Hur kan automatiserade fordon bidra till mer effektiv kollektivtrafik?

Erik Jenelius
Future Mobility
Autonomous vehicles

- Owned cars
- Self-driving taxis/car sharing/ride sharing
- Urban form/planning
- Technology for integration of multimodal mobility
- Public transport

- Changes in demand behavior
- Interaction between conventional and self-driving vehicles
  (Correia and van Arem, 2016; Fagnant and Kockelman, 2015)
- MaaS
- Less owned cars
- Less public transport
  (Fagnant and Kockelman, 2016; ITF, 2015; Liang et al., 2016; Burghout et al., 2015)
- Low levels of demand
- Smaller vehicles
- Last mile solutions
- On demand services
  (Bergqvist and Åstrand, 2017; Scheltes and Correia, 2017)

- Low densities
- Increasing urban sprawl
- Space reallocation
- Parking space
- Service Platforms
Shared fleets

AV’s will only help to meet public policy goals if they come as shared fleets integrated with PT.

Source: UITP (2017)
Shared fleets as part of PT system

Hierarchical system:
- Fixed high-capacity lines
- Feeder lines
- On-demand services
- Shared AV’s

Source: UITP (2017)
Evaluation of bus service automation

Scenario study: Group of lines gathered in a trunk corridor (city center) and branched in the periphery.

Comparison of three different technologies:
- conventional bus: current technology that needs drivers
- full-autonomous bus: drivers will be removed
- semi-autonomous bus: drivers will be partially removed working by platoons

Zhang et al. (2018)
Effect of capital and operating costs

Fully autonomous buses advantageous if similar commercial speed
Semi-autonomous buses competitive mainly in inter-regional service

Zhang et al. (2018)
How should the AV bus network be designed?
Where is the deployment of AV bus networks most profitable?
Simulation Optimization approach
Application to Stockholm
SMART
Simulation and Modeling of Automated Road Transport

- Modeling requirements for simulating shared AVs in mesoscopic simulation models?
- When can demand-responsive AVs be an alternative or complement to fixed-route, fixed-schedule public transit?
- How can real-time coordination of shared AVs influence operating and passenger costs in flexible public transit?

Example scenarios: Feeder/Last-mile

- Pick-up/Drop-off points
- Transfer station to/from mass transit
- Fixed timetable
- Dynamic timetable
- Empty-vehicle redistribution

Increasing flexibility
Methodology

BusMezzo public transit simulator (line-based)
Individual vehicle and passenger agents
Day-to-day learning for route and mode choice
Extension with dynamic routing and dispatching capabilities
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