

Motivation

Most driving assistance/autonomous systems do not use internal driver monitoring yet most road accidents are due to driver error

Driver-unaware interactions are often distracting or ignored resulting in low effectiveness

Eye gaze provides a valuable signal to the computer for collaborative interaction

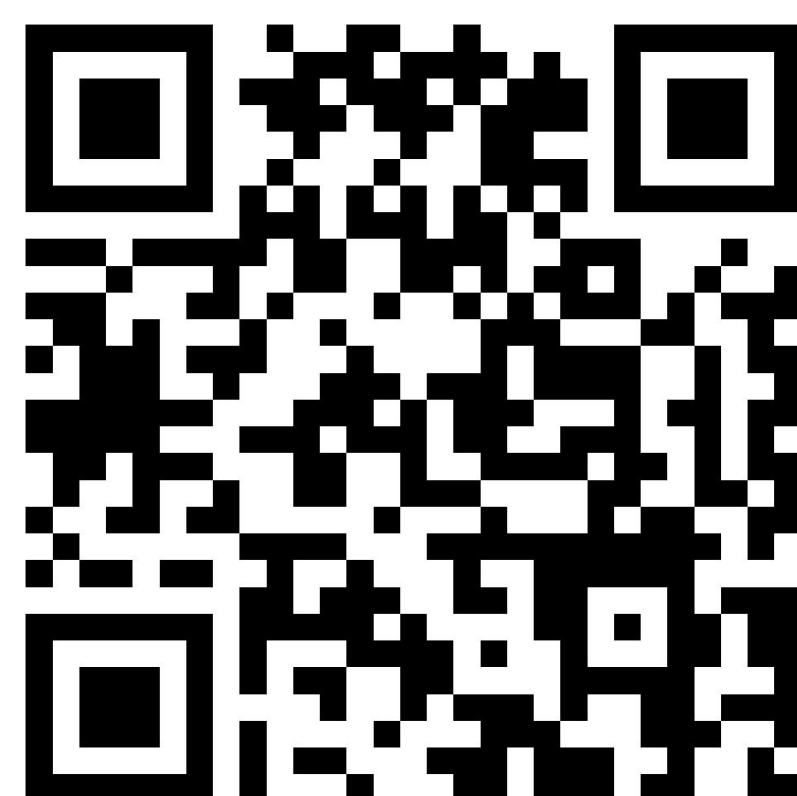
Expected Contributions

In the next two semesters we will contribute:



- A 3D VR driving simulator based on **CARLA** with several intervention mechanisms available between driver and vehicle
- A flexible driver-aware assistance system to balance intervention subtlety and assertion
- Curated realistic driving scenarios with events and stimuli for driver distraction, autonomous conflict, and potential hazards

Our simulator (DReyeVR) code and documentation can be found by scanning the QR code:



Approach

Key idea:

- Run NHTSA-inspired scenarios in the simulator with real time gaze data fed into the driver-assistance system
- Compare driver-aware and driver-unaware intervention schemes on comfort and safety



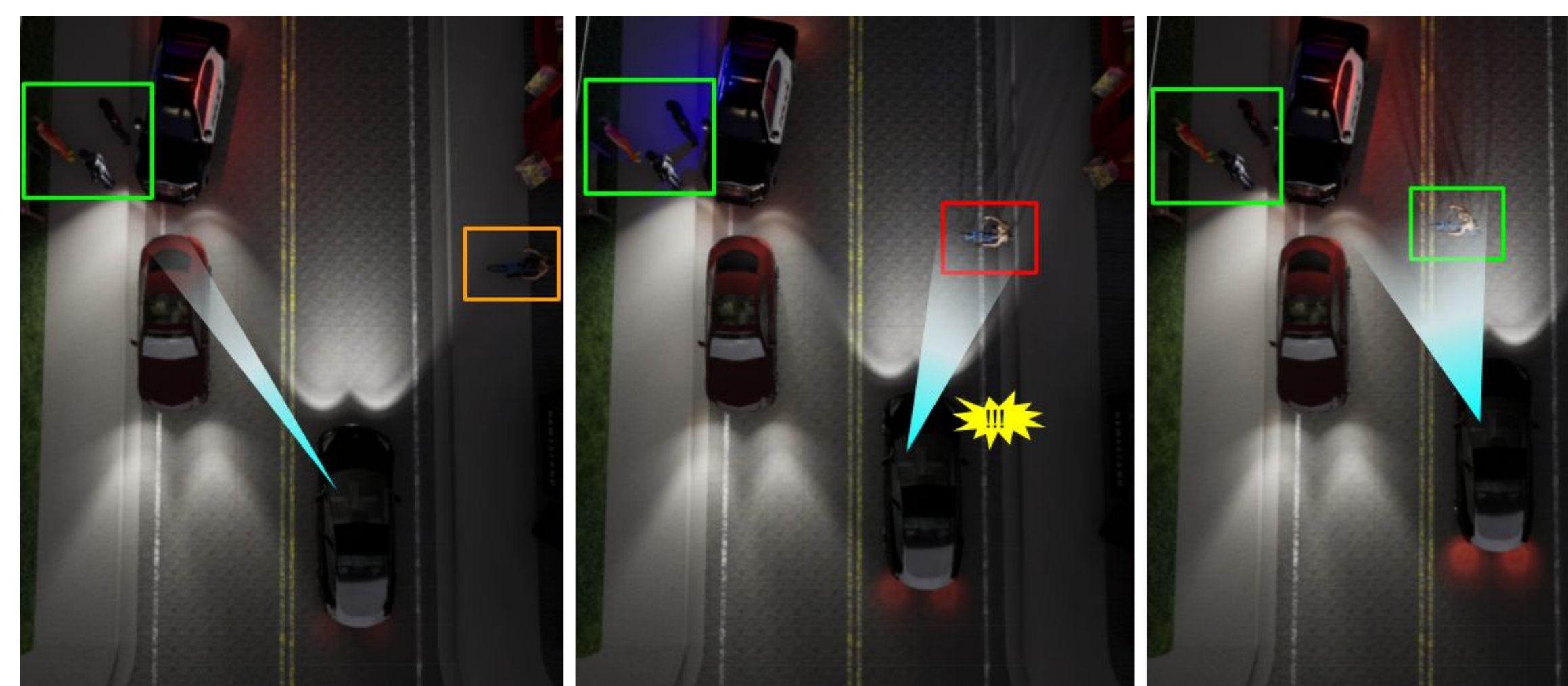
Flat-screen (spectator) view of the simulator (eye reticle at gaze point)



VR (participant) view of the simulator (no eye reticle)

Evaluation

Participants drive through a curated route, distractions and hazards are hand-placed to trigger interesting scenarios

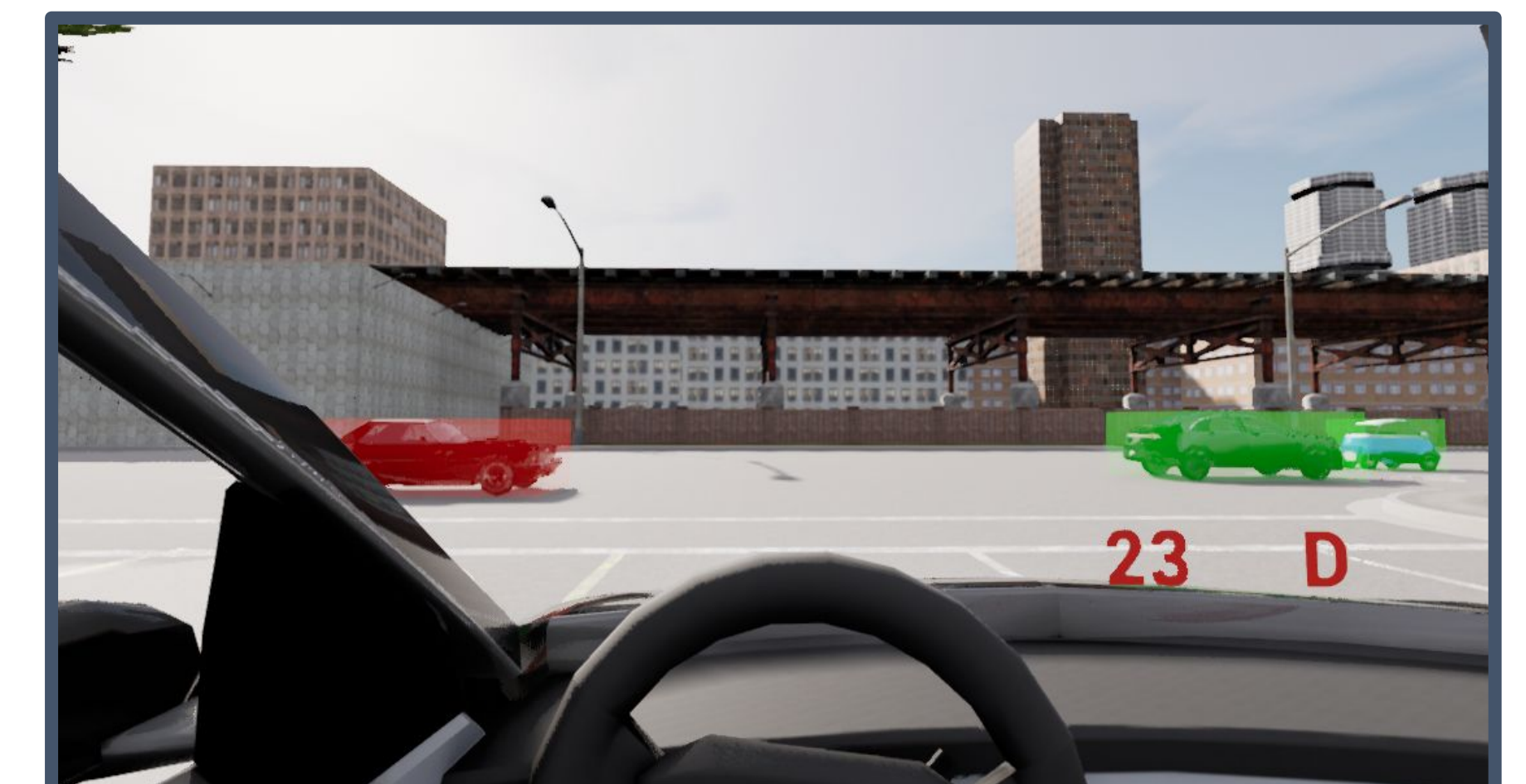


Example scenario where driver (cyan) is distracted, the assistive driving system detects incoming cyclist (orange) and knows the driver hasn't. An intervention (yellow) is made to signal the driver of the cyclist (red), ensuring an early vehicle slowdown before an accident.

Planned Intervention Mechanisms



[Notification] Lights inside vehicle and audio cues



[Highlight] Dynamic AR bounding boxes over hazards



[Takeover] Autonomous handoff with haptics

Acknowledgments

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