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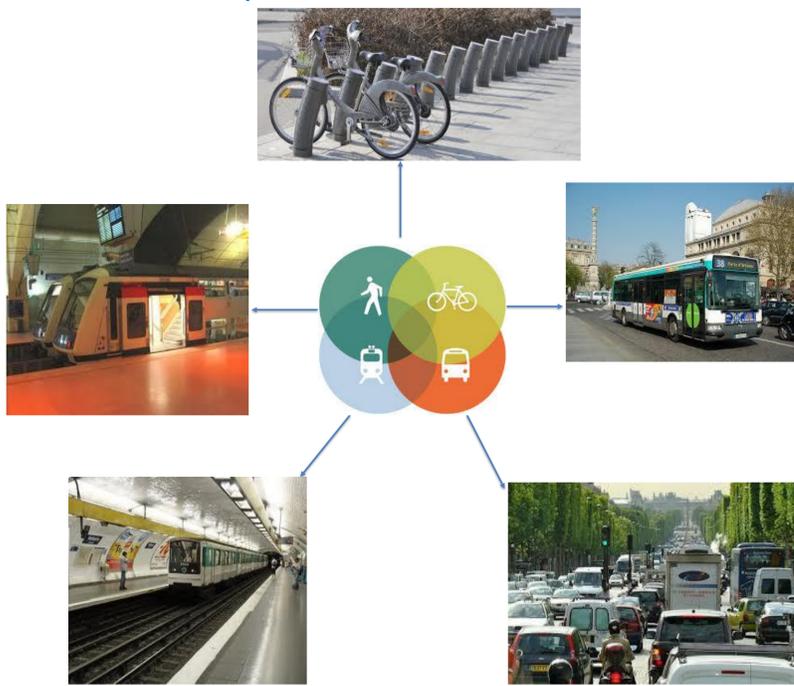
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Dynamic Rerouting in Multimodal Transportation Networks

Omar Dib, Alexandre Caminada, Marie-Ange Manier

Human mobility within urban areas usually happens thanks to a multimodal transportation system that informs commuters with all the modes of transport that are available from one place to another. However, some paths may become inaccessible due to some disruptions, such as accidents or perturbations. Therefore, an essential service called "re-routing" can be added to the system in order to make it an intelligent transportation system that is able to provide both optimal routes and alternative ones.

1.Context: Transportation Networks



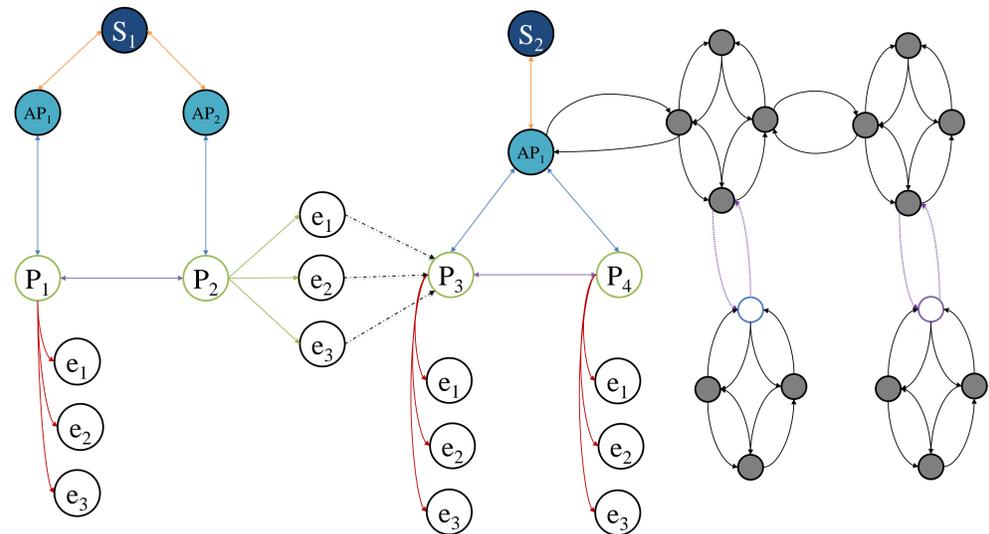
- Multimodal transportation networks
- Large scale network
- Complex systems
- Traveling according to preferences
- Smart passengers information systems
- Advanced routing tools

2.Challenges: Enhancing Transportation System

- Appropriate key modelling
- Multimodal network
- Time variant vs time invariant edges
- Deterministic vs stochastic edges
- Multicriteria optimization
- Vehicles' capacities
- Individual vs collective interests
- Passengers' behaviours
- Short terms results

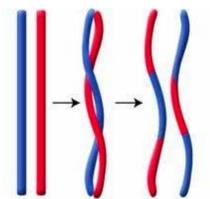
3.Modelling approach

- Directed graph
- Private and public modes
- Super network



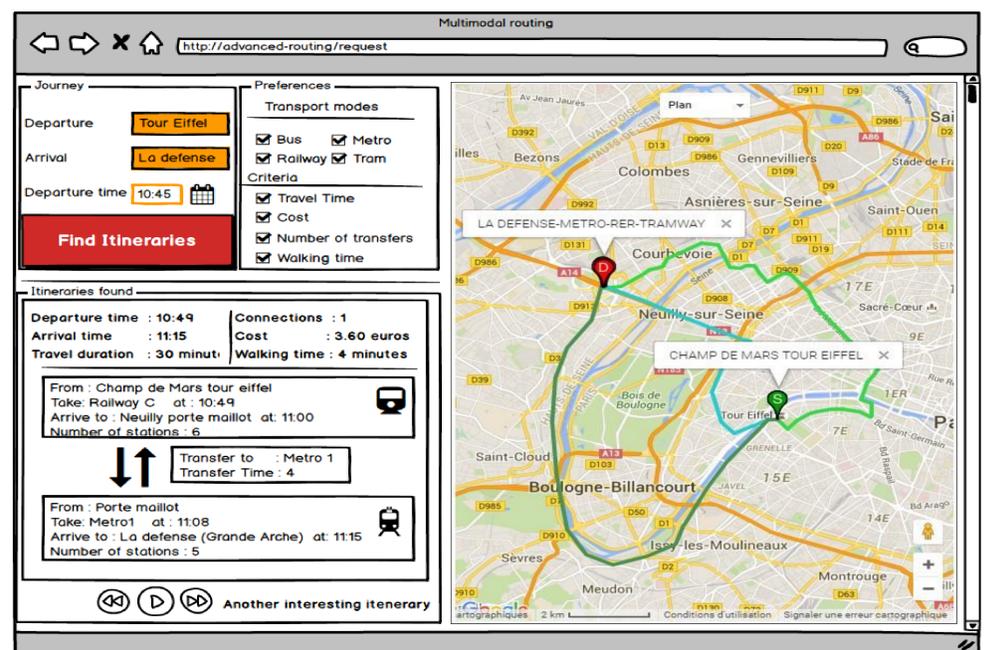
4.Routing Algorithms

- Traditional shortest path algorithms
- Metaheuristics for routing issues



5.Results: Smart Routing Decision Making Tool

- OSM for unrestricted modes
- GTFS for schedule based networks



References:

- Dib, Omar, Marie-Ange Manier, and Alexandre Caminada. "Memetic algorithm for computing shortest paths in multimodal transportation networks." *Transportation Research Procedia* 10 (2015): 745-755.
- Dib, Omar, et al. "Combining VNS with Genetic Algorithm to solve the one-to-one routing issue in road networks." *Computers & Operations Research* (2015).