Comparing Human and LLM Perceptions of Urban Walkability: A Case Study in Augsburg

Bachelor- or Masterthesis

Background

This thesis investigates how humans and large language models (LLMs) perceive and evaluate walkability in urban environments. Using Augsburg as a case study, the project compares qualitative and quantitative assessments from human participants (via surveys, interviews, or think-aloud) with walkability evaluations generated by LLMs based on urban data, textual prompts, and geospatial context.

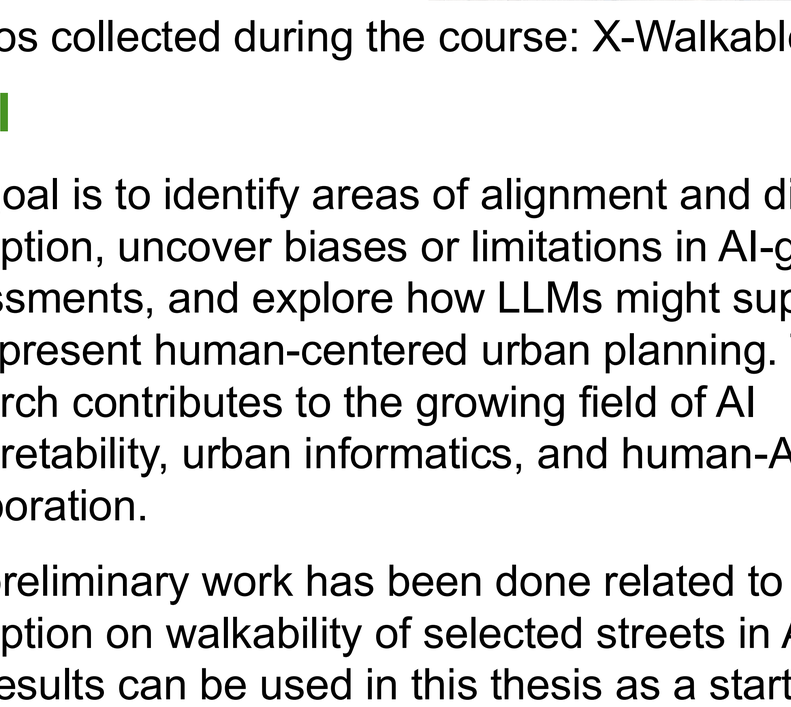


Photos collected during the course: X-Walkable City

Goal

The goal is to identify areas of alignment and divergence in perception, uncover biases or limitations in AI-generated assessments, and explore how LLMs might support or misrepresent human-centered urban planning. This research contributes to the growing field of AI interpretability, urban informatics, and human-AI collaboration.

The preliminary work has been done related to human perception on walkability of selected streets in Augsburg. The results can be used in this thesis as a starting point.



Alfonzo's (2005) hierarchy of walking needs

Objectives

- How can a framework be developed to enable a systematic comparison between human and LLM perceptions?
- How do humans and LLMs perceive street-level images across key dimensions of walkability, including overall walkability, feasibility, accessibility, safety, comfort, and liveliness?
- What are the similarities and discrepancies between human and LLM perceptions of walkability?

Methodology

- Study setup
  - Identify key dimensions of walkability
  - Prepare appropriate street images
  - Conduct human-subject study
    - Using pilot study to determine the right participants scope
    - Ask participants to rate on perceived walkability
  - Measure the LLM perception on walkability
    - Identify relevant LLMs
    - LLM prompting
- Data analysis
  - Representativeness calculation
  - Natural language processing and topic modeling
  - Alignment analysis between human and LLMs
  - Discrepancy analysis between human and LLMs

References

- Alfonzo, M. A. (2005). To walk or not to walk? The hierarchy of walking needs. *Environment and behavior*, *37*(6), 808-836.
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- Wedyan, Musab, Yu-Chen Yeh, Fatemeh Saeidi-Rizi, Tai-Quan Peng, and Chun-Yen Chang. "Urban walkability through different lenses: A comparative study of GPT-4o and human perceptions." PLoS One 20, no. 4 (2025): e0322078.

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Marktplatz der Forschung