性能有待于系统完善的测试评价。专用短程通信（DSRC）是车联网的主要技术之一，针对 DSRC 测试评价的需求，在封闭测试场环境下构建了多个典型车联网应用场景。制定了详细的测试方案，以丢包率和时延为评价指标，测试分析了速度、距离、遮蔽物等因素对 DSRC 通信性能的影响。测试结果表明，通信距离和遮蔽物是造成 DSRC 通信性能下降的主要因素。

关键词： 封闭测试场；车联网；DSRC；性能测试；丢包率；时延

DSRC-Based Vehicle Network Communication Performance Test in Closed Test Field

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Abstract：

In recent years, the Internet of Vehicles communication has become the key technology of the new generation of intelligent transportation systems. Before the large-scale application and promotion, its communication performance needs to be systematically tested and evaluated. Dedicated short-range communication (DSRC) is one of the main technologies of the Internet of Vehicles. For the requirements of DSRC test evaluation, a number of typical vehicle networking application scenarios are constructed in a closed test field environment. A detailed test plan was developed, and the packet loss rate and delay were used as evaluation indicators to analyze the effects of speed, distance, and shielding on DSRC communication performance. Test results show that communication distance and shielding are the main factors that cause DSRC communication performance to decline.

keywords: closed test field; the internet of vehicles; DSRC; performance testing; packet loss rate; delay

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Cooperative Control for Connected Vehicle Platoon on Curved Road

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Abstract：This paper is concerned with the problem of designing a decentralized consensus controller for connected vehicle platoon drive on the curved road. The consensus controller is proposed to consider the states of immediate vehicles and the characteristics of curved road based on the third-order dynamic model. In particular, the longitudinal and lateral collaborative controllers for vehicle platoon are present. Then, the stability of proposed longitudinal and lateral controllers is analysed by Hurwitz stability criterion. Furthermore, the numerical experiments are conducted to verify the effectiveness of the proposed controllers. Finally, the result analyses is illustrated to show the performance of the proposed controller.

Key words：curved road; collaborative control; stability analysis; numerical simulation

Communication Delay Boundary Modeling for Homogeneous CACC String Stability

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Abstract：With the rapid increasing of electronic commerce, the logistics industry becomes prosperous meanwhile the road transportation experiences more and more stress. Platoon is a key technique to improve the traffic safety and efficiency and reduce the fuel consumption, which can mitigate the problem above-mentioned. However, communication delay is a nature for the platoon in Cooperative Adaptive Cruise Control (CACC) mode. The delay could cause string instability and even traffic emergency. Therefore, this paper proposes a model to calculate the delay boundary according to current vehicle dynamic, e.g., actuator lag τ, and CACC controller parameters, e.g., time headway td and feedback gains. The work can provide an objective bound for practitioners or engineers so that they can determine whether the wireless Inter-Vehicle Communication (IVC) system is qualified or not to maintain the string stability for current vehicle system and selected CACC controller. Simulations are performed to verify the correction of the proposed model. The results show that, the disturbance of speed and spacing in upstream of platoon starts to be amplified when the pre-setting delay exceeds the modeled delay boundary.

Key words: communication delay boundary modeling for homogeneous CACC string stability; platoon; Cooperative Adaptive Cruise Control (CACC); longitudinal control; Constant Time Gap (CTG) policy

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A Model Based Mainstream Traffic Controller for Mixed Manual/Automated Traffic Flow

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Abstract：Deploying AVs are expected to address the issues (e.g., high costs of fixed-point sensors and relatively low driver compliance) encountered by existing variable speed limits (VSL) systems. However, the appealing scenario that 100% AVs are on motorways is seen as a long-term goal. Therefore, this study explores the utilization of AV technologies in VSL systems under mixed traffic conditions where AVs coexist with manually driven vehicles. In this paper, a VSL system using AVs as a source of data is presented. More specifically, an Extended Kalman Filter (EKF) based data assimilation method is proposed to estimate system variables (i.e., density, speed, critical density and compliance rate) from the collected AV data. Following this, a Model Predictive Control (MPC) scheme is adopted to solve the optimal AV data based VSL control problem on the basis of estimated system variables. Finally, the efficiency of the proposed system is verified against a real motorway section in New Zealand using micro-simulation. The results revealed that the proposed VSL offers an effective solution for future traffic control.

Key words: traffic control

基于长短时记忆网络的车载网络入侵检测算法研究

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摘　要：智能化网联化进程的深入推动着交通大环境的技术变革，利用通信技术实现多元资源共享和信息交互，达到人、车、路、环境的协同化。与此同时，面临的信息安全问题也愈发突出，因此智能网联汽车应用和普及的前提需要解决汽车信息安全问题。本文旨在研究利用深度学习技术——应用学习时间序列的长短时记忆神经网络，提取车载网络数据的特征，设计智能网联汽车车载网络数据的预测算法，实现对车载网络的异常检测，实现低误报、高检测率的入侵检测。

关键词：智能网联汽车；网络安全；长短时记忆网络；异常检测

Research on Intrusion Detection Algorithm of In-Vehicle Based on Long Short-Term Memory Network

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Abstract：

The process of intelligent networked integration is in-depth, continuously promotes technological changes in the transportation by using communication technology to achieve multi-resource sharing and information interaction， and achieve synergy between people, vehicles, roads and the environment. At the same time, the cyber Security issues faced by automobiles are becoming more prominent, so the premise of intelligent connected vehicles （ICVs） applications and popularization needs to solve cyber security problems. This paper aims to study the Long Short-Term Memory （LSTM） neural network to learn time series. After extracting the characteristics of the vehicle network data, and then design the prediction algorithm of the CAN bus data to realize intrusion detection of the attack on the vehicle network with low false positives and high detection rate.

keywords: intelligent and connected vehicle; cyber security; Long Short-Term Memory neural network; anomaly detection

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基于 MPC 的自动驾驶紧急换道控制策略研究

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摘　要：随着传感器技术和信息处理技术的发展，自动紧急刹车(Autonomous Emergency Braking ， AEB)作为一项保证行车安全的重要技术在车辆中的应用越来越多。现有 AEB 多借助毫米波雷达识别车辆前方障碍物，在车辆与前方障碍物之间的距离大于车辆当前速度下的最小刹车距离时，AEB 可以控制车辆制动，避免碰撞发生，但是当刹车距离不足时，AEB 只能将碰撞速度降至最低，无法避免碰撞发生。针对该问题，考虑紧急换道过程中的车辆自身状态，在安全距离约束的基础上加入车辆的质心侧偏角约束和侧向加速度约束，设计了具有多种约束条件的 MPC 控制器实现自动驾驶车辆的紧急换道。随后进行了仿真测试和实车验证，结果表明该 MPC 控制器可以在获取前方障碍物信息后有效地控制自动驾驶车辆进行紧急换道行为。

关键词：自动驾驶；路径规划；紧急换道；MPC 策略

Research on Automatic Emergency Line Change Control Strategy Based on MPC

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Abstract：

With the development of sensor and information processing technologies, Autonomous Emergency Braking (AEB) is increasingly used in cars as an important technology to ensure driving safety. When the distance between the vehicle and the obstacle is greater than the minimum braking distance, the AEB can control the vehicle to brake to avoid collision, However, when the braking distance is insufficient, the AEB can only minimize the collision speed to avoid the collision. Aiming at this problem, the vehicle's own state is considered during the emergency lane change process. Morever, the vehicle's centroid side angle constraints and lateral acceleration constraints are imported as the safety distance constraints. The model predictive controller based on these constraints is designed to realize the automatic emergency lane change of the vehicle. The subsequent simulation tests and real vehicle experiments prove that the MPC strategy can effectively control the automonous vehicle for emergency lane change with the obtained information of the obstaicle.

keywords: autonomous driving; path planning; emergency line change; MPC strategy

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Effect of Customized Bus Services on Evolution of Multiple Travel Modes for Heterogeneous Commuters

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Abstract：As a new public transport mode, customized bus (CB) can provide advanced, bookable, and comfortable services to commuters. For heterogeneous commuters, there are more alternative travel modes to select in their daily travelling. This paper aims at testing the effect of different travel modes including conventional bus, customized bus and automobile on decision behavior of heterogeneous commuters who are car-owners and non-car-owners. The generalized travel cost is defined as the linear weighted sum of economic cost, total travel time and extra-waiting-cost which even consider the commuters' travel comfort level in the trip time. An evolutionary game model based on replicator dynamics is formulated. The stability of the model under different conditions and existence and uniqueness of its solution are theoretically proven. To show the dynamic evolution features of generalized travel cost (unit distance economic cost of CB, extra-waiting-cost), travel distance of commuters and proportion of car-owners, a specific simulation is conducted on a test OD pair. The simulation indicates that while the distance of commuters is longer (more 23km), the advantage of customized bus is obvious in the urban traffic.

Key words: urban traffic; customized bus; travel mode; evolution game; heterogeneous commuters

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智能车联网中基于 MDP 的服务迁移策略的研究

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摘 要：随着智能交通的发展，出现了各种各样的计算密集型，时延敏感型车辆应用。由于传统的智能车辆的计算能力较差，以及将应用程序卸载到远程云的回程资源不足，研究人员提出了移动边缘计算(Mobile Edge Computing, MEC)和车辆互联网(Internet of Vehicles, IoV)的集成架构来解决这些问题。然而，这种预想的整合遇到各种挑战，最主要的挑战之一是现有的切换卸载管理方案不能直接应用到整合后的场景中，因为其在进行切换决策时忽略了车辆的移动性以及边缘服务器的负载情况。为了满足 IoV 中计算服务迁移方案的要求，提出了在车辆移动过程中考虑通信、计算以及 MEC 服务器的负载等因素的基于马尔可夫决策过程(Markov Decision Process, MDP)的计算服务迁移决策方案。通过考虑当前的即时回报以及一定比例的未来回报来最小化车辆计算任务的时延得到最优切换卸载策略。通过与常规切换方案对比，结果表明此方案得到的迁移策略可以有效地降低车辆计算任务的时延以及服务迁移的次数。

关键词：马尔科夫决策过程；移动边缘计算；切换决策；车联网

The Research of Service Migration Strategy Based on MDP in Internet of Vehicles

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Abstract：

With the development of smart transportation, various of computation-intensive and delay-sensitive vehicle applications have emerged. Due to the poor computing capacity of the intelligent vehicles and the deficient backhaul resource of the offloading the application to remote cloud, the researchers proposed the integrated architecture of Mobile Edge Computing (MEC) and Internet of Vehicle (IoV) to address the encountered issues. However, the proposed integration encountered various challenges, one of which was that the existing handover offloading management scheme could not be directly applied to the integrated scenario, because it ignored the mobility of vehicles and the load of edge servers when making handover decisions. In order to meet the requirements of the service migration scheme in IoV, the handover decision scheme based on Markov Decision Process (MDP) is proposed to provide a handover strategy during the vehicles' movement by considering the communication, computation factors and the load of MEC servers. The scheme makes handover decision to minimize the delay of the vehicles' computing tasks by considering current immediate rewards and a certain percentage of future rewards. The simulation results show that the proposed scheme can significantly improve the vehicles' quality of service while reducing the number of service migrations.

keywords: Markov Decision Process; mobile edge computing; handover decision; internet of vehicles

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公众对无人驾驶和人工驾驶事故的严重程度的不同判断

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摘 要：大规模采用无人驾驶汽车有望大幅降低交通事故。但是无人驾驶不可能消除所有交通事故。本研究考虑公众对无人驾驶汽车所造成的事故和传统人工驾驶汽车所造成的看法。一共招募 360 名参试者，随机分为三组，分别对应两种无人驾驶汽车（它们的安全性是人类司机的平均水平的一倍和五倍）和一种人工驾驶汽车（安全性是人类司机的平均水平）。发现参试者认为这两种无人驾驶汽车所造成的事故更为严重。人们对无人驾驶汽车所造成的事故可能存在过度反应。在推广无人驾驶汽车过程中，需要考虑公众对相关事故的反应。

关键词：无人驾驶汽车；交通事故；严重程度；过度反应

Different Levels of Perceived Severity of Crashes Caused by Self-Driving Vehicles and Human-Driven Vehicles

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Abstract：

Wide adoption of self-driving vehicles (SDVs) promises to largely reduce the number of traffic crashes. However, it cannot eliminate all traffic crashes. This study considered people's evaluations of traffic crashes caused by SDVs and human-driven vehicles (HDVs). A total of 360 participants were recruited, who were randomly assigned into one of the three conditions: two SDVs, the safety levels of which were manipulated to be the average safety performance of all human drivers and 5 times safety of the average safety performance of all human drivers, and an HDV, the safety levels of which was manipulated to be the average safety performance of all human drivers. Participants perceived the traffic crashes caused by the two SDVs to be more severe than that caused by the HDV. It implies that people might have over-reactions to traffic crashes caused by SDVs. We need to pay attention to people's reactions to crashes relevant to SDVs in the deployment process of SDVs.

keywords: self-driving vehicles; traffic crashes; perceived severity; over-reaction

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基于驾驶模拟器利用 fNIRS 的驾驶员直行工况晕车状态与脑活动的关联性研究

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摘　要：为了更好地探究自动驾驶的汽车和电动汽车上出现的晕动病的发病机理，基于六自由度驾驶模拟器和非侵入式功能性近红外光谱技术（fNIRS），收集了直行工况下 52 位参与者的驾驶数据与大脑数据并对它们进行差异性分析。结果表明，大脑区域的活跃度按 BA6、BA17 和 BA18 区域最活跃，接着是 BA1、BA2、BA3 和 BA4 区域，最后是 BA8、BA10 和 BA40 区域依次递减；直行工况下与晕动病相关的大脑 Brodmann 区域会有不同的反应。此研究结果有助于从大脑的角度更好地去研究晕动病，并对车辆自动驾驶技术的发展具有重要的意义。

关键词：非侵入式功能性近红外光谱技术；晕动病；驾驶模拟器；脑活动

Study of Relationship Between Brain Activity and Motion Sickness of Drivers Using fNIRS Based on the Driving Simulator Under Straight Driving

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Abstract：

　　The driving and brain data from 52 participants under the straight driving were collected and their differences were analyzed to better explore the pathogenesis of motion sickness which appears on automated vehicles and electric vehicles, based on the six-degree-of freedom driving simulator platform and noninvasive functional near-infrared spectroscopy (fNIRS). The results show that the BA6, BA17 and BA18 areas of brain have the highest degree of activity, followed by the BA1, BA2, BA3 and BA4 areas, and the BA8, BA10 and BA40 areas in the decreasing order. Brodmann areas of brain associated with motion sickness may differ under the straight driving. The research results can make the motion sickness be better understood from the perspective of the brain, and have important significance for the development of autonomous driving.

keywords: functional near-infrared spectroscopy; motion sickness; driving simulator; brain activity

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城市高架路入口匝道车头时距分布研究

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摘 要：为了研究不同类型高架路入口匝道处的车头时距规律，在临近成都市二环高架路内环（双车道）的高层建筑上进行摄像，采集整理交通数据，并利用拟合分析和 检验对车头时距分布情况进行研究。结果表明，直接式加速车道合流区内侧车道车头时距服从 M3 分布和移位的 6 阶 Erlang 分布，但采用 M3 分布的拟合优度更优；外侧车道车头时距服从 M3 分布。平行式加速车道合流区内侧车道、外侧车道和加速车道均服从对数正态分布。研究结果可为城市高架路主线路段车辆运行状态奠定基础，并提高入口匝道仿真的精细化程度。

关键词：交通运输系统工程；车头时距；卡方检验；入口匝道

Study on the Time Headway Distribution of the On-Ramp Metering in Urban Elevation Expressway

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Abstract：

In order to study the time headway regularity of different types of the on-ramp metering, video on the high-rise buildings near the inner ring (two lanes) of the second elevated ring road in Chengdu. Collecting and sorting the traffic data, use fitting analysis and chi-square test to study the time headway distribution. The results show that the time headway of the inner lane in the merge area of the direct accelerating lane follows the M3 distribution and 6-order Erlang distribution, but the fitting degree of M3 distribution is better. The time headway distribution of the outer lane follows the M3 distribution. The inner lane, the outer lane and the accelerating lane of parallel accelerating lane are all subject to lognormal distribution. The research results can lay a foundation for the operation state of main road section of urban elevation and improve the precision of on-ramp simulation.

keywords: engineering of communication and transportation system; time headway; chi-square test; on-ramp

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公众对自动驾驶汽车的接受度研究

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摘　要： 本研究将初始信任和主观范式纳入技术接受模型(TAM)，提出了自动驾驶汽车接受度模型。设计并收集了 395 份问卷对模型的有效性进行了验证。结果显示初始信任是自动驾驶汽车接受度的最关键、最直接的决定因素，它也可以中介其他因素（比如感知有用性和主观规范）对行为意图的影响。此外，在集体主义文化占主导地位的中国，主观范式也是影响自动驾驶接受度的重要因素。

关键词： 自动驾驶；科技接受度；初始信任

Public's Acceptance of Autonomous Vehicles

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Abstract：

This study aimed to investigate factors that determine public's acceptance of autonomous vehicles (AVs) by proposing and empirically testing an acceptance model. The model was developed by incorporating two factors, trust and subjective norm, into the Technology Acceptance Model. The validity of the model was confirmed with a structure equation modeling analysis based on the data collected from 395 survey samples. It was found that trust was the most critical determinant of users' acceptance of AVs and offered a way for other factors (i.e. perceived usefulness and social norm) to impact AV acceptance. Subjective norm was also identified as an important factor in shaping users' usage intention, at lease in China dominated with a collectivistic culture. Findings from this study provide some guidelines in improving AV products to attract users.

keywords: autonomous driving; technology acceptance; initial trust

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Exploring Consumers' Preferences on Functionality Design of Shared Autonomous Vehicle Based on a Bayesian-Efficient Choice Experiment

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Abstract：With the rise of Mobility as a Service (MaaS), shared autonomous vehicle (SAV) is expected to play an important role in the future mobility. Fully automated vehicles will come with no steering wheel and the inner space of an autonomous vehicle (AV) is no longer just a place for ride. An AV can also be used as a moving mini-office, sleeping cabin or even a game room. The coming future will be full of high level AVs (level 4 and 5), and in such a future what additional services can be provided to travelers apart from satisfying their need of moving from A to B? Specifically, what functions should an SAV be equipped with to meet travelers' diversified needs better? In this paper, in order to explore travelers' preferences for SAV functionality (working, resting and entertaining). A Bayesian-efficient choice experiment involving 24 hypothetical scenarios was designed and used to generate the experiment with priors obtained from a pilot sample. It is worth mentioning that this paper introduces the process and content of Bayesian-efficient choice experimental design in detail. Based on the data from 1200 field observations, an MNL model was estimated and the importance of variables such as cost, waiting time, in-vehicle time, Wi-Fi, car brand, number of shared passengers and trip purpose was verified. Preferences for SAV's functionality are found to be varied across socio-demographics with younger people showing greater interest in non-standard SAV. Meanwhile, highly-educated people and those with 3+ years of driving experience shows significant heterogeneity in their preferences for SAV design and functionality. These findings suggest that a mix of SAV fleet with different shapes, sizes, and functions is likely to work best in the Chinese market.

Key words: Bayesian efficient experiment; shared autonomous vehicle; choice behaviour; consumers' preference; functionality design

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自动驾驶汽车公众接受度与支付意愿研究综述

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摘　要： 自动驾驶汽车接受度（含支付意愿）调查是获取公众对自动驾驶汽车态度的重要途径。本文系统梳理了目前已发表的几乎所有关于自动驾驶汽车公众态度方面的调查研究成果，共 54 项。分别从调查者、调查对象、调查方式、样本量等多个方面进行了总结。然后，对调查结果进行了综述，利用社会人口属性、态度、当前行为和出行特征四大类解释变量对通常接受度、支付意愿和使用意愿三大类反应变量进行了详尽解释。最后，基于上述分析，对自动驾驶汽车接受度调查本身和结果进行了总结，并提出了关于自动驾驶汽车接受度调查可能改进的方面和进一步研究的方向，包括规范实验设计、精细化调查内容、如何提高公众接受度和将预期值与真实值进行对比分析研究。

关键词： 自动驾驶汽车；公众接受度；支付意愿；调查；文献综述

Public Acceptance and Willingness to Pay for Automated Vehicles: A Review

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Abstract：

Acceptance survey (including willingness to pay) of automated vehicles is an important way to gain knowledge on public acceptance of automated vehicles. This paper systematically sorted out almost all the published investigation researches of public attitude towards automated vehicles with 54 surveys in total. Seeing from the aspects of investigators, survey objects, survey methods and sample size, the results of these surveys were summarized. Then, a review has been done based on the results. Three major categories of responses including general acceptability, willingness to pay and willingness to use were explained in detail using four categories of explanatory variables, including socio-demographic attributes, attitude, current behavior and travel characteristics. Finally, based on the above analysis, the research findings were concluded, and the possible improvements and further research directions on the acceptance survey of automated vehicles were pointed out, including standardizing the experimental design, refining the content of the investigation, improving the public acceptance and comparing the expected value with the true value.

keywords: automated vehicles; public acceptance; willingness to pay; investigation; literature review

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Human Factor Considerations on Timing of Driver Taking over in Automated Driving Systems: A Literature Review

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Abstract：Driving automation leads to meaningful changes of driver roles, from the primary party responsible for execution of all dynamic driving tasks to supervision of selective tasks in automated driving systems with varying levels of automation. In partially automated systems, drivers are required to resume control occasionally, either voluntarily or involuntarily. This paper aims at exploring human factors influencing the course of take-over. Through a review of a large body of literature and a summary of observations, some particularly influential driver-related issues are identified. These issues include mental workload and distraction, situation awareness, and trust. Based on the consideration of these issues, the timing and the efficiency of take-over are analyzed.

Key words: transition of control; partial automation; human factors

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"中国·梦都"旅游公路设计策划研究

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摘 要：旅游公路是一种复合旅游产品和通行功能的新型公路，是"交通+"模式的发展和实践，本文对旅游公路设计策划方法及流程进行研究，探讨旅游公路设计理念及设计要点在实际工程中的应用，对我国的旅游公路建设具有一定的参考借鉴价值。

关键词：旅游公路；设计理念；设计流程

Research on the Design Planning of "China·Dreamland" Tourist Highway

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Abstract：

Tourist highway is a new type of highway which compounded tourism products and traffic. It is the development and practice of "traffic plus" mode. This paper studies the design planning method and flow of tourist highway, and discusses the application of design concept and design points in practical projects. It is high reference value for the construction of tourist highway in China.

keywords: tourist highway; design concept; design flow

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基于空间句法的阆中古城街道游览空间可达性分析

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摘 要：在经过现场调查的基础上，运用空间句法对阆中古城街道游览空间的可达性进行解析，同时对总体游览空间的量化数据进行对比分析后得出，在整个阆中古城游览空间中对于整合性、控制性、开放性和便捷性都较高的游览空间，如下沙河街（中、西段），其可达性也较高而易于集中人流，适合于开展一些商业和文化等旅游活动，以促进旅游经济的发展和旅游文化的推广。本文解析了阆中古城街道的游览空间与人类活动之间的关系，以期为阆中古城旅游活动的进一步开展提供理论依据和指导作用。

关键词：阆中古城；空间句法；可达性；游览空间

The Analysis of Langzhong Ancient Town Street Touring Spaces by the Space Syntax

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Abstract：

This paper is based on the investigation of locale, and using the space syntax to analyze the reachability of Langzhong ancient town touring spaces, then analyzing the overall touring spaces's quantitative data. The result shows that the Integration, controlling, openness and convenience of touring spaces are high throughout the Langzhong ancient town touring spaces, such as Xiashahe street, and its reachability is also high and people concentrate there easily, it also conducive to commercial and cultural tourism activities, to promote the development of tourism economy and the popularization of tourism culture. This paper analyzes the relationship between touring spaces and human activities in Langzhong ancient town, which could provide theoretical basis and play the guiding role on the further development for tourism activities of Langzhong ancient town.

keywords: Langzhong ancient town; space syntax; reachability; touring space

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六盘水市城乡公路交通网络发展过程及其可达性演化特征

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摘　要：选择六盘水市为研究对象，分析了六盘水市建市以来公路交通网络发展阶段、公路交通网络规模与等级结构变化演化特征，选取了 1990、2000、2010、2016 年四个截面，并以市内 90 个城镇节点分析公路交通网络可达性、区位优势度的演化特征。结果表明：①六盘水市建市以来的公路交通网络发展历经划分为：规划、准备阶段（1978-1990 年）—初步建设阶段（2001 年-2010 年）—快速发展阶段（2001-2010 年）—路网高等化发展阶段（2011-2016 年）四个阶段。②六盘水市城乡公路交通网络规模不断扩大，区内公路交通网等级结构日趋完善，等级公路里程呈现波动增长的趋势，"四横二纵一环线"公路交通网络框架形成基本。③1990-2016 年六盘水市城乡交通可达性显著提高，可达性时空离散程度表现出聚集—均衡—聚集的发展过程，其空间格局整体上呈现从南北廊道向东同心圆拓展态势。④1990-2016 年六盘水市城乡交通区位优势度分布表现出从聚集向均衡性逐步发展态势，总体区位优势度空间格局呈现出"多中心圈层——中心圈层与轴线并行——轴线延展——短时圈连片发展"阶段性演化特征。提出建立"两极、两重心"空间区域结构和构筑完善的公路交通网络空间格局的建议。

关键词：六盘水；公路交通网络；时空演化；可达性；区位优势度

Development History and Accessibility Evolution of Road Traffic Network in Urban and Rural Areas of Liupanshui

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Abstract：

This paper chooses Liupanshui as the research object, analyzed the development stage of road traffic network, the evolution characteristics of road traffic network scale and hierarchical structure since the establishment of Liupanshui, choosed four sections in 1990, 2000, 2010 and 2016, and analyzed the evolution characteristics of road traffic network accessibility and location dominance with 90 nodes in the city. The results show that: (1) Since the establishment of Liupanshui, the development of road traffic network had experienced four stages: planning, preparation (1978-1990) — preliminary construction (2001-2010) — rapid development (2001-2010) — highway network development (2011-2016). (2) The scale of urban and rural road traffic network in Liupanshui was expanded, the grade structure of road traffic network in Liupanshui was becoming more and more perfect, and the mileage of grade road shows a trend of fluctuating growth. The framework of "four horizontal, two vertical and one ring" road traffic network was basically formed. (3) From 1990 to 2016, the accessibility of urban and rural traffic in Liupanshui had been significantly improved. The degree of spatial and temporal dispersion of accessibility shows the

development process of agglomeration-equilibrium-agglomeration, and its spatial pattern as a whole presents the trend of concentric circle expansion from the North-South Corridor to the east. (4) From 1990 to 2016, the distribution of urban-rural traffic location dominance in Liupanshui City showed a gradual development trend from aggregation to equilibrium. The spatial pattern of overall location dominance showed a phased evolutionary feature of "multi-center circle layer-parallel of central circle layer and axis-extension of axis-short-term circle development". Suggestions are put forward to establish the spatial regional structure of "two poles and two canters of gravity" and to construct a perfect spatial pattern of highway traffic network.

keywords: Liupanshui; road traffic network; temporal evolution; accessibility; location dominance

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民用航空对云南旅游与城镇发展的影响

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摘 要： 在新型城镇化背景下，丰富的旅游资源与相对发达完善的民航机场体系使民用航空成为克服时空阻隔，推进云南旅游城镇化创新发展的动力因素。风景资源的旅游价值加上航空运输的高可达性，吸引了更多游客、旅游相关产业与从业者、设施、资本在旅游目的地聚集，形成旅游城镇的规模经济和边际效益递增，促进了"飞地型城镇"化的发展。在对云南的实证研究中，基于相关性分析、耦合协调度分析、GIS 空间分析方法，发现民用航空与云南旅游业和城镇发展呈现高度正相关关系。受当地机场"枢纽-轮辐式"的体系结构和"东轻西重"的非均衡空间分布特征影响，形成了以滇中的昆明为旅游枢纽城市，以滇西北的丽江、迪庆，滇西南的西双版纳，滇西的大理、腾冲为地区旅游中心城市，其它旅游城镇为旅游节点的三级旅游城镇体系。沿边地区的旅游开发尚未得到良好的航空服务支撑。进而从机场布局、航线优化、基于全域旅游概念的多规合一等方面提出促进航空与旅游城镇协调发展的改进建议。

关键词： 民用航空；旅游城镇化；可达性；枢纽—轮辐；飞地型城镇化

The Impacts of Civil Airport Layout to Yunnan Local Tourism Industry

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Abstract：

Under the new-type urbanization background, the rich tourism resources and the relatively well-developed civil aviation airport system make the civil aviation to overcome the time and space barrier, and promote the development of Yunnan's tourism urbanization. The tourism value of scenic resources and on air transport high accessibility, attracting more tourists, tourism related industry and practitioners, facilities, capital in tourism destination aggregation, forming urban tourism economy of scale and increasing marginal benefit, to promote the development of "Enclave cities and towns". In the empirical study of Yunnan, based on correlation analysis, coupled coordination degree analysis, GIS spatial analysis method, it is found that civil aviation and the development of Yunnan tourism and urban development are highly positive correlation. By the local airport hub and spoke system structure and non-balanced spatial distribution characteristics influence, it formed three-level tourism town system in Yunnan. Finally the paper proposed suggestions on coordinating the development of aviation and tourism.

keywords: civil aviation; tourism; accessibility; hub and spoke; enclave cities and towns

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探索美丽公路建设设计模式

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摘 要：安徽省公路建设逐渐进入由产量到提质转变的新阶段，"转型升级、提质增效"成为下一步公路建设的主题。本文就根据安徽省现有的公路建设状况，提出了适合安徽特征的美丽公路+的建设理念，并结合 S322 泾县至茂林段美丽公路建设工程设计，进行全面的建设模式探索和分析，包括工程项目概况、设计原则、设计理念、设计内容、体现形式。对在其中存在问题进行剖析，并对安徽省美丽公路建设模式提供新的思路。

关键词：美丽公路；S322 泾县美丽公路建设；设计

Explore the Beautiful Highway Construction Design Patterns

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Abstract：

Gradually into the highway construction in anhui province from production to a new stage of the qualitative change, "transformation and upgrading, quality efficiency" has been the subject of the next step of highway construction. In this paper, according to the condition of existing highway construction in anhui province, put forward the suitable characteristics of anhui + beautiful highway construction concept, and combining the turf S322 jingxian county to the period of the beautiful design of highway construction project, the construction of a comprehensive exploration and analysis model, including project overview, design principle, design idea, design contents and forms. Analysis in which the problems, and provide new train of thought to beautiful mode of highway construction in anhui province.

keywords: beautiful highway; beautiful highway S322 jingxian county beautiful highway construction project; design

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旅游公路服务业体系建设策略研究

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摘 要：满足人民对美好生活的向往是我们不断追求的目标。随着全民旅游、全域旅游时代的到来，交通运输业对旅游业的支撑和带动作用愈加凸显。目前国内现有公路体系中高速公路服务体系比较完善，而普通国省干线公路或农村公路等服务设施的建设刚刚起步，尤其缺少体系性的服务设施。基于河北省承德市"国家一号风景大道"旅游环线服务体系的建设实际。以旅游业为载体，以交通为脉络，以服务为带动，提出了旅游、交通、服务一体化体系发展策略。以便更好的服务全域旅游事业发展，更好的实现旅游公路对沿线社会资源、城镇建设、精准扶贫、美丽乡村的带动作用。

关键词：全域旅游；旅游公路；服务设施；一体化建设

Study on the Construction Strategy of Tourism Highway Service System

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Abstract：

To satisfy people's yearning for a better life is our constant goal. With the advent of the era of national and regional tourism, the supporting and driving role of the transportation industry for tourism is becoming more and more prominent. At present, the existing highway service system in China is relatively perfect, while the construction of service facilities such as national and provincial trunk roads or rural roads has just started, especially the lack of systematic service facilities. Based on the construction practice of "national no.1 scenic avenue" tourism ring line service system in Chengde city, Hebei province. Taking tourism as the carrier, transportation as the thread and service as the driving force, the paper puts forward the development strategy of the integrated system of tourism, transportation and service. In order to better serve the development of the tourism industry in the whole region, and better realize the driving effect of the tourism highway on the social resources along the road, urban construction, targeted poverty alleviation and beautiful villages.

keywords: global tourism; tourist highways; service facilities; integrated construction

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广东滨海旅游公路规划方法研究

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摘　要：滨海旅游资源是我国旅游资源的重要组成部分，而自驾游的兴起使滨海旅游公路成为旅游目的地及旅游产品。本文以广东滨海旅游公路阳江段为例探索滨海旅游公路建设，总结旅游公路概念内涵及技术方法，为公路转型发展提供新思路，同时也为地方经济发展出谋划策。

关键词：交通运输规划与管理；旅游公路；景观设计；旅游产品

Study on the Planning Method of the Coastal Tourism Scenic Byway- Taking Yangjiang Section of Guangdong Coastal Tourism Highway as an Example

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Abstract：

　　Coastal tourism resources are an important part of China's tourism resources, and the rise of self-driving tourism makes coastal tourism highway become a tourist destination and tourism products. Taking Yangjiang section of Guangdong coastal tourism highway as an example, this paper explores the construction of coastal tourism highway, summarizes the connotation and technical methods of the concept of tourism highway, provides new ideas for the transformation and development of highway, and also provides suggestions for local economic development.scenic byway; Hainan Wenchang; planning and design; tourism product.

keywords: transportation planning and management; scenic byway; planning and design

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海南环岛旅游公路规划思路初探

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摘 要： 根据海南省文昌市滨海一带不同区域旅游资源特征，实验性地采用叙事策略对海南环岛旅游公路文昌段进行规划设计，赋予不同路段特色故事主题，进行相应景观及旅游产品设计，以此突出地域文化及自然景观特征，对城市与自然肌理实现更好的保护，构建景观生态安全格局。同时，破除旅游组团的交通分隔，提高全域旅游可达性，满足城市发展和旅游建设的双重需求。以旅游产品化视角，传达公路设计理念，从设计公路到创造产品。利用工程、艺术、经济、生态等多种思维方式，将海南环岛旅游公路文昌段建设为交通、旅游、文化、景观多功能复合的线性廊道空间。

关键词： 旅游公路；海南文昌；规划设计；旅游产品

A Preliminary Study on the Method of Scenic Byway Planning and Design Based on Narrative Strategy-Taking Wenchang Section of Hainan Island-Ring Scenic Byway as an Example

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Abstract：

According to the characteristics of different regional tourism resources in the coastal area of Wenchang, Hainan Province, this project experimentally uses narrative strategies to plan and design Wenchang section of Hainan Island-Ring Scenic Byway, it endows different sections with characteristic story themes, and designs landscape and tourism products correspondingly in order to emphasize the characteristics of regional culture and natural landscape, to achieve better protection of urban and natural texture, and to build a landscape ecological security pattern. At the same time, it breaks the traffic separation of different tourism groups to improve the accessibility of universal tourism and meet the dual needs of urban development and tourism construction. It conveys concepts of byway design from the perspective of tourism products to achieve the transformation from byway design to product creation. The purpose is to construct Wenchang section of Hainan Island-Ring Scenic Byway as a multi-functional and complex linear corridor space of transportation, tourism, culture and landscape by means of engineering, art, economy, ecology and other thinking modes.

keywords: scenic byway; Hainan Wenchang; planning and design; tourism product

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美国邮轮业管理运营的经验借鉴

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摘 要：为更好推进我国邮轮运输发展提供有益借鉴，本文从美国邮轮港口运营、航线管理、安全应急、节能环保、旅游管理等方面，全面分析借鉴了美国在国际邮轮运输管理和运营的发展经验，提出对我国邮轮业发展的相关建议。

关键词：美国邮轮业；经验借鉴

Lessons from the Management and Operation of the US Cruise Industry

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Abstract：

In order to promote the development of China's cruise transportation, this paper comprehensively analyzes the development experience of the United States in cruise management and operation from the aspects of US cruise port operation, route management, safety emergency, energy conservation and environmental protection, and tourism management. Suggestions on the development of China's cruise industry were put forward.

keywords: American cruise industry; management and operation

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旅游公路规划中的产业与旅游规划思路研究——以广东旅游公路汕尾段为例

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摘 要：对旅游公路沿线产业和旅游的规划提出了研究思路，并以实际项目广东滨海旅游公路汕尾段为例，进行了分析、规划和解读。

关键词：产业；旅游交通

Industry and Tuorism Idea Research in Road Panning

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Abstract：

This paper puts forward some research ideas on the industrial and tourism planning along the tourist highway, and takes Shanwei section of Guangdong coastal tourism highway as an example to analyze, plan and interpret it.

keywords: industry tuorism traffic

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全域旅游背景下中山市旅游交通规划研究

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摘 要：2016 年，中山市被纳入国家第一批全域旅游示范区创建名单，为了支撑中山打造国家全域旅游示范区，实现旅游业的快速可持续发展，制定了"快进慢游"的旅游交通发展目标，同时围绕发展目标提出了各项具体措施，打造具有高品质、人性化、特色化和可持续等特征的全域旅游交通体系。

关键词：旅游交通

Research on Tourism Transportation Planning of Zhongshan City Under the Background of Holistic Tourism

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Abstract：

In 2016, Zhongshan was included in the list of the first batch of holistic tourism demonstration zones in the country. In order to support Zhongshan to build a holistic tourism demonstration zone and achieve rapid and sustainable development of tourism, "rapid transit and slow tour" was formulated.as the goal of the development of tourism transportation. Various concrete measures have been put forward around the development goals to create a holistic tourism transportation system with high quality, humanization, specialization and sustainability.

keywords: tourism transportation

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Transportation Travel Accessibility Study Based on Traffic Big Data for Fenghuang Ancient Town

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Abstract：The travel of Fenghuang Ancient Town has been the most important pillar industry for county-level cities of Xiangxi Autonomous Prefecture, and how well the transportation accessibility is has become one of main constrain factors for future tourism economy development of Xiangxi. Therefore, to study travel transportation accessibility, this study has referred former study on existing travel accessibility evaluation model, and picked some static indexes including central city distance and transportation facilities connection. But, more importantly, this paper has firstly introduced dynamic index and improved existing model, and such dynamic index is the congestion delay index for congestion level evaluation and is recorded and applied by AMAP Company. Through the combination of static and dynamic index together, the improved model can be more solid. Then, applied such model, we have calculated transportation accessibility of Fenghuang Ancient Town. Finally, by comparing with other related study, the result showed that the calculated value of Fenghuang Ancient Town is quite low, and there should be more construction on the road network improvement and more improvement on transportation mean connection.

Key words：transportation accessibility; traffic big data; tourism economy; county-level travel management; fenghuang

季冻区绿色公路建设理念与科技创新实践——集安至通化项目绿色公路创建综述

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摘　要：以吉林省集双高速集安至通化段（以下简称"集通高速"）创建绿色公路典型示范工程为例，结合项目区域的自然生态、历史人文和旅游经济等地域特征，提出适合季冻区创建绿色公路的实施原则和实施策略，在"生态融合、文化展示、景观营造、旅游服务、实用耐久、创新驱动"等方面采取科技创新实践措施，将集通高速打造成国内知名的精品生态旅游示范路，树立绿色公路建设新标杆，引领吉林省公路建设绿色转型发展，推动我国公路建设整体水平提升。

关键词：绿色公路；生态融合；旅游服务；科技创新

Principle and Technological Innovating in Green Road Construction of Seasonal Frozen Area-Review on Green Road Construction from Ji'an to Tonghua

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Abstract：

This paper proposed the implementation principle and strategy of building green highway in seasonal freezing area when the typical demonstration project of construction green road from Ji'an to Tonghua section of JiShuang expressway in Jilin province (hereinafter referred to as "Jitong expressway") is taken as the example. And the project area's natural ecology, history, humanities and tourism economy and other regional characteristics are considered. The practice measures of technology innovation are adopted in some aspects of "ecological integration, cultural display, landscape construction, tourism services, practical durable and innovation-driven". Jitong expressway has been built into a famous boutique eco-tourism demonstration road in China as a new benchmark for green road construction, which leading the green transformation and development of highway construction in Jilin province and promoting the overall level of highway construction in China.

keywords: green highway; ecological integration; tourism services; science and technology innovation

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邻近旅游区的高速公路服务区的规划设计研究

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摘 要：我国旅游业的繁荣以及社会各层对交通服务的多元化要求，促使公路沿线设施的不断完善。位于旅游区附近的高速公路服务区不仅要发挥基本服务功能，还应肩负起分担旅游区高峰停车压力、宣传当地旅游文化等责任。同时，为响应交通运输部关于进一步提升高速公路服务区服务质量的意见以及"交通+旅游"的发展模式，本文就自然条件、交通特征、服务区规模以及商业功能等对邻近旅游区的服务区的特点进行了分析，然后基于服务区的布局规划、服务区与旅游区的连接方式，为高速公路服务区与邻近旅游区联合发展模式提出规化设计划策略。

关键词：高速公路服务区；旅游区；布局规划；连接方式

Research on Planning and Design of Expressway Service Area Near Tourist Area

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Abstract：

The prosperity of Chinese tourism industry and diversified requirements for transportation services at all levels of society have led to the continuous improvement of facilities along the highway. The expressway service area located near the tourist area should not only play the basic service function, but also shoulder the responsibility of sharing the peak parking pressure in the tourist area and publicizing the local tourism culture. At the same time, in response to the Ministry of Transport's opinion on further improving the service quality of expressway service areas and the development mode of "traffic + tourism", the paper analyzes the characteristics of service areas in nearby tourist areas based on natural conditions, traffic characteristics, service area scale and commercial functions. Then, based on the layout planning of the service area, the connection mode between the service area and the tourist area, the planning strategy for the joint development mode of the expressway service area and the adjacent tourist area is proposed.

keywords: expressway service area; tourist area; layout planning; connection method

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基于文化渗透视角的旅游公路设计

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摘　要： 旅游公路沿线文化的展示与渗透是其设计中的关键之处，是沿线文化价值的集中体现。目前我国的旅游公路建设往往只是注重公路本身及沿线服务设施功能的提升，缺少文化的支撑，这样的旅游公路缺乏生命力。本文针对基于文化渗透视角的旅游公路设计提出设计原则和技术路径，并通过以抚松县旅游公路设计为例，分析当地文化特色，对文化主题线路进行分段设计，包括主线设计、慢行系统设计、服务设施设计等方面，形成了一条以文化脉络为主线，带动沿线产业联合发展的新型旅游公路。为今后我国旅游公路的规划设计提供了一定的理论基础和技术借鉴。

关键词： 旅游公路；文化渗透；设计原则；技术路径

Tourism Highway Design Based on the Perspective of Cultural Infiltration

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Abstract：

The display and penetration of culture along the tourist road is the key point in its design, and it is the concentrated expression of the cultural value along the line. At present, the construction of tourist roads in China often only pays attention to the improvement of the functions of the road itself and the service facilities along the line, and lacks the support of culture. Such tourist roads lack vitality. This paper proposes design principles and technical paths for the design of tourism roads based on the perspective of cultural infiltration. Through the design of Fusong County tourist roads as an example, the local cultural characteristics are analyzed, and the cultural theme lines are segmented, including main line design and slow-moving system. In terms of design and service facility design, a new type of tourist road with cultural threads as the main line and the joint development of industries along the line has been formed. It provides a certain theoretical basis and technical reference for the planning and design of China's tourism highways in the future.

keywords: tourism highway; cultural penetration; design principles; technical path

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到访港珠澳大桥的影响因素研究

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摘 要： 港珠澳大桥不仅是连接中国大陆与港澳地区的桥隧工程，更是作为中国新世纪伟大工程项目之一而成为旅游景点，吸引众多游客前往参观。在以往的桥梁交通研究中，不少学者就针对影响人们通行桥梁的决策因素进行了探讨，研究发现包括出行者信息、交通信息、出行成本等因素都对其选择通行某一桥梁的决策产生影响。但在旅游情境下，当桥梁被视为重要旅游吸引物时，人们选择是否到访桥梁的这一决策还可能受到诸如吸引物知名度、旅游信息等因素的影响。因此，在此情境下，若简单地将港珠澳大桥视为交通工程或旅游目的地时，则不能较为全面地找出访客到访大桥行为决策的影响因素。因此，本研究在交通与旅游的双重情境下，探究影响访客到访港珠澳大桥决策的因素，并进一步分析这些影响因素是如何影响访客的决策行为，为其制定相对应的访客管理政策。本文选用可以用来预测因变量概率的统计方法，即逻辑回归模型，通过建立模型自变量的分类转换表，对本研究选定的待筛选量建立分类转换表，对复数的自变量进行回归迭代计算，确定的变量进行自回归迭代分析，最终对模型进行拟合分析，得出结论。最后，选择性的分析重要的影响因素，并给出相应的政策管理建议。

关键词： 港珠澳大桥；逻辑回归；影响因素；旅游交通

Exploring the Influencing Factors of Visiting Hong Kong-Zhuhai-Macao Bridge

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Abstract：

Hong Kong-Zhuhai-Macao Bridge is not only a bridge and tunnel project connecting mainland China and Hong Kong-Macao region, but also a touristic attraction as one of the greatest transportation projects in China. It attracts many tourists to visit and revisit. In the previous research, many scholars have discussed the decision-making factors affecting people's transportation choice, such as traveler information, traffic information, travel cost and so on. However, when the bridge is regarded as an important tourist attraction, travelers' decision may be influenced by attraction popularity, tourism information and so on. Therefore, it is impossible to find out the influencing factors of visiting the Bridge if the bridge only seen as a traffic engineering or tourist destination. Therefore, in the dual context of transportation and tourism, this study explores the factors affecting visitors' decision-making to visit Hong Kong-Zhuhai-Macao Bridge, and further analyses how these factors affect their behavior. This paper chooses the statistical method that can be used to predict the probability of dependent variables, namely logical regression model. The complex variables are calculated by regression iteration, the determined variables are analyzed by autoregressive iteration,

and finally the model is fitted and analyzed, and the conclusion is drawn. Finally, selective analysis of important factors are discussed deeply, and corresponding policy management recommendations are given.

keywords: Hong Kong-Zhuhai-Macau Bridge; logistic regression; influencing factors; tourism transport

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流动性正义视角下的旅游公路管理建设

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摘 要： 随着社会经济的发展，现阶段转型中的社会对于道路呈现出多样化的需求趋势。同一个道路空间，如何为不同的人群提供多样性的功能是现在面临的重要的问题。在过去 30 年中，许多城乡道路建设主要考虑了其经济功能，满足货物运输及人流通勤的需求。但随着人们生活水平的提高及对环境质量要求的提升，这样单一的以车辆为主导的道路建设不足以满足多样化的需求：1. 在道路空间的使用上，排除了其他的交通方式，如步行和自行车等；2. 没有考虑运输以外的其他功能，如审美、旅游、休闲等。从流动正义的视角看，该道路建设指导思想会受到空间正义的质疑。本研究通过赤水河旅游公路案例来分析如何结合现阶段的多样性需求对已有的道路进行改造升级，以满足不同的流动需求，实现流动性正义，从而为未来道路的设计、规划、管理提出建议。本研究采用的研究方法为实地调研和二手数据分析。研究发现该道路：1. 新增的旅游功能不仅能满足游客的旅游休闲活动，也为本地人提供了休闲空间；2. 起到串联景点的作用；3. 由于货运交通仍然是占主导，货车带来的交通安全和景观问题无法解决；4. 由于赤水河空间狭小，通过空间划分隔离货车和非机动车使用者存在一定难度，故应从时间上面探讨分时段管理的可能性。

关键词： 旅游公路；流动正义；休闲；非机动车

Management of Tourist Road from the Perspective of Mobility Justice

Jia Bicen, Li Jun

（Sun Yat-sen University）

Abstract：

Road construction is one of the most basic infrastructures in the modern society. The demands of road hierarchies, qualities and quantity have been always changing with the social development. In transitional China, the demands for roads have presented an increasing trend of diversity. Conflicts of road use in a same road space are observed. How to provide the diverse functions to different users in a same road space has become a pending problem. In the past 30 years, most of the designs of Chinese urban and rural roads have mainly focus on their economical function in order to satisfy the needs of freight and commute transportation, and vehicles are treated as the most important transportation tools. But with the increase of quality of life and environmental quality, the simple design of road which only satisfies the needs of vehicles has led to the following issues: 1. The current road design excludes the needs of other transportation modes, such as bicycle and walking. 2.Besides the movement of people and goods, the current road design does not take other functions, such as aesthetic experiences, tourism and leisure, into consideration. So, the current principles of roads development are being questioned by space justice from the perspective of mobility justice. This study attempts to answer the question of transformation and upgrade of the

current roads regarding the various demands by analyzing the case of Chishui tourist road in Guizhou Province, China. Field survey and second-hand data analysis have been adopted in this study. The study has found out that: 1. The development of Chishui tourist road has not only satisfied the tourist and leisure needs of tourists, but also provides the locals leisure space. 2. Chishui tourist road has also play the role of connecting the local scenic spots into a scenic belt. 3. Yet, Chishui tourist road is also facing challenges of the safety and sight issues which are caused by freights. 4. Due to the narrow space of Chishui tourist road, it is challenging to separate spaces for the vehicles and non-motorized vehicles. It is proposed that temporal management of the road can be an alternative to address the special issue. Overall, the study aims to raise the attention of satisfying different mobility demands and achieve mobility justice, and to provide the suggestions for future design, planning and management of road construction to policy makers.

keywords: tourist road; mobility justice; Leisure; non-motorized vehicle

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Inhabiting the Traveling - Car

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Abstract：We spend ever-increasing periods of our lives traveling in cars, yet quite what happens during our car journey is largely overlooked. Inspired by the advances in the field of automobility, this article explores how people inhabit the cars under the non-daily circumstance with following Urry's (2006) notion of the "socially inhabited car". Specifically, combined several approaches of what has recently been termed 'mobile methods, three different road trips of different traveling groups that take by cars are studied. Particular attention is paid to the practice of inner car space during traveling car journeys. The article illuminates the relation of auto-mobility and habitation through car journey and is key to further understanding of driving tourism consumption and car culture.

Key words：automobility; inhabiting; driving tourism; car

公共汽车停靠站协同优化方法

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摘　要：随着机动化进一步发展，交通拥堵、事故频发、空气污染等交通问题日益突出。广泛发展的大运量公共交通为缓解交通需求与交通供给之间的矛盾提供了可能。虽然轨道交通服务品质高，但其建设投资大、施工时间长且要求的基础客运量在百万人口之上，导致其仅适用于部分特大型城市，且一经建成，极难改造。因此，公共汽车服务成本较低、设计灵活且建设周期短的优势，使得其在绝大多数城市中承担着运输客流的关键作用。尽管公共交通发展迅速，在有限的资源下，其服务的覆盖范围仍然存在充分的优化空间，使得乘客可以便利地获取公共交通服务。另一方面，超过99%的公共汽车均运行于无隔离的道路环境上，极易受到其他交通流的干扰，导致其运行效率显著低于自驾、网约车等出行方式，亟须改善公共交通的服务质量。

当前虽然智能交通系统快速发展，公共汽车运行与服务过程中仍有诸多问题未解决，尤其在与乘客需求的衔接、与社会交通流的交互等方面存在严重不足。基于此背景，该研究着眼于传统交通工程学视角，紧紧围绕联通公共交通服务、乘客需求与社会交通流的基础元素——停靠站，以乘客需求与交通流动态为主要研究对象，利用多源数据探索公共汽车服务粘接乘客、与社会交通流协调运行的方法。乘客的核心需求是公共交通系统存在与发展的根本原因——便捷地获取公共交通服务并高效地实现出行。基于此，该研究从可达性与高效性两个方面展开，利用包括出行行为调查、交通流视频和车牌等数据，一方面提高公共汽车的服务品质，一方面协调公共汽车与社会交通流的关系，治理城市交通之瓶颈点。

关键词：公共汽车停靠站；服务；可达性；高效性；混合交通流

The Coordinated Method to Optimize Bus Stops

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Abstract：

With rapid motorization, urban traffic congestion, frequent traffic accidents and air pollution have become increasingly serious problems. It is a well-accepted remedy to develop public transit to relieve the conflict between travel demand and supply. Though rail service is characterized with high quality, it costs a lot and takes a long time to build, requiring ridership larger than one million to support its operation, which is rather difficult to be changed once established. In contrast, bus service is characterized with cost efficiency, design flexibility and short contruction period to act as the backbone of public transit in most cities. However, under limited resources, it is still necessary to optimize service distribution and to enhance transit accessibility to retain and enhance transit ridership. Moreover, as more than 99% buses are operating on non-separated lanes, open to various interruptions from social traffic, it is urgent to enhance bus efficiency especially compared to self-

driving and shared mobility.

Though intelligent transport system develops rapidly, bus service is still challenged with various problems, especially in connecting passengers and coordinating with social traffic. Against this background, this research takes the perspective of traditional transport engineering and focuses on the basic unit of bus service-bus stop that interfaces passenger demand and social traffic dynamics-with multi-source data. Bus service operates primarily around passenger demand to allow travelers to access transit service with ease and to go through the trip efficiently. That is the starting point of this study, aiming at enhancing transit accessibility and alleviating the traffic bottlenecks at bus stops.

keywords: bus stop; service; accessibility; efficiency; mixed traffic flow

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Shared Autonomous Taxi System and Utilization of Collected Travel Time Information

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Abstract：The topic of this research is shared autonomous taxi (SAT) system. Firstly, it is verified that the detour SAT system, in which an occupied SAT can detour to serve another customer, outperforms non-detour SAT system and non-sharing system. Then, the effects of the shortest travel time paths and reliable paths on customers' travel time saving and on-time arrival probability with the travel time information collected by the SAT are compared. This research also implements and validates system-beneficial path guidance in a simulation environment.

Key words：autonomous vehicle; ride-sharing; shared autonomous taxi system; travel time; on-time arrival reliability; fleet size

Heterogeneous Vehicular Network Model and Selection with Capacitated Network Performance

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Key words: connected vehicle; intelligent transportation system; heterogeneous vehicular network

Jointly Optimizing Vehicle Routing and Timetable for Customized Bus Service Based on Multi-Source Data

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Abstract：In this paper, a customized bus line design model based on multi-source data is presented to discuss the customized bus route design problem (CBRDP). This paper provides the following twofold contributions: (1) A multi-source data fusion method is developed for estimating and extracting the travel demand of CB passengers; (2) we develop a new type of problem scenario: Multi-Trip Multi-Pickup and Delivery Problem with Time Windows (MT-MPDPTW), to describe CBRDP by simultaneously optimizing the operation cost and passenger profit, where excess travel time is introduced to estimate passenger extra cost compared with taxi service, and each vehicle is allowed to perform multiple trips for operation cost savings. Taking Beijing commuting corridor as case studies, we calculate and compare the monetary and travel costs of CB with other travel modes, and quantitatively confirm that the CB can be a cost-effective choice for passengers.

Key words: customized bus; transit system operation and optimization; multi-source data

Human Factors in Transport Systems: A Systematic Analysis from Marine, Aviation and Road Safety Perspectives

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Abstract： It is often recognized that safety is the result of activities by a human being or group of people, or end users (drivers, pilots, whole crews, air traffic controller, a team of controllers, etc.) (Szczukowski, 2017). Human factor is considered to be a critical role in transport systems, which contributes to 70%-80% of aviation accidents, 75%－96% of marine accidents, and 90%-95% of road accidents (Rothblum, 2000; Ellison et al., 2015; Kharoufah et al., 2018; Chen and Yu, 2018). The history of aviation safety experienced the era of technical factors from the early 1900s to late 1960s, and that of human factors from the early 1970s to mid-1990s, respectively. Recently, organizational factors have become a new concern and safety tends to be viewed from a systemic perspective, including both human and organizational factors as well as other factors.

Literature review indicates that research questions and methodologies vary significantly among marine, aviation and road accidents. However, several similarities can be observed: both marine and aviation accident have low probability but high consequence; the major accident type for marine and road accident is collision/crash; drivers or crews＇ drowsy behaviors should be paid enough attention, etc. Thus, an overall perspective for better understanding of human factor mechanism in different transport systems is needed.

Key words： Human factors; marine; aviation; road; safety

Highlighting the Potentials of Transit Oriented Development: A Case Study of Orange Line Metro Train, Lahore

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Abstract： Transit Oriented Development (TOD) bids several benefits to transit users, make streets safer, and reduce dependence on automobiles, helps to reduce pollution, indorse healthy cities and enhance fare revenue to transit systems with allowing them to provide better services. The same is expected from the preferment of Transit Oriented Development along on-going Orange Line Metro Train Project in Lahore under China Pakistan Economic Corridor (CPEC). This research highlights the aptitudes for Transit Oriented Development along the ongoing project of Orange Line Metro Train Corridor, and the policy, rules and regulations that should be adopted to encourage and implement Transit Oriented Development along Orange Line route. A great potential of TOD has been identified along various sections of the Orange Line Metro Train Corridor, which can possibly be tapped by adopting such new policy guidelines for Land use zoning that can arouse TOD along the Orange Line Metro Train Lahore.

Key words： Transit Oriented Development; Metro Train; Redevelopment; Regulations

Optimal Lane Choice Model of Autonomous Vehicle at Toll Plaza

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Abstract：The toll plazas are one kind of highway nodes that will pose a challenge to the flow of autonomous vehicles (AVs). Whether or not AVs will pay toll fees and regardless of who will pay for them, AV must be able to efficiently traverse the toll plaza area. In this paper, a simple decision model that does not depend on flow rate and velocity is developed which facilitate the AVs to choose the most optimal lane at the plaza in real time. Two indicators called the Rod ($〖SR〗\_s$) speed and the decisive value ($D\_(〖SR〗\_i)$) are defined and calculated for each of the AV option lane at the plaza. The $〖SR〗\_s$ depends on the average service rate, relative longitudinal position of the AV with respect to the plaza gates and the corresponding number of cars in front of the AV. The decision value depends on the $〖SR〗\_s$, the lateral position in lanes, the AV dimensions in terms of length and width. The simple choice is based on the lane with the largest $D\_(〖SR〗\_i)$. It was found that for the 6 toll lane plaza that has a throughput for the AV lane of 1771vehs/h, there is need to have the AVs reach at least 45% for the AV toll lane to begin developing some queues and to efficiently utilize it under saturation flow, the AVs should be at least 50%. It was also concluded that instead of having a dedicated AV lane, it is better to have the AVs use the same lanes for the ETC conventional vehicles until the average population of AV vehicles is more than that of conventional vehicles.

Key words：Rod speed; autonomous vehicles; toll plaza; decisive value; dedicated AV toll lane

浅谈韩国首尔公交改革及其对中国的启示

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摘　要：上个世纪中期以来，韩国在短时间内经济快速发展，GDP 由 1960 年接近 40 亿美元变成 2004 年 7,600 多亿美元 ，44 年内 GDP 增长接近 200 倍。随着经济快速发展，更多人口聚居在首尔，韩国变成以首尔为主、人口集中的国家。居民出行需求越来越高，首尔亟需提高移动性。1974 年以前，首尔居民的主要出行方式是常规公交车。由于公交公司过度民营化，过于追求公司利润，公交服务质量很差。随着经济发展，更多的居民放弃服务质量差、速度慢的公交车，转而使用私家车，私家车的拥有量急速增加。有限的道路资源上，过度增加的车辆数量引发严重的交通拥挤。并且公交车与新公交方式（地铁）产生竞争关系，公交乘客数量急剧下降，出现恶性循环。公交车行业的恶化带来巨大的外部性，包括道路拥堵、交通事故、环境污染等。因此，首尔市政府 2004 年开始实施公交改革，得到很大成就。本文通过文献综述与访谈的方法，了解从 1954 年至今首尔市公交政策与公交运营状况，详细介绍了 2004 年首尔公交改革的内容，分析公交改革取得成功的主要影响因素。并尝试从"交通（Traffic）"、" 移动性（Mobility）"及" 可达性（Accessibility）" 三个理念的转型来比较各时代的首尔公交政策。本文发现，虽然当前首尔市比 1950 年代增加了很多人口，行政区域也更大了，但是交通的可达性却变得更好，乘客满意度也更高，居民出行也更方便了。通过介绍首尔的经验与成就，以期为中国城市公交改革提供参考和借鉴。

关键词：首尔；公共交通；改革；交通测量方法；转型

A Brief Discussion on the Seoul Public Transportation Reform and Implications for China

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Abstract：

　　South Korea has had a rapid economic development in a short period of time since the middle of last century. In 1960, the GDP of South Korea was almost 4billion dollars, which changed to more than 760 billion dollars in 2004. In 44 years the GDP of South Korea grew by nearly 200 times. As the economy grew rapidly, more population were concentrated in Seoul, South Korea became a predominantly populated country. Seoul government needs to provide more quick and convenient mobility as citizens demand more services. Until 1974, Seoul's main travel mode was the regular bus. Due to the excessive privatization of the bus companies and their pursuit of profit, the service quality of Seoul's buses was very poor. With the economic development, more and more citizens are disgusted with the poor service quality and slow bus and use private cars, thus private car ownership increased rapidly. The excessive increase in the number of the limited road resources caused serious road congestion. Moreover, as buses compete with the new public transport mode (subway), the number of bus passengers decreases even more, which lead to a vicious circle. The

deterioration of the bus industry brings about huge externality, such as road congestion, traffic accidents, environmental pollution, etc. As a result, the Seoul city government implemented a bus reform in 2004.

Through literature reviews and personal interviews, this paper has given a picture of the public transport policies and the operation of public transportation in Seoul from 1954 to the present. It has introduced in detail the contents of the public transport reform in Seoul in 2004 and analyzed the main factors for its success. Besides, it attempts to compare Seoul's public transport policies in different eras with the concepts transition from "Traffic", "Mobility" to "Accessibility". We can find that even though Seoul now has a much larger population and a larger administrative area than it did in the 1950s, transportation is much more accessible, passenger satisfaction is much higher, and transportation is much more convenient. Through the experience and achievements of Seoul, we hope to provide experience and reference for the urban public transportation reform in China.

keywords: Seoul; Public transportation; Reform; Transportation measuring methods; Transition

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Assessment and Improvement of Travel Efficiency: An Application to Sino-Moroccan Maritime Routing with a Focus on Transshipment Port Efficiency and Terminal Handling Equipment Productivity

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Abstract： The following report is an abstract of a PH.D dissertation aiming to assess and improve travel efficiency between Kingdom of Morocco and People's Republic of China, by finding out initially the main elements that contribute in decreasing the overall travel time with regard to cost, then investigating the advantage and efficiency of deployed transshipment ports and finally a bibliographic analysis of port terminal equipment productivity.

Key words： Travel efficiency; K-firm concentration ratio; HHI; Gini Coefficient; Entropy Index; BCG; DEA; transportation problem (LP); Strategic positioning; Seaports efficiency

安哥拉罗安达市的交通状况介绍

安钰德

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摘 要： 在这里我们对安哥拉罗安达市的现状交通基本情况介绍，我们在这里还提出了一下改建的方案。

关键词： 可达性；流动性；城市化政策；公共交通；个人运输

Introduction to the Traffic Situation in Luanda, Angola

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Abstract：

Here we introduce the basic situation of Luanda city in Angola, and we also put forward a plan for its renovation.

keywords: Accessibility; Mobility; Urbanization Policies; Public Transportation; Individual Transportation

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Application of Waste Toner Material in Asphalt

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Abstract： The waste product of the recycled toner from printing industry is usually disposed with a high rate of 3000 to 4000 tons/year, which could be an economical waste and cause environmental hazardous if not treated properly. Because the main composition of the waste toner product is polymer consisting of phenolic resin and fillers as calcium carbonate and pigments, it is possible that such material could be of a useful admixture to asphalt industry for cost saving and potential performance improvement. Based on this hypothesis, the objective of this study is to explore the potential benefit of including the waste ink in the asphalt binder and mixtures by conducting a series of laboratory experimental testing. Specifically, the paper aims to (1) identify the optimum content of the recycled ink product and best application method when added into asphalt mixture; (2) quantify its effect on rutting and cracking performance improvement for both asphalt binder and mixture; (3) evaluate the chemical composition and the environmental safety of including such material into asphalt pavement. The conducted experimental tests include: frequency sweep test (E* master curves), multiple stress creep compliance (MSCR) test, and oscillation test; mixture design, E* test, Hamburg wheel track test (HWTT), and semi-circular bend test (SCB); and microscopic tests such as attenuated total reflectance-fourier transform infrared spectroscopy (ATR-FTIR), and fluorescence microscope. The results indicated that overall, with the addition of waste toner powder, the rutting and cracking properties of asphalt material were improved due to the improved elasticity. There is benefit and good potential of using the waste toner in asphalt industry.

Key words: Waste Toner

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Comparative Parking Policy Evaluation Using Urban Traffic-Parking System Dynamics with Macroscopic Traffic Model

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Abstract：Planning parking demand has a critical impact on planning the traffic system of a certain urban traffic network due to the high influence on the overall system. Recent studies verified that analyzing network parking dynamics can better represent the real dynamic environment of the traffic system. In this paper, a model based on the macroscopic dynamic parking model proposed by Cao and Monica [1] further extend to analyze the network parking properties and deeply analyzes the key dominant factors sensibility and elasticity with respect to the parking demand. Empirically, the model is tested and nourished with the real data of two central business districts in different networks in Shanghai, Xujiahui area, and Zurich, Bahnhofstrasse area having different infrastructural and socio-economic culture.Beyond assessing the parking system parameters of the two areas, it estimates the areal parameters sensitivity or elasticity with respect to percentage change of parking space and mean parking duration[-50%-+50%]. The result shows Bahnhofstasse CBD is more sensitive with relatively higher elasticity compared to Xujiahui CBD with respect to policy changes.

Key words：Parking system Dynamics; MFD; policy sensitivity; Elasticity; Bahnhofstasse; Xujiahui

刚果(布)道路交通安全战略及保障措施

约翰

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摘 要： 安全是国家可持续发展的重要中心支柱，道路交通安全是国家安全最主要的组成部分，对国家经济的发展和人民健康至关重要。道路交通安全是指在交通活动过程中，能将人身伤亡或财产损失控制在可接受水平的状态。交通安全意味着人或物遭受损失的可能性是可以接受的。随着路网的扩张和机动化水平的不断提高，道路交通事故已成为社会公害，从交通安全战略层面引入全新的交通安全管理理念十分必要。本文从刚果(布)道路交通安全现状和存在的问题出发，提出了交通安全战略目标及保障措施。

关键词： 道路；交通安全；战略；保障措施

Congo-Brazzaville Road Traffic Safety Strategy and Safeguard Measures

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Abstract：

Safety is an important central pillar of national sustainable development. Road traffic safety is the most important component of national security, which is vital to the development of national economy and people's health. Road traffic safety refers to the state in which personal casualties or property losses can be controlled at an acceptable level in the course of traffic activities. Traffic safety means that the possibility of loss to people or things is acceptable. With the expansion of the road network and the continuous improvement of the level of mobility, road traffic accidents have become a social hazard. It is necessary to introduce a new concept of traffic safety management from the strategic level of traffic safety. Based on the current situation and existing problems of road traffic safety in Congo Brazzaville, this paper puts forward the strategic objectives and safeguards of traffic safety.

keywords: Road; Traffic safety; Strategy; Safeguard measures

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Coordinating Transport and Urban Planning. Visions and Local Practices in Switzerland and in France

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Abstract：The idea that better coordination between transport and urban planning policies is one of the conditions for sustainable urban development is widely accepted by researchers, professionals and politicians. If this conception is not new, the underlying objectives have largely evolved since the end of the 1960s. How has the shift in perspective, from adapting the city to the automobile toward promoting sustainable cities and motilities, been translated into action? And what of local issues, visions, and coordination practices surrounding transportation and urban planning? What factors favor this kind of integration, and can we identify sources of inertia and causes of public action fragmentation? Based on a comparative study of four urban area's transport policy and urban planning trajectories (Geneva, Bern, Strasbourg and Bordeaux), this paper analyses the coordination between transport and urban planning as a political process in permanent (re)construction.

Key words: transport; urban planning; coordination

Study on Safety of "One Belt One Road" Freight Transportation Based on Vehicle Dynamics

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Abstract：The "one belt and one way" national development strategy has promoted the development of China's international road freight transport. This thesis mainly introduces the road freight transportation in China and others countries which are along one belt one road. This paper analyzed the obstacles to the development of international road freight transport .Technical requirements from the aspects of the maximum permitted gross mass, dimension and safety specifications,for the selection of vehicles for international road freight transport are put forward, which provides technical means for strengthening and standardizing the management of international road freight transport vehicles.This Paper mainly   study on the current situation of the road transport of the Belt and Road Initiative, Issues with the Belt and Road Cargo Transportation, Dynamic Analysis of Vehicles, Safety measures for the freight transportation of the Belt and Road and developing logistical counter measure for freight transportation in one belt one road via automobile.

Key words: reight transportation in international road; current situation; Frieght transporation Saftey; technical requirements

中国和法国沥青及沥青混合料标准、设计和性能验证试验差异与联系的研究

格兰

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摘 要：随着"一带一路"的倡议和交通运输行业国际化的快速推进，国家间的交通基础设施工程建设项目逐步增多。由于不同国别和区域的工程建设标准往往存在差异，因此，公路基础设施项目的建设中，对不同国家和区域公路工程建设标准差异和对接的研究十分必要...

关键词：沥青混合料；法国标准；配合比设计；沥青混合料试验

Study on Performance of PR FLEX 20 Modified Asphalt and Its Mixture Based on Chinese and French Specifications

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Abstract：

With the "One Belt and One Road" initiative and the rapid advancement of the internationalization of the transportation industry, the construction projects of transportation infrastructure projects between countries have gradually increased. Due to the differences in engineering construction standards between different countries and regions, it is necessary to study the differences and docking of highway engineering construction standards in different countries and regions in the construction of highway infrastructure projects.

keywords: Asphalt mixture; French standard; mix design; asphalt mixture test

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级配类型对沥青混合料拌和流动特性的影响

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摘 要：为了延长路面的使用寿命、保证路面的施工质量，沥青混合料必须具有良好的施工和易性。目前，道路工作人员对沥青的黏度开展了大量的研究，并取得了圆满的成果，但施工和易性不只与沥青的黏性有关，也需要考虑其它影响因素。基于一些研究和实验数据，本文研究了级配类型对沥青混合料拌和流动特性的影响。实验选取了 AC-13、AC-20、SMA-13、OGFC-13、ATB-25 等 5 种级配类型，配制了 70#基质沥青，采用课题组自行开发的变速拌和功率测试装置，在不同拌和温度下，对不同沥青种类、不同沥青用量和不同级配类型的沥青混合料进行了变速拌和试验，分析了级配类型对沥青混合料拌和特性的影响。

关键词：路面工程；沥青混合料；级配类型；拌和流动特性；和易性

Effect of Different Types of Asphalt Mixtures to the Mixing Flow Characteristics

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Abstract：

In order to prolong the service life of pavement and guarantee the Construction Quality of Pavement, asphalt mixture must have good construction and good workability. At present, road workers have carried out a lot of research on the viscosity of asphalt, and achieved satisfactory results, but workability are not only related to the viscosity of asphalt, but also need to consider other factors. Based on some research and experimental data, this paper studies the influence of gradation type on mixing and flow characteristics of asphalt mixture. AC-13, AC-20, SMA-13, OGFC-13 and ATB-25 five gradation types and 70# base asphalt were selected in the experiment . The variable speed mixing power testing device developed by the research group was used to change the speed of the mixture.Mixing tests were used to analyze the effect of grading types on the mixing characteristics of asphalt mixtures by different asphalt dosage and different gradation types at different mixing temperatures. The effects of gradation types on mixing characteristics of asphalt mixtures were analyzed.

keywords: Pavement Engineering; Asphalt Mixture; Gradation Type; Mixing Flow Characteristics; workabilty

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基于节能减排的沥青路面养护技术

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摘 要： 对于高速公路养护的研究，美国五六十年代就开始了。高速公路养护的技术发展到了今天，外国的主要研究方向是公路的预防性养护。而我国高速公路养护，也是在 80 年代美国提起预防性养护时就开始广泛研究。可以说我国高速公路养护的理论一开始就包含了预防性养护的理念。现今，我国高速公路养护以"预防为主、防治结合"为方针，坚持"机械化养护为主，防止中断交通"的原则。现在，我国在高速公路养护新技术上，已经普遍采取沥青再生技术、微表处技术、柔性基层技术、雾封层技术及就地热再生技术等，这些都是在发达国家公路养护过程中发展起来的。但是在对这些技术的综述中，忽略了节能减排方面的说明，或者是没有详细解释这些技术在节能减排工作的应用状况。对于高速公路的养护施工中，采用最新的高速公路养护综合技术，在节能减排工作的应用中，也是非常重要。尽管认识到了这个问题的重要性，但是在具体使用某项养护新技术时在节能减排方面究竟有多大影响，比以前的技术有多大的提高，对于这些都是很重要的内容，有的文章只是语言描述，从综述的角度来介绍有哪些节能减排方面的高速公路养护新技术，并没有具体数据分析。本课题主要是调研高速公路养护新技术在节能减排工作中的具体应用状况，主要解决在实际中所使用的高速公路养护技术具体在节能减排工作中有什么样的体现及如何应用。本课题研究内容，包括（1）对沥青再生成套技术、微表处技术、柔性基层技术、雾封层技术及就地热再生技术进行具体描述（2）分别对上述技术在高速公路节能减排工作方面的应用进行具体分析。我国从"十一五"规划纲要，就提出了节能减排的总体目标，同时《中华人民共和国节约能源法》里面明确表明"节约资源属于中国的一项国策。国家的能源发展战略之中将节约摆在最重要的位置。"近年来，我国社会经济得到了健康持续发展，然而这种发展的代价是资源的浪费以及生态条件的严重破坏，在我国过去的公路养护过程中队环境造成了严重的破坏及造成大量的燃料等资源浪费，因此只有充分利用新技术，来实现节能减排的工作目标。能源消耗及其产生的排放引起的生态环境恶化越来越受到全社会的关注。在交通运输部积极推动绿色公路的环境下，厂拌乳化沥青冷再生、水泥再生土、高聚物注浆等具有节能减排效果的技术在安徽省高速公路改建工程中开始大规模应用。同时，本文对高速公路养护新技术在节能减排工作中的应用进行综述，也可以弥补对高速公路节能减排工作的空白。本文主要是通过文献法对高速公路养护新技术进行综述，然后进行对比分析，从收益-成本分析的角度来分析个技术在节能减排方面的应用情况。

关键词： 高速公路；改建工程；能耗与排放；养护技术；节能减排；应用研究

Asphalt Pavement Maintenance Technology Based on Energy Saving and Emission Reduction

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Abstract：

For the study of highway maintenance, the United States began in fifty or sixty years. Highway maintenance technology development today, main research direction of foreign is preventive the maintenance of highway. But our country Highway maintenance, but also in the in 80's the United States of America filed widely research began to preventive maintenance. can be said that maintenance of Expressway in our country started the theory contains the preventive maintenance concept.Nowadays our country highway maintenance by "giving priority to prevention, combining prevention with control principle, adhere to the mechanized maintenance,to prevent the interruption of traffic" principle. Now, our country in the new technology of highway maintenance,has been generally adopted asphalt recycling technology, the micro-surfacing technology, flexible base technology, the fog sealing and hot in place recycling technology, which is developed in the developed countries in the process of highway maintenance.But in an overview of theses techniques, ignoring the energy conservation and emission reduction, of energy-saving emission reduction work. For the maintenance of expressway,the expressway maintenance integrated technology, the application of energy-saving emission reduction work, is also very important. Although realized the importance of this issue, but in the specific new technology using a conservation in energy conservation and emission reduction effects of what, how much higher than previous techniques, for these are the very important content, some articles just language description, from the perspective of the new highway maintenance the technical aspects of what energy-saving emission reduction, and there is no specific data analysis.

This subject is mainly the concrete state of application of new technology of expressway maintenance research in energy- saving emission reduction work, mainly to solve the highway maintenance technology in the actual use of the specific manifestation of what and how it is applied in energy saving and emission reduction.

The research content includes, "on the regeneration technology of asphalt, the micro-surfacing technology,flexible base technology the fog sealing and hot in- place recycling technology are described and "we carried out a detailed analysis of the application of the technology in the energy-saving emission reduction work".

China from the " eleven five " plan, put forward the energy-saving emission reduction targets, " people's Republic of China energy conservation law " also pointed out that the " conservation of resources is China's basic national policy, National implementation of conservation and development simultaneously, the top priority to conservation of energy development strategy. " China's rapid economic growth, the construction has made great achievements, but also paid a great resource and the cost of environmental destruction, in our country the past Highway Maintenance Squadron has caused serious environmental damage and cause a lot of fuel, waste of resources,so that only the full use of new technologies, to achieve energy-saving emission reduction work target. At the same time, this paper summarizes the application of new technology in highway maintenance in the energy-saving emission reduction work,also can make up for the blank of the energy-saving emission reduction work.the deterioration of ecology environment caused by energy consumption and emissions has aroused more and more attention by the whole society.

This paper is to review the new technology of expressway maintenance through the literature method, then carries on the contrast analysis, to analyze the application of the technology in energy-

saving and emission reduction from the cost analysis benefit-angle.

keywords: Highway; Energy saving and emission reduction; Freeway; Pavement; Maintenance technology; comprehensive application

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Development of Sino-Mongolian Transportation Network Under the Background of the Belt and Road

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Abstract：At present day world, the economies are closely linked and dependent on each other's. The "Belt and Road" is a wide geographical area and it involves multiple stakeholders and the countries engaged and involved with it. This project is a huge investment, with long construction period having potential risks, having set a historical record. The strategic objectives of the "Belt and Road" are establishment of a community of responsibility for the interest community, the community of destiny and political mutual trust, economic integration and cultural exchange. This includes the group of countries from Eurasia, building beneficial community of interests for both the sides, destinies and responsibilities.Mongolia is one of China's partners and located next to China and in the hinterland of Belt and Road. It's of great significance in terms of economic relationship between the two under Belt and Road to construct a network of road is of pivotal role for the future transportation between the two.

Mongolia is a landlocked country and located between two World Powers, China and Russia. China's efforts to re-invent the Silk Road trading route for the modern era, connecting Asia to the Middle East and Europe, have implications for the foreign policy options of all its neighbors. Mongolia, a democratic, free market society to its north, is one such nation that is shifting its economic and political strategies, in hopes of benefiting from the new opportunities that may appear in the next decade. Mongolian political and economic strategists see their nation, region, and continent as at a critical juncture which stimulates openness to institution-building to reduce tensions and the rise of regional networks to overcome energy and transportation challenges. From the 'critical juncture' theory perspective, the major factors of changing geostrategic context, political leadership, and crises, real or perceived are all present, and certainly Mongolia and its political leadership are reacting to these circumstances.

One of the six corridors of BRI is the link between China to Russia through Mongolia. This "Belt" aspect of BRI is in severe need of transport infrastructure and communications support, and Mongolia is and always has been in a strategic location between the two giants.

In September 2013 and October, during the visit to Central Asian and Southeast Asian countries, President Xi Jinping proposed the proposal to build the "Silk Road Economic Belt" and the "maritime Silk Road in twenty-first Century". In March 2015, in order to promote the implementation of the "one belt and one road" initiative, the government issued the vision and action to promote the construction of the Silk Road Economic Belt and the maritime Silk Road in twenty-first Century. The document clearly points out that infrastructure interconnection is the priority area

of "one belt and one road" construction, and investment and trade cooperation is the key content of construction.

Along the "one belt" road, most of them are developing countries with low level of economic development. The weak transportation infrastructure in China is an important constraint to their economic development (Lu Feng et al. 2015). To jointly build "one belt and one road" and give priority to the promotion of transport infrastructure construction can improve the investment and trade environment of various countries along the border and promote sustained and rapid economic growth of the countries along the line. It is generally believed that the economic growth of countries along the route or the improvement of transportation infrastructure between China and other countries along the route will have a positive effect on China's export of goods. Transportation infrastructure has the attribute of public goods. The improvement of the national transportation infrastructure along the "one belt and one road" will reduce the transportation cost of China's goods while reducing the transportation costs of other countries. Especially those countries that are closer to each other and have more trade complementarities, the improvement of transport infrastructure may be more conducive to the export of these countries. In addition, the improvement of infrastructure quality in the countries along the route may also attract import-substituted direct investment, which will change the way of internationalization of Chinese enterprises from export to foreign direct investment, and the scale of China's exports of goods may also decline as a result. Therefore, the impact of the improvement of transport infrastructure quality on the import and export of goods is obvious.

Inner Mongolia Autonomous Region is the frontier position for the implementation of China's opening-up strategy and energy strategy, as well as the main provinces and regions of China-Mongolia economic and trade cooperation. As an important mode of transportation between Inner Mongolia and Mongolia, international road transport has achieved rapid development with the deepening of economic and trade cooperation between the two countries. However, with the rapid development of the market, some deep-seated problems are gradually exposed. The transportation capacity-building lags behind the demand of market development, which has become the main problem for China and Mongolia to face and solve.

Key words： China-Mongolia-Russia economic corridor and transportation infrastructure construction and operation; China-mongolia-Russia economic corridor and transportation

Road Transport in West Africa and Central Africa

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Abstract：In West and Central Africa, economic growth and employment still depend mainly on agriculture and mining, and rely heavily on imports.

Landlocked countries in the region are characterized by severe trade imbalances, export-to-import ratios below 30 per cent, and over-reliance on road transport.While improvements in infrastructure are still necessary, reforms are now needed to reduce costs and increase competition for transportation and logistics services.However, the political economy of the necessary reforms is complex and little known.

When governance and political and economic factors seem to hinder any technically feasible progress, the analysis of these reforms becomes crucial.

Road transport is often politicized, especially in countries that rely heavily on food security and trade.In West and Central Africa, vulnerability, political instability and structural economic and trade imbalances are affecting the sector's reform momentum.Despite significant progress in road infrastructure in the region, key policy reforms aimed at correcting market distortions and increasing the value of investment have not yet been implemented.The ssatp discussion paper reviews the inefficiency of transportation in the region and highlights the main challenges in the political economy that have so far prevented meaningful reforms.It reviews previous analytical work on sectoral reforms in the region, describes current challenges and opportunities, and provides an analytical framework for assessing reforms, with a focus on the political economy and the feasibility of implementing them.Implementation, and finally, practical advice for those responsible for public action.To this end, the book aims to provide guidance for the World Bank's future participation in this area.Its geographic coverage is limited to the main transport corridors in West and Central Africa, selecting regional trade based on its role in the region, up-to-date data from the transport sector, and the World Bank's past and present commitments.

This book is deeply rooted in ssatp's analysis of the legal and regulatory framework for the transport sector and the West African and Central African road transport industry, particularly with regard to logistics costs, surveys related to freight transport in Benin and Niger, or in East Africa, and the mainland. Compilation of international legal instruments on transport and trade facilitation in Africa.The publication of ssatp marks the launch of a regional initiative aimed at establishing a national, bilateral and regional model of transport legal and regulatory frameworks.

Some of the major inefficiencies that result in an increase in overall logistics costs relate to the organization of road transport and the determination of transit transport prices without real competition.

The freight industry is dominated by small informal operators1 Lack of professional training and business acumen.These road carriers have timely access to domestic and international activities, and there is almost no formal entry threshold.In the context of security issues that further influence the political incentives of key private and public actors, the network of formal and informal institutions

is shaping professional and freight market access within and between countries.The over-burdenization of the sector is characterized by the strong influence of informal intermediaries and trade unions, as well as numerous formal and informal rules, such as non-competition of freight distribution, which increases transportation costs and reduces the incentives for renewal.fleet.In addition, the incentives and intentions of individuals operating in formal state institutions do not always match the incentives and intentions of the institution.

On their own, this further reduces the chances of any reform success.In fact, in the past, some actors have proven to be sufficient to prevent reforms (open or secret) or have only promoted a very limited set of reforms that do not undermine their rent-seeking status or condemn their corruption.Many interrelated factors have exacerbated the difficulty of implementing meaningful reforms in the region.The lack of implementation of axle load regulations means that containerized road or rail transport services are still more expensive than road freight overload.Political factors have distorted decisions about vehicle investment and use, but they have also distorted many other behaviors used by the sector.For example, trucks cannot be used as collateral in many countries, which limits opportunities for new vehicles to obtain credit.Similarly, operators' choices are based on trust rather than value, which reduces the incentives and opportunities for return or investment to get better returns.Coastal transport restrictions help reduce asset productivity and increase air freight returns.Overall, the factors that led to insufficient resource and cost increases in the logistics systems in West and Central Africa were similar across all corridors.

An important observation of the analysis of the road transport sector in the corridors studied suggests that the degree of risk of commercial and financial risks is highly uneven, depending on the company's business model.

Companies acting on their behalf and companies offering these services for business purposes profit on a different basis.Although commercial transportation is profit-oriented, self-operated transportation is only a cost item, not an independent profit center.Operating profit also varies greatly. Some large operators – usually subsidiaries of multinational logistics groups – make a profit, while many small-scale owner-operators have little profit, first because they cannot afford all operating costs, and because they absorb profits. Intermediary.As a result, the current dominant mode of small-scale owner-operators is incapable of obtaining long-term freight rates and their ability to update their fleets due to their low level of professionalism and inefficiency.

The inefficiency of road transport companies is related to the lack of professional standards for entry into national and regional markets.At present, there is almost no form of becoming a carrier, and the cost of entry is limited to the cost of used cars.In addition to allowing for a lack of legal and regulatory frameworks, the institutional capacity building mechanisms of operators in this sector are also inadequate.This lack of capacity has some consequences, especially for road safety and the environment, because undertrained airlines tend to be less cautious and the vehicles are less fuel efficient.

Many intermediaries operating in the region are deepening the gap between freight costs and prices, or the gap between the price paid by the shipper and the payment received by the carrier.

While many informal intermediaries bring value to the supply chain by helping to meet transportation needs, they are not subject to contractual constraints and therefore do not assume any contractual liability.Coxeurs (Chart to track latest price changes) or informal intermediaries that are

not subject to the terms of the contract indicate that the department's failures and lack of formal freight distribution exchanges, in addition to small and non-compliant operating costs, operators will not be able to find shipping costs.In most of the corridors analysed, distorted market access rules and politically motivated mechanisms for distributing goods provide fuel for at least part of the transit transport market, which inevitably increases the price of transport services.

keywords: Road transport; west Africa; central Africa; company

The Measurement of the Railway Gauge Exchange Impact on the "Silk Road Economic Belt" Performance

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Abstract：In the context of exploring China's current state of the "Silk Road Economic Belt" (SREB) branch of "One belt One Road "(OBOR) initiative, and in order to develop the level of researches about China's connectivity to world and especially Europe, this paper comes to investigate the transportation network gap of handling freight trains at the Chinese-Kazakh border in the Khorgos Gateway. As it is known, railway lines in China use the standard West European railway gauge of 1,435mm, and since Kazakhstan uses Russia's wider gauge of 1,524mm which means whenever cargo crosses in or out of China it needs transferring to different wagons. the flip-side process of Khorgos for trains entering Europe through the Polish town of Siemianówka on the Belarus border is also to be considered. Following a first literature-based survey with a content analysis, and using also the Balanced Scorecard as a method to measure the development of the transit potential in this exchange station, which helped to answer the impact of this logistics terminal trough on the performance of business cooperation and the velocity of trade operations. This paper can also be a comprehensive research and allow a further one to propose a better solution for this logistics gradient point.

Key words：transportation; gauge exchange; Logistics; Silk Road; freight trains; Performance

Logistics (Transportation) and Its Role in Economic Growth of the State; A Theoretical Perspective

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Abstract：Every country of the world has a different potential and therefore people do not find everything they need for life in their nearest environments. They are forced to transport their goods (raw materials, information) and themselves as well. The globalization of the economic system and growing specialization of individual regions increase this need. Therefore, transport is one of the fundamental pillars of current economics. Traditionally, measuring return on investment for transportation initiatives has focused on direct user benefits and the economic impacts that arise from those cost savings. Estimating minutes of travel time saved by passengers or freight is acceptable, but some projects require more exploration and depth.

Without logistics industry which means all kinds of "Transportation", no one country can attain the level of national economic growth. Logistics industry is the only way to facilitate the movement of good from one place to another through supply and chain management system. Although, the term "logistics" was used for transferring or moving military equipment, weapons and good since ancient times but, since the late 1990s, this term is most commonly being used in the business and trade sector. However, the age of globalization has generated a huge competition in logistics industry too. Several logistics companies have acquired the status of multi-national company, and, they have expanded their business infrastructure around the globe. Furthermore, such expansion generated lot of threats to domestic logistics industries of developing countries where foreign logistics industries of developed world were at highest level of quality in services as compare to domestic companies. So, to protect domestic logistics companies and to ensure national economic growth, developing countries impose some rules and regulations for promoting domestic logistics companies against foreign logistics companies. This trend is called "protectionism". Similarly, these countries promote economic patriotism regarding delivering the message to their public for using domestic products or services. And, people of respective countries try to follow such direct or indirect instructions. This is called "economic nationalism" or "economic patriotism".

Although, the imposition of economic nationalism and protectionism is considered as the fundamental need of developing countries but, this is also the reality that United States is the mother of modern protectionism. Therefore, it is investigated that every country at any level, tries to protect its domestic industry from the harmful effects of foreign industries. So, summarization of this article articulates that the logistics industry in any country can only be successful if there will be imposition of economic nationalism and protectionism.

This research is focused on transportation, logistics, economic nationalism and economic patriotism and their effect on the growth of overall national economy.

Key words：Transportation; Logistics; Economic Nationalism; Supply and Chain

Road and Traffic Conditions in Zambia

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Abstract：Roads affect all aspects of development in Southern Africa. Businesses depend on effective roads for transporting their goods, industry relies on roads for delivery of equipment, and people require roads for travel between home, workplaces, and elsewhere in the region.

In comparison with other areas of development, the road network in the Southern African Development Community (SADC) region is relatively strong. Although it varies from Member State to Member State, 50% of the paved road network was deemed in good condition in 2001. As the road system accounts for the vast majority of surface transport in the region, SADC aims to sustain its current successes in this sector and improve upon them as the region develops in the future. In order to maintain roads and road transport as a priority, SADC passed its Protocol on Transport, Communication and Meteorology in 1996.

In signing The Protocol on Transport, Communication and Meteorology, Member States agree to assist in developing an adequate road network that supports the socioeconomic growth underway in the region. This network needs to provide access to major centers, ports, and harbors, while minimizing road transport costs and impacts to the environment.

In order to craft this network, the Protocol on Transport, Communication and Meteorology requires Member States to collaborate on a harmonized regional road policy that provides for monitoring the effectiveness of road infrastructure, introducing commercial practices for supporting roads, and developing strategies for reducing operating costs.

The Protocol on Transport, Communication and Meteorology also advises Member States to adopt a harmonized policy on road transport that supports commercial transport enterprises through equal treatment, non-discrimination, reciprocity, and fair competition.

As assessed in 2001, the road infrastructure in Southern Africa is comparatively strong. Botswana, Lesotho, and Namibia have particularly good road standards; similarly, two-thirds of the road network of South Africa and Zimbabwe remain in good condition. However, road maintenance has been neglected in Angola Zambia and Mozambique, where 90% of roads are deemed in fair to poor conditions. Fortunately, Mozambique and Zambia have recently undertaken a major road rehabilitation programme to increase these conditions.

Yet, certain key locations still maintain missing road links, disabling road transport along vital corridors. These missing links lie predominantly in Angola and the Democratic Republic of Congo – a substantial concern due to these Member States' large extractive industries that rely heavily on roads to facilitate trade through transport. Although traffic volumes are low, these two Member States need new roads constructed alongside the necessary repairs to damage caused by conflict and neglect.

The cost of road maintenance remains an issue for the region as a whole. While Member States recognize the importance of a functional, integrated road network, funding is often diverted into other sectors. Likewise, significant funds have previously been put into the road network, but were

inefficiently managed by governments in many Member States. With traditional top-down approaches to funding for repairs and construction proving ineffective, SADC is currently exploring new systems of funding, including public-private partnerships and user-pays principles.

Key words： safety; traffic; development

The Implication of Blockchain in Quality Control of Automobile Spare Parts Supply Chain Case Study of SHACMAN on Counterfeit Spare Parts

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Abstract： Purpose: The purpose of the thesis is to explore the potential of blockchain in supply chain, and to further break it down into the specific sub categories, processes and points where it can help to achieve (agility, structural flexibility, extended enterprise, risk management through) efficient and effective information management.

Design/Methodology/Approach: Using case studies, the theories were built (more than 24 case studies) from the literature and then the benefits that these cases have gained were analyzed. After effectively analyzing theses case studies the supply chain design of SHACMAN collected through questionnaires and an interview were discussed. The implications of these cases have been applied to achieve concreteness in anti- forging mechanism, and the quality of cost reduction through efficiency in the Supply chain.

Findings: The strengths of Blockchain like decentralization that supports data validation through consensus, and providing integration with security through cryptography makes it the perfect fit to use it as the central data management repository for Supply chain management. Moreover, the range of problems it can solve across the supply chain makes it the perfect choice for solving the risks that global supply chain is incurring.

Practical Implication: The risks across the global supply chain are multi-dimensional so do the solution has to be. The Blockchain can provide a network to connect all the different partners spread across different territories that could enable the transparency, visibility, traceability, immutability, and untampered updated information management. All these benefits could solve the problem of Counterfeits (this issue encompasses Pharmacy, coffee makers, automobile to aircraft and even military spare parts to name a few), efficiency, risk reduction, cost reduction, auditability.

Originality/Value: To the best of author＇s knowledge; the Blockchain＇s implications across all the different sectors of supply chain has not been discussed in the literature. The literature related to Blockchain lacks the practical implications or models to discuss/assess the Blockchain. Also the transparency from Blockchain through the perspective of Ethics management has not been discussed. The general theory of task to technology fit(Mindfulness) has not been discussed in the context of Blockchain (Supply chain).

Key words： Supply chain management; Blockchain; quality control

Social Innovation of High-Speed Railway Development in Indonesia in the Framework of Belt and Road Initiative

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Abstract： The low choice of other modes of transportation to use, such as modes of transportation that are more environmentally friendly, adversely affects residents in the metropolitan area from congestion, air pollution, and poor noise levels. This causes a decrease in the quality of life on a large scale. The Belt & Road Initiative (BRI) is the appropriate momentum as a solution to a number of problems that occur in developing countries, including Indonesia, which can benefit from the cooperation that is built, especially in social innovation in the infrastructure sector such as High-Speed Railway (HSR). The HSR project with the Jakarta-Bandung route is one of the consortium-based cooperation between Indonesia and China which is included in the BRI agreement. This study aims to identify and analyze the initial conditions, relationship between dimensions of social innovation and expectations of the social innovation in the development of the first high-speed railway in Indonesia, also the role of Penta helix towards the HSR project, which collaborates five elements consisting government, educational institutions, businesses, communities, citizens / communities, each coordinating well with each other. The mixed research approach was chosen as the methodology in this study. Data was collected using documents and library research, questionnaires and in-depth interviews with semi-structural techniques. The results of the study show that the development of sustainable social innovation of the HSR project with all helix cooperation will have a positive impact on the development of society as a whole. The concept that involves five actors in Penta-helix must go hand in hand, as a whole, which is mutually supportive and interconnected.

Key words： Social innovation; High-Speed Railway (HSR); penta helix synergy; Belt and Road Initiative

High Speed Rail (HSR) as a Efficient Solution For Passenger Transport

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Abstract：More than 2,000 years ago, China's royal representative Zhang Qian helped to build the Silk Road, a network of trade paths that linked China to Central Asia and the middle east. The name has come from one of China's most important exports, silk. This road affected the development of the entire region for hundreds of years.

In 2013, Xi Jinping (China's president) proposed organizing a network of railways, roads, pipelines, and utility grids that would link China and Central Asia, middle east. One Belt and One Road (OBOR), includes more than physical connections. It intends to organize the world's largest program for economic cooperation, including policy coordination, trade and financing collaboration, and social and cultural cooperation. Through open discussion, OBOR can create benefits for everyone.

Recently, the fast development of a high-speed rail (HSR) network in China has developed into a wide HSR network. Each HSR line is a reasonable train path. A HSR network includes a number of railway lines. Among these lines, a passenger transit hallway can be found when the line not only meets a large passenger demand, but also has a low indirect degree of train path. On the high-speed railway network, except for trains running along each railway line, a large number of cross-line trains are operated. The operation of cross-line trains can decrease the transfer ratio and transfer times, and promote the service level drastically.

Transport infrastructure and services do not follow the same long-term planning criteria. Private operators, including car owners, decide how much and when to invest in new capacity (and this also includes technology). Private airlines decide which type of aircraft to buy depending on their demand expectations and business strategies. There is strong evidence that competitive air transport services work reasonably well (Morrison and Winston, 1995; 2005). This is also true of bus transport services, at least under a scheme of competition for the market (Nash, 1993; ackie and Preston,1996; Preston, 2004).

On the contrary, roads, airports, ports and railway tracks and stations ultimately belong to the public sector (with some exceptions). Although many crucial transport decisions are in the hands of private operators subject to market discipline, the public sector can heavily influence future modal split and the configuration of transport networks through investment, pricing and regulatory decisions affecting capacity. This is the case with high-speed passenger trains operating largely within the public sector, both in the areas of infrastructure and services.

The future of transport is expected to be dominated by strict budgetary constraints and the introduction of efficiency-oriented policies affecting pricing and investment decisions, such as the

application of polluter-pays and user-pays principles, and the planning of infrastructure on a strict economic basis. The ultimate objective is to have an "integrated and sustainable transport system" that promotes economic growth and social cohesion (European Commission, 2009).

From an economic perspective, the question is quite simple. Like any other technology, HSR is not inherently good or bad. Its social value resides in its ability to solve transport problems that are significant enough to justify its opportunity cost. Cost-benefit analysis can help answer this crucial question, but we do not need to go any further to maintain that the economic case for HSR investment depends on the prevailing conditions in the intercity corridor where the construction of the new line is planned, in particular the level of demand, the degree of congestion, value of time, expected time savings from diverted traffic, generated traffic and the net external effects.

HSR has advantages over airlines beyond vertical integration (with subsidized prices), reflecting some structural differences. Airports and airlines would still serve a large number of markets using the same airport capacity, and it is not clear that airport congestion management would be better with vertical integration. The HSR advantage in this case is that capacity is used to serve a very small number of markets (O-D pairs), and this makes it possible to reach very high levels of reliability.

HSR is more reliable than air transport, and access and waiting time much less cumbersome. Airport and airlines managers do not necessarily have the same objectives and, as a matter of fact, the generalised cost advantage of HSR lies outside the travel-time segment of the trip. In the case of roads, the differences are even clearer. Road infrastructure and operations are vertically separated. In contrast with the single operator of HSR, there are many users driving their own cars with free access (sometimes paying a toll) to a limited-capacity infrastructure. Road transport has the advantage of reducing access and waiting time to almost nothing and the cost disadvantage appears in the travel-time segment.

Time savings are not the only consequence of HSR investment. The reduction in the generalised cost of travel generates new trips, and the diverting of traffic from other modes of transport may contribute to a reduction in congestion, accidents and environmental externalities.

Transport affects the environment in numerous ways. The most important parameters are exhaust emissions, noise, and climate change. Land use, including intrusion and barrier effects, may also be important.

Independent research has concluded that the climatic benefits of HSR may not be particularly significant. Studies suggest that the socio-economic benefit of reducing traffic emissions through HSR may typically amount to a small percentage of the overall benefits produced (de Rus, 2008, Nilsson and Pydokke, 2009, Kågeson, 2009).

Pros and cons of high-speed rail

• HSR consumes less energy and emits fewer emissions per seat- km than aviation or cars

• However, the difference compared to road transport is modest when indirect emissions from marginal electricity production are accounted for

• HSR, being a fast mode, generates new traffic

• HSR causes noise, intrusion and barriers

Summary:

• HSR is likely to reduce greenhouse gases from traffic

• The reduction is modest and it may take many decades for it to compensate for the emissions caused by construction

• Traffic noise is likely to increase as passengers shift from aviation and road transport to HSR

• A new HSR line will cause intrusion and barriers which, depending on local circumstances, may be more or less serious

This paper provides an overview of the costs and benefits of HSR investment. Governments promote HSR construction as an instrument for a better environment. So the environmental benefits and costs of HSR construction and operation are analysed.

Key words： High Speed Rail; Transportation; Greenhouse gases; Business strategies

Uzbekistan on New Silk Road, Prospective Development of Transportation System of Uzbekistan with Other Neighbouring Countries Under Chinese "One Belt and One Road" Initiative

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Abstract：After the dissolution of the Soviet Union, the former Soviet countries emerged and became independent and began the transition from centrally—planned economy to a market economy. This paper presents a case study of Uzbekistan. This paper aims to review of the transport sector in the Uzbekistan aims to assess the current condition and performance of transport systems and to identify key issues and underlying causes. The paper principally covers development of transportation, condition of current situation, including institutional arrangements, legal and regulatory issues, operation of public transport systems, traffic management, and parking, and less extensively hardware aspects, such as construction of road network. Uzbekistan is located in the heart of Eurasia and plays key role in the logistics between Asia and Europe, in so called "Modern Silk Road". Statistics, analytical materials and legislative frameworks will be translated from the references that are in Uzbek and Russian language into English and it will brings value to this manuscript. This paper creates different prospectives for future research of transportation modes and infrastructure in Uzbekistan region and central Asia. The research was undertaken to assist researchers and transportation planners to define and comprehend the basic views of transportation. Transportation sector is a main sector of economy in the world. Different modes of transportation as railway, road, air, water and pipelines organize movement of people, goods, animals and other things from one place to another. In such big continent as Eurasian continent the Central Asian space's transportation plays a huge role. Historically by this space there were passed Great Silk Road which connected Europe and Asia. Central Asian region includes post-soviet countries as Uzbekistan, Kazakhstan, Kyrgyzstan, Azerbaijan and others. And all of them have post-soviet historical background which influenced on development of transport systems. This article reviews case of Uzbekistan country, which has geopolitical priority that located between Asia and Euope. Uzbekistan is modern, new independently post-soviet country and its significant location also influences on transportation all over Eurasian continent. This paper also explains current condition of transportation in the country, policy in transportation industry, modern roads and condition.

Key words：Uzbekistan; Central Asia; "One Belt and One Road"; Modern Transportation strategies; Innovative transport system; Transportation networks in Harmonious world

New Thoughts on Integration and Development of Transportation and Tourism in Uzbekistan

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Abstract：The paper targets to investigate the status and growth of transportation integration development and tourism in Uzbekistan. Transportation integration and tourism industry with superior reference to country`s tourism infrastructure sectors. As a Great Silk Road tourism destination and unique cultural, historical, archeological, and natural attractions, Central Asian States (CAS) (Kazakhstan, Kyrgyzstan, Turkmenistan, Tajikistan and Uzbekistan) present essential interest and potential for tourists from all over the world. This article makes an overview of the current status of transportation integration development in tourism industry with reference to a country's tourism infrastructural sectors. Transportation integration and tourism industry with the aim of finding out the strategy for developing a program that enhances the strength of Uzbekistan in the international arena. The results serve to point out key trends and gaps in which to focus future research on this topic and also they might be useful in formulating public policies and strategies for transportation integration and tourism industry development in Uzbekistan.

Key words：Uzbekistan; transportation; tourism; integration development; One Belt One Road (OBOR)

Metaphorical and Computative Analysis of Paved Cracks Gray Level Image Transformation Techniques with Arduous Variation and Implementation

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Abstract：Digital image processing is becoming a more promising and emerging requirement in today's technological era. As it is the method through which we get the modified image gain from the input after different processing techniques. What we have to do in this paper to gain visualize image of road pavement as an input to gain output by implementing gray level image enhancement techniques. Enhancement does need a lot of research with different procedure and techniques to overcome a complicated problem that we face in daily life. In this paper of image enhancement, we have to specify and categorize different characteristics of an image like intensity, color adjustment and conversion for the better enhancement. We analyze the different techniques of gray level image enhancement on the basis of their computative capability using MATLAB. That shows the result of images of road pavement in a comprehensive way to evaluate the characteristics and consequences after modification. Image Enhancement techniques like Image Negative, Logarithmic transformations, Gamma Corrections, etc. are used to evaluate the road cracks detection in a more precise way to analyze. With every single technique, the general mathematical implementation is proposed like gamma and constant values, etc. The subclasses of Piecewise-Linear Contrast stretching are also discussed to detect the road cracks in a more comprehensive way to evaluate. We cannot implement a specific technique for all kind of gray level image enhancement. As the logarithmic transformation is good for transformation in which we took the log but that doesn't suit to image negative and vice verse. In the latter part of this paper, every possible value and its output with comparative analysis through figures and MATLAB will be presented.

Key words：Logarithmic transformations; Power-Law Transform; Gamma Corrections; Piecewise-Linear Contrast stretching; Contrast Stretching; Gray Level Slicing