

DESIGNING A HUD INTERFACE FOR SPOTIFY HELPS YOUNG DRIVERS DRIVE SAFELY AND STAY FOCUSED ON THE ROAD

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Abstract

This study aimed to develop a Spotify interface using flat screen display (HUD) technology, enabling young drivers to use in-vehicle music entertainment systems safely while maintaining their focus on the road. The research encompassed literature reviews, interviews, and eye-tracking tests to thoroughly examine young drivers' behaviors and attitudes toward using infotainment systems while driving. Prototyping involved employing diverse methods and technical assistance to enhance the process. Through the analysis of user attitudes, mental objectives, and eye-tracking heatmap data, iterative prototyping refined the safety and driving experience for this demographic.

Design

Songs rolling list

The currently selected song information will be enlarged as the user scrolls, allowing the driver to quickly check it while driving.

Rolling list

Highlight selected information content within a limited number of pages



Introduction & Background

The literature review highlights the risky music-related behavior of young male drivers, who habitually listen to music while driving to alleviate boredom, creating persistent and dangerous habits. This underscores the necessity of designing a HUD interface to address these risks and ensure safe driving. The study aims to explore the potential of a Spotify HUD interface to enhance safe music control while driving, examining hypotheses on the effectiveness of integrating infotainment controls on the HUD and connecting a Spotify module. It also addresses the impact of music on boredom and potential distractions posed by inattentive music control.

Information content

Reduce the amount of time a driver spends paying attention, reducing gaze time and thinking time

User purpose

- Psychological mapping behind needs
- Drivers don't need to look too hard to know what song is on the screen.
 - Faster song cutting with fewer levels of operation
 - Reduced gaze time

Testing

Comparison of young drivers' status on **traditional infotainment systems and HUD** at time and attention on heat maps by **AB test**. Attention information was collected by eye-tracking and analyzed using **heat maps** after collection.

The 2 groups of tasks each include 5 tests

- Select Song List
- Volume up
- Next song
- Switch Songs
- Switch Song List

Test Result



Attention

Participants' attention was always in front of them during the testing of the HUD interface



Interface

Complex HUD interface attracts driver attention



Infotainment

Traditional infotainment systems need to spend more attention on testing tasks

Study Methodology

The project employed various methodologies to support its execution, detailed in subsequent sections. The literature review underscored its role in academic research, offering insight into the topic's context and previous work. The prototype development involved wireframes for early low-fidelity testing, followed by high-fidelity prototypes for advanced testing. User testing, integral to prototype design, assessed user needs and usability. Post-test interviews collected user attitudes and needs.

Results

Overall, participants found the HUD interface better and safer than conventional systems, but certain prototype versions had excessive information that might distract. The experiment confirmed the hypothesis that HUD systems are safer. Some participants struggled with Spotify interaction due to familiarity with other systems. Iterations addressed issues and psychological goals for safer driving.

Conclusions

Future work

• Accessibility and inclusiveness

Research is needed to examine HUD entertainment accessibility for diverse populations and to explore the feasibility of voice and push-button controls.

Finally

The HUD prototype generally enables young drivers to drive safely, reduces the risk of distraction and provides a better entertainment experience. Concerns remain about connecting the HUD to the Spotify module, prompting the new design iteration to address user psychological needs identified in the experiments.

• Technological innovation

Does adding other features to the music entertainment system make drivers safer?

• Variegation

Do the designs of different music entertainment systems affect participants differently or in the same way?