CASE STUDY

HUD Navigation vs. In-Dash Navigation Systems:
Using Eye Tracking Tools to Ensure Driver Safety

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Using Eye Tracking Tools to Ensure Driver Safety

AN AUTOMOTIVE COMPANY WANTED TO EVALUATE the safety benefits of transitioning from their current dash display navigation system and their newer Heads-Up Display (HUD) Navigation system. They wanted to conduct further testing to see if making the change was in all stakeholders' best interests.

- Tasks would include:
  - Driving to a nearby restaurant
  - Driving to a nearby office
  - Driving to a nearby mall
- These tasks are chosen because they replicate typical life activities in most communities. The goal is to make sure the locations are nearby, but not places the participant typically drives (so the route isn't memorized).

"There was not a high enough statistical difference to conclude that the change would have a positive effect on safety."

Our Solution

Our researchers used their human factors background to identify the best methods to test the product. Since cognitive load, visual clutter, situational awareness, and tunneling were just a few of the potential issues facing the new technology, the researchers recognized that multiple observational channels were critical. KLI chose to use eye tracking to gather data specific to how long participants were looking at particular elements and where on the HUD or normal display they were looking.

We understood from the company that comparative data was important. They needed to understand how the *current* solution worked vs. their *proposed* solution. They wanted observational data to help with safety concerns and customer feedback to provide insight into whether this was a desirable shift for customers.

Our Approach

- Screen for participants for whom driving is a significant part of daily life:
  - Suburban/rural
  - Commuters
- Mobile eye-tracking hardware (eye tracking goggles) to automatically identify where and for how long the user's attention is focused.
- Three navigational tasks in two settings:
  - Using the HUD
  - Using the participant's normal car setup

The Results

The study indicated that the HUDs did not perform quite as well as expected, and in comparison to the in-dash system, there was not a high enough statistical difference to conclude that the change would have a positive effect on safety.

KLI recommendations included formative testing on any changes. This would ensure there wouldn't be any additional safety related issues derived from the alterations, but rather that the changes were improving the safety and reliability of the HUD.

What made this project unique

KLI devised an approach in which they were were able to provide comparative data of the exact same tasks with and without the HUD display. The length of relevant fixations, scan patterns, etc., were compared to published data, related to cognitive load and distracted driving, to recommend formative safety testing.

Eye tracking tools permitted the collection of definitive metrics from which they could make decisions rather than qualitative user feedback.

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