Test Plan

1 Verification Overview

Subsystems that require computer vision or machine learning will first be verified in a simulated environment off of the robot. These and the remaining functions will be verified within several test environments designed on the Florida Tech campus. Environments will include paved and grass areas to assess the robot's movement capabilities. Each system function will be tested independently, through unit tests, before system testing occurs. Test courses of varying depth and difficulty will be constructed with, but not limited to, masking tape, white ribbon, paint, furniture, and cones. Furthermore, data will be collected from these test courses to improve simulation testing.

2 Lane Detection

The lane detection model, and lane following subsystem, will be tested off of the robot using collected data. The model will be tested on test courses from which additional data will be gathered to improve the model. After the robot can reliably detect lanes, the subsystem will be tested concurrently with the Obstacle Avoidance subsystem.

3 Obstacle Avoidance

The obstacle avoidance subsystem will be initially tested off of the robot using collected data and simulations. The model will then be tested on test courses, from which additional data will be gathered to improve the model. After the robot can reliably detect obstacles, the subsystem will be tested concurrently with the Lane Following subsystem.

4 Mapping

The mapping subsystem will be tested independently simulating the outputs from the lane detection and obstacle detection submodule. After verifying that the mapping module is capable of understanding the input and accurately map objects on the virtual map, it will be tested using real input from the detection subsystems.

5 Path planning

Path planning will be tested initially on the robot without other functions. The robot will be provided a simple map of the robot and its waypoints' positions. After it demonstrates it can

successfully traverse to a waypoint, additional complexities will be added