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Revisiting Urban Traffic Control in Austria, Germany and Switzerland - Requirements for Future Developments

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In a Nutshell

- We conducted **14 expert interviews** with representatives of Austrian, German and Swiss cities' traffic control authorities between **April and July 2021**
- We determined **the status quo of traffic control** (system, strategies, spatial levels) in the surveyed cities
- We revealed that **adaptive network control systems are not popular** and identified the reasons for that
- We found that cities wish for **multimodal** traffic controls in the future, but expect many challenges in implementation
- We enquired the **potential of AI** for urban traffic control
- We derived **requirements for future urban traffic control**

Acknowledgements

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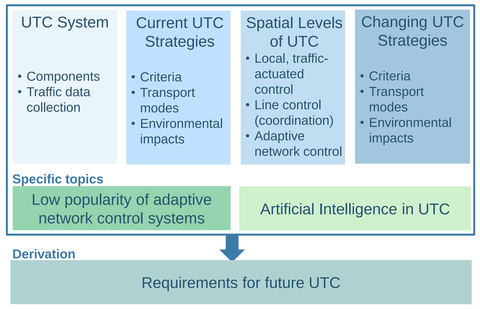
City Sample

- Cities have structural differences (see statistical data)
- Cities face different challenges: different traffic demands, financial resources, regulatory responsibilities and municipal political circumstances

Geographical Location of the Interviewed Cities

Statistical Data of the Interviewed Cities

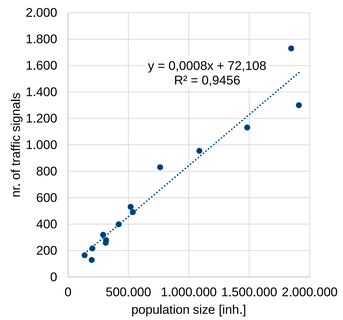
Survey Elements



*UTC: Urban Traffic Control

Results

Dependency between Traffic Signal Number and City's Population Size

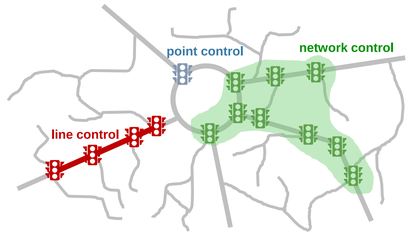


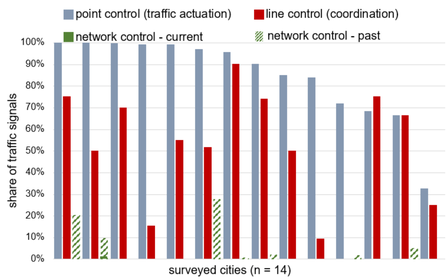
Potential of Artificial Intelligence in Urban Traffic Control

- Rather in the handling of big data for traffic state estimation and prediction than in the traffic control task itself
- Improvement expected for data fusion (data of different types and from different detectors)

Spatial Levels of Urban Traffic Control

- Local traffic-actuated control is widely implemented: at 85% of traffic signals on average
- Coordination is widely used: at 53% of traffic signals on average
- Commercially available, adaptive network control systems (e.g. MOTION, BALANCE) are rare: 7 out of 14 cities applied adaptive network control around the 2000s, but switched them off in the past years
- Prioritization of public transport has been promoted for decades and is now widespread

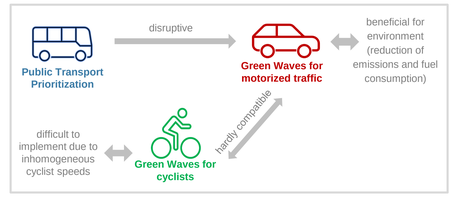




Reasons for the Low Popularity of Adaptive Network Control Systems

- Intransparency
- Low cost-benefit ratio
- Frequent switching traffic control operations
- Strong focus on motorized private transport

Current Challenges in Urban Traffic Control



Requirements for Future Urban Traffic Control

Requirements	Implementation
1. Integrated (network) control	Traffic management + signal control measures
2. Transparency and inclusion of a city's expertise	Measure and spots identification in cooperation with the city
3. Multimodality	Temporal and spatial differentiation in network control
4. Improved traffic state estimation and prediction	Spots identification for pre-warning, AI based methods for data processing

Conclusion

- Political reorientation from car-oriented urban transport planning to a promotion of cycling and walking (multimodality)
- Local traffic-actuated control, coordination and public transport prioritization are widespread
- Adaptive network control systems were switched off in the past years or were not even considered for implementation
- A revival of network control systems requires a wider scope, transparency, multimodality and an improved traffic state estimation and prediction