

Research Report Summary



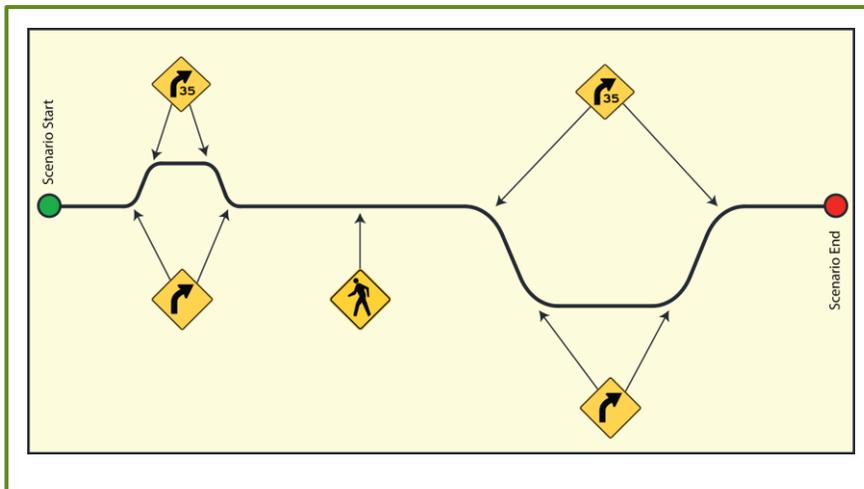
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Effectiveness of In-Vehicle Virtual Traffic Control Devices

Virtual Traffic Control Devices and their Potential for Replacing Traditional Post-Mounted Control Devices

Project Objectives

- Evaluating the behavior of subjects as they drive on a signless road containing only
- Simulator scenario used emulates an environment in which holographic projections replace



TCDs of holographic nature.

roadway signs.

Overview of Key Scenario Geometry and Characteristics

Experimental Methodology

Twenty participants, nine females and eleven males, aged 20 to 68, all with at least four years of driving experience, drove through the following three scenarios in random order.

Motivation



“Visual Clutter in Fresno, Ca.”
Imagery obtained from Google Maps - Street View

Visual clutter leads to increased potential for drivers to miss significant warning, regulatory, or guidance signs.



Virtual chevron signs overlaid on pavement flash when subject approaches.

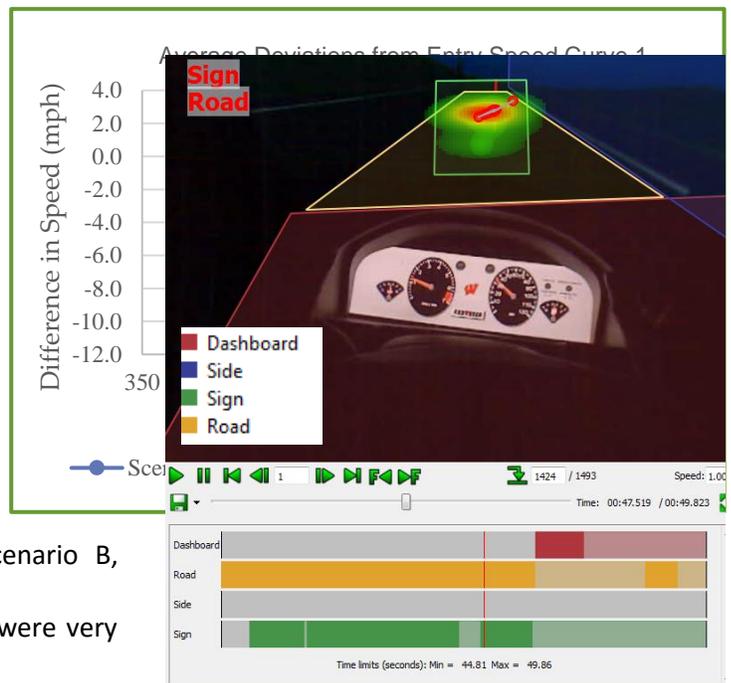
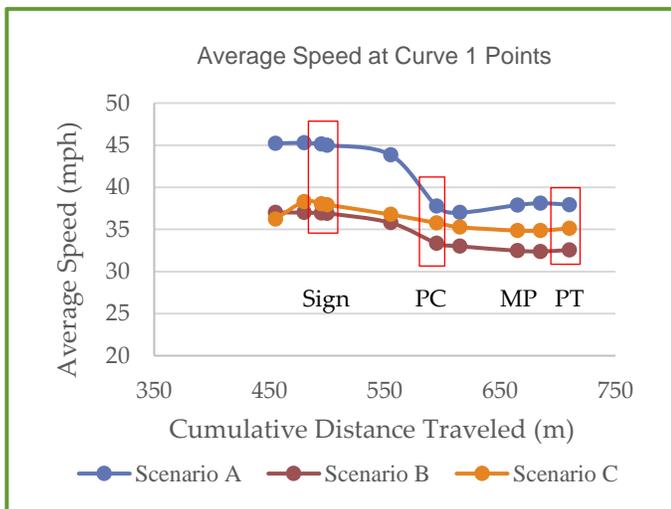
- **Scenario A:** Roadway without the corresponding signs.
- **Scenario B:** Traditionally post-mounted signed roadway.
- **Scenario C:** Virtually holographic signed roadway.

The technology studied can provide a smooth transition towards a future in which self-driving vehicles are common on the road.

Results and Conclusions

- Scenario A: Drivers' average speeds and speed deviations were the highest.
- Scenarios B and C: Drivers complied with the speed limit and reacted to holographic signs as they did to roadside signs.

Eye-Tracking Data



- Fixations on the roadside were very high in Scenario B, whereas they were very minimal in Scenario C.
- Fixations on the road (along driver's line of sight) were very high in Scenario C.

Summary of Findings

Driver reactions to each of the three scenarios suggest that holographic projections could offer a viable alternative to post-mounted signs in the future. The results of this experiment were certainly encouraging, but they don't provide an absolute answer about the feasibility of replacing physical TCDs with holographic ones.

Future Work

- Evaluating the impact of holographic-style technology in more complex driving tasks that involve interaction between drivers and other road users.
- Conducting experiments to understand how similar holographic technology can be used to increase driver awareness of pedestrian presence.

Sample Eye Tracking on Scenario C