User Perspectives on
Intelligent Transportation Systems

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Abstract

Intelligent Transportation Systems (ITS), or the advanced use of Information and Communication Technology (ICT) in the transportation context, offers new tools in the continual effort to develop an accessible, safe, and sustainable transportation system. In this thesis, focus is placed on ITS targeting individual use or the end users' transportation experiences, e.g., video surveillance, cashless payments, pedestrian navigation, real-time information, emergency communications, and parking services. For the end user, such services can serve to enhance one's sense of assurance by reducing uncertainty and facilitating planning and dealing with unforeseen circumstances.

However, ITS and the data collection and processing upon which it is built bring their own challenges, as personal data and privacy are fundamentally intertwined. Individuals’ data is routinely collected, from which one can infer a broad range of activities and lifestyle choices, and which may have implications over time or in other contexts. Perceptions of technology and data use are contextual; what may be considered acceptable or privacy-invasive in one situation and for one purpose may not hold true for other persons, situations, or purposes. Concerns often focus on aspects of anonymity, lack of knowledge or control, function creep, etc. Furthermore, although individual, end users are affected by policies and technologies guiding data collection and processing, they are rarely involved in decision-making processes, offered realistic alternatives, or able to control their own data.

The aim of this thesis is to investigate end users’ perceptions of ITS. As various contexts and factors have proven to influence perception in other research areas, the approach has been to use empirical case studies of different end user groups and ITS systems. Additionally, the case studies vary contexts and contrast potential negative consequences of ITS, such as privacy infringement, with potential positive benefits (which may depend on the circumstances of the particular user group and/or the ITS system), such as increased assurance and independence. Users are surveyed via structured interviews and questionnaires that include items addressing perceptions of benefits/risks, privacy, trust, etc. In investigating ITS from the users’ perspective, this research attempts to paint a more holistic view of the issues surrounding the use of ITS in our daily, mobile lives.

The broad-spectrum conclusions are that the respondents, in general, perceive ITS as relatively beneficial, more so on a general, social level, and feel more reassured due to the systems. Privacy concerns are generally not a major barrier for acceptance in the scenarios presented, although respondents do not necessarily express high levels of trust for the data collectors or low levels of risk for data misuse. Results show that perceptions are influenced by a number of factors, such as: the targeted beneficiary; addressing a specific, personal need; perceived personal control of a situation; the actor (data collector); status within the organization; gender and parenthood. There are also indications that end users feel a sense of resignation due to lack of choice, control, or perceived influence. For example, there is no strong interest in discussing technological applications with companies, government agencies, or elected representatives, nor in searching for information about technological applications irrespective of perceived privacy infringement or acceptability. This may have broader implications, e.g., for decision-making and democratic processes, as perceived lack of influence and perceived lack of interest in participation feed back into each other.

As such, recommendations include informed consent, choice (e.g., opt-in/opt-out), control over one’s personal data, ongoing, two-way dialogue between stakeholders (from the beginning of the design process), comprehensive technological assessments, as well as following through on the use of Fair Information Practices/Principles such as limitation of data collection and use, purpose specification, transparency, individual participation, etc. ITS and data collection and processing are not “silver bullets” able solve all problems via “complete and perfect” information. They are additional tools in the toolbox that bring with them their own challenges related to issues such as privacy, lack of choice/control, and technological accessibility. Thus, efforts should be made to address these new challenges, such as technological mechanisms, personal actions and user participation, and proactive organizational policy and public legislation. The research presented in this thesis serves to remind us that a coordinated effort on multiple fronts is vital in addressing users’ needs and meeting broader social goals.