

Comparing the Effects of Integrated and Nomadic Navigation Systems on Road Traffic Safety: A Naturalistic Experiment

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The real world problem that this masters thesis project addresses is the problem of distraction while navigation assisted driving. This study works with the following assumptions: (A) Traffic safety needs improvement. (B) Car navigation systems, like other information systems have the potential to cause dangerous distraction while driving. (C) Therefore optimizing navigation systems to minimize distraction will likely improve overall traffic safety. This study aims to provide empirical observations by quantitative experimental setup (n=30) on whether or not an integrated car navigation system causes less distraction (therefore be less detrimental to traffic safety) compared to a nomadic navigation system, such as a smartphone navigation app. This experiment is preceded by a requirements elicitation consisting literature review, a qualitative survey of 50 persons, traffic safety expert interviews and 10 field observation sessions. Requirements elicitation produces an analysis and a ranked set of indicators to road traffic safety, distraction and user interface design. Ultimately, this research will answer: (1) What are the specific distractions introduced by smartphone navigation systems that impact road safety? (2) What are the specific indicators of road safety that are relevant to the use of navigation systems? (3) How can these indicators be ranked in terms of their importance for evaluating the safety impacts of nomadic (smartphone) versus integrated car navigation systems? (4) How do nomadic (smartphone) navigation systems and integrated car navigation systems differ in terms of their impact on road safety indicators? (5) Is there a significant difference in road safety indicators between the use of smartphone navigation systems and integrated car navigation systems? (6) How can the results of this study be used to inform the design of future car navigation systems and regulations around their use to improve road safety? The project has a lead time from February until (and including) July 2023 and is dividable into three phases: (1) preparation, (2) requirements elicitation, and (3) experiment phase. The phases have a critical path, meaning each phase will be (must be) fully finalized before the next phase starts.