

PY371 Project Proposal 2D Scanner

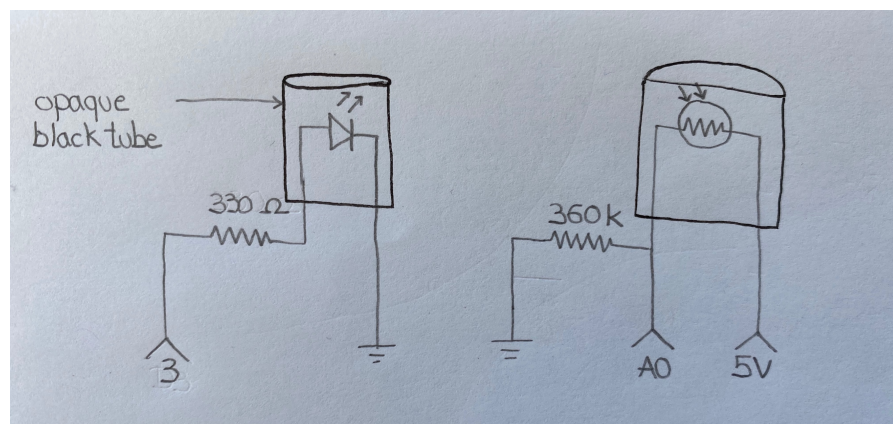
Abstract

The purpose of this project is to create a 2D map of the environment with a distance sensor. The sensor consists of two separate components, a green LED which emits light, and a photoresistor which detects the intensity of the reflected light bounced off surrounding objects. The sensor is mounted on a stepper motor and both are connected to an Arduino. The Arduino controls the stepped rotations of the motor, registers the change in voltage from the change in resistance of the photoresistor and calculates the distance to the surrounding object. After a full rotation of the motor, data is communicated through a serial connection to my computer and a 2D point map of the environment is generated.

Main Steps

1. Solder sensor elements onto a small circuit board and mount the board on the motor's shaft.
2. Calibrate for voltage readout on A0 as a function of distance, in a dark room, by facing a clipboard at different distances [5 – 50 cm] perpendicular to the sensor's line of sight.
3. Program the Arduino to rotate the motor, collect sensor values and transmit them, through serial connection, to a python script simultaneously running on my computer for real time plotting.

Sensor Circuit Diagram



BOM [All available]

Circuit Board	Arduino
9V Battery	Stepping Motor
Jumper Wires	4x MOSFETs
2x 10W 20Ω Rs	4x Diodes
330Ω R	Green LED
360kΩ R	Photoresistor

Reference

Photoresistor Data Sheet: <https://cdn-learn.adafruit.com/downloads/pdf/photocells.pdf>