

RPS Robot

What is it?

A mechanical hand that can form rock-paper scissors gestures and recognize those of a human's; it uses this information to play the game against human players.

Software components:

- OpenCV for hand gesture recognition
 - The OpenCV C API will be used for camera capture in order to detect the shapes that the robot sees live
- Code for the Servo software in C

Hardware components:

- Acquired Raspberry Pi will be used to connect the robot hand to a webcam
- Need robotic parts (*specification needed*) for the hand
 - Servomotor to control the hand
- Need webcam

Prototype Plan (Evolutionary):

- Get camera and computer to communicate with one another (possibly first detect movement in the frame)
- Get camera and computer to recognize/approximate different hand gestures (RPS) and output what the computer's move would be (Eg 1 for rock, 2 for paper, 3 scissors)
- Make robotic hand and use it with the previous prototype

Challenges:

- Getting the software to recognize, analyze and differentiate between three gestures
 - Also, getting it to differentiate between rock or initial three/two hand movements (when you say Rock-Paper-Scissors-Go and pump your fist 3 times before playing)
- Designing the hand to move fast enough to match human reaction time
- Differentiating between valid or invalid moves
- Learning how to get hardware to interact with software, playing around with different inputs, outputs, and algorithms to optimize efficiency