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Integrated public transport and last-mile delivery: Optimizing the delivery vehicle route

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Systeemianalyysin laboratorio

Background

- Original Vehicle Routing Problem (VRP) from 1959 and the Traveling Salesman Problem (TSP) from 1930s
- Increased demand on package delivery services, environmental considerations, traffic congestion, pressure to cut costs…
- Different solutions presented: UAV/drones, delivery robots, integrating delivery with public transport…

Objective and constraints

- Find a model for small delivery vehicle integrated into public transport
- Constraints:
  - one delivery vehicle with capacity one
  - delivery vehicle starts and ends at a depot
  - delivery vehicle should not cause delays on public transport
  - time windows determined by the public transport route
- Goal is to minimize the delivery time/cost of the delivery vehicle
- This is a simple case, future work can focus on more complicated cases

Problem visualization
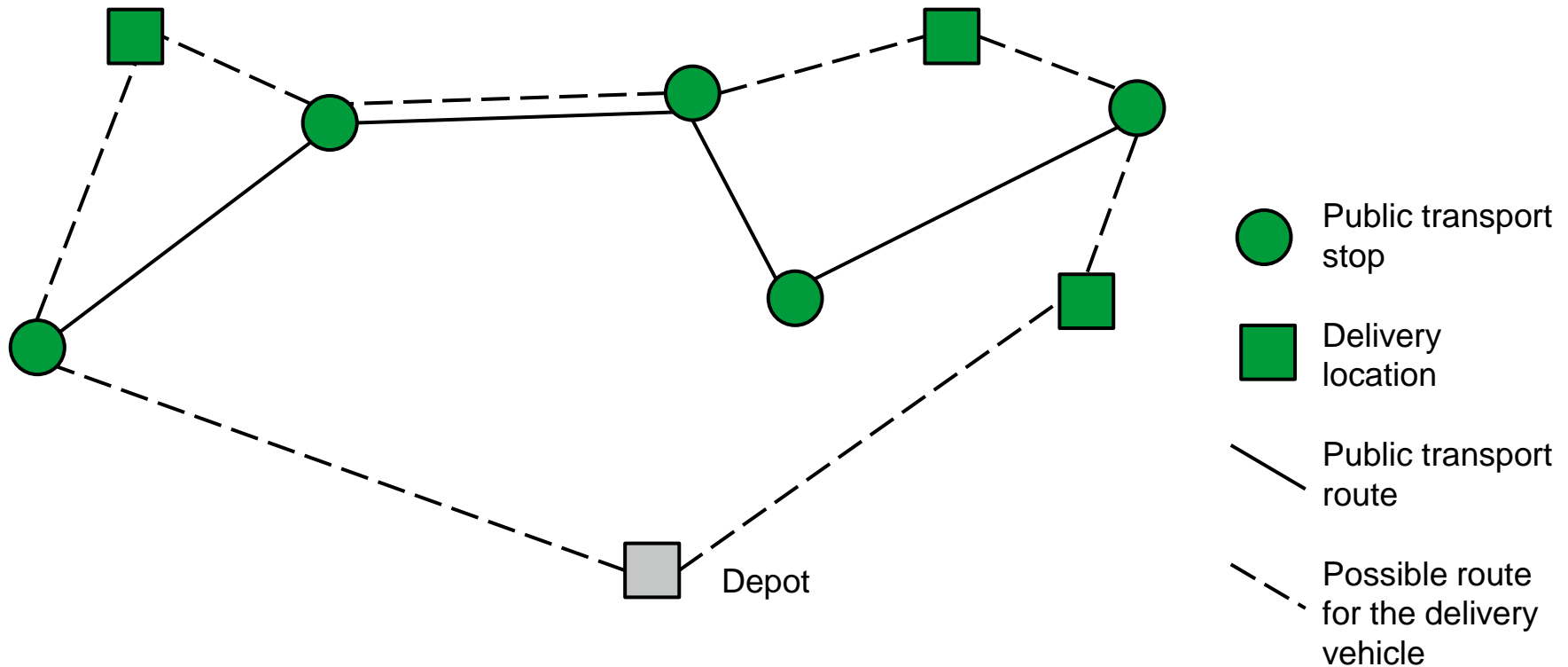
Schedule plan

- Getting to know the problem and related literature 05-06/23
- Topic introduction 16.6. (today)
- Formulating the model 06/23
- Finding solution approaches 07/23
- Writing the thesis 06-07/23
- Thesis presentation 08/23

Literature

- Savelsbergh, Sol, (1995) The General Pickup and Delivery Problem

- Berbeglia et al., (2007) Static pickup and delivery problems: a classification scheme and survey

- Demir et al., (2022) Last mile logistics: Research trends and needs

- Ghilas et al., (2016) An adaptive large neighborhood search heuristic for the Pickup and Delivery Problem with Time Windows and Scheduled Lines

- Murray, Chu, (2015) The flying sidekick traveling salesman problem: Optimization of drone-assisted parcel delivery