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"i-PASSION": A Concept Car User Interface Case Study from the Perspective of User eXperience Design

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1. INTRODUCTION

Since a car has become more than just a means of transportation with more complex functions despite the safety risks, design of in-vehicle technologies does not mean the design of the space for only driving [1]. To enlarge the design space for the in-vehicle user interface, the present study delineates how to integrate various functions and to offer better user experience to drivers and all passengers. This case study demonstrates the "i-PASSION", an in-vehicle user interface which was embedded in the Hyundai-Kia Motors concept car, "i-Mode" and demonstrated at the 2008 Geneva Motor Show. To generate an integrated, hybrid center fascia user interface design, multiple User eXperience designers (3 In-Vehicle UX experts and 6 other electronic products UX experts) at the LG Electronics led and participated throughout the entire design process.

2. MAIN CONCEPTS & FEATURES

"i-**PASSION**" means the ***P****rogressive* ***A****gent* ***S****ystem: **S**eamless, **I**ntegrated, **O**ptimized, and **N**etworked*. The most prominent feature of i-PASSION is a smart agent, called "Aurora", who provides appropriate information in a diverse range of environment, and plays a role as a co-driver. Since Aurora has no physical body and face, but only her own voice, we expect that drivers would focus more on driving instead of looking at the agent while interacting with her. Besides, the i-PASSION provides *integrated* all-in-one infotainment system for all of the passengers, *optimizing* three classes of in-vehicle tasks including primary (driving), secondary (related to driving), and tertiary (infotainment) tasks [1] depending on users and their situations. Drivers can use speech recognition system using a directional microphone and a main control unit of touch screen (Figure 1, left). A passenger can also use the touch screen as well as other controllers such as a keyboard and a mouse for an additional passenger display (Figure 1, right). Moreover, drivers can enjoy *seamless* digital services from home and workplace to their car by connecting their mobile phones, MP3 players, memory sticks, and laptops with the i-PASSION. These services can be possible through the connection via Bluetooth protocol and wireless *network*.

To implement these concepts, the i-PASSION consists of following main features: Car Service, Navigation System, Communication, Health Care, Home Net, and Entertainment (including Rear Seat). In Car Service functions, in addition to issue-report and solution-suggestion of the current status of the vehicle functions, the driver can even monitor children in backseats through webcams on the rear seat view function. The distinctive feature of the navigation system is to furnish 3D real-time road images on the screen that are captured by a camera with POI information near the vehicle.

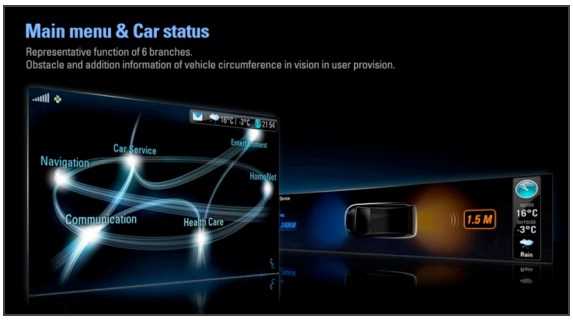

Figure 1. Screen of i-PASSION (main menu and car status).

Using the Night Vision function, during nighttime or in a foggy area, an infrared detection system can check obstacles in a distance, allowing for upgraded safe driving. When a driver gets a new email, Aurora reads out it for the driver. Also, the driver can send an email instantly using speech recognition system. In Health Care, based on biosensor technology, the system analyzes the driver's physical and mental status by her finger touch on the touch screen and provides an adequate solution such as supplying fresh air. A driver or passengers can *monitor* housing security using several cameras and check their children's playground changing cameras' angle while they are away from home. Furthermore, they can *control* household appliances in Home Net.

3. DISCUSSION

In order to provide better User eXperience in car, we aimed to not merely add new functions, but also consider and reflect entire user groups' goals and tasks in their particular situation. To this end, first, going beyond the Auto PC, we tried to extend the design space of the automotive user interface from the driver-based one, to including other passengers (a passenger and people in rear seats) as well. Second, we attempted to change the concept of driving from an independent task into a collaborative work with an intelligent agent or a passenger. Drivers may want to develop a driving plan through the collaboration with an agent and get real time feedback about their driving from the agent. Finally, we reconsidered 'interaction' in the vehicle. Interaction does not equal to just customization or predefined user settings (e.g., personal settings of the seat height or radio channel). User interfaces should be able to dynamically evolve by learning users and adapting to users' change (e.g., interface familiarity, driving skill, or fatigue). This case study approach is expected to provide a blueprint of the automotive user interface in the near future and to expand the design space for it.

4. REFERENCES

[1] Kern, D., & Schmidt, A. (2009). Design space for driver-based automotive user interfaces, *Proceedings of the 1st International Conference on Automotive User Interfaces and Interactive Vehicular Applications*, Essen, Germany, pp. 3-10.