

Overview of Project TJA2

Software Engineering CSE435

Michigan State University

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Team members:

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Customer: Mr. William Milam

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*Please direct all inquiries to the instructor.

Project Overview

- System provides functionality of Adaptive Cruise Control and Lane Assist below the minimum required speeds for both.
- Automatically adjust acceleration, braking, and steering to maintain safe distance and lane position.
- Motivation for project
 - Address problem with driver workload and safety in congested, low-speed highway traffic.
 - Facilitates smoother traffic flow and consistent vehicle control with minimal driver intervention.

Overview of Features

- Lane Centering utilizing a front facing camera
 - Applies a force upon the wheel to keep car centered unless turn signal is activated
- Adaptive Cruise Control Capabilities
 - Forward-Looking Radar Integration to identify target vehicles and calculate the closing rate
 - Three Selectable Following Distance to choose from
- TJA System utilizes dashboard system and audio system to give notifications

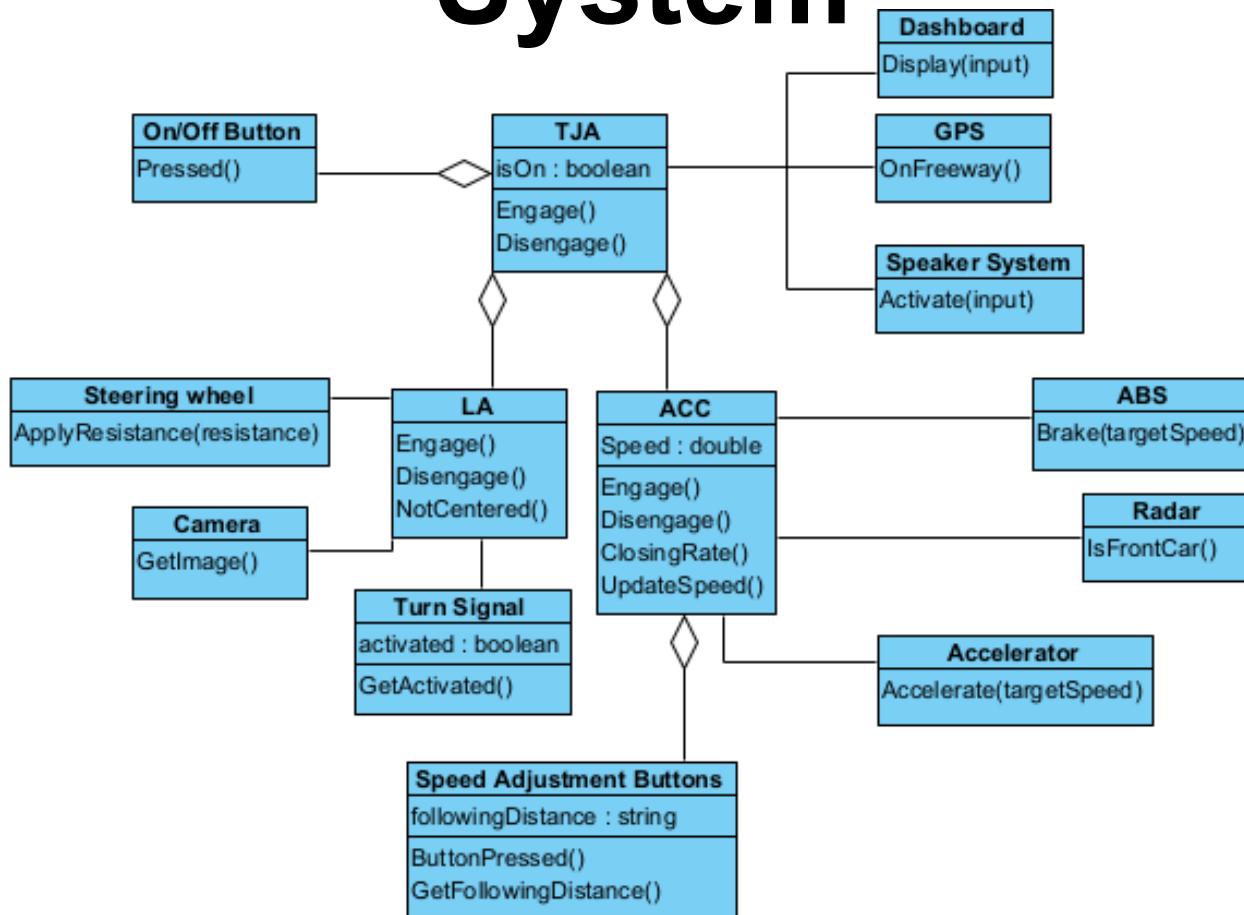
Domain Research

- TJA is **not an automated** driving system, and the system has **limitations**.
- Most manufacturers design TJA for **speeds lower than 40mph**.
- Hardware needs to be carefully calibrated for the system to work correctly.
- **NHTSA** vehicle safety guidelines

Constraints

- NHTSA requirements
- Driving under **tough weather conditions**
- ADAS calibration
- **Safety critical properties** like airbags, anti-lock braking system, electronic stability control system and a forward collision warning system
- **Lane-splitting**
- **Use on highways**

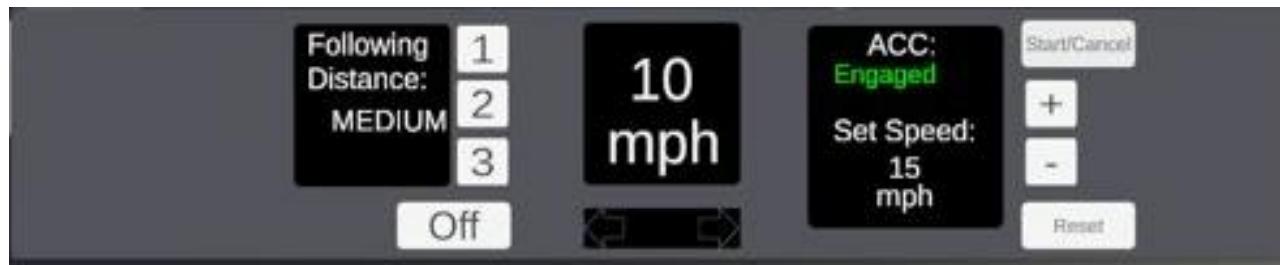
Part II: Model-based View of System



Class Diagram

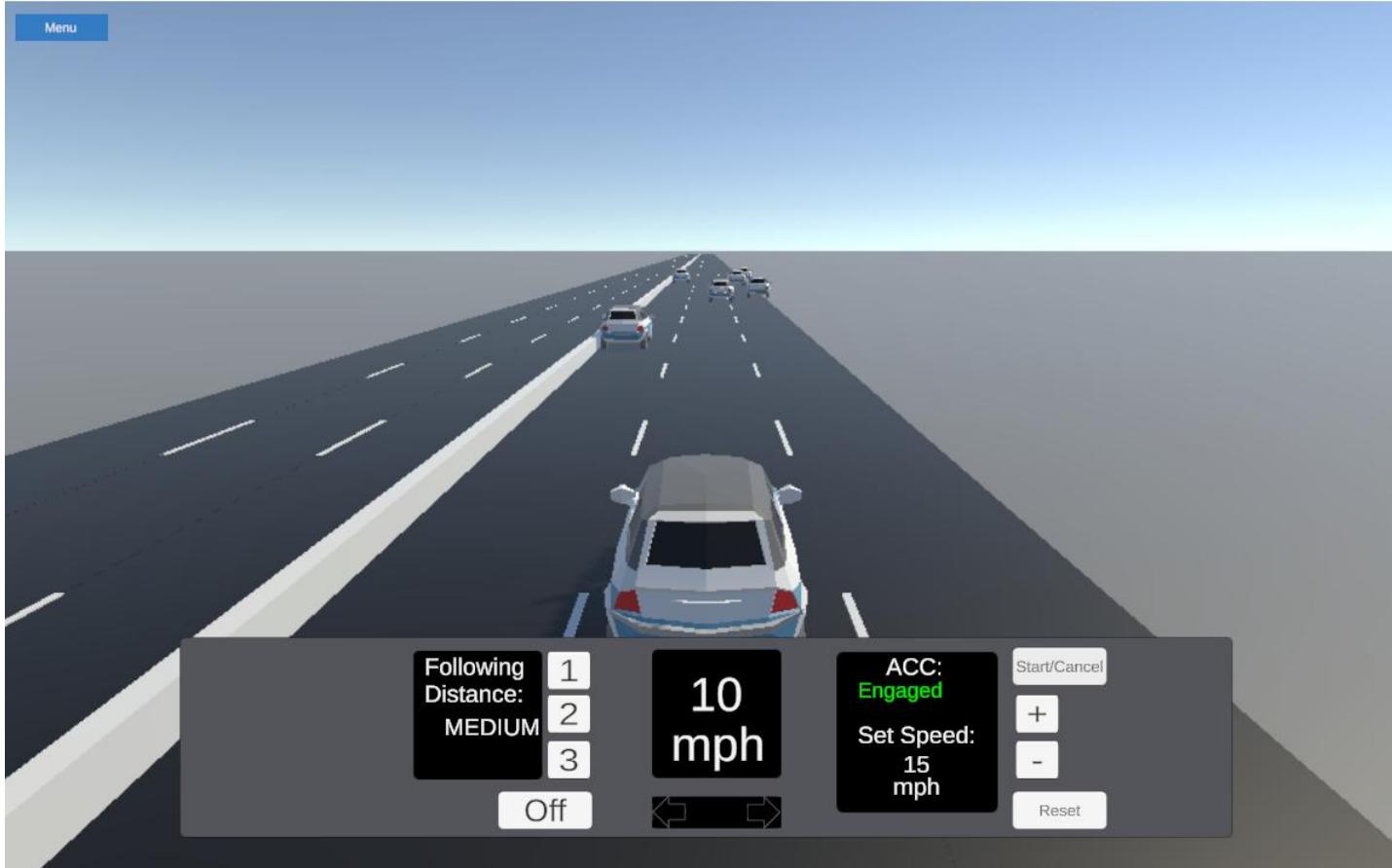
Part III: Demonstration

- Interface



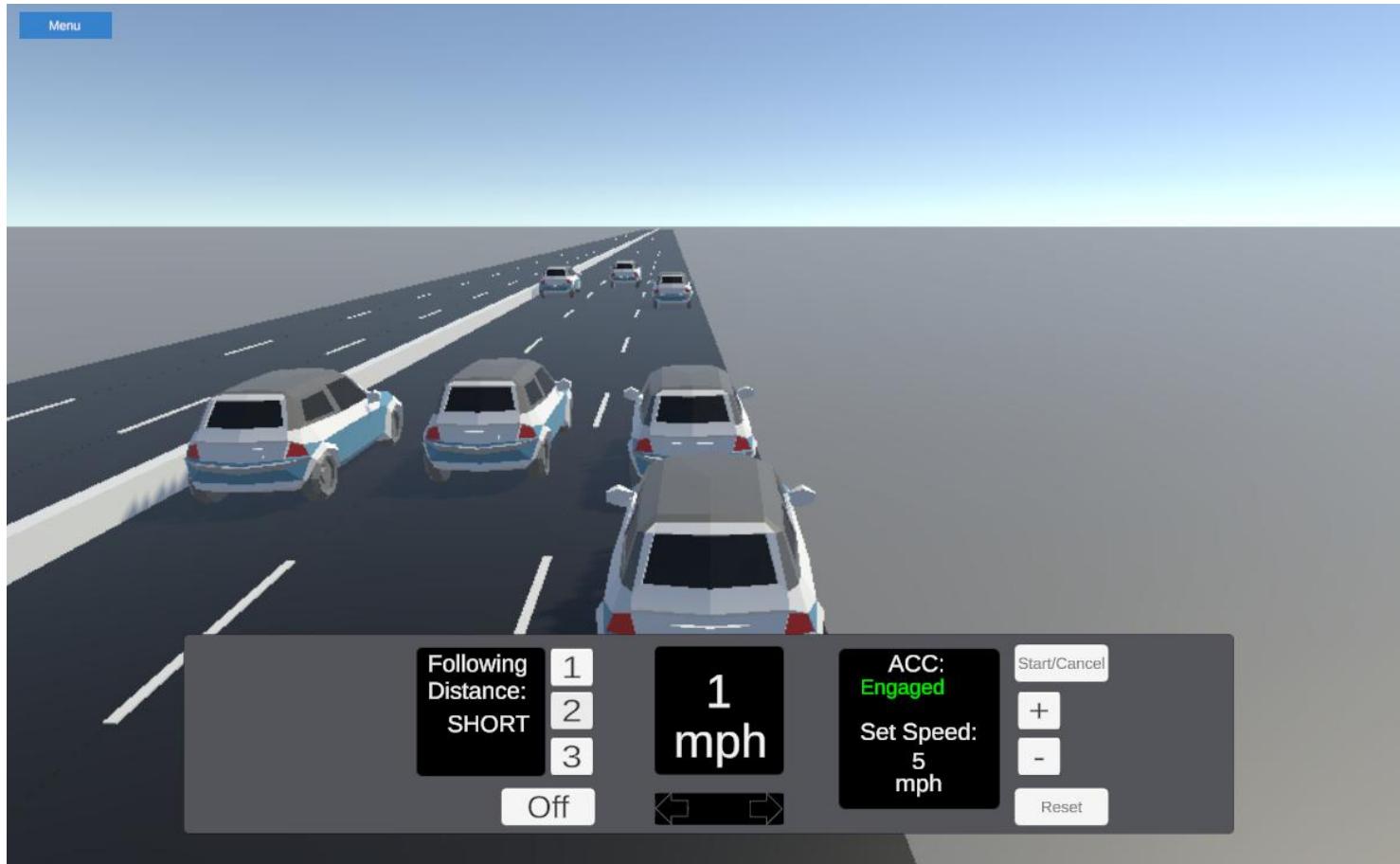
- "WASD" controls
- "Q"/"E" to turn on left/right blinkers
- <https://www.egr.msu.edu/cse435/tja2/prototype/>

Moving Traffic



- When ACC is engaged, vehicle will maintain following set following distance behind other cars

Stopped Traffic



- When the car in front has stopped, our vehicle will slow and resume following at correct distance

Acknowledgements

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