# 1. Experiments with One Sensor

Description of the Experiment:

It was very important to test the photosensitive light sensors in order to implement hand-gesture based control for the project. Initially the team tested only one sensor to check the analog output and the sensor sensitivity. This was done to make sure that the light sensors could successfully capture the hand gesture.

Experimental Setup

One photosensitive light sensor was connected to the Raspberry Pi as discussed in the class tutorial (Berges and Chen 2019). The analogue signals from the sensor were converted to digital signals using MCP3008 that came along with the sensor kit. MCP3008 processes 8 channels of analog input with 10-bit precision. The numberings of the pins are shown below (Berges and Chen 2019).

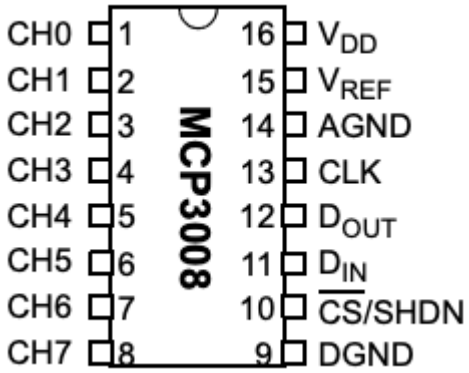


Figure 1: MCP3008

| MCP3008 | RPi |
|---|---|
| VDD (Pin 16) | 3.3V |
| VREF (Pin 15) | 3.3V |
| AGND (Pin 14) | GROUND |
| CLK (Pin 13) | SCLK |
| DOUT (Pin 12) | MISO |
| DIN (Pin 11) | MOSI |
| CS (Pin 10) | GPIO5 |
| DGND (Pin 9) | GROUND |

Figure 2: Connections

CH0-CH7 pins (Pins 1-8) take the analog inputs from sensors. Rest of the pins are connected to corresponding pins on the RPi with jump wires.

Experimental Results

The photosensitive light sensor initialized itself to the ambient lighting. On moving our hand above the sensor, the light detected by the sensor is reduced. This corresponded to a jump in the voltage as seen in the Plot below. From this experiment, the team concluded that photosensitive light sensor could be used to detect hand presence. However, in order to detect a hand motion (gesture), we would need more than one sensor.

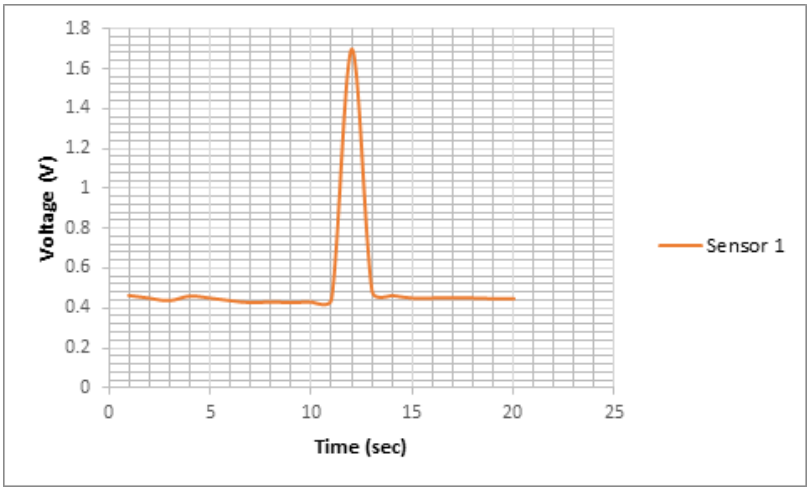


Figure 3: Voltage output from sensor