Bus Line Optimization Considering Passenger Choice

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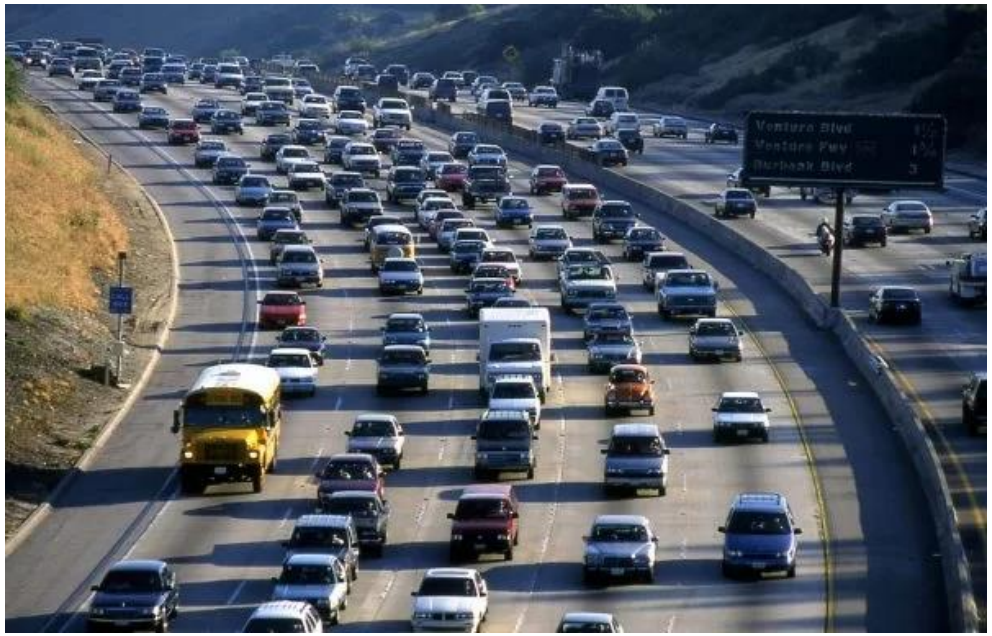
Motivation



- The cost of congestion in the US alone is roughly $121 billion per year or 1% of GDP [Alonso-Mora et al, ’16]

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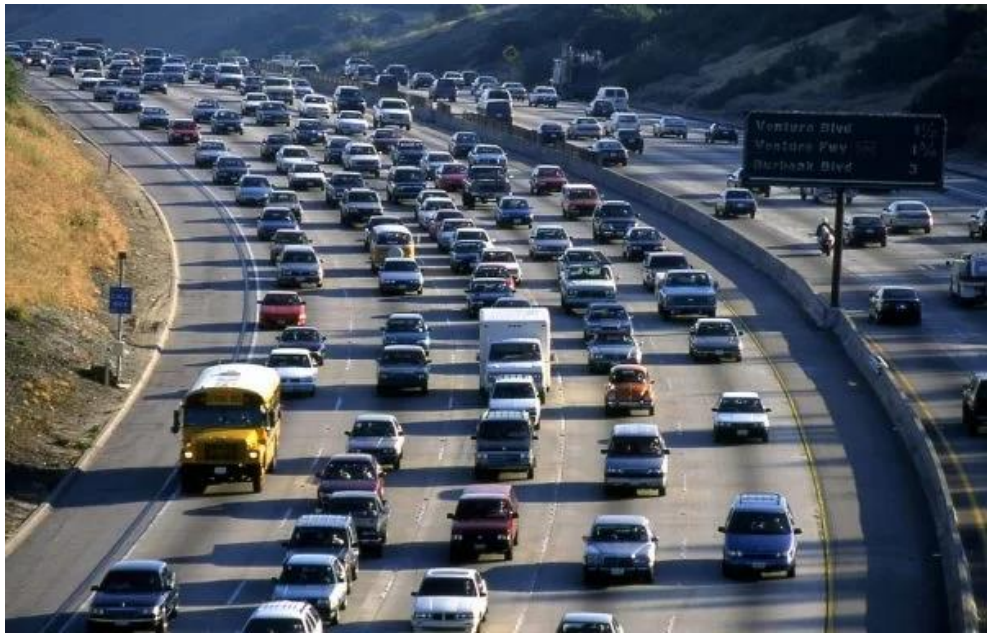
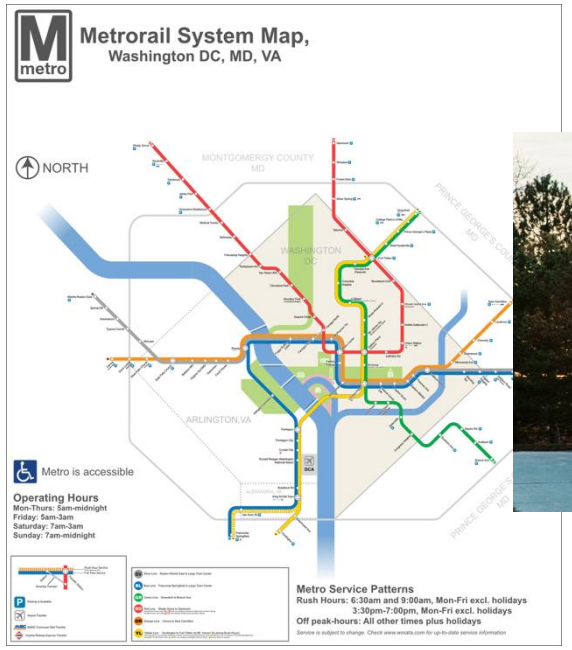


- The cost of congestion in the US alone is roughly $121 billion per year or 1% of GDP [Alonso-Mora et al, ’16]

- Call for improving sustainable public transit to hopefully help reduce congestion

Design Goals for Transit



- Sustainable and equitable
- Affordable, fast, convenient

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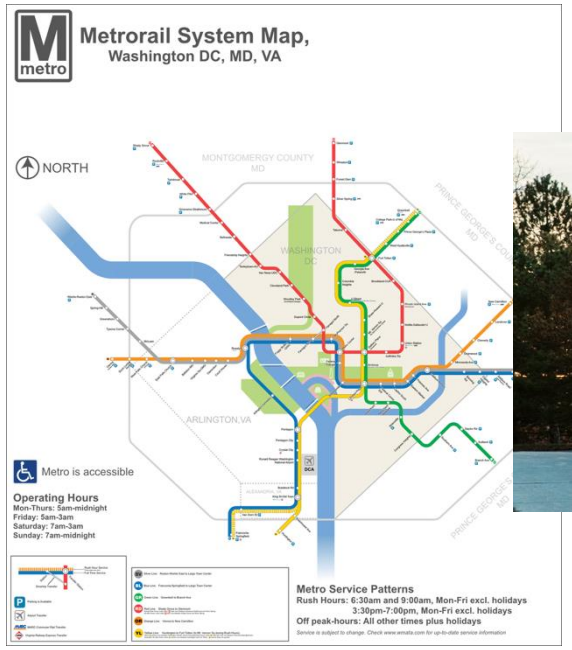

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Bus Line Optimization: Incorporating Passengers' Choices
How should we design efficient bus networks considering passengers' preferences over options of available lines and other transportation modes?

Math Modeling Approach

Travelers

Options

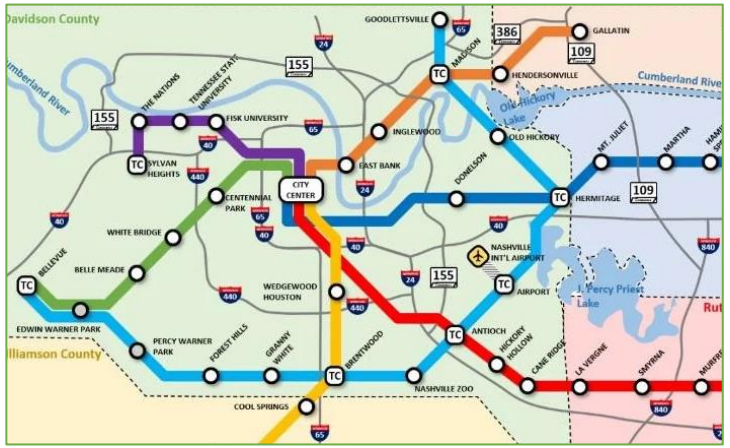
Market Share

Network

Choice Modeling with Synchronized Congestion (Delay)

Bus Line A | Bus Line B | Bus Line C | Driving | Others

Demand for Each Bus Line



Find the optimal lines to operate:

- Maximize Ridership
- Capacity Constraint
- Budget Constraint

Moving Forward

Analytical results: showcase computational efficiency of the approach, consulting external advisors and transportation agencies

Tool for operators: apply congestion pricing to roads with high traffic volumes, informed by the congestion scenarios