

UNIVERSITY OF COLORADO BOULDER

ECEN 2270: ELECTRONICS DESIGN LAB FINAL REPORT

Movement Controlled Robot

Joseph BLAKE
Matthew HANEY

Rachel LAWSON
Milica NOTAROS

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1 Introduction

Our project involved utilizing a glove and a muscle sensor to operate our robot wirelessly. The glove was wired with two flex sensors and an accelerometer, used as forward/backward/left/right input. The muscle sensor controlled the speed of the robot by sensing the magnitude of the electrical activity of the muscle and translating this into either fast, medium, or slow. These components deliver commands wirelessly to the robot over WiFi.

2 Materials

Hardware • EMG Sensor (Sparkfun Muscle Sensor v3)

- Arduino UNO R3
- 2x Flex Sensor (FS7548)
- Accelerometer (ADXL337)
- Teensy 3.1 (PJRC)
- TeensyLC (PJRC)
- 2x Wireless Transmitter Module (ESP8266)
- Gardening Glove, Duct Tape
- Robot with lab 1-5 components
- Common lab equipment (Oscilloscopes, power supplies, etc)

Software • Arduino IDE

- PJRC Teensy Software (Arduino IDE Extension)
- IntuiLink Data Capture
- LTSpice

3 Implementation

This project can be loosely divided into three slices: an array of inputs, a wireless transmitter that encodes the input data into a command, and a wireless receiver that translates the command into an action taken by the robot.

3.1 Input

Input was collected from five sources: an electromyograph (muscle sensor), two flex sensors, an accelerometer, a button, and a potentiometer.

3.1.1 Glove

There were two modes of input, one of which read the EMG to determine drive speed, the other of which read a potentiometer to determine drive speed. The potentiometer was intended as a backup in case the EMG failed or was unreliable. Pushing a button triggered an interrupt in code to switch between these two modes of operation.

3.1.2 EMG

In

3.1.3 Flex Sensors

3.1.4 Accelerometer

3.2 Transmitter

3.3 Receiver

3.3.1

4 Results

Results

5 Next Steps

Future Work