Autonomous Vehicle System

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CS 250: Introduction to Software Systems

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Program Specification

System Description:

The system shall be implemented in commercial four-wheel vehicles and will be able to navigate any road or pathway. The system will receive input and information from carrier-provided data-carrying satellite feed without requiring any input from the user. It will be able to deal with obstacles using the cameras and other sensors in the vehicle. The system will also be able to navigate through weather and visibility conditions. The system will only be able to follow a road, being able to react to bends and turns, and it will not be able to operate at making turns, intersections, or react to traffic signs, etc.

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User:

An emergency mode will be available when the system is unable to function properly and will require the user to take over. The user will receive training for this occurrence and will be licensed to drive a motor vehicle.

Features:

The system will only be implemented into four-wheel vehicles (commercial vehicles). Electronics like cameras and sensors will be used to achieve the functionality of the system.

External detection of alien objects.

During the operation of the system it will be able to identify when an external object becomes too close to it. This will be achieved by gathering information from the cameras and sensors and continuously updating the trajectory for the vehicle to follow.

Road stability in marked paths.

While the system is active it will continuously utilize detection features to ensure that the trajectory maintains stability on the road.

Real-time data gathering.

The system will be able to receive data through a networking element that has been installed in the vehicle to be able to gather satellite data that is tracked in the area that the vehicle is located. Emergency data will be sent to the system via the networking element and use the data to avoid dangerous pathways as instructed.

Live vehicular state transmitted and stored.

This system will operate to transport human lives when in operation. In order to ensure the wellbeing of the passengers and be able to operate effectively the system will also be able to access the vehicle's information in its current state such as engine life, transmission force, and anything else that it might find as useful information to navigate the road.

Key things that the system will not be required to do are as follows:

The system won't be able to navigate, make turns at intersections, react to traffic signs or traffic signals, and will otherwise not be navigating towards a destination. It will only be able to follow the course of a single road and be able to react to curves or bends in that road. All other responsibilities associated with operating a vehicle such as those listed above will be the

responsibility of the drivers to take care of. For example it will be their responsibility or reacting to traffic signs and signals, making turns at intersections, merging and exiting freeways, and applying brake and throttle as needed.

Development plan and timeline

UML Class diagram: Daniel, Anwar

https://drive.google.com/file/d/1dDJn8Ftm5isvRCxKLStk52BPtDuKuZSQ/view?usp=drive_link

Software Architecture Diagram: John, Rodolfo

https://drive.google.com/file/d/1C72OHvF7xKMLe6RtPf8gkPg-t-ZVXdmK/view?usp=drive_link

Description of Class: Joseph

https://docs.google.com/document/d/14A-Okyd2yPFObvk437T2rbpYfSGINKLEce8hCiIo7Ik/edit?usp=sharing

Description of Attributes: Joseph

Description of software architecture: Gabe

https://docs.google.com/document/d/1-tdq0d9cKrTDbJUExDNYS7KiSmsz3NWFmXtVJHY6crc/edit?usp=sharing

Software Architecture Overview:

Architectural diagram of all major components: