Researching and designing a car interaction interface for older drivers

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Abstract

Electric cars and smart driving cabs have become popular in our lives. More and more older drivers will become its users. As designers it is important to design the vehicle's communication interface for this important user group, which is essential for driving ·safety.

I will study a wide spectrum of knowledge from the paper, including research on older users and research on car interface design. Through user research, prototyping and testing, I will provide a user interface that meets the habits of older drivers.

Introduction & Background

With the rapid development of the automotive industry, the vehicle interaction interface has become an important factor in the driver's driving experience. According to a study by the United Nations Population Fund, in 1950 there were 205 million people over the age of 60 in the world. By 2012, the number of older people had risen to almost 810 million. It is expected to more than double to 2 billion by 2050. The growing number of older people is gradually increasing the number of older drivers who use the interactive interface of the car. In the future, older drivers will make up a large proportion of users. At the same time the number of accidents caused by older drivers is increasing, for example, in Japan, where ageing is at its peak, **reducing the incidence of traffic accidents among older drivers has become a serious social problem.**

As global fuel prices continue to rise and governments become increasingly concerned about the greenhouse effect of vehicle emissions, governments are introducing mandatory regulations that require older drivers to reduce the number of accidents. As a result, electric vehicles will become a major product in the future market. **The interior design of cars is also increasingly using display screens instead of physical buttons.**

According to the Forbes, the median age of users of Tesla, the world leader in electric vehicles, is already over 54. **It is clear that older people are already a major user of electric smart cars**, but there are currently no car interfaces on the market that are designed for older drivers.

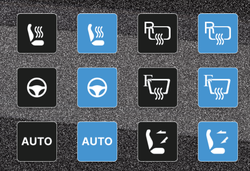
By studying the demographic characteristics of the elderly, including physical, psychological and behavioural. The study of the physiological, psychological and behavioural characteristics of the elderly population and the interactive interface of the car. The design of a human interaction interface for the elderly has been developed. The design of a human interaction interface for the elderly has been developed to improve the usability for elderly drivers.

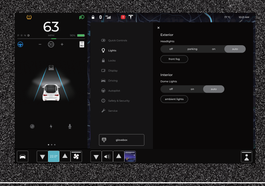
Diagram / Design

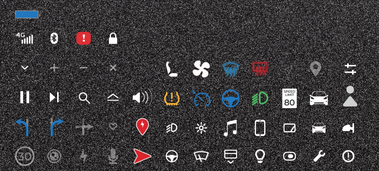
The interaction scenario in a car is the in-car environment, so safety is the first consideration, beauty is the second.

The user has to complete the interaction in a very short time,

This led to the need for a clear layout of the information and the need for a one-step access to all functions.







Study Methodology

The research methodology for this design project is based on qualitative and quantitative analysis to investigate and validate the design of the interactive interface.

The methods used in the quantitative research were **questionnaires**, **literature reading**, **A/B testing**. questionnaires to obtain feedback from users through a series of set questions and to obtain user requirements. The objective of the questionnaire is to collect user characteristics, usage scenarios, user needs, etc. Literature reading was done by reading articles related to elderly drivers and automotive HMI design. To find the theoretical basis for the design. The A/B test is a two-part process that tests the relationship between the size of the keys and their usability. A/B testing consists of two parts: firstly, testing the relationship between the size of the keys and their usability; secondly, testing the layout of the interface.

The qualitative research was mainly based on **user interviews**. The aim of the study was to obtain information from the language of the interviewees about how they felt about the product. The user interviews were semi-structured and focused on the user's perception of human-vehicle interaction. A rough outline of questions will be set before the interview, but the content will not be controlled within this.

Reserch Results

Through the above research and investigation, some design principles were identified, such as **keeping all interactions in vehicle interactions to within 3 seconds**. Click interaction is preferred over swipe interaction. These ensure the safety of the driver. Also, due to the reduced perception and memory of older people, the information structure of the interface should be simple. The interface feedback needs to be clearer in terms of colour changes due to the reduced visual ability of the elderly. Due to their reduced physical abilities, **older people have difficulty in reaching the buttons precisely, so the buttons need to be designed in a larger size.**

Some of the needs listed through the user research were

- Functions that are difficult to touch
- Inability to determine if a function is triggered
- Complex interface and unclear button functions

Based on these theoretical foundations and user feedback, two or more lo-fi prototypes were developed and tested with users. Improvements based on the results of the tests. Finally a high quality solution is designed.

Conclusions & Future Work

For this project, I provided comprehensive feedback and adjustments to the target group to achieve the final design. The software was brought to its original conceptual model based on the questionnaire format and survey. During this process, I needed to continue to optimise and improve, getting straight to some of the pain points and perceived misconceptions when using the software.
Future work could shift the focus to modelling different age groups or disease levels, segmenting the population in a compartmentalised way, precisely like a hospital care service, to ensure user stickiness

For this project, I provided comprehensive feedback and adjustments to the needs of the older driver's body. The end result was a more efficient and safe car interface design for older drivers.
However, there are some limitations to my design. I will need to do more extensive testing to improve my design in the future. As my interface prototype was tested with only 5 users and they are at a good stage of education and economic status, they are not representative of the entire user base. I need to test with more users to continue optimising and improving.