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Autobot Racing

Project Charter

Anthony Goeckner; Benjamin Huemann; Eric Osburn; Zachary Perry; Harold Smith
TEAM #

Introduction and Background

Autonomous vehicles are an area of active research, and our team would like to contribute to the growing body of knowledge in that area. The aim of this project is to create an automated car racing system, with centralized control of all vehicles. While similar systems may already exist, this new "Autobots" system will implement advanced behaviors such as lane-keeping and passing capabilities, along with collision and obstacle avoidance. This will be achieved with one sensor: an overhead camera tracking all vehicles.

Project Objectives

- The system will allow for automatic guidance of cars around a course.
- The system will automatically identify the layout of the course based on features visible to the camera. For example, some sort of marker to identify corners will be placed on the ground, and detected by the camera.
- The system will support advanced behaviors, such as passing and lane-keeping. Time permitting, this may also include obstacle avoidance.
- The system will provide scoring of races.
- The system will track laps taken around the course by each vehicle.

Stakeholders

- Project Development team – The project members actively contributing to the creation of the project
- Development Managers – Alina Nesen & Hasini Gunasinghe; graduate teaching assistants that will oversee the progress of the project
- Project Owners – The project development team double as the project owners

Deliverables

A software product with the following features:

1. Centralized control system to provide directions to cars
2. Centralized location detection, based on camera feed, to inform control system of a car's location.
3. Scoring system to provide scores to cars as they finish the race
4. User interface to control system
5. Hardware to transmit directions to vehicles

Previous Work

Most team members have completed CS 30700. Their work in that class is listed below:

Anthony Goeckner & Harold Smith

Created a biometric ATM consisting of a touchscreen interface, fingerprint scanner, facial recognition camera, and backend server. No code from that project will be used in the Autobots system.
https://github.com/raokrutarth/ATM_2.0

Ben Huemann
Created a "Magic Mirror" information hub. The project featured a 2-way mirror attached to a computer monitor. Display was powered by a Raspberry Pi with a Leap Motion used for 3D gestures. Weather, Calendar, Quotes, etc were shown in the display. This project and its source code will not be used in the Autobots system
https://github.com/Bhuemann/MagicMirror

Eric Osburn
Didn't take CS 307. This class was taken with permission of Professor Dunsmore.

Zach Perry
Created a mobile debate app, "iDebate", which includes all the functionality of debate.org, with added options for location, categorical preferences, and gamification. The project was written in Swift for iOS, with a firebase backend and database.
https://github.com/CS307-iDebate/iDebate