Postdoctoral Associate – Designing Autonomous Mobility On-Demand

Future Urban Mobility Interdisciplinary Research Group

Singapore-MIT Alliance for Research and Technology Centre

SMART is a major new research enterprise established by the Massachusetts Institute of Technology (MIT) in partnership with the National Research Foundation of Singapore (NRF). SMART serves as an intellectual hub for international research collaborations, not only between MIT and Singapore, but also involving researchers from the region and beyond. At SMART, we identify and carry out research on critical problems of societal importance. SMART is a magnet attracting and anchoring global research talent, while simultaneously instilling and promoting a culture of translational research and entrepreneurship in Singapore. Five interdisciplinary research groups (IRGs) have been established to date: BioSystems and Micromechanics (BioSym), Centre for Environmental Sensing and Modeling (CENSAM), Future Urban Mobility (FM), Infectious Diseases (ID) and Low Energy Electronic Systems (LEES)

Project Overview

Within the new project titled "**Autonomous Mobility-On-Demand systems' impact on transportation in Singapore"**, an innovative and comprehensive framework for designing and assessing the impacts on mobility of Autonomous Mobility On-Demand (AMOD) systems and applying it for the Singaporean context is being developed. In addition, leveraging our group's experience in phone-based transportation surveys, AMOD targeted behavioural models will be estimated using actual behavioural data to be collected through an innovative smart-phone based technologies. AMOD systems are demand-responsive mobility services based on a fleet of shared autonomous vehicles, that can be easily accessed (pick-up and drop-off) within the operating area. Such system can have multiple design and operational configurations, each of them having very different impacts on the transportation and economic system and on individual choices themselves. To tackle these challenges, an advanced agent-based simulation framework that integrates operational and behavioural models, SimMobility, is used. The main objectives are to create an integrated platform for multiple scenario assessment, to show its full potential of for the analysis of innovative autonomous solutions and to give a further insight on the benefits and issues when implementing AMOD services in Singapore.

Responsibilities

The Future Urban Mobility Interdisciplinary Research Group is currently seeking to employ a postdoctoral associate, based at the SMART Centre in Singapore. The job scope is as follows:

- Simulation-based optimization of real-time (demand responsive) systems
- Implement and test AMOD demand and supply models in the context of a mobility simulator (SimMobility) as a team leader and potentially also as code developer;
- Explore the variety of factors impacting individual mobility and multimodal network performance in the presence of different configurations of a future AMOD system in Singapore.
- Explore new methods, procedure and algorithms to postulate model specifications and estimation of advance models.
- Co-authoring articles for publication in top-tier, peer-reviewed journals and conferences;
- Monitor the progress of the project, supervision of student, regularly meet with PIs and disseminate new findings in journals/conferences.

Requirements

The candidate should have the following:

- PhD in Optimization Research, Networks, Transportation Systems or Computer Science;
- Experience with simulation-based optimization of Transportation Systems;
- Excellent academic standing;
- Experience with programming in scientific languages (e.g. Python, R, Matlab, Octave, Julia);
- Positive work attitude, good communication and interpersonal skills and an ability to work independently and in multi-disciplinary teams.

Candidate with any of the following will have an advantage:

- Familiarity with automated/connected vehicle technologies and
- Experience in optimizing shared-mobility services;
- Familiarity with demand estimation research topics, such as demand modelling, travel surveys, vehicle motion simulation or energy estimation;
- Large scale (e.g. entire city) transport simulation
- Knowledge about C++ or any other Object Oriented Programming language is preferable.

The position will be based at the SMART FM Offices on the new campus of the National University of Singapore (NUS), with the possibility of traveling to MIT (up to a few months) as part of the international collaboration. The postdoctoral associate will work with an integrated team of faculty, researchers and students from MIT and Singaporean University partners, including: Dr. Ravi Seshadri (SMART), Prof. Moshe Ben-Akiva (MIT) and Prof. Jinhua Zhao (MIT).

To Apply

Interested applicants should send a cover letter expressing specific interest in the position and a detailed CV with information on education qualifications, work experience, list of publications, the contact details of two referees and citizenship status to andrew.tong@smart.mit.edu and CC:ravi@smart.mit.edu. Subject should read**: Postdoctoral Associate – Designing AMOD**. We regret that only shortlisted candidates will be notified.