Considering built environment and spatial correlation in modelling pedestrian injury severity

This study looks at mitigating and aggravating factors that are associated with the injury severity of pedestrians when they have crashes with another road user and overcomes existing limitations in the literature by posing attention on the built environment and considering spatial correlation across crashes. Reports for 6539 pedestrian crashes occurred in Denmark between 2006 and 2015 were merged with geographic information system resources containing detailed information about built environment and exposure at the crash locations. A linearised spatial logit model estimated the probability of pedestrians to sustain a severe or fatal injury conditional on the occurrence of a crash with another road user. This study confirms previous findings about older pedestrians and intoxicated pedestrians being the most vulnerable road users, and crashes with heavy vehicles and in roads with higher speed limits being related to the most severe outcomes. This study provides also novel perspectives by showing positive spatial correlation of crashes with the same severity outcome and emphasising the role of the built environment in the proximity of the crash. This study emphasises the need for thinking about traffic calming measures, illumination solutions, road maintenance programs and speed limit reductions. Moreover, this study emphasises the role of the built environment, as shopping areas, residential areas, and walking traffic density are positively related to a reduction in pedestrian injury severity. Often, these areas have in common a larger pedestrian mass that is more likely to make other road users more aware and attentive, while the same does not seem to apply to areas with lower pedestrian density.
Effects of new bus and rail rapid transit systems – an international review

Cities worldwide are implementing modern transit systems to improve mobility in the increasingly congested metropolitan areas. Despite much research on the effects of such systems, a comparison of effects across transit modes and countries has not been studied comprehensively. This paper fills this gap in the literature by reviewing and comparing the effects obtained by 86 transit systems around the world, including Bus Rapid Transit (BRT), Light Rail Transit (LRT), metro and heavy rail transit systems. The analysis is twofold by analysing (i) the direct operational effects related to travel time, ridership and modal shifts, and (ii) the indirect strategic effects in terms of effects on property values and urban development. The review confirms the existing literature suggesting that BRT can attract many passengers if travel time reductions are significantly high. This leads to attractive areas surrounding the transit line with increasing property values. Such effects are traditionally associated with attractive rail-based public transport systems. However, a statistical comparison of 41 systems did not show significant deviations between effects on property values resulting from BRT, LRT and metro systems, respectively. Hence, this paper indicates that large strategic effects can be obtained by implementing BRT systems at a much lower cost.

General information
A Bayesian Additive Model for Understanding Public Transport Usage in Special Events

Public special events, like sports games, concerts and festivals are well known to create disruptions in transportation systems, often catching the operators by surprise. Although these are usually planned well in advance, their impact is difficult to predict, even when organisers and transportation operators coordinate. The problem highly increases when several events happen concurrently. To solve these problems, costly processes, heavily reliant on manual search and personal experience, are usual practice in large cities like Singapore, London or Tokyo. This paper presents a Bayesian additive model with Gaussian process components that combines smart card records from public transport with context information about events that is continuously mined from the Web. We develop an efficient approximate inference algorithm using expectation propagation, which allows us to predict the total number of public transportation trips to the special event areas, thereby contributing to a more adaptive transportation system. Furthermore, for multiple concurrent event scenarios, the proposed algorithm is able to disaggregate gross trip counts into their most likely components related to specific events and routine behavior. Using real data from Singapore, we show that the presented model outperforms the best baseline model by up to 26 percent in R-2 and also has explanatory power for its individual components.

General information
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Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Singapore-MIT Alliance for Research and Technology, University of Coimbra
Authors: Rodrigues, F. (Intern), Borysov, S. S. (Ekstern), Ribeiro, B. (Ekstern), Pereira, F. C. (Intern)
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Scopus rating (2010): SJR 3.513 SNIP 7.095
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Analysing improvements to on-street public transport systems: a mesoscopic model approach

Light rail transit and bus rapid transit have shown to be efficient and cost-effective in improving public transport systems in cities around the world. As these systems comprise various elements, which can be tailored to any given setting, e.g. pre-board fare-collection, holding strategies and other advanced public transport systems (APTS), the attractiveness of such systems depends heavily on their implementation. In the early planning stage it is advantageous to deploy simple and transparent models to evaluate possible ways of implementation. For this purpose, the present study develops a mesoscopic model which makes it possible to evaluate public transport operations in details, including dwell times, intelligent traffic signal timings and holding strategies while modelling impacts from other traffic using statistical distributional data thereby ensuring simplicity in use and fast computational times. This makes it appropriate for analysing the impacts of improvements to public transport operations, individually or in combination, in early planning stages. The paper presents a joint measure of reliability for such evaluations based on passengers’ perceived travel time by considering headway time regularity and running time variability, i.e. taking into account waiting time and in-vehicle time. The approach was applied on a case study by assessing the effects of implementing segregated infrastructure and APTS elements, individually and in combination. The results showed that the reliability of on-street public transport operations mainly depends on APTS elements, and especially holding strategies, whereas pure infrastructure improvements induced travel time reductions. The results further suggested that synergy effects can be obtained by planning on-street public transport coherently in terms of reduced travel times and increased reliability.

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Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, COWI A/S
Authors: Ingvardson, J. B. (Intern), Kornerup Jensen, J. (Ekstern), Nielsen, O. A. (Intern)
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Scopus rating (2014): SJR 0.882 SNIP 0.939 CiteScore 1.26
Scopus rating (2013): SJR 0.757 SNIP 0.861 CiteScore 1.03
Scopus rating (2012): SJR 1.017 SNIP 1.001 CiteScore 0.96
Scopus rating (2011): SJR 1.214 SNIP 1.783 CiteScore 1.26
Scopus rating (2010): SJR 0.582 SNIP 0.759
Delay estimation on a railway-line with smart use of micro-simulation
This paper formulates a delay propagation model that estimates total railway line delay as a polynomial function of a single primary delay. The estimate is derived from a finite series of delays over a horizon that spans two dimensions: the length of the railway line and the number of trains in the service plan. The paper shows that the total delay estimate is a cubic relation for small primary delays.

A probabilistic approach is presented to combine the total delay functions of primary delays given to different trains. The final estimate is the total delay on railway lines, after a random incident has occurred. The model can be integrated in railway timetable analysis to reduce the number of necessary simulations, and can be used when the computation speed is an issue, such as on-line rescheduling algorithms. The model is demonstrated with an analysis of a Danish suburban railway.

Empirical analyses of a choice model that captures ordering among attribute values
In most choice models, the evaluation of attributes depends on differences of attribute values. Some research, mainly in marketing and psychology, suggests that the differences do not give the full picture of how decision makers evaluate choice alternatives, e.g. some decision makers may penalise an alternative additionally because it has the highest price.

In this paper, we specify a discrete choice model that takes into account the ordering of attribute values across alternatives. This model is used to investigate the effect of attribute value ordering in three case studies related to alternative-fuel vehicles, mode choice, and route choice. In our application to choices among alternative-fuel vehicles, we see that especially the price coefficient is sensitive to changes in ordering. The ordering effect is also found in the applications to mode and route choice data where both travel time and cost sensitivities are affected by the ordering. Overall, the ordering effects have implications for both parameter estimates and the evaluation of willingness-to-pay measures.
Enabling Bus Transit Service Quality Co-Monitoring Through Smartphone-Based Platform

The growing ubiquity of smartphones offers public transit agencies an opportunity to transform ways to measure, monitor, and manage service performance. The potential of a new tool is demonstrated for engaging customers in measuring satisfaction and co-monitoring [Editor's note: This is the authors' word, meaning "agencies using public feedback to supplement official monitoring and regulation."] bus service quality. The pilot project adapted a smartphone-based travel survey system, Future Mobility Sensing, to collect real-time customer feedback and objective operational measurements on specific bus trips. The system used a combination of GPS, Wi-Fi, Bluetooth, and accelerometer data to track transit trips while soliciting users’ feedback on trip experience. Though not necessarily intended to replace traditional monitoring channels and processes, these data can complement official performance monitoring through a more real-time, customer-centric perspective. The pilot project operated publicly for 3 months on the Silver Line bus rapid transit in Boston, Massachusetts. Seventy-six participants completed the entrance survey; half of them actively participated and completed more than 500 questionnaires while on board either at the end of a trip, at the end of a day, or both. Participation was biased toward frequent Silver Line users, the majority of whom were white and of higher income. Indicative models of user-reported satisfaction reveal some interesting relationships, but the models can be improved by fusing the app-collected data with actual performance characteristics. Broader and more sustained user engagement remains a critical future challenge.

General information
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Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Massachusetts Institute of Technology, Singapore–Massachusetts Institute of Technology (MIT)
Authors: Li, C. (Ekstern), Zegras, P. C. (Ekstern), Zhao, F. (Ekstern), Qin, Z. (Ekstern), Shahid, A. (Ekstern), Ben-Akiva, M. (Ekstern), Pereira, F. C. (Intern), Zhao, J. (Ekstern)
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Evaluating the police service quality for handling traffic crash reporting: A combined MCDA and LCA approach

Purpose The phenomenon of traffic crash under-reporting has been extensively documented in terms of its extent, but not equally analysed in terms of its reasons. As police distrust has been recently identified as a major reason for crash under-reporting, the purpose of this paper is to look at the police service quality for handling the reporting of traffic crashes.

Design/methodology/approach This study introduces a novel approach to evaluate service quality that combines multi-criteria decision analysis (MCDA) with latent class analysis (LCA). Moreover, this study presents the design of a web-based survey on the basis of the SERVQUAL approach to detecting strengths, opportunities and threats with crash reporting to the police at a strategic level. Transportation stakeholders (e.g. researchers, authorities, consultants, NGO representatives, suppliers) with an interest in traffic safety in Denmark participated in the survey that yielded 86 complete responses.

Findings The novel approach was successfully applied and its implementation demonstrated the usefulness of the tool even in countries with a high police service. Results showed that the participating stakeholders perceived human factors as more important than physical factors in order to increase the crash reporting, with responsiveness as the most important and tangibles as the least important dimensions. Nevertheless, most stakeholders viewed a mixture of human and physical factors as crucial to increase crash reporting rates.

Originality/value This study advances the knowledge about police service quality with a novel expert-based decision support tool based on SERVQUAL, MCDA and LCA, demonstrates its applicability in countries with a high-police service, and opportunities and barriers for increasing the crash reporting rate.

General information
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Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Management Science, Operations Management, University of Queensland, Hebrew University of Jerusalem
Authors: Janstrup, K. H. (Intern), Kaplan, S. (Intern), Barfod, M. B. (Intern), Prato, C. G. (Intern)
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BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.408 SNIP 0.778 CiteScore 0.79
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.353 SNIP 0.855 CiteScore 0.68
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.459 SNIP 0.715 CiteScore 0.67
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Scopus rating (2011): SJR 0.426 SNIP 0.789 CiteScore 0.71
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Scopus rating (2010): SJR 0.542 SNIP 0.778
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.362 SNIP 0.72
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Scopus rating (2008): SJR 0.223 SNIP 0.434
Scopus rating (2007): SJR 0.276 SNIP 0.708
Scopus rating (2006): SJR 0.272 SNIP 0.615
Scopus rating (2005): SJR 0.325 SNIP 0.726
Scopus rating (2004): SJR 0.513 SNIP 0.826
Scopus rating (2003): SJR 0.321 SNIP 0.837
Scopus rating (2002): SJR 0.237 SNIP 0.43
Harnessing big data for estimating the energy consumption and driving range of electric vehicles

Analyzing the factors that affect the energy efficiency of vehicles is crucial to the overall improvement of the environmental efficiency of the transport sector, one of the top polluting sectors at the global level. This study analyses the energy consumption rate (ECR) and driving range of battery electric vehicles (BEVs) and provides insight into the factors that affect their energy consumption by harnessing big data from real-world driving. The analysis relied on four data sources: (i) driving patterns collected from 741 drivers over a two-year period; (ii) drivers' characteristics; (iii) road type; (iv) weather conditions. The results of the analysis measure the mean ECR of BEVs at 0.183 kW h/km, underline a 34% increase in ECR and a 25% decrease in driving range in the winter with respect to the summer, and suggest the electricity tariff for BEVs to be cost efficient with respect to conventional ones. Moreover, the results of the analysis show that driving speed, acceleration and temperature have non-linear effects on the ECR, while season and precipitation level have a strong linear effect. The econometric model of the ECR of BEVs suggests that the optimal driving speed is between 45 and 56 km/h and the ideal temperature from an energy efficiency perspective is 14 °C. Clearly, the performance of BEVs highly depends on the driving environment, the driving patterns, and the weather conditions, and the findings from this study enlighten the consumers to be more informed and manufacturers to be more aware about the actual utilization of BEVs.
How indicative is a self-reported driving behaviour profile of police registered traffic law offences?

Although most motorised countries have experienced massive improvements in road safety over the last decades, human behaviour and differences in accident risk across sub-groups of drivers remains a key issue in the area of road safety. The identification of risk groups requires the identification of reliable predictors of safe or unsafe driving behaviour. Given this background, the aim of this study was to test whether driver sub-groups identified based on self-reported driving behaviour and skill differed in registered traffic law offences and accidents, and whether group membership was predictive of having traffic law offences. Sub-groups of drivers were identified based on the Driver Behaviour Questionnaire (DBQ) and the Driver Skill Inventory (DSI), while traffic offences and accidents were register-based (Statistics Denmark). The participants (N = 3683) were aged 18–84 years and randomly selected from the Danish Driving License Register. Results show that the driver sub-groups differed significantly in registered traffic offences but not in registered accidents. In a logistic regression analysis, the sub-group “Violating unsafe drivers” was found predictive of having a traffic offence, even when socio-demographic variables and exposure were controlled for. The most important predictive factor, however, was having a criminal record for non-traffic offences, while gender, living without a partner, and being self-employed also had a significant effect. The study confirms the use of the DBQ and DSI as suitable instruments for predicting traffic offences while also confirming previous results on accumulation of problematic behaviours across life contexts. The finding that driver sub-groups did not differ in registered accidents supports the recent research activities in finding and modelling surrogate safety measures.
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BFI (2017): BFI-level 2
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Scopus rating (2016): CiteScore 3.24 SJR 1.49 SNIP 1.97
Web of Science (2016): Indexed yes
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Scopus rating (2015): SJR 1.206 SNIP 1.808 CiteScore 2.63
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.19 SNIP 2.067 CiteScore 2.79
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ISI indexed (2013): ISI indexed yes
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Scopus rating (2012): SJR 1.3 SNIP 2.238 CiteScore 2.56
ISI indexed (2012): ISI indexed yes
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BFI (2011): BFI-level 2
Scopus rating (2011): SJR 0.922 SNIP 2.008 CiteScore 2.61
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.146 SNIP 2.356
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.203 SNIP 1.848
Web of Science (2009): Indexed yes
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Scopus rating (2008): SJR 1.276 SNIP 2.228
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.109 SNIP 2.064
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.5 SNIP 2.244
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Scopus rating (2005): SJR 1.008 SNIP 2.387
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.899 SNIP 1.947
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.785 SNIP 1.933
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.614 SNIP 1.443
Web of Science (2002): Indexed yes
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Investigating the reasons behind the intention to report cycling crashes to the police and hospitals in Denmark

This study explores the factors underlying the reporting intentions of cycling crashes by looking at barriers to reporting from other contexts and eliciting them via a survey and a structural equation model (SEM). The barriers consist of the attitude that crash reporting is useless, the preference to allocate time to other activities, the concerns about family distress and social image, the distrust in the police, and the medical consultation aversion. The survey elicited the reasons as well as socio-economic characteristics, cycling habits and last crash experience of cyclists, and yielded 1512 complete responses that were used for SEM estimation. The empirical analysis revealed that: (i) distrust in the police and medical consultation aversion are related to the reporting intentions both directly and indirectly through the attitude that crash reporting is useless and the preferences to allocate time to other activities; (ii) medical consultation aversion has a higher weight than the distrust in the police in demotivating cycling crash reporting intentions; (iii) the reasons are all strongly related to cyclists' characteristics and last cycling crash characteristics; and (iv) information provision regarding the societal benefits of crash reporting is important for increasing the reporting rate. (C) 2016 Elsevier Ltd. All rights reserved.

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Authors: Kaplan, S. (Intern), Janstrup, K. H. (Intern), Prato, C. G. (Ekstern)
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Scopus rating (2014): SJR 0.986 SNIP 1.601 CiteScore 2.02
Web of Science (2014): Indexed yes
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Scopus rating (2013): SJR 0.988 SNIP 1.765 CiteScore 2.22
ISI indexed (2013): ISI indexed yes
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BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.62 SNIP 2.441 CiteScore 2.54
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
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ISI indexed (2011): ISI indexed yes
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BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.184 SNIP 1.651
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Scopus rating (2009): SJR 1.359 SNIP 1.824
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Learning Supervised Topic Models for Classification and Regression from Crowds

The growing need to analyze large collections of documents has led to great developments in topic modeling. Since documents are frequently associated with other related variables, such as labels or ratings, much interest has been placed on supervised topic models. However, the nature of most annotation tasks, prone to ambiguity and noise, often with high volumes of documents, deem learning under a single-annotator assumption unrealistic or unpractical for most real-world applications. In this article, we propose two supervised topic models, one for classification and another for regression problems, which account for the heterogeneity and biases among different annotators that are encountered in practice when learning from crowds. We develop an efficient stochastic variational inference algorithm that is able to scale to very large datasets, and we empirically demonstrate the advantages of the proposed model over state-of-the-art approaches.

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Web of Science (2015): Indexed yes
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BFI (2013): BFI-level 2
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Modelling production-consumption flows of goods in Europe: the trade model within Transtools3

The paper presents a new model for trade flows in Europe that is integrated with a logistics model for transport chain choice through Logsum variables. Logsums measure accessibility across an entire multi-modal logistical chain, and are calculated from a logistics model that has been estimated on disaggregated micro data and then used as an input variable in the trade model. Using Logsums in a trade model is new in applied large-scale freight models, where previous models have simply relied on the distance (e.g. crow-fly) between zones. This linkage of accessibility to the trade model makes it possible to evaluate how changes in policies on transport costs and changes in multi-modal networks will influence trade patterns. As an example, the paper presents outcomes for a European-wide truck tolling scenario, which showcases to which extent trade is influenced by such a policy. The paper discusses how such a complex model can be estimated and considers the choice of mathematical formulation and the link between the trade model and logistics model. In the outcomes for the tolling scenario we decompose the total effects into effects from the trade model and effects from the logistics model.

General information

State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, University of Leeds, John Bates Services
Authors: de Jong, G. (Ekstern), Tanner, R. (Ekstern), Rich, J. (Intern), Thorhauge, M. (Intern), Nielsen, O. A. (Intern), Bates, J. (Ekstern)
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Forecasting the potential demand for electric vehicles is a challenging task. Because most studies for new technologies rely on stated preference (SP) data, market share predictions will reflect shares in the SP data and not in the real market. Moreover, typical disaggregate demand models are suitable to forecast demand in relatively stable markets, but show limitations in the case of innovations. When predicting the market for new products it is crucial to account for the role played by innovation and how it penetrates the new market over time through a diffusion process. However, typical diffusion models in marketing research use fairly simple demand models. In this paper we discuss the problem of predicting market shares for new products and suggest a method that combines advanced choice models with a diffusion model to take into account that new products often need time to gain a significant market share. We have the advantage of a relatively unique databank where respondents were submitted to the same stated choice experiment before and after experiencing an electric vehicle. Results show that typical choice models forecast a demand that is too restrictive in the long period. Accounting for the diffusion effect, instead allows predicting the usual slow penetration of a new product in the initial years after product launch and a faster market share increase after diffusion takes place.

General information
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Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Traffic Modelling, Pontificia Universidad Catolica de Chile
Authors: Jensen, A. F. (Intern), Cherchi, E. (Intern), Mabit, S. L. (Intern), Ortúzar, J. D. D. (Ekstern)
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Web of Science (2016): Indexed yes
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Web of Science (2015): Indexed yes
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Scopus rating (2014): SJR 2.995 SNIP 2.286 CiteScore 3.11
Web of Science (2014): Indexed yes
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Scopus rating (2013): SJR 2.843 SNIP 3.057 CiteScore 3.34
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
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ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
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Probabilistic Modeling and Visualization for Bankruptcy Prediction

In accounting and finance domains, bankruptcy prediction is of great utility for all of the economic stakeholders. The challenge of accurate assessment of business failure prediction, specially under scenarios of financial crisis, is known to be complicated. Although there have been many successful studies on bankruptcy detection, seldom probabilistic approaches were carried out. In this paper we assume a probabilistic point-of-view by applying Gaussian Processes (GP) in the context of bankruptcy prediction, comparing it against the Support Vector Machines (SVM) and the Logistic Regression (LR). Using real-world bankruptcy data, an in-depth analysis is conducted showing that, in addition to a probabilistic interpretation, the GP can effectively improve the bankruptcy prediction performance with high accuracy when compared to the other approaches. We additionally generate a complete graphical visualization to improve our understanding of the different attained performances, effectively compiling all the conducted experiments in a meaningful way. We complete our study with an entropy-based analysis that highlights the uncertainty handling properties provided by the GP, crucial for prediction tasks under extremely competitive and volatile business environments.

General information
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Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, University of Coimbra
Authors: Antunes, F. (Ekstern), Ribeiro, B. (Ekstern), Pereira, F. C. (Intern)
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Web of Science (2016): Indexed yes
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Road signage comprehension and overload: The role of driving style and need for closure

This study looks at the provision of information via traffic signs and its relation with driving styles, need for closure and socio-economic characteristics of road users. A web-based questionnaire allowed collecting information about traffic signs and road surface markings in 12 traffic locations that were presented in two variations: (i) in the first 6 cases, a first configuration contained information that led to ambiguity about the manoeuvres that were legal and a second configuration added traffic signs to eliminate the ambiguity; (ii) in the second 6 cases, a first configuration presented the road environment without signs and a second configuration added traffic signs to verify information redundancy. Respondents indicated for each location which manoeuvres they deemed legal and how many conflicts they estimated without traffic signs, and safety perception and comfort level improved with the traffic signs. Moreover, respondents reported their socio-economic characteristics and filled two questionnaires about need for closure and driving styles. Completed questionnaires from 753 participants from Hungary with expertise in transport and traffic were analysed via statistical and factor analysis, and results reveal that: (i) road users are heterogeneous in their perception and processing of information, as the number of manoeuvres correctly identified as legal relates to their socio-economic characteristics; (ii) the perception of improvements after the provision of information relates also to the road users' socio-economic characteristics and their driving style and need for closure; (iii) different amounts of information are sufficient for different road users not to feel uncertain regarding manoeuvres being legal at a certain traffic location.

General information

State: Published
Organisations: Department of Management Engineering, Transport DTU, Department of Transport, Transport Modelling, Technical University of Denmark
Authors: Bortei-Doku, S. (Ekstern), Kaplan, S. (Intern), Prato, C. G. (Intern), Nielsen, O. A. (Intern)
Pages: 442-449
Publication date: 2017
Conference: 3rd Conference on Sustainable Urban Mobility, Volos, Greece, 26/05/2016 - 26/05/2016
Strategic assessment of capacity consumption in railway networks: Framework and model

In this paper, we develop a new framework for strategic planning purposes to calculate railway infrastructure occupation and capacity consumption in networks, independent of a timetable. Furthermore, a model implementing the framework is presented. In this model different train sequences are generated and assessed to obtain timetable independence. A stochastic simulation of delays is used to obtain the capacity consumption. The model is tested on a case network where four different infrastructure scenarios are considered. Both infrastructure occupation and capacity consumption results are obtained efficiently with little input. The case illustrates the model's ability to quantify the capacity gain from infrastructure scenario to infrastructure scenario which can be used to increase the number of trains or improve the robustness of the system.

General information
State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Rambøll Danmark A/S, Erasmus University Rotterdam
Authors: Jensen, L. W. (Intern), Landex, A. (Intern), Nielsen, O. A. (Intern), Kroon, L. G. (Ekstern), Schmidt, M. (Ekstern)
Pages: 126-149
Publication date: 2017
Main Research Area: Technical/natural sciences
Suitability of commercial transport for a shift to electric mobility with Denmark and Germany as use cases

This paper identifies commercial sectors suitable for a shift to electric mobility in Denmark and Germany by analysing daily driving distance. The paper concludes that construction, human health and other service sectors are the most suitable sectors for electric mobility because many vehicles are registered in these sectors and daily mileage is reasonably low. They should be primary target groups of specific policy measures to promote the use of electric vehicles. Both Denmark and Germany have incentives to promote the use of electric vehicles. Nevertheless, electric vehicles do generally not show economic benefits unless travel distance is high. However, today the travel range of large vans is an important barrier for electrification due to battery weight and the limitation of 3.5 tonnes gross vehicle weight for driving with a normal driving licence. The rule needs amendments for electric vehicles, as has been done in Germany. The paper recommends EU countries follow the German rule allowing EVs up to 4.25 tonnes to be driven with a class B licence, thereby potentially creating a market for big vans with long travel range.

General information
State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, German Aerospace Center, COWI AS
Authors: Christensen, L. (Intern), Klauenberg, J. (Ekstern), Kveiborg, O. (Ekstern), Rudolph, C. (Ekstern)
Number of pages: 13
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Main Research Area: Technical/natural sciences

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BFI (2018): BFI-level 1
Testing the slope model of scheduling preferences on stated preference data

The valuation of travel time variability is derived either from a structural model, given information on departure time, or directly from a reduced-form model where departure time is assumed to be optimally chosen. The two models are theoretically equivalent under certain assumptions, hence are expected to yield similar results. We use stated preference data to compare the valuation of travel time variability under a structural model where trip-timing preferences are defined in terms of time-dependent utility rates, the "slope model", against its reduced-form model. Two choice experiments are used that are identical except one has a fixed departure time while the other allows respondents to choose departure time freely. The empirical results in this paper do not support the theoretical equivalence of the two models as the implied value of travel time variability under the reduced-form model is an order of magnitude larger. This finding, which is robust to various specification tests, is in line with a recent Swedish study by Börjesson, Eliasson and Franklin [Transportation Research Part B: Methodological, 46(7), 855–873 (2012)]. Since our data allows a direct comparison of the two approaches, we are able to rule out some potential explanations lined up by past research for the observed discrepancy between the two models.
The Recharging Infrastructure Needs for Long Distance Travel by Electric Vehicles: A Comparison of Battery-Switching and Quick-Charging Stations

On-road electric vehicle recharging infrastructure is essential in the transformation of electric vehicles into a practical transportation option. This study focuses upon assessing the need for recharging infrastructure for long distance travel for a large market share of electric vehicles, finding the optimal infrastructure deployment, and understanding the economic, social and environmental costs and benefits associated with the optimal infrastructure deployment. The analysis considers quick-charging and battery-switching as plausible recharging technologies. Results show: (i) the promotion of electric vehicles is beneficial when considering economic costs and benefits for operators and users, tax redistribution, and environmental externalities, even with a relatively modest market share; (ii) the number of required recharging stations for satisfaction of the travel demand is at the magnitude of 1–2% of the current gasoline infrastructure, under the assumption of wide availability of off-road recharging at home and the workplace; (iii) the optimal deployment of the recharging stations is along the main national highways outside of urban conurbations, under the assumption of wide availability of home recharging; (iv) the battery-switching technology is far more attractive to the consumer than the quick-charging technology for long-distance travel requiring more than one recharging visit.

The restricted stochastic user equilibrium with threshold model: Large-scale application and parameter testing

This paper presents the application and calibration of the recently proposed Restricted Stochastic User Equilibrium with Threshold model (RSUET) to a large-scale case-study. The RSUET model avoids the limitations of the well-known Stochastic User Equilibrium model (SUE) and the Deterministic User Equilibrium model (DUE), by combining the strengths of the Boundedly Rational User Equilibrium model and the Restricted Stochastic User Equilibrium model (RSUE). Thereby, the RSUET model reaches an equilibrated solution in which the flow is distributed according to Random Utility Theory among a consistently equilibrated set of paths which all are within a threshold relative to the cost on the cheapest path and which do not leave any attractive paths unused. Several variants of a generic RSUET solution algorithm are tested and calibrated on a large-scale case network with 18,708 arcs and about 20 million OD-pairs, and comparisons are performed with respect to a previously proposed RSUE model as well as an existing link-based mixed Multinomial Probit (MNP) SUE model. The results show that the RSUET has very attractive computation times for large-scale applications and demonstrate that the threshold addition to the RSUE model improves the behavioural realism, especially for high congestion cases. Also, fast and well-behaved convergence to equilibrated solutions among non-universal choice sets is observed across different congestion levels, choice model scale parameters, and algorithm step sizes. Clearly, the results highlight that the RSUET outperforms the MNP SUE in terms of convergence, calculation time and behavioural realism. The choice set composition is validated by using 16,618 observed route choices collected by GPS devices in the same network and observing their reproduction within the equilibrated choice sets generated by the RSUET model. Relevantly, the RSUET model is very successful in reproducing observed link.
The role of information systems in non-routine transit use of university students: Evidence from Brazil and Denmark

In this study we seek to understand the relation between travel information, transit use intentions and night travel. We hypothesize that transit use is related to the perceived usefulness and the ease-of-use of the system, which are related to information quality and real-time information availability. The hypothesized relations are anchored theoretically in the Technology Acceptance Model and validated empirically in two case-studies: (i) Copenhagen (Denmark), characterized by a highly integrated transit system with an advanced web-based information system; (ii) Recife and Natal (Brazil), characterized by a lower perceived level-of-service and non-integrated information sources. Data from a tailor-made survey of 1123 university students were collected. Structural equation models were employed for explaining the use of transit as a function of the observed respondent characteristics and the latent constructs. The results show that: (i) information search quality and source explain transit use; (ii) information quality underlies level-of-service and familiarity; (iii) the use of real-time information links to information quality and familiarity; (iv) general transit use and non-routine use during night and to unfamiliar places are correlated; and (v) the behavioral framework is confirmed with the two case-studies. (C) 2016 Elsevier Ltd. All rights reserved.
The use of electric vehicles: A case study on adding an electric car to a household

The market share of battery electric vehicles (EVs) is expected to increase in the near future, but so far little is known about the actual usage of this emergent technology. Consumer preference studies have indicated that the current limitation on driving distance is important. At the same time studies on the actual use of household vehicles indicate modest requirements for daily travel. An unresolved issue is to what extent these range limitations affect daily travel in EVs. In this study, we use real electric vehicle trip data to study the distribution of daily use and types of home-based journeys where a household decides to use an electric vehicle instead of their conventional vehicle. The results show how several factors related to distance and number of necessary charging events have plausible effects on electric vehicle travel behaviour. Further, the modelling indicates that the EV alternative is mostly used for well-planned transport and that EV use will not be the same as use of the conventional vehicle in two-vehicle households.
Because of environmental and economic stress, current strong investment in adaptive transport systems can efficiently use capacity, minimizing costs and environmental impacts. The common vision is of a system that dynamically changes itself (the supply) to anticipate the needs of travelers (the demand). In some occasions, unexpected and unwanted demand patterns are noticed in the traffic network; these patterns lead to system failures and cost implications. Significantly, low speeds or excessively low flows at an unforeseeable time are only some of the phenomena that are often noticed and need to be explained for a transport system to develop a better future response. The objective of this research was the formulation of a methodology that could identify anomalies on traffic networks and correlate them with special events by using Internet data. The main subject of interest in this study was the investigation of why traffic congestion was occurring as well as why demand fluctuated on days when there were no apparent reasons for such phenomena. The system was evaluated by using Google’s public data set for taxi trips in New York City. A “normality” baseline was defined at the outset and then used in the subsequent study of the demand patterns of individual days to detect outliers. With the use of this approach it was possible to detect fluctuations in demand and to analyze and correlate them with disruptive event scenarios such as extreme weather conditions, public holidays, religious festivities, and parades. Kernel density analysis was used so that the affected areas, as well as the significance of the observed differences compared with the average day, could be depicted.

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State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling
Authors: Markou, I. (Intern), Rodrigues, F. (Intern), Pereira, F. C. (Intern)
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Main Research Area: Technical/natural sciences

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Volume: 2643
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Scopus rating (2016): CiteScore 0.75 SJR 0.494 SNIP 0.722
Web of Science (2016): Indexed Yes
BFI (2015): BFI-level 1
Motivating people to change their departure time could play a key role in reducing peak hour congestion, which remains one of the most prevalent transport problems in large urban areas. To achieve this behavioural change, it is necessary to better understand the factors that influence departure time choice. So far, departure time choice modelling focussed mainly on objective factors, such as time and costs as main behavioural determinants. In this study, we derived psychological factors based on the Theory of Planned Behaviour, estimated them based on structural equation modelling, and included them into a discrete choice model. The psychological factors were measured based on an online questionnaire addressed to car commuters to the city centre of Copenhagen (N = 286). The questionnaire additionally included a travel diary and a stated preference experiment with nine departure time choice scenarios. All psychological factors had a significant effect on departure time choice and could improve the model as compared to a basic discrete choice model without latent constructs. As expected, the effects of the psychological factors
were different depending on framework conditions: for people with fixed starting times at work, the intention to arrive at work on time (as estimated by subjective norm, attitude, perceived behavioural control) had the strongest effect; for people with flexible working hours, the attitude towards short travel time was most relevant. Limitations, the inclusion of additional psychological factors and their possible interactions are discussed.

**General information**
- State: Published
- Organisations: Department of Management Engineering, Transport DTU, Transport Modelling
- Authors: Thorhauge, M. (Intern), Haustein, S. (Intern), Cherchi, E. (Intern)
- Pages: 94–105
- Publication date: 2016
- Main Research Area: Technical/natural sciences

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  - Web of Science (2016): Indexed yes
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  - Web of Science (2015): Indexed yes
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  - Scopus rating (2014): SJR 0.986 SNIP 1.601 CiteScore 2.02
  - Web of Science (2014): Indexed yes
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  - Scopus rating (2013): SJR 0.988 SNIP 1.765 CiteScore 2.22
  - ISI indexed (2013): ISI indexed yes
  - Web of Science (2013): Indexed yes
  - BFI (2012): BFI-level 2
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  - ISI indexed (2012): ISI indexed yes
  - Web of Science (2012): Indexed yes
  - BFI (2011): BFI-level 2
  - Scopus rating (2011): SJR 1.28 SNIP 2.175 CiteScore 2.56
  - ISI indexed (2011): ISI indexed yes
  - Web of Science (2011): Indexed yes
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  - Scopus rating (2010): SJR 1.184 SNIP 1.651
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  - Web of Science (2009): Indexed yes
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  - Scopus rating (2008): SJR 1.422 SNIP 2.018
  - Web of Science (2008): Indexed yes
  - Scopus rating (2007): SJR 0.796 SNIP 1.279
  - Scopus rating (2006): SJR 0.949 SNIP 1.521
  - Scopus rating (2005): SJR 0.698 SNIP 1.515
  - Scopus rating (2004): SJR 0.429 SNIP 1.255
  - Scopus rating (2003): SJR 0.462 SNIP 1.025
  - Scopus rating (2002): SJR 0.414 SNIP 0.769
  - Scopus rating (2001): SJR 0.311 SNIP 0.536
Bounded rational choice behaviour: applications in transport

Even though the theory of rational behaviour has been challenged for almost 100 years, the dominant approach within the field of transport has been based upon the assumptions of neoclassical economics that we live in a world of rational decision makers who always have perfect knowledge and aim to maximise some subjective measure. Where other fields, for example within the social sciences and psychology, have made serious efforts to explore alternative models derived from principles of bounded rationality, this direction has begun to take speed within transport applications only recently.

Bounded rational choice behaviour focuses on how the latter approach can be seriously taken into account within transport applications. As the editors discuss in the introduction, a true optimal choice can only be made if an individual has full and perfect information of all relevant attributes in his/her choice set. An individual is said to demonstrate bounded rational behaviour if he/she does not systematically consider all attributes deemed relevant for the decision problem at hand, does not consider all choice options and/or does not choose the best choice alternative. Such simplified representation and limited processing may occur due to time constraints, low involvement in the decision at hand, relying on habits or the task requiring too high a mental effort.
Mapping Social Media for Transportation Studies

General information
State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Technical University of Munich
Authors: Chaniotakis, E. (Ekstern), Antoniou, C. (Ekstern), Pereira, F. C. (Intern)
Number of pages: 7
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Main Research Area: Technical/natural sciences

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Scopus rating (2016): CiteScore 3.7 SJR 0.877 SNIP 2.225
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 0.898 SNIP 2.421 CiteScore 3.36
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.115 SNIP 2.224 CiteScore 2.64
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 0.749 SNIP 2.245 CiteScore 2.3
Mest trafiksikkerhed for pengene
Ny forskning fra DTU peger på, at det er muligt at forbedre prioriteringen af infrastrukturforbedringer på baggrund af viden om vejenes tilstand, de skønnede udbedringsomkostninger samt uheldsforekomst og alvorlighedsgrad.

General information
State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Technology and Innovation Management, Systems Analysis
Authors: Janstrup, K. H. (Intern), Møller, M. (Intern), Pilegaard, N. (Intern)
Pages: 10-11
Publication date: 2016
Main Research Area: Technical/natural sciences

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On the need for integrating LCA into decision making
The need for sustainable solutions has gained attention both in academia and industry research due to increasing demands of human beings, which are incompatible with limitations in resources availability. Several methods, such as Life Cycle Assessment (LCA), were developed in the past decades to assess the environmental profile of products and services. However, when decision makers have several alternatives at hand to solve a problem, environmental performance is not the only criterion for choosing the best alternative. Other criteria such as risks and economical costs and benefits that are associated with the alternatives will also influence the final choice. Sometimes the most environmentally sustainable alternative may not be the safest or cheapest one. How to make a balanced decision
considering environmental performance together with other criteria is not straightforward.

Decision analysis is broadly used to help decision makers identify the best solution among alternatives. The decision is based on expected utility generation, which incorporates consequences (or impacts) associated with each alternative. Depending on the research field and goal of the study, the included consequences can be e.g. environmental impacts, property damages from natural hazards and/or human health impacts. We examined the current decision analysis practice as it is applied in different research fields. The review shows that generally environmental impacts are considered less often than the other consequences. Meanwhile, LCA has been applied in many research fields to assess a wide range of environmental impacts associated with products or services. There is a huge potential for integrating LCA into other decision analysis tools to include assessments of the environmental profile of alternatives. This will provide the possibility of systematical inclusion of environmental considerations in the decision making process, thus facilitating a more holistic decision. However, due to different scopes and purposes of LCA and other decision analysis tools, the integration is not straightforward. The lack of consistency in e.g. system boundaries and handling of uncertainty needs to be carefully managed.
Uncertainty in Bus Arrival Time Predictions: Treating Heteroscedasticity With a Metamodel Approach

Arrival time predictions for the next available bus or train are a key component of modern traveler information systems (TISs). A great deal of research has been conducted within the intelligent transportation system community in developing an assortment of different algorithms that seek to increase the accuracy of these predictions. However, the inherent stochastic and nonlinear nature of these systems, particularly in the case of bus transport, means that these predictions suffer from variable sources of error, stemming from variations in weather conditions, bus bunching, and numerous other sources. In this paper, we tackle the issue of uncertainty in bus arrival time predictions using an alternative approach. Rather than endeavor to develop a superior method for prediction, we take existing predictions from a TIS and treat the algorithm generating them as a black box. The presence of heteroscedasticity in the predictions is demonstrated and then a metamodel approach is deployed, which augments existing predictive systems using quantile regression to place bounds on the associated error. As a case study, this approach is applied to data from a real-world TIS in Boston. This method allows bounds on the predicted arrival time to be estimated, which give a measure of the uncertainty associated with the individual predictions. This represents to the best of our knowledge the first application of methods to handle the uncertainty in bus arrival times that explicitly takes into account the inherent heteroscedasticity. The metamodel approach is agnostic to the process generating the predictions, which ensures the methodology is implementable in any system.

General information

State: Published
Organisations: Department of Management Engineering, Transport DTU, Transport Modelling, Singapore-MIT Alliance, Massachusetts Institute of Technology, Northeastern University
Authors: O'Sullivan, A. (Ekstern), Pereira, F. C. (Intern), Zhao, J. (Ekstern), Koutsopoulos, H. N. (Ekstern)
Number of pages: 11
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Main Research Area: Technical/natural sciences

Publication information

Journal: IEEE Transactions on Intelligent Transportation Systems
Understanding traffic crash under-reporting: Linking police and medical records to individual and crash characteristics

Objective: This study aligns to the body of research dedicated to estimating the underreporting of road crash injuries and adds the perspective of understanding individual and crash factors contributing to the decision to report a crash to the police, the hospital, or both. Method: This study focuses on road crash injuries that occurred in the province of Funen, Denmark, between 2003 and 2007 and were registered in the police, the hospital, or both authorities. Underreporting rates are computed with the capture–recapture method, and the probability for road crash injuries in police records to appear in hospital records (and vice versa) is estimated with joint binary logit models. Results: The capture–recapture analysis shows high underreporting rates of road crash injuries in Denmark and the growth of underreporting not only with the decrease in injury severity but also with the involvement of cyclists (reporting rates of about 14% for serious injuries and 7% for slight injuries) and motorcyclists (reporting rates of about 35% for serious injuries and 10% for slight injuries). Model estimates show that the likelihood of appearing in both data sets is positively related to helmet and seat belt use, number of motor vehicles involved, alcohol involvement, higher speed limit, and females being injured. Conclusions: This study adds significantly to the literature about underreporting by recognizing that understanding the heterogeneity in the reporting rate of road crashes may lead to devising policy measures aimed at increasing the reporting rate by targeting specific road user groups (e.g., males, young road users) or specific situational factors (e.g., slight injuries, arm injuries, leg injuries, weekend).

General information
State: Published
Organisations: Department of Management Engineering, Transport Modelling, Transport DTU, Danish National Police, Odense University Hospital
Authors: Janstrup, K. H. (Intern), Kaplan, S. (Intern), Hels, T. (Ekstern), Lauritsen, J. (Ekstern), Prato, C. G. (Intern)
Number of pages: 5
Pages: 580-584
Publication date: 2016
Main Research Area: Technical/natural sciences
Using internet search queries to predict human mobility in social events

While our transport systems are generally designed for habitual behavior, the dynamics of large and mega cities systematically push it to its limits. Particularly, transport planning and operations in large events are well known to be a challenge. Not only they imply stress to the system on an irregular basis, their associated mobility behavior is also difficult to predict. Previous studies have shown a strong correlation between number of public transport arrivals with the semi-structured data mined from online announcement websites. However, these models tend to be complex in form and demand substantial information retrieval, extraction and data cleaning work, and so they are difficult to generalize from city to city. In contrast, this paper focuses on enriching previously mined information about special events using automated web search queries. Since this context data comes in unstructured natural language form, we employ supervised topic model to correlate it with real measurements of transport usage. In this way, the proposed approach is more generic and a
transit agency can start planning ahead as early as the event is announced on the web. The results show that using information mined from the web search not only shows high prediction accuracy of public transport demand, but also potentially provides interesting insights about popular event categories based on extracted topics.

**General information**

State: Published
Organisations: Department of Management Engineering, Transport Modelling, Transport DTU, KTH - Royal Institute of Technology, Singapore–Massachusetts Institute of Technology (MIT), Los Alamos National Laboratory
Authors: Borysov, S. (Ekstern), Lourenco, M. (Ekstern), Rodrigues, F. (Intern), Balatsky, A. (Ekstern), Pereira, F. C. (Intern)
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Data models, Predictive models, Internet, Urban areas, Web search, Planning
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Source: FindIt
Source-ID: 2350291944
Publication: Research - peer-review › Article in proceedings – Annual report year: 2016

**Robustness indicators and capacity models for railway networks**

In a world continuous striving for higher mobility and the use of more sustainable modes of transport, there is a constant pressure on utilising railway capacity better and, at the same time, obtaining a high robustness against delays. During the planning of railway operations and infrastructure this can be assisted by improving decision support systems to enable planners to use their time more efficiently. In the context of strategic (long-term) planning, efficient decision-support tools translate into being able to evaluate infrastructure and timetable scenarios fast with little data input. This has motivated the research conducted and described in this thesis, where the objective has been to develop and improve existing methods to achieve timetable and infrastructure plans with robust capacity utilisation aimed at the strategic and early tactical planning phases.

**General information**

State: Published
Organisations: Department of Transport, Traffic modelling and planning, Department of Management Engineering, Transport DTU, Transport Modelling, Rambøll Danmark A/S
Authors: Jensen, L. W. (Intern), Nielsen, O. A. (Intern), Landex, A. (Intern)
Number of pages: 226
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Main Research Area: Technical/natural sciences
Electronic versions:
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Publication: Research › Ph.D. thesis – Annual report year: 2016

**Activities:**

**Integrating environmental impacts into cost-benefit analysis - The value of environmental pollutants**

Period: 26 Jun 2017
Yan Dong (Speaker)
Stefano Manzo (Other)
Michael Zwicky Hauschild (Other)
Integrating environmental impacts into cost-benefit analysis- The value of environmental pollutants

Period: 25 Jun 2017 → 29 Jun 2017

Yan Dong (Guest lecturer)
Stefano Manzo (Guest lecturer)
Michael Zwicky Hauschild (Guest lecturer)

Department of Management Engineering
Quantitative Sustainability Assessment
Transport DTU
Transport Modelling

Description
Sustainable Development Goals (SDGs) have raised the attention of the global society to apply environmental friendly solutions to solve problems. Cost Benefit Analysis (CBA) has been broadly used in different contexts and disciplines to facilitate decision makers in choosing among alternatives. CBA assumes that for each alternative there is a set of consequences, divided between costs and benefits that can be expressed in monetary terms. The preferred alternative is the one with the higher benefit cost ratio or Net Present Value (NPV). The considered consequences vary depending on the decision context. For example, the consequences that are covered in conventional transport projects include, among others, financial costs, travel time savings, variation in distance traveled, and the so-called externalities, including number of accidents, noise impacts and some air pollutants (e.g. CO2, NOx, SOx, CO and HC from fuel consumption). With respect to the air pollutants, monetary values are provided by CBA guidelines for transport as well as for other disciplines. However, CBA overlooks the full life cycle of infrastructures and vehicles, and the full set of environmental impacts, due to the lack of methodology to quantify the comprehensive impacts and the lack of monetary values of those impacts.

Life Cycle Assessment (LCA) is a robust methodology that assesses environmental profiles of products and services through their whole life cycles. For a given solution to a decision problem, LCA can quantify environmental pollutants and resource consumptions that are associated with the physical elements in the solution (e.g. infrastructures and vehicles). Note that LCA provides an inventory that covers a comprehensive list of pollutants and resource consumptions, which can also be translated into damages on the protected area, namely ecosystem health, human health and resources availability, via life cycle impact assessment (LCIA). This gives possibilities of monetizing environmental impacts either on the inventory level, or on the damage level. Nevertheless, the monetizing values of different pollutants and resources should be consistent with the damages (and thus the monetizing values of the damages) that they may cause on the protected area.

This research aims to 1) investigate the monetary values of environmental pollutants in the chosen application disciplines; 2) understand if those values are consistent with the monetized damages calculated by LCA methods and; 3) compare CBA with and without LCA, considering the uncertainty, using a transport case study.

Our study shows that the monetized damages calculated by LCA methods lie within the range of values reviewed in transport and waste treatment studies. The variation of pollutant prices can vary up to 2-3 orders of magnitude depending on the chosen methodology. The results from the transport case study show that including the monetized LCA result in the traditional CBA doubles the NPV. This suggests that the price assigned to particularly CO2 can change the NPV dramatically, which can influence the decision when more options are available. In sum, integrating monetized LCA results into current CBA is a feasible way of including environmental impacts in decision making, increasing the environmental relevance of the decision support.
**Related event**

**ISIE 2017: Science for Sustainable and Resilient Communities**
25/06/2017 → 29/06/2017
Chicago, United States
Activity: Talks and presentations › Conference presentations

**Applying LCA in decision making- the need and the future perspective**
Period: 10 May 2017
Yan Dong (Speaker)
Simona Miraglia (Other)
Stefano Manzo (Other)
Stylianos Georgiadis (Other)
Hjalte Jomo Danielsen Sørup (Other)
Elena Boriani (Other)
Tine Hald (Other)
Sebastian Thøns (Other)
Michael Zwicky Hauschild (Other)
Department of Management Engineering
Quantitative Sustainability Assessment
Centre for oil and gas – DTU
Transport DTU
Transport Modelling
Department of Applied Mathematics and Computer Science
Statistics and Data Analysis
Department of Environmental Engineering
Urban Water Systems
National Food Institute
Research Group for Genomic Epidemiology
Department of Civil Engineering
Section for Structural Engineering
Documents:
AbstraApplying LCA in policy decision making_Final
Links:
https://brussels.setac.org/welcome/

**Related event**

**SETAC Europe: 27th Annual Meeting – Environmental Quality Through Transdisciplinary Collaboration**
07/05/2017 → 13/07/2017
Brussels, Belgium
Activity: Talks and presentations › Conference presentations

**Applying LCA in decision making- the need and the future perspective**
Period: 7 May 2017 → 11 May 2017
Yan Dong (Guest lecturer)
Simona Miraglia (Guest lecturer)
Stefano Manzo (Guest lecturer)
Description
There is nowadays a need of including sustainable considerations in the policy and decision making. Sound decision making requires evidence-based support, i.e. decision analysis to help decision makers in identifying the best alternative based on the associated impacts. Decision analysis includes four steps: 1) structure decision problem; 2) assess possible impacts associated with alternatives; 3) determine stakeholder preferences and 4) evaluate alternatives. Decision analysis can be performed applying different tools, such as cost-benefit analysis (CBA), risk assessment, and life cycle assessment (LCA).

LCA is a decision analysis tool that focuses on environmental impacts. One limit is that LCA is based on defined impact categories and therefore does not provide information for those impacts and consequences out of the LCA scope. However, the LCA framework closely follows the decision analysis scheme and has the potential to be integrated with other decision analysis tools to enhance their assessment of environmental impacts.

To understand why LCA is needed in the policy decision context, we looked into the decision support for policy in several disciplines. Taking sustainable transport policy as an example, the traditional decision analysis tool for choosing the best alternative is CBA. CBA mainly analyses socio-economic impacts, such as travel time savings and costs, while only some environmental impacts are considered; i.e. the damage costs of greenhouse gas emissions, particulate matters, SOx, NOx and noise. Therefore, current transport policy making rarely reflect a full environmental profile of the suggested alternatives. Making decisions based on incomplete information may lead to sub-optimal solutions, especially where the environment is a major concern. There is a growing attention of conducting LCA in transport. Some identified environmental hotspots, such as consumer and household behavior, which may be the focus for future policies. Others assess the environmental impacts associated with building infrastructures and vehicle use. These studies verify that LCA can successfully quantify the environmental profile of alternatives in transport policy, if the relevant physical changes, e.g. vehicle travel distance and new infrastructures, are well-defined. However, before integrating LCA with other decision analysis methods for decision support, the study system, objectives, scopes, evaluation metrics and uncertainty handling need to be aligned.

Degree of recognition: International

Links:
https://brussels.setac.org/

Related event
SETAC Europe: 27th Annual Meeting – Environmental Quality Through Transdisciplinary Collaboration
07/05/2017 → 13/07/2017
Brussels, Belgium
Activity: Talks and presentations › Conference presentations

Modelling production-consumption flows of goods in Europe: the trade model within Transtools 3
Period: 5 Oct 2016
Estimation results and elasticities are presented for the trade model within the European transport model Transtools3. We also explain how the outcomes of this model are used in the overall freight model.

**Related event**

**European Transport Conference 2016**
05/10/2016 → 05/10/2016
Barcelona, Spain
Activity: Talks and presentations › Conference presentations

This paper describes the structure of the Transtools3 freight transport chain choice model for Europe and the data at the shipment level that were used in estimation, and presents the estimation results and resulting elasticities. It also discusses the structure of the overall freight model and how production-consumption matrices from a trade model are combined with the transport chain choice model in model application. In the estimation of the transport chain choice model on the available disaggregate data sources (the Swedish Commodity Flow Survey 2009 and the French ECHO survey) we tested several options for the specification of transport costs in the model and various nesting structures.

**Related event**

**heart 2016**
14/09/2016 → 16/09/2016
Delft, Netherlands
Activity: Talks and presentations › Conference presentations
Synthesis of household based trip diaries
Period: 14 Sep 2016
Mikkel Thorhauge (Speaker)
Jeppe Rich (Other)
Department of Management Engineering
Transport DTU
Transport Modelling
Documents:
Thorhauge - Trafikdage 2016 - Synthetic HH

Related event
heart 2016
14/09/2016 → 16/09/2016
Delft, Netherlands
Activity: Talks and presentations › Conference presentations

Udvikling af transportvænedata for husholdninger
Period: 23 Aug 2016
Mikkel Thorhauge (Speaker)
Jeppe Rich (Other)
Department of Management Engineering
Transport DTU
Transport Modelling
Degree of recognition: National
Documents:
Thorhauge - Trafikdage 2016 - Synthetic HH

Related event
Trafikdage 2016
22/08/2016 → 23/08/2016
Ålborg, Denmark
Activity: Talks and presentations › Conference presentations

SafeTREC-UCTC Seminar: Departure time choice modeling
Period: 7 Feb 2014
Mikkel Thorhauge (Speaker)
Department of Management Engineering
Transport DTU
Transport Modelling

Description
The focus of this study is departure time choice modeling of car commuters in the morning rush hours. To model this we use the approach first formulated by Small (1982), i.e. the Scheduling Model. This study will contribute to the research of departure time choice modeling in three distinct ways. Firstly, by designing an efficient stated choice design specifically built to capture the trade-offs being made in the choice of departure times. Secondly, to account for detailed level of flexibility not only in relation to the specific trip under question, but for trips and activities throughout a 24 hour time period. This is important because a crucial problem when studying departure time is that the choice of when to realize a given trip is (often) related to the full daily activity pattern, such as a restriction or a preference in one activity may form restrictions in the flexibility of other activities and thereby affects the preference for the related departure time. And thirdly, to incorporate latent variables to measure underlying preferences that potentially affect departure time following the Theory of Planned Behavior, as these preferences are believed to be an important factor in explaining behavior.
Degree of recognition: International
Documents:
SafeTREC-UCTC Seminar: Departure time choice modeling

07/02/2014 → 07/02/2014
Berkeley, United States
Activity: Talks and presentations › Conference presentations

Samfundssøkonomiske fordele i køreplaner ved hjælp af passagerforsinkelsesmodeller

Period: 9 May 2012
Mikkel Thorhauge (Speaker)
Department of Management Engineering
Transport DTU
Transport Modelling
Degree of recognition: National
Documents:
Mikkel_Thorhauge_Banekonferencen_2012

Danish Railway Conference 2012

09/05/2012 → …
Copenhagen, Denmark
Activity: Talks and presentations › Conference presentations

INFORMS Railway Application Section 2016 Student Paper Award - Second Place

Fabrizio Cerreto (Recipient), Otto Anker Nielsen (Recipient) & Steven Harrod (Recipient)
Department of Management Engineering, Transport DTU, Transport Modelling, Management Science

Description
RAS (Railway Applications Section), a subdivision of INFORMS (Institute for Operations Research and Management Sciences), is sponsoring a student research paper contest on analytics and fact-based decision making in railway applications.

Operations Research (OR) and the Management Sciences (MS) are professional disciplines that deal with the application of information technology for informed decision making. OR/MS professionals aim to provide rational bases for decision making by seeking to understand and structure complex situations and to use this understanding to predict system behavior and improve system performance. Much of this work is done using analytical and numerical techniques to develop and manipulate mathematical and computer models of organizational systems composed of people, machines, and procedures. RAS provides a forum for bringing together practitioners, consultants, and academics interested in applying OR/MS techniques to the railroad industry. RAS activities include roundtables, paper sessions at INFORMS national meetings, workshops, and focus groups. Roundtables provide attendees with a unique opportunity to explore, in-depth, topics ranging from eBusiness to simulation to network modeling together with a panel of experts. Paper sessions feature the latest in OR/MS research pertaining to the rail industry.

Details
Awarded date: 13 Nov 2016
Degree of recognition: International
Granting Organisations: INFORMS
event: INFORMS Nashville 2016 Annual Meeting
Prize: Prizes, scholarships, distinctions

Prof. P.H. Bendsens Transport Research Award
Mikkel Thorhauge (Recipient)
Department of Management Engineering, Transport DTU, Transport Modelling
Details
Awarded date: 22 Aug 2016
Degree of recognition: National
event: Trafikdage 2016
Prize: Prizes, scholarships, distinctions