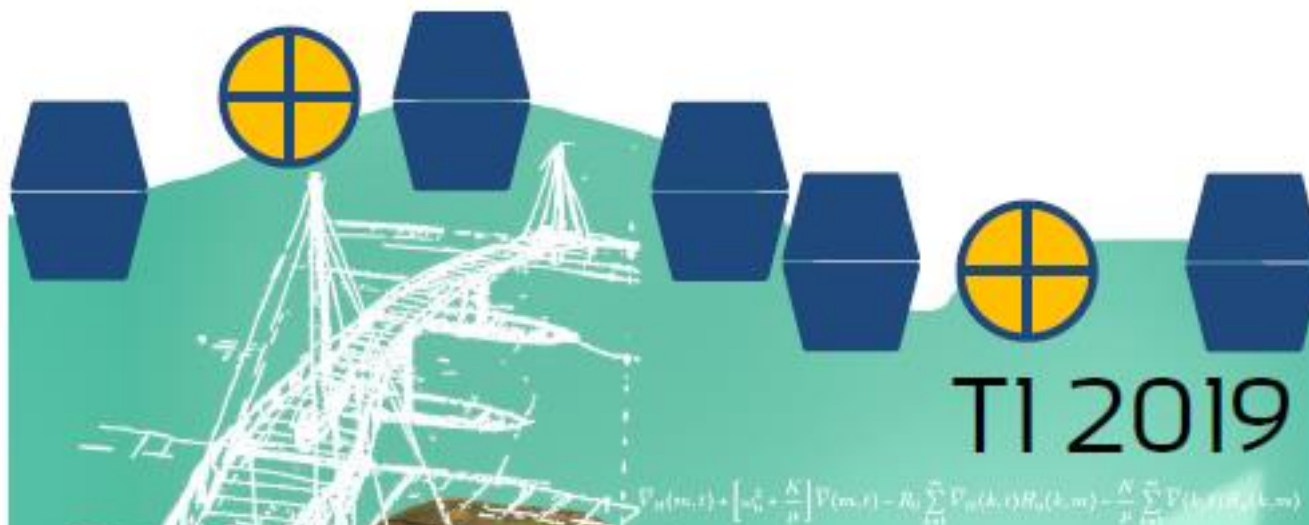




Book of Abstracts

TRANSPORT ONLY

Honours and Masters Seminar Presentations



Date: 7th TRANSPORT Location: CE403
 June 2019

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9:15	9:30	2. Chung, Jeremy Gregorious (H)	Understanding the Role of Inattentional Blindness in Look-But-Fail-To-See Crashes in NSW	Prabhakharan, Prasannah
9:30	9:45	3. Du, Qiang (M)	Transport resilience to natural disaster- Tropical Cyclone Debbie	Dixit, Vinayak
9:45	10:00	4. Israel, Aurelia Mooryanti (H)	New approaches to level of service assessment: Benchmarking of the development and place framework	Jian, Sisi Wijayaratna, Kasun
10:00	10:15	5. Le, Thi Ngoc Mai (H)	Modelling the behaviour of connected and autonomous vehicles in transport networks accounting for emergency operations	Grzybowska, Hanna
10:15	10:30	6. Li, Qiang (M)	Analysis of Air Travel In Australia from 2004 to 2018	Chakka, Mohana Naga Sai
10:30	10:45	7. Liu, Tianyu (M)	Using crowdsourced traffic data for predicting crashes	Chakka, Mohana Naga Sai
10:45	11:00	MORNING TEA		
11:00	11:15	8. Lu, Duc Phat (H)	Preference Choice Study of Separated Cycleways Around the South East Light Rail	Saxena, Neeraj
11:15	11:30	9. Meredith, Joshua (H)	A network model for evaluating global outbreak control strategies	Rey, David
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11:45	12:00	11. Parekh, Kerfegar Tehmasp (H)	A comparative study of stated preference surveys with and without driving simulator experience to assess route choice behaviour due to stop and go traffic	Saxena, Neeraj

12:00	12:15	12. Shen, Zhongchu (H)	Understanding the route choice behaviour of drivers: A survey	Saxena, Neeraj
12:15	12:30	13. Tomlins, Aaron John (H)	The Traffic Impacts of Short-Notice Bushfire Evacuations in Australia	Wijayaratna, Kasun
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13:30	13:45	16. Yin, Yongjian (M)	Transportation Network Resilience on 2016 Waroona Fire	Dixit, Vinayak
13:45	14:00	17. You, Jiahao (H)	Estimating the demand of shared bike services for students living in Eastern Suburbs	Saxena, Neeraj
14:00	14:15	18. Zhang, Xinan (M)	The effect of different factors on traffic incidents duration	Chakka, Mohana Naga Sai
14:15	14:30	19. Zhao, Yiming (M)	Optimising human performance of the Dynamic Driving Task fallback through the use of auditory and visual alert tones	Prabhakaran, Prasannah Dixit, Vinayak
14:30	14:45	20. Zhi, Feng (M)	Understanding the route choice behaviour of pedestrians	Saberi Kalae, Meead
14:45	15:00	21. Zhou, Junming (M)	Applications of crowd-sourced traffic data for transport planning and traffic management	Chakka, Mohana Naga Sai

H - Honours M - Masters

1. Autonomous vehicles: Disengagements and accidents

By Huang Chen

Supervisor: Mohana Naga Sai Chakka

Autonomous vehicles are expected to be publicly used owing to the benefits they bring to the consumers in terms of driving convenience and safety enhancement. Several tests regarding autonomous vehicles are currently being carried out on California public roads by different manufacturers. In this work, both disengagements and accidents data obtained from the reports provided by the manufactures will be analysed, which are crucially associated with safety and reliability issues. Disengagement reports contain data upon disengage number and corresponding driving miles as well as factors contributing to the disengagements. Disengagements occur when the automatic systems break down, which requires a driving control transition from systems to human drivers. The results indicate the cumulative number of disengages grows significantly slowly when the cumulative autonomous miles increase. This means the automated technology becomes better. And accident reports show collision types, driving modes of the autonomous vehicles during the accidents and other basic information. Only 1 case of total 141 collision cases was found to take responsibility for the accident while in autonomous mode. This study aims to evaluate autonomous vehicle disengagement for safety significance and accident contributors to help manufacturers ensure safe performance of autonomous vehicles.

2. Understanding the Role of Inattentional Blindness in Look-But-Fail-To-See Crashes in NSW

By Jeremy Gregorious Chung

Supervisor: Prasannah Prabhakaran

Motorcyclist are overrepresented in NSW crash statistics and considered one of the most vulnerable road users. This study investigated a psychological phenomenon called Inattentional Blindness (IB), where a person fails to observe a salient object when engaged in another task, and how this may contribute to Look-But-Fail-To-See crashes in motorcyclists. The study tested 88 participants, where they watched a point-of-view videoclip of a car pulling-up to an intersection. The participant's task was to count the number specified coloured cars that passed through the intersection. During the clip, a blue motorcyclist would drive on-scene. Following the test, participants were asked whether they noted the motorcycle approaching from the opposite side. The study examined whether the colour of the cars passing the intersection as well as the colour of the targeted cars impacted on how much blindness occurred. Eye-trackers were also used to identify whether participants had fixated on the motorcycle, but failed to recall it appearing. Participants were assigned to one of three conditions: (1) counting white cars, with other black cars at the intersection, (2) counting white cars, with coloured (red, green and blue) cars at the intersection and, (3) counting blue cars, with coloured at the intersection. The results revealed only 27% of participants freely recalled seeing the motorcyclists. The colour of the cars passing by the intersection had minimal effect on the level of IB, with similar results between Conditions 1 and 2. However, the colour of the target car impacted on the IB of motorcyclist, whereby participants in Condition 3 was

able to recall a motorcycle when cued 48.28% (n=29) of the time compared to participants in Condition 1 (26.67%) and Condition 2 (27.59%). This study suggests the of the colour of the target vehicle plays an integral role when analysing Look-But-Fail-To-See crashes using the IB paradigm.

3. Transport resilience to natural disaster- Tropical Cyclone Debbie

By Qiang Du

Supervisor: Vinayak Dixit

The resilience of transportation under the increasing frequency of disaster, no matter natural disaster or human-made destruction has aroused attention on a global scale. Researchers have given various definition related to the resiliency performance and studied transportation resilience ability in a large number of ways. In order to improve the resilience of transportation system, a series of metrics quantifying transport resilience have been proposed so as to minimize the impact of sudden disaster or destruction as well as recover the serviceability of transportation. To assist the analyzation of transport resilience, transport network which is mainly composed of transport links and nodes are presented as an integer system of a specific road or railway. Meanwhile, python is utilized to analyze the metrics related to the performance of resilience. In this thesis, the disaster happened in Queensland named Tropical Cyclone Debbie will be taken as a typical case and examined in the process of recovering road utilization, thus analyzing the resiliency of this transportation system. Finally, this thesis analyzes the metrics by observing the evacuation path as well as the closing and opening of the road, thereby finding ways to enhance the transportation resilience.

4. New approaches to level of service assessment: Benchmarking of the development and place framework

By Aurelia Mooryanti Israel

Supervisor: Kasun Wijayaratna; Sisi Jian

Negative impacts generated by increased car use due to the unprecedented growth of urban sprawl has caused transport institutions to advocate for more sustainable modes of transportation. To do so, they base their strategies on Level of Services (LoS), a measure of the performance of factors representing the quality of services experienced by each user. Previously, the indicators used to assess LoS were based on movement, mostly evaluating delays and number of vehicles per roads. Presently, they include environmental aspects, seen in the 'Movement and Place' framework from Transport for New South Wales and the Roads and Maritime Services, on which this paper is based on.

This study investigates existing LoS appraisal methods, considering place and movement indicators and attempts to validate the robustness of the Demand Weighted Level of Service Estimation (DWLE) method. This paper aims to lay the groundwork for a methodology that holistically accounts for both types of indicators. The methodology used consists of a sensitivity analysis of the variation of demand, based on five scenarios and evaluating the weightings accorded for all modes based on the standard capacity for each mode.

Preliminary results met expectations, the demand for each mode affects the performance of a road depending on the initial LoS. Roads already performing well for one mode tend to be positively impacted by having a higher weight in number of users. The inverse is true, demonstrating the stability

of the method. The weighting and threshold on acceptable LoS had a significant impact on the results, demonstrating the importance of accurate metrics based on the users' perspective.

It is envisioned that this study can assist transport institutions to concentrate resources on improving specific aspects of roads to achieve their desired LoS outcome. Ultimately, this would allow them to decide on an optimal mode distribution.

5. Modelling the behaviour of connected and autonomous vehicles in transport networks accounting for emergency operations

By Thi Ngoc Mai Le

Supervisor: Hanna Grzybowska

An ambulance or fire truck arriving a couple of seconds late can be the difference between life and death for some in emergency situations. Therefore, the minimization of the response time of an emergency vehicle to arrive at its destination by improving its travel time should be a top priority. This thesis will analyse the use of dynamic lane reversals in a fully autonomous network to reduce the travel time of a hypothetical emergency vehicle.

The ultimate aim of this research will be to design a utility function which will help identify shortest route the emergency vehicle will take in such a scenario. The utility function will be tested using a VISSM model network which accurately demonstrates the behavior of a fully autonomous network. The results yielded from these tests will be analysed to answer the question of whether dynamic lane changing will be useful.

6. Analysis of Air Travel In Australia from 2004 to 2018

By Qiang Li

Supervisor: Mohana Naga Sai Chakka

Australia's aviation industry has been growing fast in the past few decades. An increasing number of passengers have been choosing to travel by an aeroplane, and Australia currently has a large number of international travelers.

This thesis discusses the trends in the number of air passengers and aircraft movements between 2004 and 2018. We found that low-cost carriers are more popular than full-service airlines and international air travel has a higher increasing rate than domestic air travel. Next, this thesis introduces Zipf's law, which is the frequency of any routes is inversely proportional to its rank and see how it fits the distribution of top twenty domestic air routes in Australia. Furthermore, this thesis also performs network structure analysis of Australian airports using the NetworkX and Basemap package of Python. In this process, we use a lot of calculations and approaches to check the performance and estimate the resilience of the network. We use 2018 air traffic data to construct and analyze the airport network to see its difference with the 2011 one. Finally, after analyzing the airport network model, we can give some predictions for Australia's future air travel market.

7. Using crowdsourced traffic data for predicting crashes

By Tianyu Liu

Supervisor: Mohana Naga Sai Chakka

The prediction of crashes can have a significant positive impact on the improving current traffic network and designing a new road. Several studies have been implemented by analysing the relationship between crash frequency and some key factors (traffic volume, average speed, standard deviation of speed, geometric characteristics of road, weather, etc.). In this thesis, two linear regression models were introduced to describe the speed fluctuation and crash frequency. Traffic speed data collected from Google Application Programming Interface from 1st to 25th of June, 2018 on the Westlink M7 Motorway in NSW, Australia is used in this thesis. At the same time, the crash data are collected from NSW Transport from January 2012 to June 2016. In the study, the analysis of entropy, a measure of fluctuations in data and crash frequency presented that they could be affected by some factors like speed and geometry. For the entropy model, the entropy is higher when the average and standard deviation of speed were higher. Then, compared with the normal section, entropy is higher than it is at entries and exits. For the crashes model, the result indicated that higher standard deviation of speed and entropy would lead to a higher crash frequency. Moreover, the result of the model presented that the type (normal, entry and exit) of the motorway section has the most significant impact on crash frequency.

8. Preference Choice Study of Separated Cycleways Around the South East Light Rail

By Duc Phat Lu

Supervisor: Neeraj Saxena

It has become prominent that cycling is gaining widespread support from public and private entities to have this transport mode incorporated into existing infrastructure. Current surveys generally assess attributes more central to personal perception and attitude, such as, purpose of trip, barriers involved and level of comfort. However, the aspect of focus in this paper is centered on service practicality; more specifically, infrastructure preference. Through a survey and fractional factorial design, the following attributes will be assessed: travel time, traffic conditions and extra distance travelled with respect to the current route, where it would be possible to gain a gauge on the acceptable range of attributes and their respective attribute levels and the likelihood of an individual choosing a separated cycleway over their current route. The results derived from this may be fed into designs, where the principles and values behind it are supported by facts and data, in turn, assisting government authorities, such as Local Government Councils, to have more bargaining power and lobby for more funds and budget from the State and/or Federal Government to financially support their projects. Furthermore, some socio-demographics will be analysed to determine which portion of the population that this form of transport appeals or does not appeal to; from this, the generated trends will be able to assist with other causes, such as, targeting various audience groups with different promotion methods. It was clear that the analysis showed that there was a positive relationship between a shorter travel time and preference for a separated

cycleway around the South East Light Rail. This research opens opportunities for further development to better understand other attributes and their respective attribute levels that should be considered; enhancing and optimising the infrastructure and route choice simultaneously.

9. A network model for evaluating global outbreak control strategies

By Joshua Meredith

Supervisor: David Rey

Emergent outbreaks represent a global risk due to the interconnectedness of the global air travel network. Because these outbreaks are by nature sudden, we cannot simply pre-allocate stockpiles of resources to a number of cities to be used in the case of an outbreak event. In the case of pathogen-specific measures (such as antivirals), it may also be difficult to access a large number of treatments when there is a new, unknown strain. Instead, we must devise strategies to quickly allocate a total pool of resources to the most effective locations possible, and have these strategies consider details about the current network, pathogen, and resources available.

To develop these strategies, it is first necessary to model the global network and varying several parameters that can be affected by local control measures and analysing their sensitivity with respect to the overall global outbreak growth. Based on the shape of this graph, we can hypothesise whether it would be better to implement partial controls at several cities, or full controls at fewer. It is found that the former case is commonly more effective. Based on this information, we can then rank cities based on various details (such as population size), and use an all-or-nothing allocation as a starting point for meta-heuristic optimisation approaches. A gradient descent-like approach is found to be effective for doing so.

10. Have people started walking more in Sydney? Role of Fitness tracker in encouraging walk behavior

By Jiarui Mi

Supervisor: Neeraj Saxena

Promoting walking is essential for people to gain a healthy lifestyle, especially for Australian widely popular for their high enthusiasm in physical activity. Recently, available and friendly interactive interventions of Fitness tracker have been recognized as an efficient method to promote walking behavior around the world. This thesis aims to compare the walking behavior of residents within and outside a competitive setting and investigate the temporal change in the walking pattern of individuals by wearing Fitness tracker. After the comparison between the Global Challenge Progress in UNSW(100 days) and nine participants outside the challenge (150 days), this thesis evaluated walking steps by simple statistical models and ANOVA method using various latest technology and different interventions (Gender, Age, Competition, Award, etc.) integrated into Fitness trackers and apps. Thus, the result shows that fitness trackers encourage the competition group to record twice the average number of steps than the matched group, and they maintain slightly higher walking steps than the matched group from the first day to last day. Respectively, the competition group has slightly and stable increase in average steps according to the number of days. By contrast, the matched group have several fluctuant increasing only during school time and a significant decrease during vacation.

Notably, the result shows that the matched group has a descending trend of walking steps according to the increase of age. Interestingly, males outside the challenge have slightly more average steps of days than females. And then, male participants' recordings reflect that they have a higher activity level than the female participants. In conclusion, this thesis would help develop walkable communities which would imply less traffic congestion and healthier population by instilling a moderately competitive environment among the resident. It also would require a joint-collaboration between government, industry and local councils to foster such an environment.

11. A comparative study of stated preference surveys with and without driving simulator experience to assess route choice behaviour due to stop and go traffic.

By Kerfegar Tehmasp Parekh

Supervisor: Neeraj Saxena

Stop-&-go (S&G) traffic is a driving condition where commuters are involved in stopping and starting of a vehicle constantly over the course of their route. This continuous S&G may affect drivers to experience discomfort and create an unsafe driving condition.

Two stated preference surveys were conducted to assess the route choice behaviour of individuals due to S&G conditions. The first stated-preference survey (SP1) was conducted without any driving simulator experience. Stated-preference 2 (SP2) was the same survey as SP1, except participants experienced a driving simulator experiment before the survey. Providing driving simulator experience before the survey helped show how people perceived S&G traffic and the effects on their travel behaviour.

Data sets for SP1 and SP2 were analysed on Biogeme using multinomial logit models (MNL). A utility equation was created to include the factors that affect route choice behaviour such as travel time, time spent in S&Gs, number of S&Gs and vehicle running cost. The research demonstrated that SP2 had a value of time 39% lower than SP1. Therefore, by gaining driving simulator experience, participants were less inclined to pay more to reduce their travel time.

Past studies have discussed stated preference surveys compared to driving simulators to understand route choice behaviour. However, further research is needed in conducting a driving simulator experiment before a SP survey and comparing the results with a SP survey without driving simulator experience. The importance of this study is to show that both SP1 and SP2 generated different results that could be compared and analysed. This knowledge helps future studies on route choice behaviour to close the difference between the results by redesigning surveys. This thesis will extend the knowledge of combining driving simulator experience with stated preference surveys and help generate a better understanding of route choice behaviour of individuals.

12. Understanding the route choice behaviour of drivers: A survey

By Zhongchu Shen

Supervisor: Neeraj Saxena

Route choice occurs to every driver across different days over the week. Either from same origin-destination matrices or various matrices. However, the travel conditions are different for different days even for those drivers travel from same nodes every day. This paper aims at evaluating drivers' behaviour of choosing routes across multiple days to understand if commuters are always aware of best routes among all the scenarios and possible influence factors. An online survey combining one section of 9 node-to-node models, one section of 9 lottery choices and another section of social demography detail was conducted in the UNSW for this study. The data was collected by circulating the survey among Engineering faculty with a focusing on staffs in the UNSW and analysed in excel using data analysing tools to investigate the route choice behaviour and possible relationships between outcomes and commuters. The result showed around a quarter (25%) of 53 participants in total have selected the almost all the best routes in every treatment out of 9 treatments and 85% are males. It is estimated that nearly 63% in total have selected best routes in almost half (at least 5 treatments) of the total treatments but statistic showed only 7.5% are female. While 26% of these participants prefer choosing fastest routes over the best routes and 45% are females. It is also appeared that the more attempts in each treatment the higher possibility to find the best routes. The outcome of this study will reveal the relationships between route choice behaviour and its possible reasons to assist further research in the field.

13. The Traffic Impacts of Short-Notice Bushfire Evacuations in Australia

By Aaron John Tomlins

Supervisor: Kasun Wijayaratna

Cities around Australia have experienced and continue to experience major bushfire disasters, due to their extensive bushland setting, which is especially present within the outer suburban communities of cities such as Melbourne, Canberra and Sydney. Fast moving and intense bushfires are particularly critical to understand as they often induce short-notice evacuations resulting in a sudden increase in road network traffic. A number of these suburban communities by nature of their urban design, often influenced by their geographical setting, are constrained by limited road access options. Short notice evacuations within these communities may cause adverse effects on the road network limiting the successful evacuation and access for emergency vehicles.

This study quantifies the traffic impacts of a short notice evacuation, using microsimulation traffic modelling, on the community of Heathcote East, located on the southern urban fringe of Sydney. Multiple evacuation proportions were assessed based on local car ownership rates, as a strategy to represent Australia's 'Prepare, Stay and Defend or Prepare and Leave Early' bushfire evacuation management policy. Some mitigation strategies were then assessed to clarify the effectiveness of evacuation options for the region.

Road closures and proactive intersection management present improvements in the evacuation ability of this community. The microsimulation modelling highlights the importance of dynamic evacuation management as a strategy to reduce evacuation times, especially in communities limited by their road access options.

14. Traveller behaviour modelling using Bayesian Statistics

By Ruiyang Wang

Supervisor: Neeraj Saxena

This paper will introduce a method to select appropriate statistical model for predicting driver's route choice behavior with considering the influence of the size of data set collected from driving simulator. A Multinomial logistic model (MNL) based on utility theory is proposed to estimate whether the data size is large enough to apply logistic regression. In addition, a Naive Bayes classifier (NB) combined with Decision Tree model (DT) is developed to predict drivers' route choice when the data set is relatively small, that the effects of logistic regression is not remarkable. There is a comparison of prediction accuracy among the logistic model, native Bayesian and decision tree to generate the most accurate simulation result under certain data size, which identifies the impact from the scale of sample set. A case – study based on driving simulation data is carried out to illustrate that the total amount of data plays an essential role in model selection and analyze the stop-&-go traffic problem. The result shows that the sample set from Driving Simulator Experiment in Travel Choice Simulation Laboratory (TRACSLab), UNSW Sydney, is insufficient to operate Multinomial logistic model (MNL). By comparison, the route choice prediction of Native Bayesian and decision tree have a better goodness of fit, which means although total 99 observations with 5 different characteristics still not enough for logistic regression, the representative of the data set is good for Naive Bayes classifier and Decision Tree.

15. Quantifying the economic impacts of High-speed Railway Development

By Zhiwei Yang

Supervisor: Wei Liu; Fangni Zhang This paper quantifies effects of HSR on regional economic growth and equity based on the panel data. Firstly, the effect of HSR on economic growth is investigated employing the difference in difference method. The economic growth where HSR is introduced during the study period (treated group) are compared with those without HSR (control group). Results show that inauguration of HSR has a positive effect on economic development, comparing developing tendency of control group and treated group, seeing that the variable representing inauguration of HSR in specific year has mostly positive effect on economy among all the variables. The second part examines the impact of HSR on wealth equality measured

by Gini coefficient at both the national level and the provincial level. The effects of HSR mileage, the number of cities and population that have access to HSR are assessed. It is found that the effect of HSR on the national Gini coefficient is insignificant. Given that the national Gini coefficient can be reflected by the composing provincial Gini indexes, this paper further investigates the effect of HSR on provincial Gini coefficient. The number of HSR cities has a positive effect on provincial Gini coefficient, which means this factor intensifies inequity of economy in provinces. Yearly fixed effect on Gini coefficient was descending after the inauguration year of HSR, representing the economy was becoming more equal. Considering two kinds of provincial HSR mileage, mileage within the province and the overall mileage of HSR passing the province, we find more influence of the former kind of HSR mileage on provincial economic equity. Equity of poor and remote provinces tends to be influenced more significantly by HSR. Besides, it is usually the case the inequity was magnified by the influence of HSR in poor area while more equality was achieved in developed regions.

16. Transportation Network Resilience on 2016 Waroona Fire

By Yongjian Yin

Supervisor: Vinayak Dixit

The resilience of the transportation system can be defined as the ability to maintain system function under disturbance and the time and resources needed for the system to return to normal levels after disturbance. The research on the resilience of the transportation network after the disaster has become a hot topic. In the past few decades, a large number of researchers have invested in the research of resilience of transportation network systems, and the definition and role of resilience in the transportation system network are presented in detail and are studied under different circumstances. Researchers have given various metrics in the transportation network to illustrate resilience. By analyzing these metrics, we study how will the metrics change over the disaster period to find which metrics are vital. The results shows how to improve the resilience of post-disaster traffic networks. The nodes and edges of the traffic network are mainly used for the analysis of metrics, the purpose of which is to simplify the analysis procedures.

This article takes the 2016 Waroona fire as an example to analyze the road traffic network covered by the incident. The resilience of the transportation network system and its changes are studied by the influence of the fire on the evacuation path of the personnel, so as to know how to improve the resilience of the network.

17. Estimating the demand of shared bike services for students living in Eastern Suburbs

By Jiahao You

Supervisor: Neeraj Saxena

The shared bike services have become more popular for the areas around the University of New South Wales (UNSW) Kensington campus in recent years. Since the car is still the dominant mode of transportation in Sydney which would contribute to traffic congestion issues, it is necessary to take actions to avoid them. Meanwhile, the demand for bike-sharing service may be affected by public transport somehow. This paper aims to examine the effectiveness of shared bike use and willingness of individuals travelling to UNSW using this mode choice. A web-based survey will be designed using Stated Preference (SP) techniques performed by Ngene to investigate the mode choices for UNSW students living in eastern suburbs. The data will be then collected by circulating the survey among faculties in UNSW and analysed by applying a Multinomial Logit model (MNL) in Biogeme to examine the mode choice behaviour. The results of the project reflect that there were almost half (46.2%) of the target participants chose bus as their most recent transport mode while 40.3% of the participants selected walking. In addition to it, the rest of them (14.5%) preferred to use the car to travel to UNSW. It shows that the dominant modes for students living in eastern suburbs would be bus and walking. Due to traffic congestion issues, the demand estimation of shared bike services is required to observe any existing traffic features around UNSW and improve traffic conditions. The outcome of the study will provide insights on the market uptake of shared bikes around UNSW, and it is crucial to investigate the changes in travel (mode choice) behaviour of UNSW commuters to estimate the demand around UNSW to help form policies for shared bike program.

18. The effect of different factors on traffic incidents duration

By Xinan Zhang

Supervisor: Mohana Naga Sai Chakka

For a long time, the increasingly serious traffic congestion has not only directly affected daily travel and logistics transportation, but also brought huge economic losses to cities, regions and even countries. In particular, among the various factors causing traffic congestion, the duration of various types of traffic incidents caused by different reasons is an important reason for the problem of traffic congestion. Accurately classifying the factors affecting the duration of traffic accidents, and rationally managing and controlling these factors, not only can shorten the duration of traffic incidents, but effectively alleviate traffic jam. In the meantime, by establishing a reasonable analysis model to analyze the variables affecting the duration of incidents, it could provide effective help for managing traffic conditions.

This study analyzed more than 90,000 traffic incidents duration data, particularly focusing on vehicles breakdown and police stop, in the state of New South Wales of Australia from January 2012 to June 2016. Linear regression models are developed to analyze the data. several key variables that could potentially impact the duration of these incidents are considered. Some of these variables are breakdown frequency, population density, total registered vehicles, income, percentage of managers and professionals, percentage of young adults and so on.

After modeling and analyzing multiple variables, there are some results can be found.

19. Optimising human performance of the Dynamic Driving Task fallback through the use of auditory and visual alert tones

By Yiming Zhao

Supervisor: Prasannah Prabhakaran; Vinayak Dixit

Although the technology of connected and autonomous vehicle is improving, drivers are still required to monitor the road traffic scenario due to the system limits. Specifically when critical events or system failure occur, drivers are required to take back control of the driving task immediately. To keep drivers attentive to the driving task, Level 2 vehicles issue the driver with warnings if it does not detect drivers' attentions in a certain time period. The purpose of this study is to assess what the best method is to optimise this take-back process through different warning strategies. Within a driving simulation, 20 participants were divided into four warning strategies: an visual and auditory alert (1) every 8 seconds, (2) every 16 seconds, (3) dynamic - alert timing based on the road environment and (4) random alerts between 8 and 16 seconds. 'Readiness' to take back control was measured through the participants' hand being detected as on the steering wheel and a pupil detector.

During the drives, two unexpected critical events also occurred to test participants' reaction times and vigilances. The study measured drivers' reaction times, vigilances, the frequency they engaging the secondary task and their mental workload which is recorded through a cognitive task load questionnaire. The preliminary results revealed that dynamic alert warning had no crashes but a relative high level of mental workload(9.96). Participants in the 8 second alert warning and random alert warning strategies both have two crashes and 8.43 and 11.17 for mental workload, respectively. Participants in the 16 second alert warning were considered to perform the safest, with only crash and the lowest mental workload(7.47).

20. Understanding the route choice behaviour of pedestrians

By Feng Zhi

Supervisor: Meead Saberi Kalae

According to the previous study, we know that there are many factors which may have impacts to the route choice behaviours. The distance and the time which two are usually considered as the most significant factors for route choice behaviour. However, there may be some undiscovered attributes to the route choice behaviour. First, we collected trajectory data of student volunteers in UNSW through recording their GPS data on google map with some basic questions which indicate their feeling about noise and environments. With the raw data, the map-matching work need to be done to make the data easier to read and use which also avoid many unnecessary problems when building model. After processing the row data, the routes alternatives will be generated according to the fixed origin and destination pairs, the number of alternatives will be less than three, which is usually enough for short-distance walking trip. With all preparations done, we will build an unlabelled discrete choice model which will reflect the importance of the noise and vegetation for choosing route in CBD area. After that, some tests will be done to validate the significance of the coefficients for these attributes. If the coefficients are significant enough can claim that these attributes do have impacts on route choice behaviours. Otherwise, we will consider that the attribute which did

not pass the tests has not enough affect for pedestrians when they choose routes in CBD areas. Besides, the willingness to pay of the factors which have enough signficance to pedestrian route choice behaviours will be calculated to decide if there are necessity to change the environment for improving the pedestrian network.

21. Applications of crowd-sourced traffic data for transport planning and traffic management

By Junming Zhou

Supervisor: Mohana Naga Sai Chakka

This thesis researches the traffic impact on Epping-Chatswood line via M2 freeway resulting from trainline closure on Sept-30-2018. It improves upon analysis of real time traffic flow data, which is collected from Google maps and Uber movement, before and after the trainline closure. It uses SCATS data – the number of vehicles passed through detector every 15 minutes – and research data as well. The methodology of research is applied to Epping-Chatswood line via M2 freeway, Sydney, NSW. The purpose of this research is to find whether there were traffic impact on applied area, according to both the peak hour traffic flow and the number of vehicle changed in the same time zone.