

Project Title: Dancing Driving Robots (DDR)
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EECS 149/249 Project Charter, Fall 2014

Project Goal

The goal of this project is to design and implement a navigation game where the agent will move based on performing hand gesture prompts on a display.

Project Approach

The agent will navigate through a predefined path, created with white tape, using a photosensor. The agent's movement will be defined by a statechart governed by the sensor inputs from the Leap Motion. We poll the sensors to check if the user made the correct gesture within the allotted time, moving along the path if he or she did or straying if he or she did not. The goal is to reach the end of the path.

Resources

Our plan is to use an iRobot with a myRIO attached with a Bluetooth receiver and photosensor for the navigation agent. We first need to configure a Bluetooth receiver onto the myRIO and then construct a communication protocol based on Leap Motion gestures. Then, we will need to implement state logic for the robot for handling erroneous moves and restoring to the correct position. We will use a photosensor to determine if we have restored to the original path but if this proves to be too complex, then we will use distance calculations to determine if we have restored our path or not. Finally, we will design a GUI with audio to interact with the user.

Schedule

- October 21: Project charter (this document)
- October 28: Testing of the leap motion controller and bluetooth communication logic.
- November 4: Have working bluetooth communication between the computer and iRobot.
- November 11: Basic navigation working; statechart done.
- November 18: Mini project update: Demonstrate communication between computer and robot, driving robot, basic recognition via the Leap Motion.
- November 25: Tie everything together; have the computer send commands to the robot it responds to.
- December 2: Create GUI on the computer, create audio effects, fine tune the control algorithms and timing for the robot.
- December 9: System and user testing.
- December 16: Demonstration video made, powerpoint prepared.
- December 17: Final presentation and demo.
- December 19: Project report and video turned in.

Risk and Feasibility

Since we are using independent parts, we need to ensure the compatibility of these sensors with the myRio. Synchronization, especially latency, between user gestures and processor polling of the sensor readings might be tough and configuring the communication protocol may be tricky. As long as we can accurately get the sensor readings to the processor, this project is quite feasible.