Collision Avoidance Vehicle Simulator

Introduction
Automobile crashes could be reduced in number and severity with the help of AI systems utilized in cars. However, it must be accurately discerned how much aid a driver should be given by AI driving systems. If there is too little intervention, the increase in safety would be minimal. If there is too much assistance, studies have shown, the driver becomes reliant on the system, and there is no real increase in road safety.

Objectives
• Create a simulation environment to test how people react to cars with collision avoidance systems.

Methods
• Track and scenario created, with vehicles, obstacles, and a user-controlled vehicle.
• Modular structure
• Allows for easy swapping of algorithms
• Information flow better mimics a real AI-equipped car system.

• World - Information about the environment that the “god object” can access
• Sensor - gathers “imperfect” information about the environment through the god object to simulate a real-life car’s sensors
• User - Input from the wheel and pedals
• Collision Avoidance System - Written by Yajia Zhang, makes decisions based on the input from the sensor and user and passes commands to the controller
• Controller - Applies the movement to the vehicle

Data and Results
Scenario: User is driving behind a car that stops suddenly. Data on graphs assume user does not brake.

Vehicle is successfully stopped and collision is avoided, preventing damage and injury.

Future Work
• Gather varied data from more subjects
• Test additional algorithms and scenarios