



Research Fact Sheet

Research project: Optimized Development of Urban Transportation Networks

What's the issue? Selecting and scheduling improvements in a transportation network is complicated because they are interrelated, and there are no readily available methods for analyzing interrelated alternatives. The right improvements can redistribute flows to improve congestion and bottlenecks, but others can be counterproductive and wasteful. Factors such as costs, constructability, operability requirements, maintenance, and political or equity considerations are also part of the decision process. Common prioritizing practices that are based on rankings and congestion levels do not produce the optimal sequence of projects because they disregard the interrelations among projects.

What did the research discover? A metaheuristic method based on a genetic algorithm can be used for planning and prioritization. The analysis, selection, and scheduling of interrelated components can be extended to include improvements to intersections, such as additional lanes. The methods described in this research can also be used to optimize the development of a rail transit network, with the model specifically capturing how the demand for rail service, headways of rail lines and network development decisions change over time.

How can I implement this?

The methods developed and tested in this project are already usable for evaluating, selecting and scheduling interrelated network improvement projects.

Learn more:

The full report is available at

https://www.morgan.edu/school_of_engineering/research_centers/urban_mobility_and_equity_center/research/completed_research/optimized_development_of_urban_transportation_networks.html

The Urban Mobility & Equity Center is a federally funded research consortium led by Morgan State University and includes the University of Maryland and Virginia Tech. www.morgan.edu/umec