

Proposers / coaches

Jaques Terken
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Clients / stakeholders

Roland van Venrooij
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Experts

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Apps on Wheels

Introduction and background project

The basic functionality of the car has always been to get us from A to B faster. Yet, as many people now spend a significant part of their life traveling, cars become much more than a simple extension of our legs. Cars become *personal cocoons* that provide us with a comfortable living space, give us protection and shelter, but may also have an adaptive skin that allows us to communicate with the outer world. In order to achieve this, cars will be packed with intelligent technology. How to design for such an environment?

From the perspective of the driver, driving is also an activity that does not fully absorb his attention, and that is not always very exciting. As a result, both manufacturers and drivers themselves look for ways to make the experience more pleasant. Car radios, cd players, mp 3 players enable drivers to listen to the news, talk shows, their favourite music. In addition, time spent in the car is a continuation of everyday life, so that drivers continue using their smart phones for making phone calls, reading and sending e-mail, texting, twittering and whatsapping, staying connected through facebook and so forth. Thus, cars are no longer a barrier for staying connected. 3G tablets will further strengthen this development.

This development creates both opportunities and threats. Opportunities concern new apps which enhance the driver experience by giving access to pertinent information for all layered goals associated with driving (both during driving and after arrival), and new interaction concepts for interacting with apps in a contextually appropriate way. Threats concern the distraction from the driving task which may result from apps drawing the driver's attention or seducing him to interact with them without being aware of each other and of the driving context.

This project invites students to generate new applications which serve drivers' needs and to think about solutions for how to circumvent the aforementioned threats. In sum, the aim is to extend the driver's connectedness through applications which are aware of the driving context and the application context.

Design challenges / research questions

Design challenges:

- To design apps and interaction concepts for the driving contexts. Apps should be developed according to a driver-oriented design process, so that the apps create value for drivers. Interaction concepts should be developed which minimize the distraction of the driver from the driving task.
- To reconceptualise the car as a personal cocoon that facilitates the driver in its needs and may function as protection & shelter, but also as a communicative interface with the outer world.

Research questions:

- If we consider apps as autonomous entities, the question arises how such apps may be made aware of each other in order to ensure appropriate behaviour not only of the individual apps but of the ensemble of apps. This question may be tackled by students at a more advanced level. The research could focus on

architectures for multi-agent systems and the proof of concept could be provided by a system that consists of at least two apps.

- A second research question concerns the constraints that an ensemble of such apps should satisfy, or in other words how the resultant interaction meets safety requirements. This includes questions concerning the prioritization / scheduling of interaction events and ways to identify relevant context states (driver-vehicle-environment).

An Android-based platform will be made available for building applications. The project offers an opportunity to develop competence in building apps for the Android platform.

Stakeholders

Client: Roland van Venrooij (TomTom)

Coaches/experts:

- Jacques Terken – expertise in the areas of driver state, driver experience, human-centred design
- Koert van Mensvoort - expert on information decoration, adaptive & informative skins, technological & social-cultural change.
- Berry Eggen – expertise on multi-modal interaction, sound design, human-centred design
-: Expert on Multi-agent systems

Development theme

(How does this project support and develop the vision and mission of the Theme and of ID)

The theme Next Nature is interested in open, dynamic systems, where the properties of the system do not reside in and are not predictable from the properties of the constituting elements (the whole is more than the sum of its parts). In other words, the system displays emergent properties. The aim of the project is to further our insights into how such systems can be built and how the resultant behaviour of the systems still satisfies certain constraints imposed by the context. Also, the nextnature theme is fascinated in how artificial things can become second nature and over time even become a first nature for us. Hence, from the perspective of the theme it will be relevant to explore how the car embodies the driver and provides him with a next skin that may function as protection & shelter, but also as a communicative interface – think for instance of blushing cars.

References / information sources

<http://images.businessweek.com/slideshows/20101115/apps-on-wheels/>

http://www.readwriteweb.com/archives/apps_on_wheels_making_the_internet_work_at_70mph.php see also the links on this page

http://www.readwriteweb.com/archives/us_wants_automakers_help_in_stopping_in-car_facebo.php

2D microgestures for drivers based on electric field sensing:

<http://www.dfki.de/~endres/geremin/>
<http://doi.acm.org/10.1145/1943403.1943457>

Multi-agent architectures:
<http://www.sei.cmu.edu/reports/99tr025.pdf>

The SPITS project
<http://spits-project.com/>

NextNature.net Links

The Sound of the Blue Canary (article on intelligent cars by Berry Eggen)
<http://www.nextnature.net/2011/06/the-sound-of-the-blue-canary/>

Facing Your Car
<http://www.nextnature.net/2011/06/facing-your-car/>

Once You Enter, You are the Car
<http://www.nextnature.net/2010/03/once-you-enter-you-are-the-car/>

BMW Flexible Skin
<http://www.nextnature.net/2010/09/bmws-flexible-skin-concept-gina/>