Geovisualization of Child-Friendly Urban Mobility: Design and Implementation of a Visualization Tool

Diploma Thesis

Why Child-Friendly Mobility?

Existing walkability/bikeability models are built for adults and don't capture what children actually need or value in their streets.

Design and implement an interactive visualization tool for assessing and communicating child-friendly urban mobility.

Objective

This research adapts the open-source NetAScore walkability and bikeability assessment model to develop NetAScore4Teens using a literature review and participatory workshops with 50 teenagers at SALIS Salzburg International School to identify child-specific indicators. The model produces walkability and bikeability index, showing suitability for children-mobility. The results are then visualized through interactive dahshboard.

Research Methodology

Indicator Identification → Perticipatory Workshops → NetAScore Model Adaptation → Data Prepration → Dashboard Development

Literature Review

Literature review and participatory workshops were conducted to understand children perceptions, mobility needs and indetification of indicators.



Participatory Workshops



Young People see streets in colors, play, greenery and attractions.

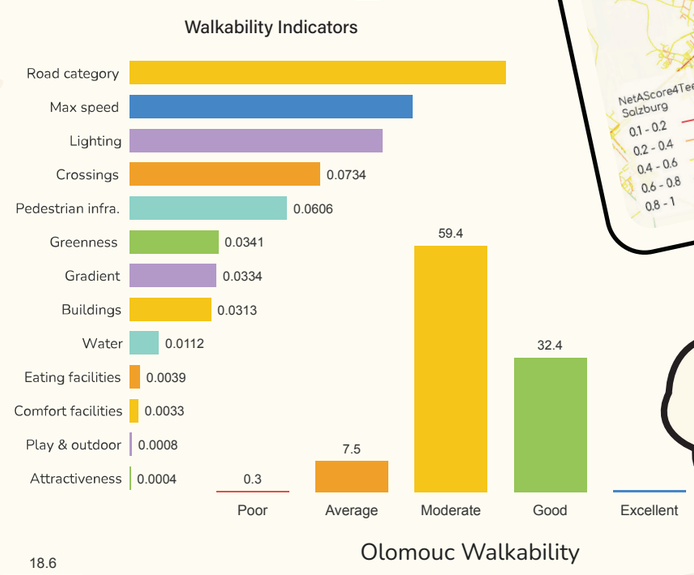
Model Implementation

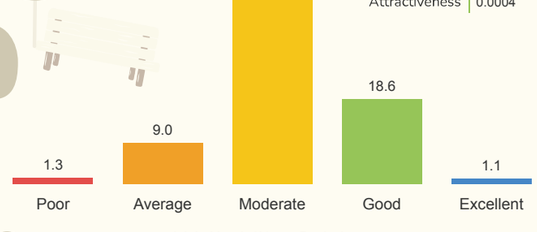
Original NetAScore pipeline was implemented that computes Walkability & Bikeability in 5 Steps.

1. Import — Network data retrieved via Overpass API
2. Network Topological cleaning and feature extraction
3. Attribute Indicator values computed from OSM tags
4. Index Weighted-average score calculated per segment
5. Export GeoPackage output generated

PostgreSQL · PostGIS · Python · Open Street Map

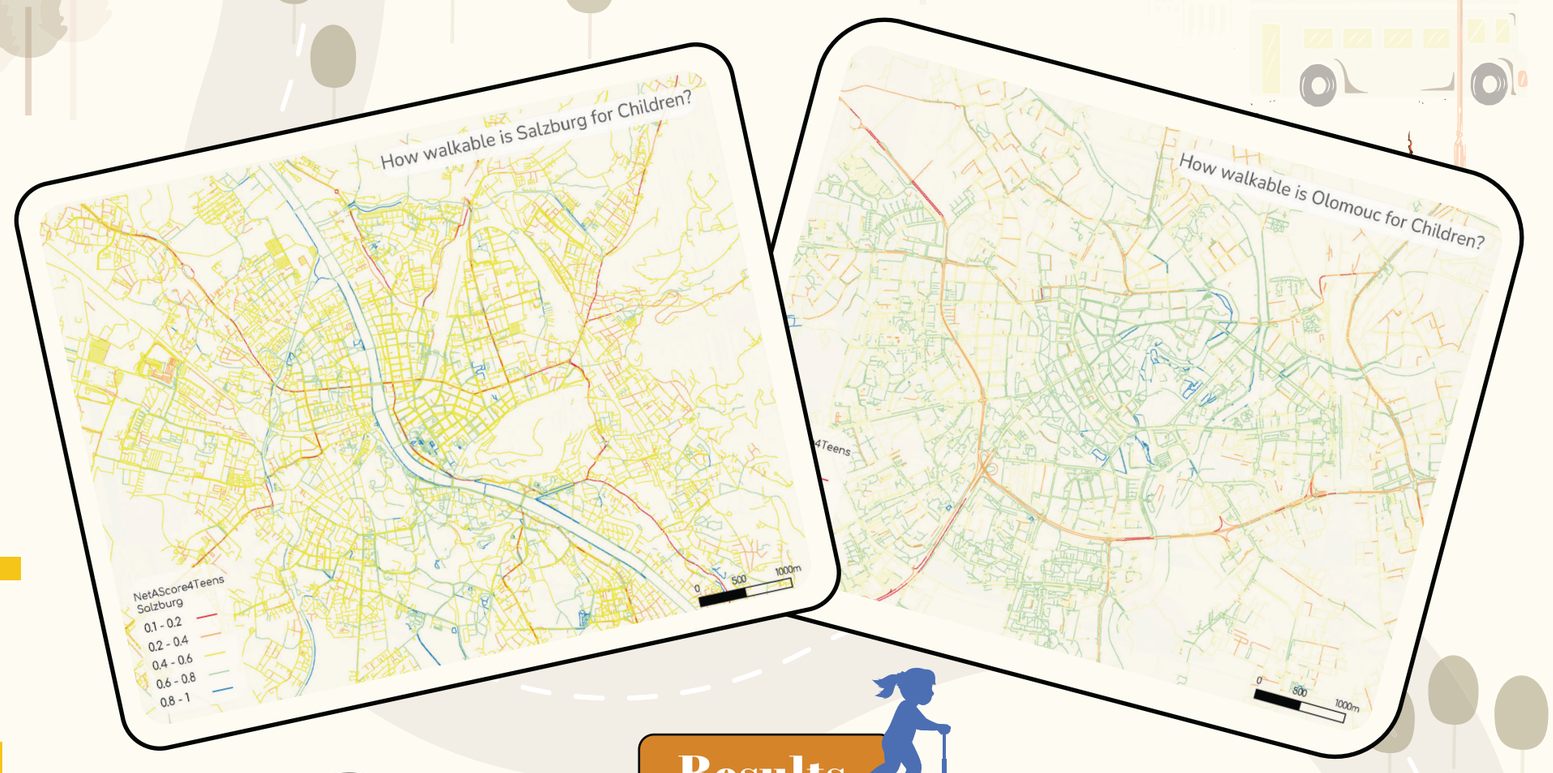
Indicators finalization & Weighting





Walkability Salzburg

Olomouc Walkability



"Children are a kind of indicator species. If we can build a successful city for children, we will have a successful city for all people."
— Enrique Peñalosa

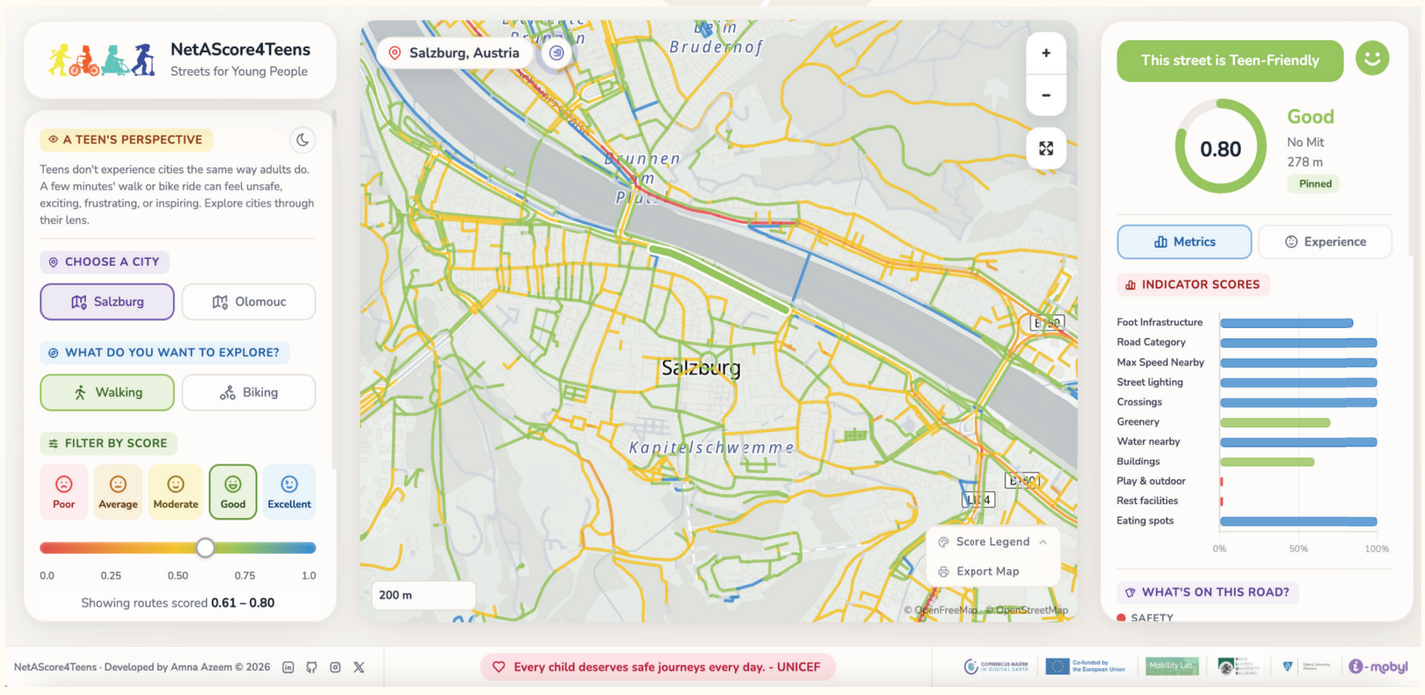
Results

NetAScore4Teens produces a street-segment-level walkability and bikeability score for Salzburg and Olomouc, revealing where children's mobility needs are, and are not currently supported by existing infrastructure or relevant indicators.



Exploratory validation across 12 street segments in Salzburg.

NetAScore4Teens
Development of an Interactive Dashboard



PM Tiles · POIs OSM · Copernicus Urban Atlas Land Use data · Copernicus Urban Atlas Tree Layers · Walk/Bike Index Layers · Github Pages · CSS · MapLibre · Javascript · HTML

User testing through 10 moderated think-aloud sessions with researchers informing dashboard refinements.

User Testing, Evaluation & Refinements

Scan to view Website/Results

COPERNICUS MASTER IN DIGITAL EARTH

PARIS LODRON UNIVERSITÄT SALZBURG · Palacký University Olomouc

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Appendix to diploma thesis no. 1