McMaster University

SmartServe

Software & Mechatronics Capstone

Project Goals

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Date	Revision	Comments	Author(s)
10/05/17	0	First revision of document completed	Christopher McDonald & Sharon Platkin

Figure 1: Revision History

1 Project Summary

The project will be a table tennis trainer, comprising of a shooting mechanism, computer vision system and machine learning recommendation algorithm.

2 Success Criteria

The following items are required to be completed for this project to be a success:

- The system can detect the boundaries of the table to determine valid returns on the system's side
- The system can detect valid returns from the user with an accuracy of 90%
- The system can hit each square of a 4x4 grid with an accuracy of 75%
- The system can apply a reinforcement learning algorithm to aid in the shot decision
- The system can pause and resume operation
- The system can calibrate its position and orientation
- The system can adjust the shooting frequency

3 Mid-Level Goals

- The system can detect the boundaries of the table to determine valid shot locations on the user's side
- The system can hit each square of a 8x8 grid with an accuracy of 75%
- The system can calibrate its shooting parametres
- The system can notify the user of their performance after each shot is taken
- The system has multiple modes including 'single-shot' and random
- The system has leaderboards for all users
- The system's state persists after shutting down
- The system can apply spin to the shot on one axis
- The system can shoot at various speeds

4 High-Level Goals

- The system can hit each square of a 16x16 grid with an accuracy of 75%
- The system can apply spin to the shot on a combination of two axes
- The system can track the ball throughout the complete path travelled across the table
- The system can collect the balls returned by the user
- The system can shoot from different heights