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PRIVACY & SUSTAINABLE COMPUTING LAB

Towards Realization of Accountable Multi-modal Smart Mobility in Vienna:

Do Smartphone Apps Influence Mode ChoiceBehavior among Viennese Citizens?

WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

The Role of User-interface Design in Influencing Users' Mobility Behaviour in Vienna

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Project Objectives

Mobility is one of the central focus areas of The Smart City Wien framework strategy which aims to provide "[t]he best quality of life for all inhabitants of Vienna, while minimizing the consumption of re- sources.

This will be realized through comprehensive innovation" until 2050. The interdisciplinary state of the art in Accountable Information Systems, Transport Economics, Human-computer interaction (HCI), etc. suggests that the emerging smart approaches to mobility are going to be increasingly personalised and Multi-modal.

Mobility Apps (such as Google Maps, Qando Wien, WienMobile etc.) are more and more involved to support individuals to choose their mode of transportation for their everyday in-city travels.

However, there is little known on to which extent these Apps actually influence mode choices in Vienna. If we assume that the Apps do influence mobility behavior of Viennese citizens, it is crucial that the information provided in the Apps (especially regarding travel times) is unbiased.

However, our pre- studies have indicated that some of the mobility Apps (such as Google Maps) are sometimes biased in favor of private motorized vehicles (personal cars, or car-sharing) and are hence inconsistent with the sustainability goals of the city of Vienna.

In other words, there is no doubt that such Apps could play a fundamental supportive role in the emerging transport economy of Vienna;

However, they could also mislead the individuals in their mobility decision making if they are not accountable and value-based regarding how they calculate different travel attributes, and how (and what) they show to the users.

Combining the results of our previous pilot studies, the state of the art, and a representative survey that will be conducted in this project, we aim to develop a human-centric roadmap for development of accountable and value-based mobility Apps in Vienna to contribute towards an ecological, inclusive, fair and innovative digital transportation economy in the City.

Besides delivering the results of this project to the City of Vienna in the forms of scientific reports, papers, and the human-centric roadmap, we aim to organize a workshop for the Mobility App developers and policy makers of the Vienna to transfer the knowledge that we gain in this project to the City.

State of the Art and Our Previous Research

Research shows that the perception of geographic reality depends heavily on the tools, such as paper maps or geographic information systems (GIS) used to perceive it. Developing a map involves countless subjective decisions and provides a window into the world-view of its creator. Especially when a system is implemented on a large scale, subjective decisions are typically invisible to users and can result in systematic biases. In other words, a perfect map does not exist; rather, a map or navigation system can be more or less appropriate for certain tasks or contexts.

Factors displayed as part of total estimate trip time	Google Maps		Wien Mobil		VOR AnachB	
	Driving	PubTrans	Driving	PubTrans	Driving	PubTrans
1. Walk to vehicle	✗	✓	✗✓	✓	✓	✓
2. Initial waiting time for vehicle	✗	✗	✗	✗	✗	✗
3. Travel time of vehicle(s)	✓	✓	✓	✓	✓	✓
4. Delays in travel time of vehicle(s)	✓	✗	✗	✓	✗	✓
5. Finding parking for vehicle	✗	n/a	✗	n/a	✓	n/a
6. Walking time from vehicle to destination	✗	✓	✗	✓	✓	✓

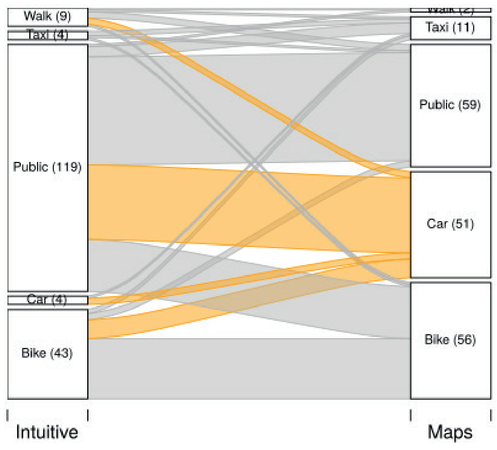


Figure 1: a) Overview of changes in user decision making for route 1 before and after using Google Maps

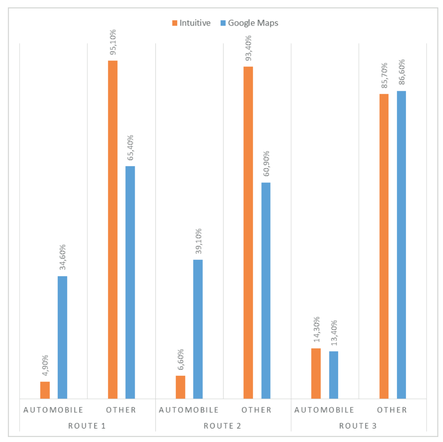


Figure 1: b) Change in decision induced by the original Google Maps version; the figure is based on our pre-study.

Methods

While conducting a representative survey regarding the mobility decision-making process of different categories of Vienna inhabitants is the main methodological focus area of this project, as an interdisciplinary project, we apply a set of different methods to fulfil the objectives of this research:

- Pilot and exploratory in-lab HCI experiments
- Qualitative Interviews
- Representative Survey

Summary of the Project Goals

In this project, we conduct a representative survey to understand to which extent (and for which trips) Viennese citizens use different mobility Apps, and to which extend such Apps influence the mobility behaviour of people in Vienna. Moreover, we aim to develop a roadmap for the future development of research and policy on digital mapping technologies in Vienna.

This roadmap will build on extensive lit- erature research, exploratory HCI approaches and the representative study of app usage in Vienna while also integrating the Smart City and wider transportation public policy priorities of the City of Vienna.

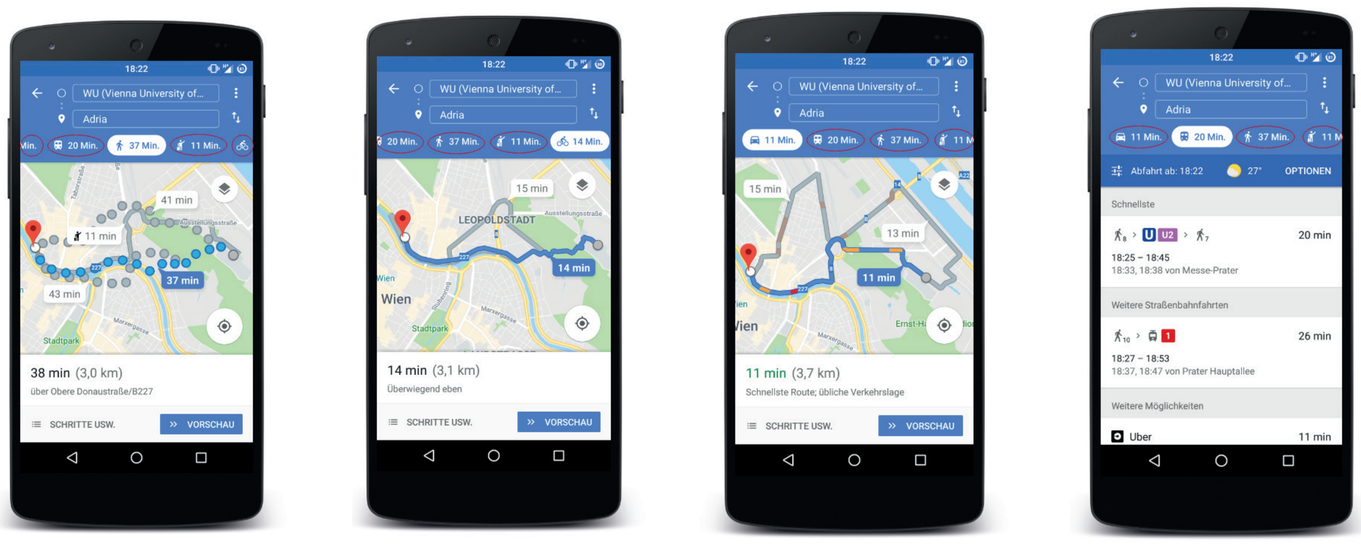
This roadmap will form the foundation of a long-term collaboration between WU and the City of Vienna re- garding App-based mobility policy. As a result, the roadmap will be finalised in a joint workshop between WU and the City of Vienna, providing clear paths for joint collaboration and future research in this area.

Importance of the project for Vienna

The proposed project will contribute to two of the topic areas that are emphasized in the 2019 WU Anniversary Fund of the City of Vienna:

Public governance: As a result of this project, we will be able to give best practice suggestion about Vienna's future transportation strategy. By providing a solid empirical basis for existing debates on ecological mobility, we contribute to ensuring evidence-based policymaking in public governance while testing the opportunities for new forms of governance within app-based tools.

Smart City Vienna: We support the Smart City Wien framework strategy, which aims at providing "[t]he best quality of life for all inhabitants of Vienna, while minimizing the consumption of re- sources. At the same time, our approach focuses on a cost-effective mechanism for reducing the level of CO2 involved in a systematic and rigorously tested manner. Rather than requiring significant re- source investment by the city, our approach ensures the implementation of the Smart City strategy in an efficient and focused manner.



This project is funded by the Jubiläumsfonds der Stadt Wien at the Privacy and Sustainable Computing Lab. Further details can be found at https://privacylab.at/