Intelligent Environment Car: A New Perspective

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ABSTRACT

Automotive development has been dominated by the special requirements and constraints of driving. However, natural relations to the more general area of Intelligent User Interfaces (IUI) exist. Previous research in related fields therefore should be adopted and included. The aim of this paper is to foster discussion between experts in otherwise unrelated fields of research.

1. INTRODUCTION

Developing Driver Assistance Systems is a very complex task which has to take a lot of specifics of the driving context into account and deal with a large number of constraints and requirements. *Automotive UI* systems differ from conventional UI systems in a number of ways. Driving, the primary task, has a natural priority over interactions and presentations as secondary and tertiary tasks. Hence, a special focus of the application development is always on the distraction of the driver, attempting to keep it as minimal as possible, i.e. communicate non-intrusively with the driver. The dynamic of a changing spatial environment leads to constant replanning of tasks, and multiple presentation tasks are competing for limited output resources (e.g. displays). Meanwhile, the automotive industry has taken an ad-hoc approach toward building in-car interfaces. Internationally-recognized standards are few; "best practices" dominate instead [3].

2. COMBINED APPROACH

Comparatively little research for instance has been done on standardized, generic presentation languages for in-car presentations and on multimodal fission concepts for communicating a dialogue response or information to the driver. Most of these questions have been tackled in a similar form in the field of *multimodal interfaces*. We argue that multimodal presentation languages such as M3L [5] or MMIL [4] should be adapted and extended for the automotive domain. Existing fission concepts [2] should be adapted as well for the special requirements of the domain. Combining these two approaches gives us powerful tools for presentations.
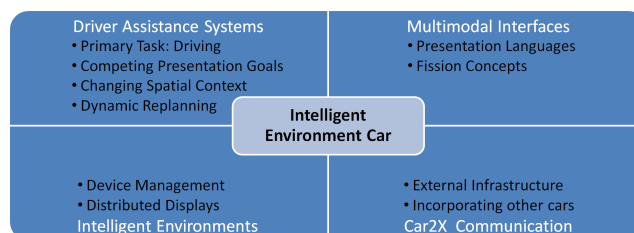

Figure 1: The car is an Intelligent Environment.

Furthermore, we need a sophisticated device management [1], which is definitely needed for a complex environment such as a car. Research on *Intelligent Environments* [6] has done that for more than a decade now; we argue that results should be taken from there, and be adapted carefully.

In consequence, we now look at the car as a special form of Intelligent Environment with explicit multimodal fission.

On the other hand, automotive research is not just including work from other research areas, but also contributes an exciting new point of view to an interdisciplinary effort trough the *Car2X concept*. Its core part consists of wireless communication between cars, motorcycles and infrastructure, which become highly mobile nodes in an ad hoc network. Applications for Car2X technology are mainly safety related.

This Car2X technology opens up a completely new perspective for multimodal interface research. The combined approach is shown in Figure 1. We now can include other cars and external infrastructure (e.g. traffic lights) and extend the scope of our presentation concept. In consequence, there are completely new output modalities, which will add a completely new dimension to established research areas.

3. REFERENCES

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