Administrativia

- Credits: 4 (60 × 50 min lectures)

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- Course meeting times (proposed): Mon/Wed 5pm–6:40pm.

About this course

Mobility analytics refers to the process of collecting, analyzing, and deriving insights from data related to mobility patterns including humans and other entities (e.g., vehicles, drones, underwater and even some "unusual" objects such as bank notes or data packets). It involves using various data sources, such as GPS data, mobile app usage, transportation data, social media data, and other relevant sources, to understand how these entities move and interact within a given geographic area.

The goal of mobility analytics is to extract meaningful information and insights that can be used to understand transportation systems, urban planning, health conditions, mobility services, among others. By analyzing mobility patterns, different groups (e.g., transportation authorities, city planners, health authorities and businesses) can make informed decisions and improve the efficiency, safety, and sustainability of mobile systems.

Some common applications of mobility analytics include:

- Traffic optimization: Analyzing traffic flow and congestion patterns to identify bottlenecks, optimize traffic signal timings, and improve overall traffic management.

- Public transportation planning: Understanding travel patterns and demand for public transportation to optimize routes, schedules, and capacity allocation.

- Disease Transmission and Mitigation: Understanding mobility patterns can help identify high-risk areas and potential transmission routes, aiding in the identification and containment of disease outbreaks.

- Urban planning: Analyzing mobility patterns to inform decisions about infrastructure development, land use, and zoning, ensuring efficient transportation and accessibility.

- Shared mobility services: Analyzing usage patterns of shared transportation services like ride-hailing, bike-sharing, or scooter-sharing to optimize fleet management, pricing, and service coverage.

- Travel behavior analysis: Studying commuting patterns, travel preferences, and mode choices to understand how people move and make informed decisions about infrastructure investments and policies.

Mobility analytics relies on data analysis techniques such as data mining, machine learning, and spatial analysis to uncover patterns, predict future mobility trends, and support evidence-based decision-making in the field of transportation and urban planning.

Topics

This course will cover the following topics: mobility data science, mobility data acquisitions and privacy, mobility data management and analysis, applications of mobility data science, mobility data science and industry.

Material

This course will be based on research papers published in the literature and parts of books related to data mining, machine learning, and spatial analysis.

Lectures

Lectures will discuss the topics above along the semester.

Evaluation

Evaluation consists of exercises, seminars, programming project and a final test.