CIVIL-477 Transportation Network Modeling and Analysis
Project Description

Spring 2025

1 Overview

This project aims to engage you in a real-world transportation problem using models and techniques learned from this course. You shall select one of the following general categories and further specify a project topic:

- **Traffic assignment with novel travel network designs:**

  With the increasing critiques of private driving and the emergence of autonomous vehicles (AVs), many novel network designs have been proposed, including but not limited to, park and ride/rail (P&R), car-free zone, AV/bus lane, central control of AVs. Pick one particular network design, integrate it into a benchmark transportation network (e.g., Sioux Falls), and use the model to quantify the potential impacts.

- **Traffic assignment for real-world traffic management:**

  Traffic assignment has been used to evaluate the impact of various traffic management schemes and policies, e.g., congestion pricing, road network expansion, transit development. Pick one real-world example, construct the corresponding network and traffic assignment model, and use the model to quantify the potential impacts.

- **Traffic assignment beyond vehicular traffic:**

  While traffic assignment was developed to predict vehicular traffic, it can also be adopted to study other transport problems, e.g., matching in ride-sharing, departure time choice in daily commute, daily activity scheduling, carriage selection in crowded trains. Pick one non-traffic-prediction problem, formulate it into a traffic assignment, and solve it in simple scenarios to demonstrate its effectiveness.

2 Timeline

Important milestones are listed as follows:

- May. 4: Project proposal

- May. 28: Final presentation (20%)

- Jun. 8: Final report (30%)

Project proposal

A project proposal should be submitted on Moodle that includes

- The choice between an individual project and a group project of 2 persons. Include the other group member's name if you choose the second option.

- The selected project topic and a short description of how it would be accomplished.

Final presentation

The final presentation is 10 minutes, plus 5 minutes Q&A. The presentation should give an overview of the project and discuss the main findings.

Final report

The final report is at most 10 pages and should cover the following aspects:

- Background and objectives

- Problem statement

- Assumptions and model formulation

- Solution method

- Numerical results and analyses

- Conclusions and key takeaways

3 Evaluation criteria

The project will be evaluated based on the following criteria:

- **Original and critical thinking:**

  Whether you showcase thorough thoughts in developing the project idea and perform rigorous analyses of the results.

- **Technical proficiency:**

  Whether you make reasonable assumptions to build the model and correctly solve the service design problem.

- **Practical significance:**

  Whether you produce insightful findings and recommendations on real-world practice.