Preferred citation style for this presentation

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Animated online version

The IVT Baseline Scenario: Current version and outlook

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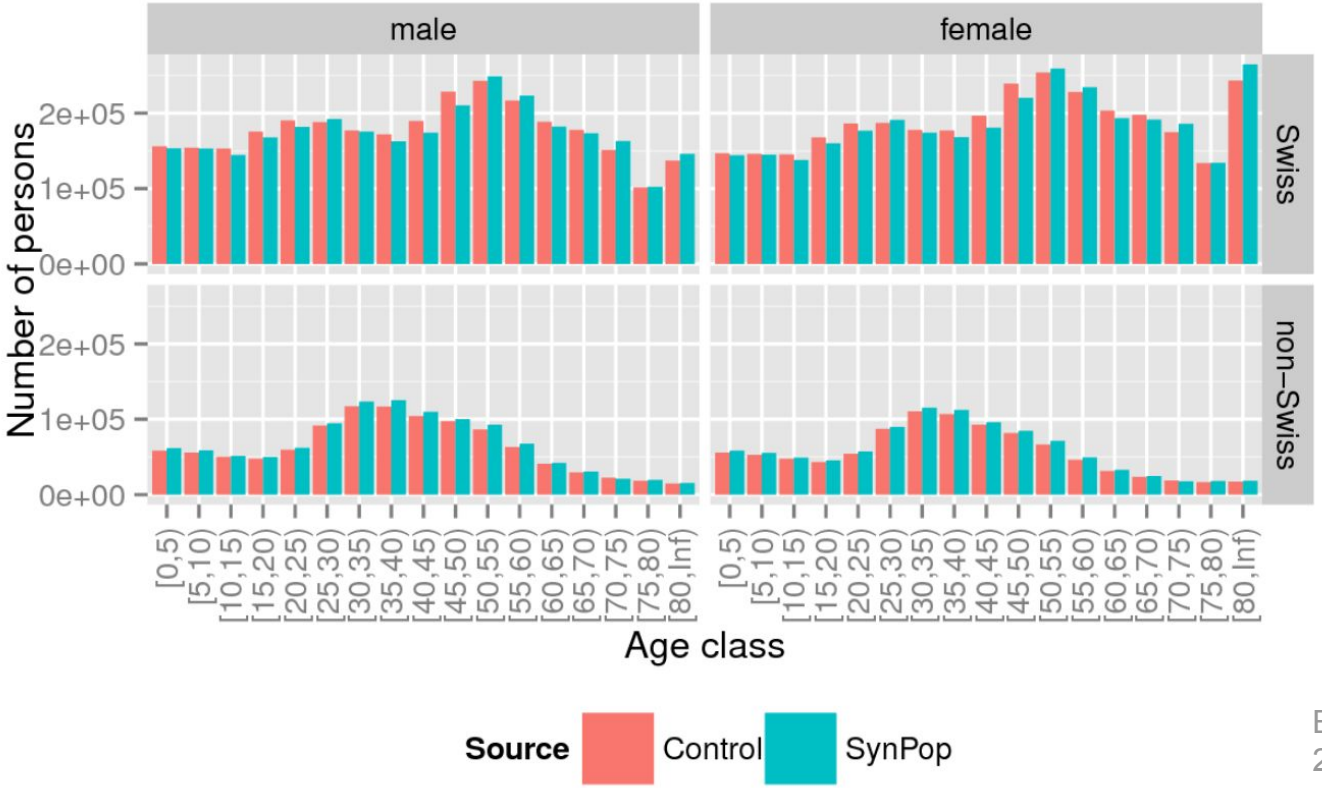
Demographics

- Microcensus Mobility and Transport 2010
  - 2015 Version available

- Generalized Ranking
  - Implementation Kirill Müller

Demographics



Bösch et al. 2016

Activity Chains

- Hot-Deck Matching with certain attributes
  - Sampling from Microcensus

- Long-term behavioural change
  - Input scenario vs. dynamic rescheduling?
  - Activity-based model?

Primary Locations

- Structural Survey 2010 - 2012
- Enterprise Census 2012

- Sampling from commuters matrices (municipalities)
- Assignment by home - workplace distance (consistency with activity chains)

- *So far no validation available*

Secondary Activity Facilities

- Enterprise Census 2012
  - Conversion: Patrick Bösch

- Capacities
  - Rather undocumented
  - Not used yet

Secondary Activity Assignment

- New sampling approach (Hörl)

- Aim: Location choices that are consistent with activity plans
- No capacity constraints yet

- Iterative process:
  - Generation of feasible “unsnapped” distance chains
  - Discretization of locations

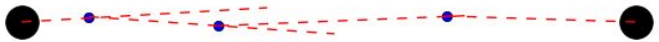
Secondary Activity Assignment

Algorithm 1: Sampling of feasible distances tours

1. Construct distribution of distances for 5min bins of travel times for each mode
2. Per agent:
   a. Sample a chain of distances based on travel times in the plan
   b. Use gravity model to relax locations in $\mathbb{R}^2$
   c. If chain is not feasible, continue with (a)
   d. Abort if maximum number of iterations is reached → Infeasible

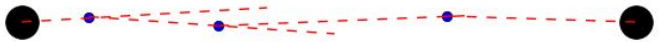
Secondary Activity Assignment

Algorithm 1: Sampling of feasible distances tours



Secondary Activity Assignment

Algorithm 1: Sampling of feasible distances tours



Secondary Activity Assignment

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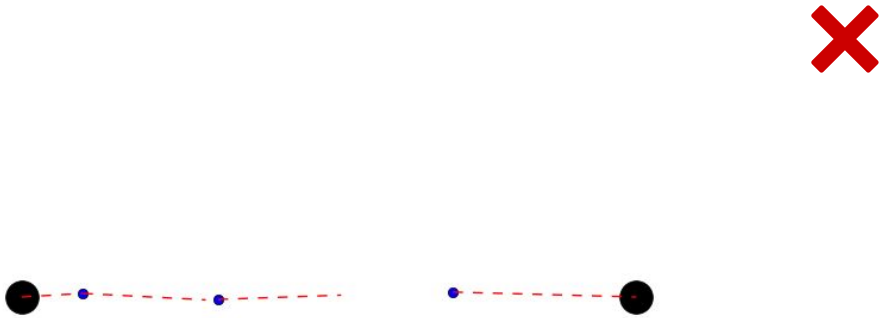


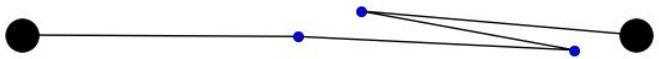
Secondary Activity Assignment

Algorithm 2: Spatial discretization

1. Sample a continuous chain (**Algorithm 1**)
2. Discretize locations (based on available facilities)
3. If discretization error is too large, continue with 1
4. Abort if maximum number of iterations is reached

Secondary Activity Assignment

Algorithm 2: Spatial discretization



Secondary Activity Assignment

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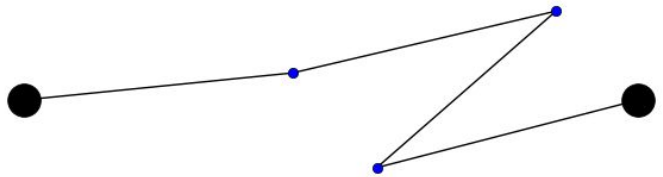

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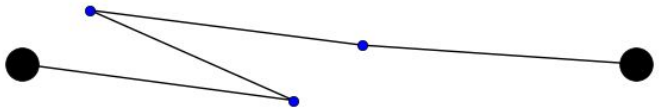

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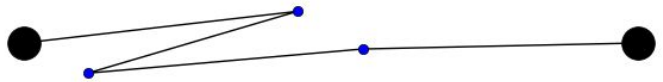

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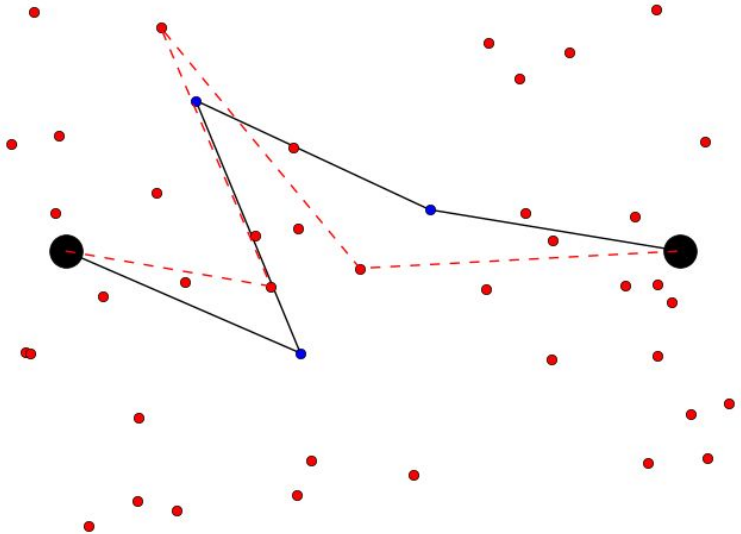

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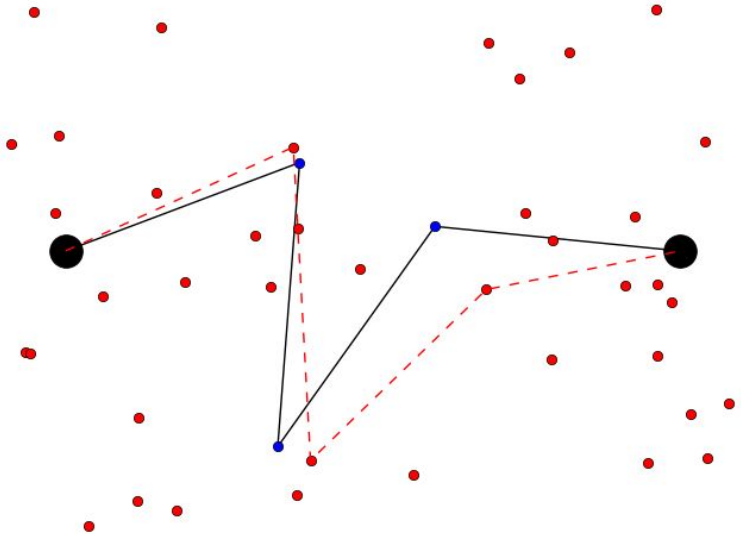

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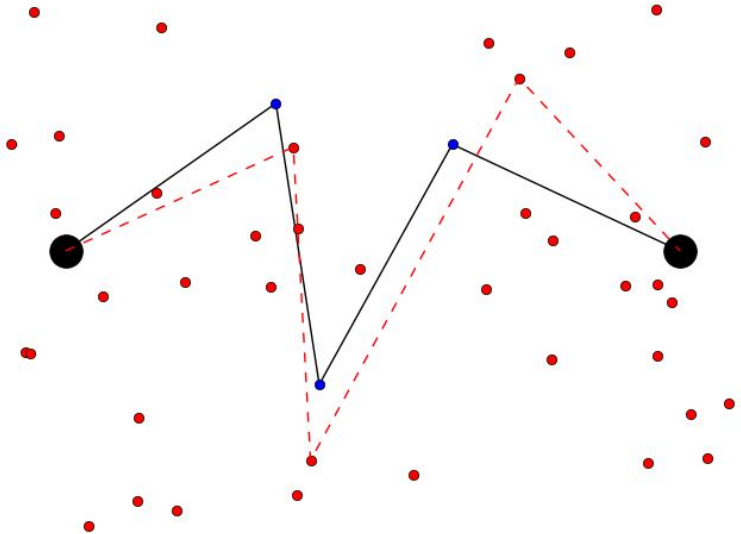

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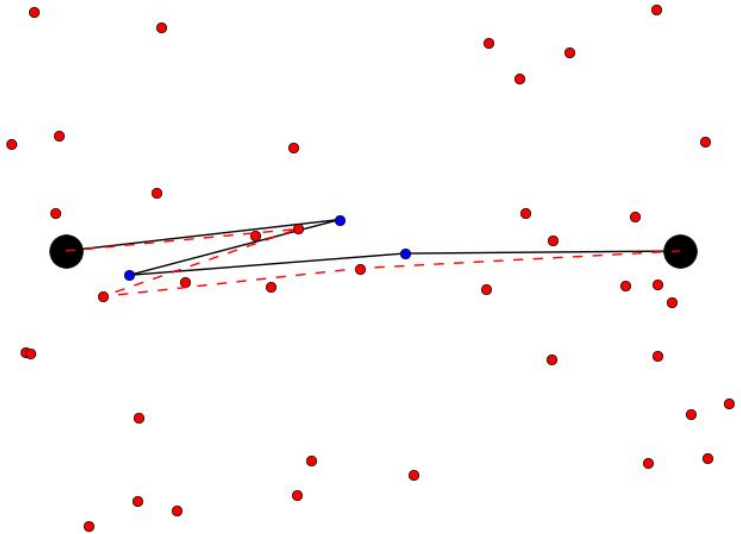

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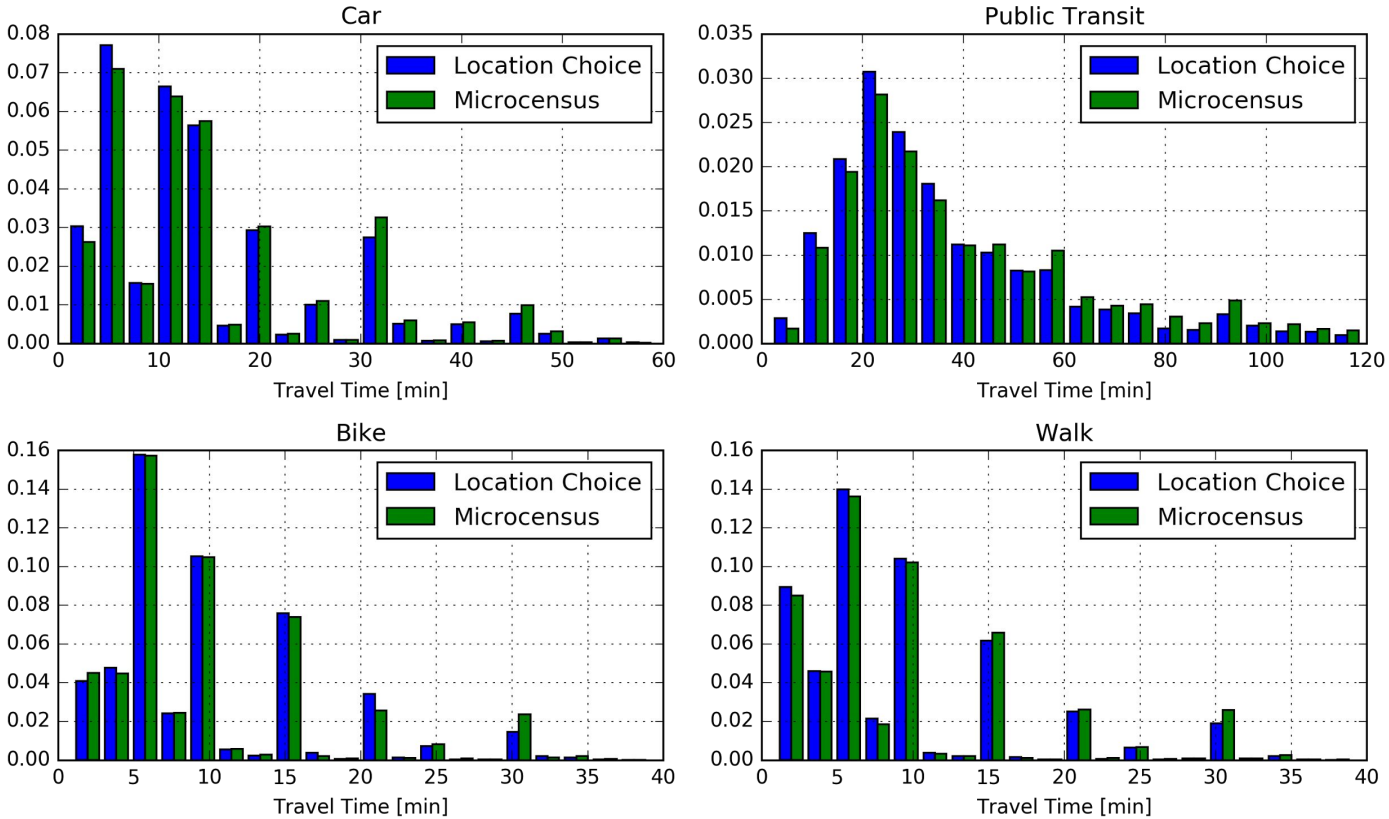

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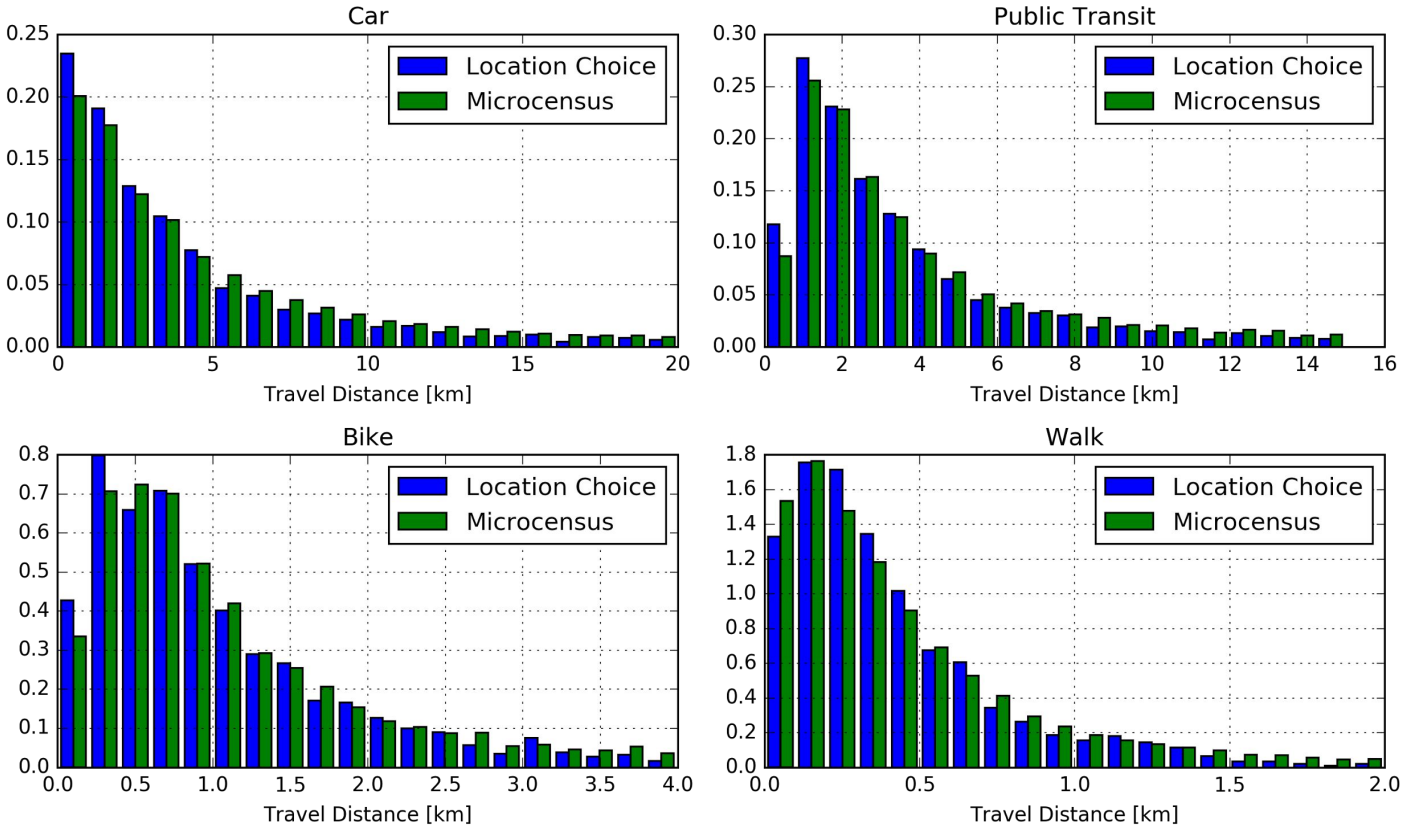


Mode Choice

- Problems
  - Currently: Based on whole subtours
  - One choice per 10% of iterations, long runtime
  - Public Transport can be “walk”
  - Connection between activities and legs?

Mode Choice

- New mode choice model (Hörl & Balac)
  - Choice of complete trip chains (structural constraints)

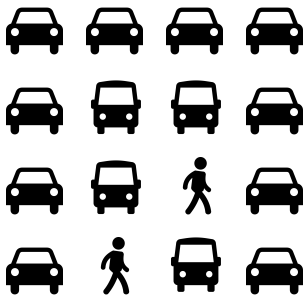
  - Mode choice model based on Microcensus (Basil Schmid)
  - Mode choice model based on Automated Vehicle survey (Felix Becker)

Mode Choice

Algorithm: Mode choice by chain

1. Construct all feasible mode chains for an agent
2. Compute probability for each trip
3. Compute weights / joint probability for each chain
4. Perform choice
    a. Either Select chain with largest weight
    b. Or Treat as categorical distribution and sample

Mode Choice



P(Chain 1) ~ P(Leg 1 = car) * P(Leg 2 = car) * ...

P(Chain 2) ~ P(Leg 1 = pt) * P(Leg 2 = pt) * ...

P(Chain 3) ~ P(Leg 1 = pt) * P(Leg 2 = walk) * ...

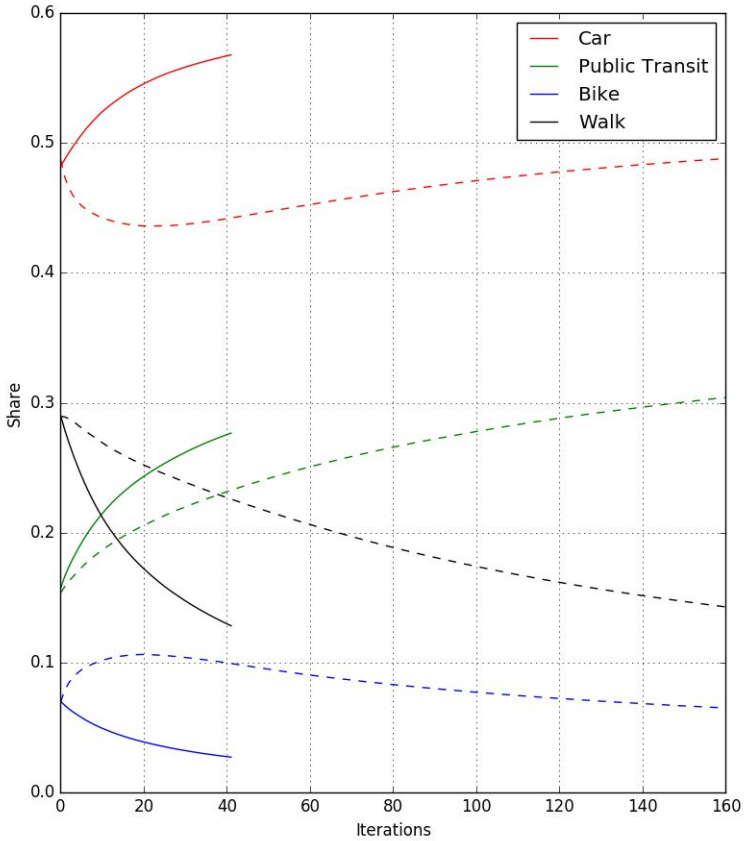
P(Chain 4) ~ P(Leg 1 = walk) * P(Leg 2 = pt) * ...

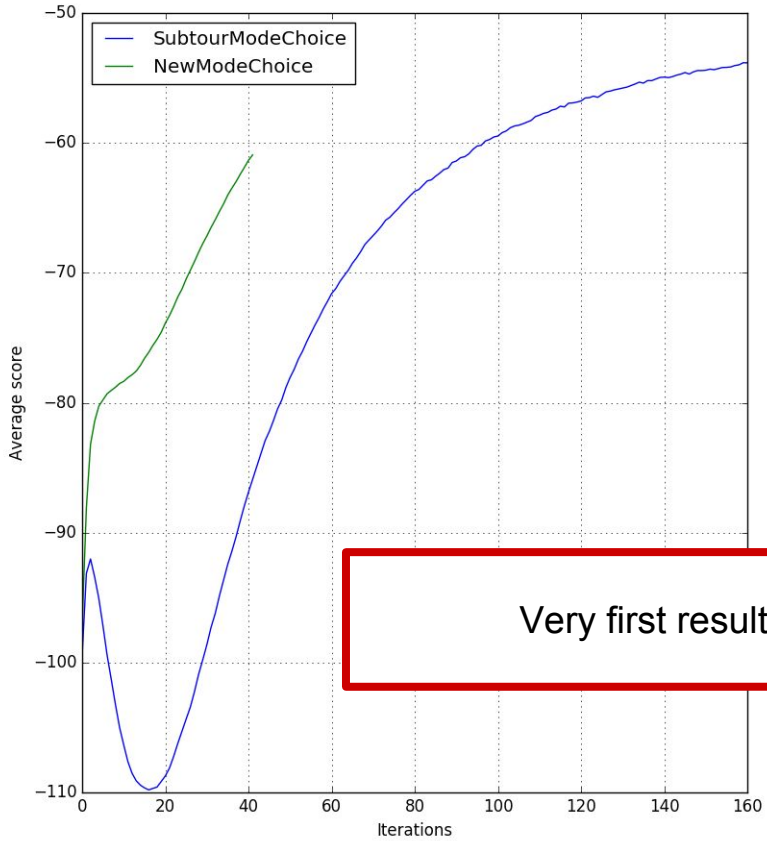
P(Chain u)

$Modes^{Legs}$ - n

Icons from the Noun Project (Adrian Coquet, ruliani)

Mode Choice





Very first results

Additional Remarks

- Temporal shifting of activity plans
- Simulated travel times
- Public Transit (currently fallback to teleportation)

Outlook

- Setup of validation pipeline
  - “Unit tests for scenarios”

- Open Switzerland Scenario
- Future scenarios (ARE, …)

Questions?

References

- Bösch, P., K. Müller, F. Ciari (2015) The IVT Baseline Scenario, Presented at the 16th Swiss Transport Research Conference, May 2016, Ascona.