

Systemic View on the Strategic Interactions of Future Mobility Offers

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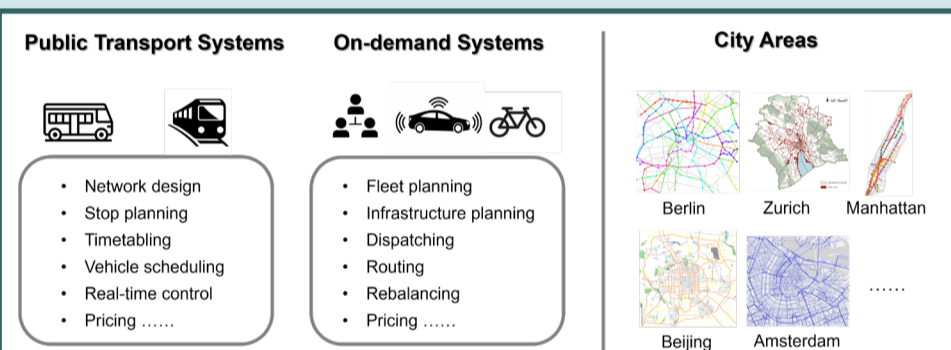
1. Motivation

Emerging mobility concepts such as **autonomous and shared mobility** are transforming traditional transportation paradigms.

However, **complex interactions** between stakeholders are often overlooked in the design and operation of mobility systems.

As a result, a mobility system composed of **independently optimized** subsystems may experience **suboptimal** performance.

Our understanding of **strategic interactions** and the corresponding outcomes remains insufficient. It is still unclear what mechanisms are required to enhance coordination and cooperation.



2. Research Goals and Questions

Support decision-making in complex **multi-agent environments** :

- How the decisions of one stakeholder can influence others within the system?
- What models are capable of capturing the complex interactions that include competition, cooperation, interdependence, and conflicts of interest?

Design mechanism to enhance cooperation:

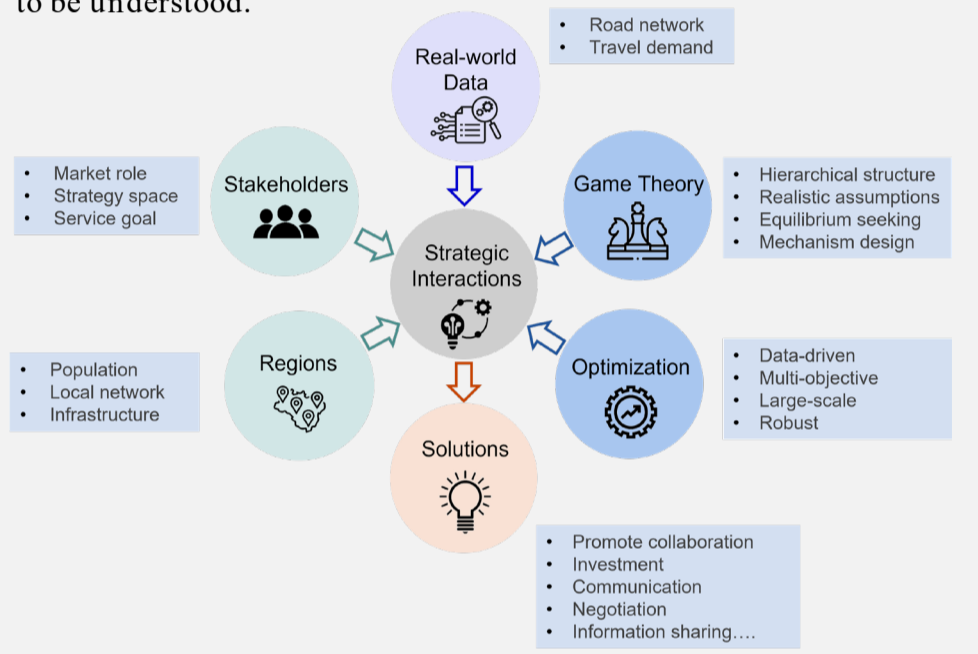
- Does the current rules of the game necessarily result in favorable outcomes?
- What mechanisms and incentives can be developed to encourage cooperation and collaboration among diverse stakeholders?

Leverage **real-world data** to provide insights for future mobility systems:

- How can realworld data be used to validate the efficiency, scalability, and robustness of algorithms in practical applications?
- What policy recommendations can be derived to inform practical decisionmaking?

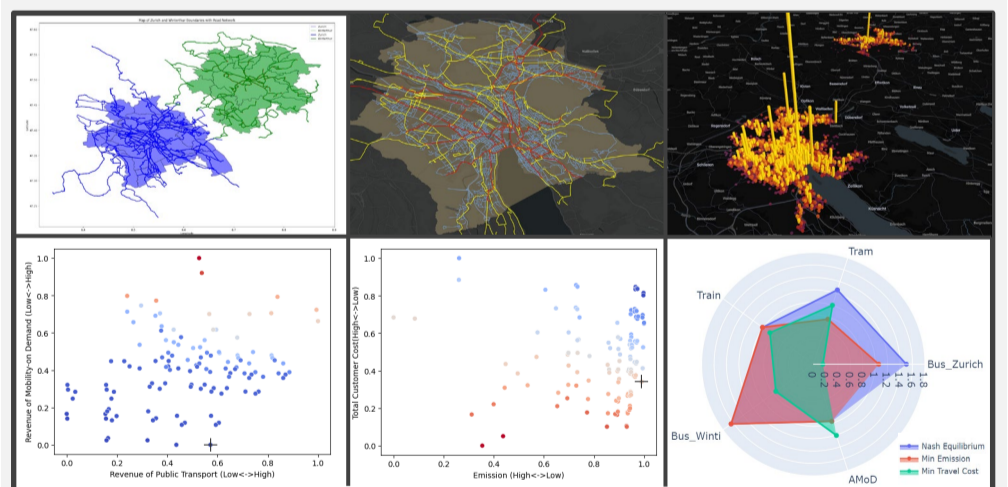
3. Crucial Concepts

To effectively model the complex system, several key concepts need to be understood.



4. Progress

1. Modeling the mobility systems of Zurich and Winterthur:



2. Cooperative network design for the route-based mobility systems
3. Application of game theory to model real-time AMoD operations in multi-agent scenarios

5. Conclusion and expected impact

Our framework will provide authorities with actionable information to plan for investment strategies in the future, as well as for designing policies to regulate the introduction of flexible mobility solutions in the existing mobility ecosystem. Mobility operators will be able to better design the service they offer and adapt it to the specific region(s) and other operators' actions.