Overview of Lane Management System

CSE 435: Software Engineering
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Team members:

- Project Manager: Sawyer VanDyke
- Artifacts Manager: Ryon Baldwin-Williams
- Facilitator: Grant Bossio & Collin Heavner
- Customer Liaison: Ben Grycza
- Security/Assurance Manager: Troy Williams

Customer: Mr. Ayush Agrawal

Instructor: Dr. Betty H.C. Cheng*

***Please direct all inquiries to the instructor.**

Project Overview

- The Lane Management System will detect lane markings, provide warnings, and apply corrective steering to the vehicle
- Motivation for project
  - Accidents are happening more frequently due to distracted driving
  - Make the driver aware of their lane, as well as providing assistance to steering

Overview of Features

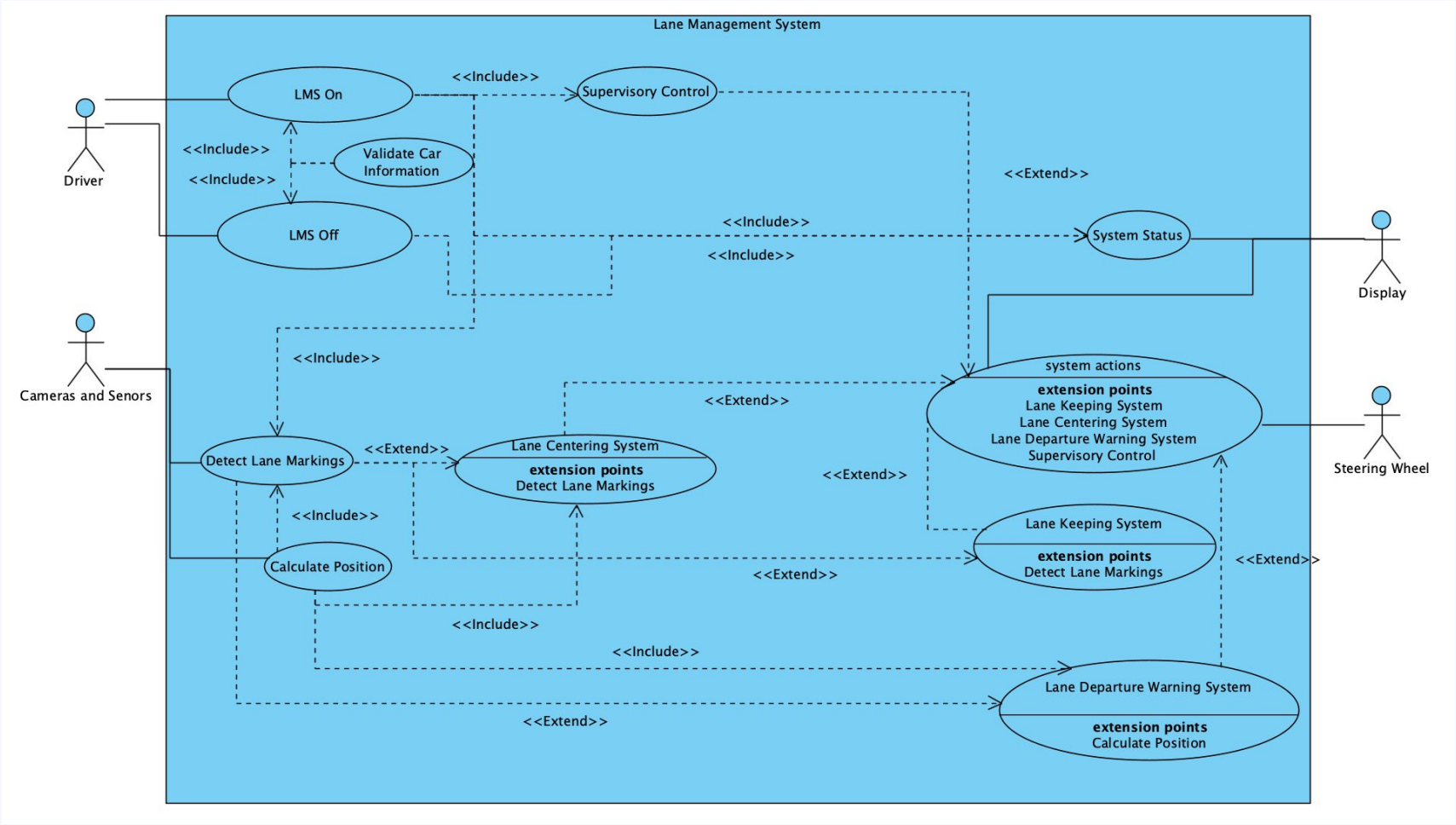
- Lane Keeping
  - This feature will keep the car in its own lane, providing a maximum of 2 Nm of force to the steering wheel
- Warning features
  - There are 3 warning features: audible, visual, and steering wheel vibration
- Sensors
  - Cameras for lane detection, GPS for precise lane coordinates, and steering wheel sensor for adjustment

Domain Research

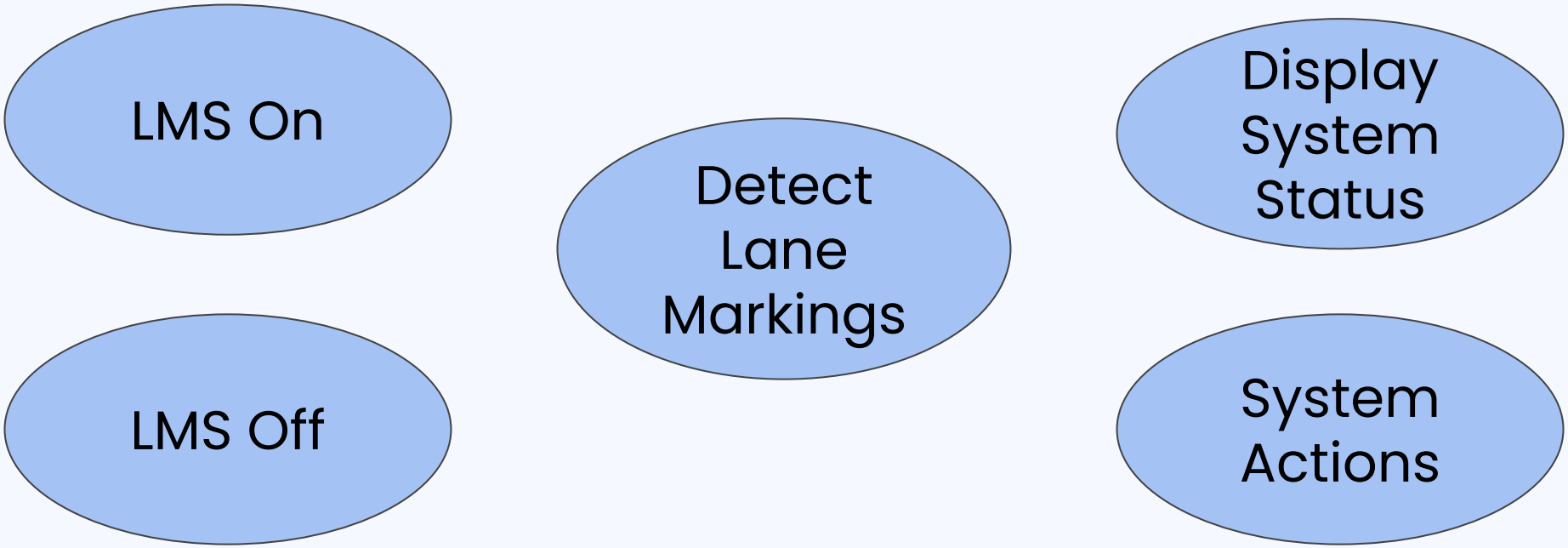
- Investigated existing lane management systems and specifications
- Applied domain knowledge when creating LMS specifications
- Project Constraints
  - LMS must only function at 35 mph+
  - LMS must only function if there are visible lane markings
  - LMS requires a functioning set of cameras

Part II: Model-based View of System

Use Case Diagram



Key Use Cases



Part III: Demonstration

The prototype is accessed online and uses Unity WebGL Player

Interface:

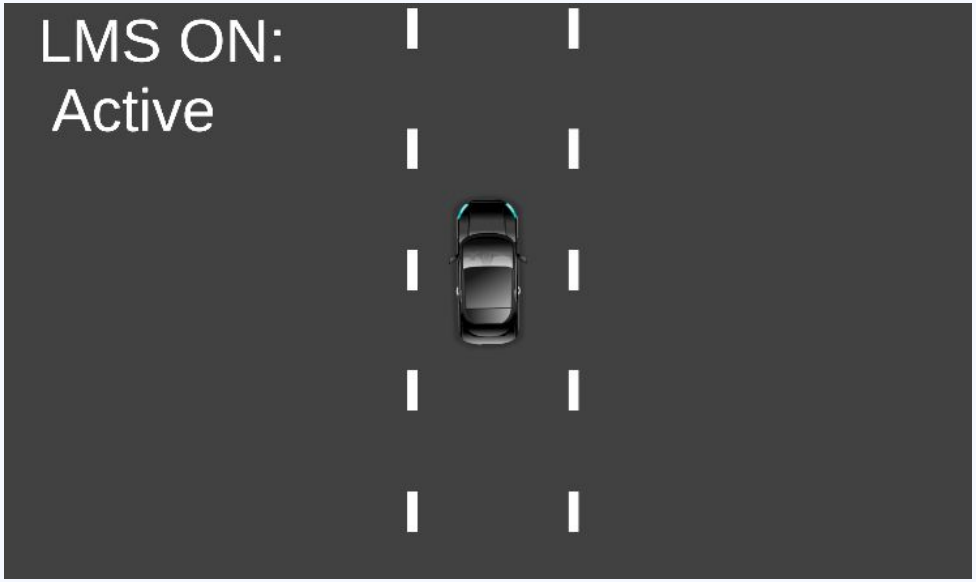
- LMS On and Off indicator
- Active Status indicator

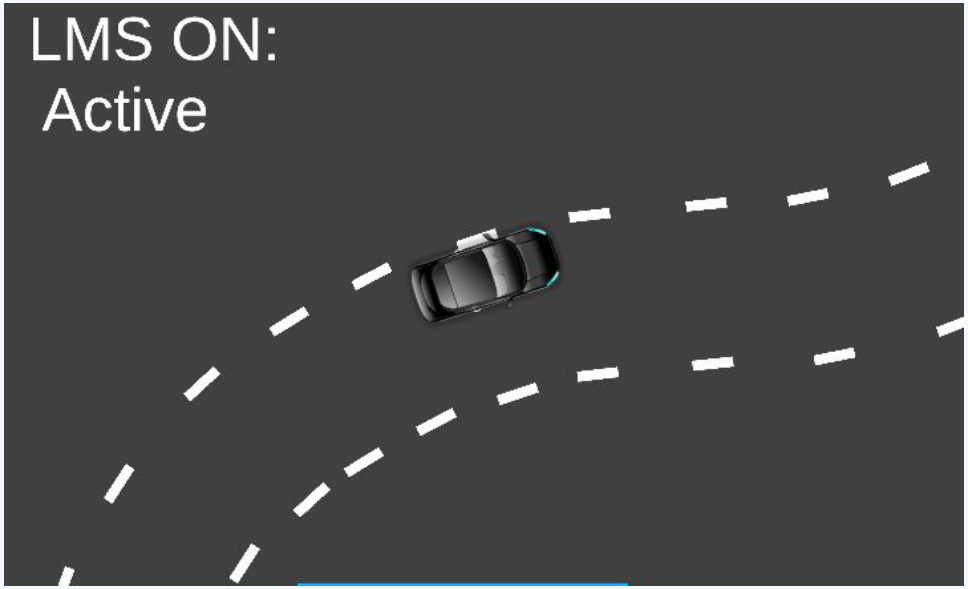
Controls:

- Movement - Arrow Keys
- Toggle LMS - Space Bar

The Ideal Scenario

- Uniform and straight road
- LMS On
- Lanes detected
- LMS Active



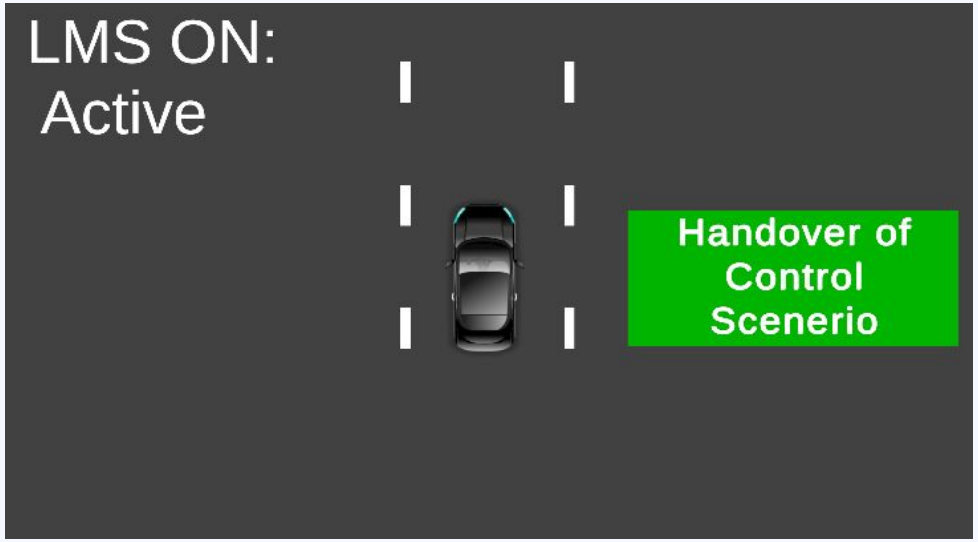


Road Curvature Scenario

- Curving and nonuniform lanes
- LMS On
- Lanes Detected
- LMS Active

Failure Scenario

- Undetectable or unclear lanes
- LMS On
- Lanes not detected
- LMS Passive



Change of Control Scenario

- Lanes detected again after failure
- LMS still on
- LMS becomes active again on lane detection

Acknowledgements

- We gratefully acknowledge and appreciate the participation of our customer, **Mr. Ayush Agrawal** from **Amazon**.