TECHNISCHE UNIVERSITÄT DRESDEN

Professur für Verkehrsprozess-automatisierung

Chair for Traffic Process Automation
"Friedrich List" Faculty of Transport and Traffic Sciences

Master / Diploma / Student Thesis

Topic: Data-Driven Approach for OD Estimation in Urban Transportation: Using Traffic Monitoring Data (VAMOS)

Description:

As cities grow larger and busier, understanding how people travel from one place (Origin) to another (Destination) — commonly known as Origin-Destination (OD) estimation — becomes crucial for intelligent transportation systems (ITS). Precise OD estimations help improve traffic management, identify optimal routes, reduce traffic congestion, and ensure that people travel efficiently and comfortably. With VAMOS traffic data, we can estimate travel patterns (OD) more accurately and adaptively using a data-driven approach.

This thesis aims to delve into data-driven methods, particularly deep learning, to estimate the OD matrix using traffic monitoring data. The research focuses on two primary objectives: firstly, to thoroughly investigate various data-driven models for estimating the OD matrix, and secondly, to evaluate their accuracy and applicability, with a special emphasis on VAMOS data.

Objectives and Research Questions:

The general objective is to answer the following research questions through this project work-

I. What are the most recent and advanced state-of-the-art methods for OD estimation utilizing deep learning techniques?
II. How can we employ the VAMOS data for OD estimation, and what necessary data processing is needed?
III. What research gap exist in current OD estimation models, and how can we integrate with VAMOS data to address these gaps?

Requirements:

- Basic Proficient in Python and C++, with a good understanding of frameworks such as PyTorch and TensorFlow.
- Familiarity with fundamental concepts of machine learning, with a particular focus on neural networks.

Language: English

Supervisor (s): Prof. Dr. Meng Wang, MSc. Jyotirmaya Ijaradar

Contact and Application: Interested students are encouraged to forward their CV and both past and current academic transcripts to MSc. Jyotirmaya Ijaradar at jyotirmaya.ijaradar@tu-dresden.de. For further details about the chair, please visit: https://tu-dresden.de/bu/verkehr/vis/vpa.