Chair of Cartography and Visual Analytics
TUM School of Engineering and Design
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TUM

Master Thesis

# Risks in Active Mobility

## Identification, Knowledge Extraction, and Visual Communication

Active mobility modes such as walking and cycling are low-cost and zero-emission forms of mobility which can also bring about health co-benefits associated with more active lifestyles. Therefore, the European Commission is promoting easier and more attractive active mobility to help achieve its aim of sustainability.



Active Mobility © so-cycling.nl

Similar to any mode of transportation, engaging in active mobility comes with inherent risks. Risks, such as traffic crashes, personal safety, infrastructure issues, environmental exposure, etc., are important to be aware of by individuals engaging in active mobility. Therefore, conducting a comprehensive analysis of risks through the utilization of multi-source datasets, extracting the knowledge, and communicating findings via visualization to relevant stakeholders will contribute significantly to the advancement of active mobility.

The potential data sources include bicycle and pedestrian lane data, traffic flow data, shared bicycle data, official and crowd-sourcing historical accident data, social media data, environmental monitoring data, census data, street view images, and other various geodata. Additionally, relevant data can be collected through methods such as questionnaires, user experiments, street experiments, etc. The risks associated with active mobility in urban environments are to be identified by integrating and analyzing the multi-source data.

Based on the identified results, hidden knowledge, such as risk classification, risk distribution, improvement suggestions, etc., could be extracted and cataloged in knowledge tools like knowledge graphs.

To conclude this thesis, effective visual communication is necessary to present the analysis results and extracted knowledge, providing insights to the public and decision-makers. Cartographic visualization methods like interactive visualization and dashboards may be used.

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