

EECS 149 Project Charter: Robot Jousting

Overview

The goal of this project is to create a physical interactive jousting game using two holonomic robot vehicles, where one vehicle is user controlled via a Wiimote, and another is controlled by either a user through a computer, or through an AI algorithm using computer vision.

Approach

We will use an arduino and xbee interface for the AI-controlled robot. We will use a webcam to get a top-down view of the game environment to allow for implementation of computer vision feedback. For the user-controlled robot, we will use an mbed platform with a bluetooth module to connect to a Wiimote via a Bluetooth connection, Interactive feedback from the robot to the user will be provided in the form of sounds or rumbles on the Wiimote. Both robots will have additional sensors (a button to model a hitbox, hall sensors to model power-ups in the form of magnets on the field, etc.) that can interrupt and/or actuate the embedded systems.

Objectives

Our major objectives are to: achieve a reliable connection between the mbed platform and wiimote, implement properly working sensor-interrupt actions, achieve a reliable position/orientation detection algorithm using computer vision, and implement reasonably working AI algorithms.

Major Deliverables

- User-controlled vehicle with Wiimote control
- Playing field with appropriate sensor regions
- AI-controlled vehicle

Risk and Feasibility

The one major risk to our project is the variable of delivered components arriving late. In terms of feasibility we predict the most difficult portions of the project will be implementing the Bluetooth connection to a Wiimote, the AI algorithms, and the computer vision module. Concerning the Bluetooth module, our implementation should be doable, especially given the open availability of resources. Concerning the AI algorithms, our simple AI algorithms are definitely feasible; however, more complex adversarial algorithms may not be completely feasible given our timeframe. Concerning the computer vision module, our implementation can be completed with the appropriate libraries. At the very least, blob detection can definitely be achieved. More complex methods such as implementing a Kalman filter may be possible depending on platform computing power.