

Transportation Network Flow Game: Proactive Planning under Adversarial Attacks

Abstract: The increasing number of automated devices associated with intersection management (e.g., traffic light controllers) in urban transportation, has introduced new challenges related to security of transport network. A common scenario for such cyber-physical attacks in transportation is traffic light manipulation. An adversary can play with the traffic lights to either break one of the links completely (e.g., the traffic light for one particular road is fixed to red) or modify the capacity of the link (e.g., the duration of the green light for one particular direction is reduced) so as to disrupt the entire traffic network. In order to tackle such disruptions on transport network, I will present a two-player iterative game (between the administrator and the adversary, each solving an optimisation model) approach to design a robust traffic network flow model under malicious attacks. Finally, I will show preliminary experimental results on synthetic datasets to demonstrate that our approach significantly outperforms the *max-flow* solution.

In addition, I will also briefly explain some of my previous research on data-centric strategic and operational planning for improving efficiencies of bike-sharing and emergency response.

Supriyo GHOSH



Supriyo GHOSH is a Postdoctoral Associate at Future Mobility (FM) IRG of SMART. He completed his PhD in Information Systems, specializing in Intelligent Systems & Optimization, from Singapore Management University (SMU). He also spent a year at Tepper School of Business of Carnegie Mellon University (CMU) as a graduate exchange student. His research interests include mathematical optimization, data-driven modelling, decision-making under uncertainty, automated planning & scheduling, urban transportation & logistic networks, game theory and machine learning. He has published papers at prestigious AI journals (e.g., JAIR) and conferences (e.g., IJCAI, AAI, ICAPS). Further information on his background and academic research can be found on his website at <https://sites.google.com/site/supriyophdsmu/>.

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11.30am

SMART-FM Seminar Space @ Level 9