AR HUD For Navigation

Ayush Agrawal

Ayush Agrawal

PROBLEM

- Today's navigation systems are dangerous, inaccessible, and inconvenient, looking at a phone or screen

- Propose an AR Heads-up Display (HUD) for displaying directions on an AR Headset while driving, using your location and destination

METHOD

1. A user inputs their destination before the drive

2. Repeatedly
   a. Fetch your location (coordinates)
   b. Convert to address and display
   c. Fetch and display the next direction to your destination

3. Once the user is at the destination, let them know they arrive
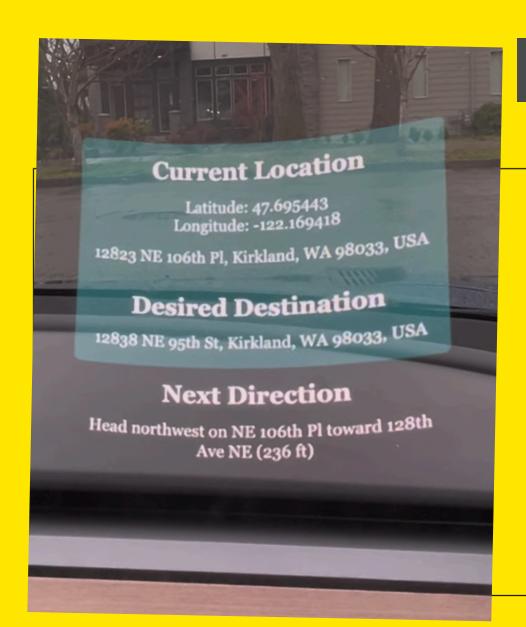
RESULTS

- Location fetching and route calculation is quick
- The use of a headset makes the display move with your head
- It's more informational than a projected HUD

Limitations:
- Geolocation is not very accurate while moving, so we propose using GPS chips to alleviate this problem in future work

CSE 493V
VR SYSTEMS

THE AR DRIVING HUD PROVIDED AN ASSISTIVE DRIVING TECHNOLOGY THAT WORKED IN REAL-TIME SUCCESSFULLY

Current Location

Latitude: 47.695443
Longitude: -122.169418

12823 NE 106th Pl, Kirkland, WA 98033, USA

Desired Destination

12838 NE 95th St, Kirkland, WA 98033, USA

Next Direction

Head northwest on NE 106th Pl toward 128th Ave NE (236 ft)

Video (1:20)

YOUR APPROACH

- This work provides real-time directions on a HUD
- The directions are visually clear, and move around with a user at their eye-level, improving on stationary HUDs
- It is limited by inaccuracies in real-time geolocation, and currently only displays text directions
- Notifies users when they arrive at their destination
- Demonstrates a proof of concept for assistive AR tech, poses questions to legislation in this field

RELATED WORK

- Mercedes-Benz is working on a pair of AR Glasses to provide directions while driving [left]
- Modern cars have a small projected HUD at the bottom of the windshield showing speed, fuel, etc. [right]

REFERENCES

1] ACTS Law, "Do GPS Devices Increase the Risk of Car Accidents?" Accessed: Mar. 18, 2025. [Online]. Available: https://actslaw.com/gps-car-accidents/
[2] A. Upadhyay, "Haversine Formula – Calculate Geographic Distance on Earth," IGISMAP. Accessed: Mar. 19, 2025. [Online]. Available: https://www.igismap.com/haversine-formula-calculate-geographic-distance-earth/
[3] Mercedes-Benz, "Mercedes-Benz AR Glasses Demonstration," Accessed: Mar. 18, 2025. [Online]. Available: https://www.youtube.com/watch?v=BqTGaYKLL1s
[4] Google Developers, "Geocoding API Overview." Accessed: Mar. 19, 2025. [Online]. Available: https://developers.google.com/maps/documentation/geocoding/overview
[5] Google Developers, "Routes API Overview." Accessed: Mar. 19, 2025. [Online]. Available: https://developers.google.com/maps/documentation/routes

PAPER