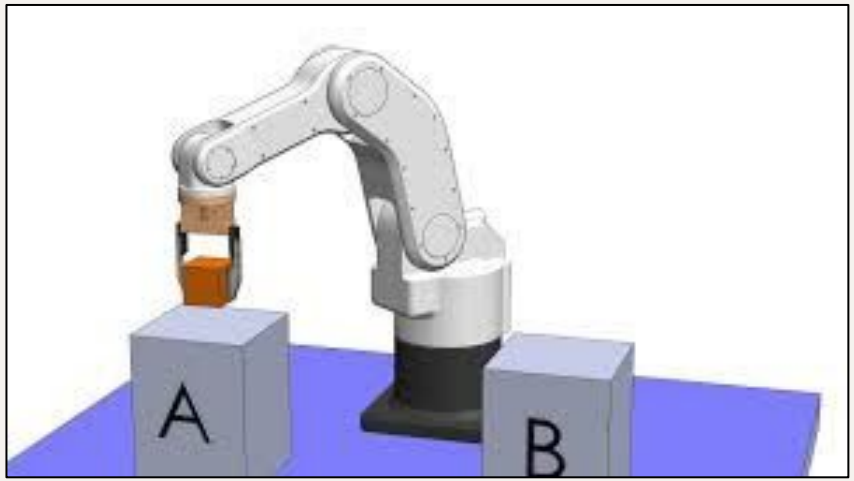
Team W1 Group Project - Distance Robot Arm

CSE 1012: Project Based Inquiry

Greta Brown, Joshua Aldrich, Mason Overman, Daniel Reyes

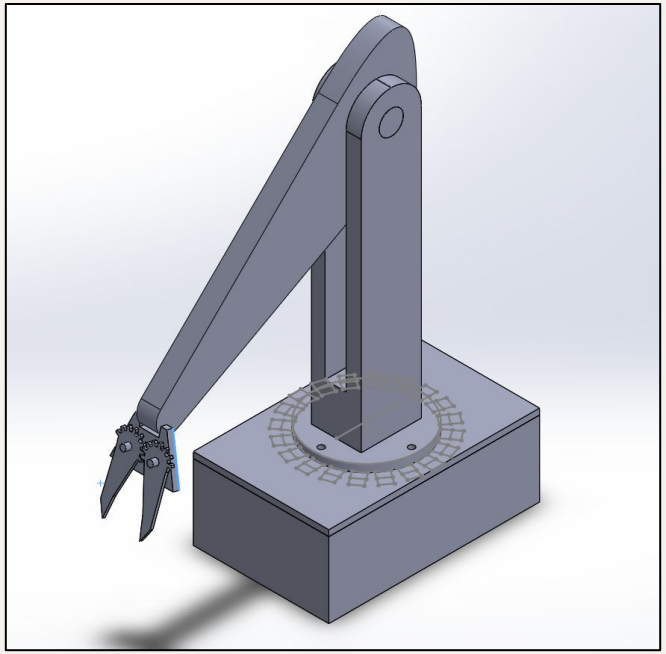
Problem Statement

How can we pick up a small object from a distance?



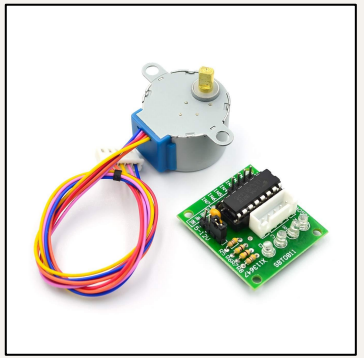
Project Concept

Pick small objects up from a distance with a glove, flex sensors, and robot arm



Design

- Flex sensors attached to glove
- Transceiver bring information from glove to stepper motors in robot arm



Transmitter Code

```
#include <nRF24L01.h>
#include <SPI.h>
#include <RF24.h>
#include "Wire.h"

RF24 radio(8, 10); // CE, CSN pins on the transceiver module
//Create a pipe addresses for the communicate
const uint64_t pipe = 0xE8E8F0F0E1LL;

int flexPin = A0;
int flexValue;
```

```
void setup() {
  Serial.begin(9600); // Start the serial communication
  Wire.begin();
  radio.begin(); // Start the transceiver module
  radio.openWritingPipe(pipe); // Set address of receiving module
}

void loop() {
  flexValue = analogRead(flexPin); // Read the flex sensor value
  Serial.println(flexValue); // Print the flex sensor value
  // Send value to receiver
  boolean test = radio.write(&flexValue, sizeof(flexValue));
  // print 0 if no connection to reciever, 1 if there is
  Serial.println(test);
  delay(100); // Wait for 100ms before sending the next value
}
```

Receiver Code

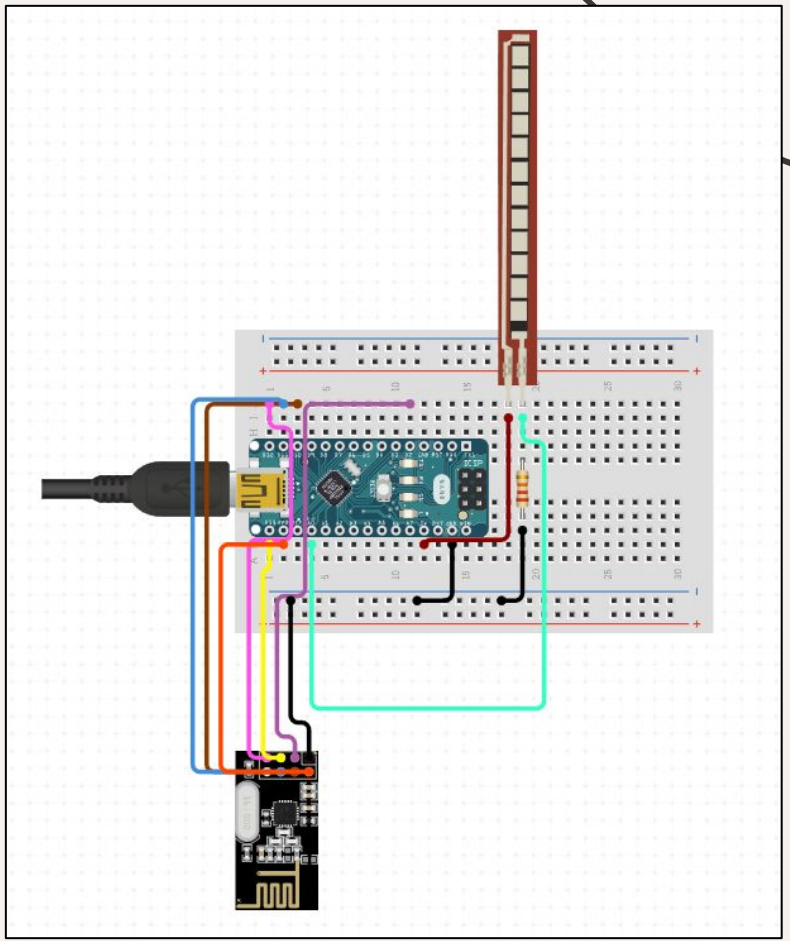
```
#include <nRF24L01.h>
#include <SPI.h>
#include <RF24.h>
#include <Servo.h>

RF24 radio(8, 10); // CE, CSN pins on the transceiver module
//Create a pipe addresses for the communicate
const uint64_t pipe = 0xE8E8F0F0E1LL;

Servo myServo;

int flexValue;
```

```
void setup() {
  Serial.begin(9600); // Start the serial communication
  radio.begin(); // Start the transceiver module
  // Set address of receiving module
  radio.openWritingPipe(1, pipe);
  radio.startListening();
  myservo.attach(7);
}
```

```
void loop() {
  // Check if there is a message available
  if (radio.available()) {
    // Read from transmitter
    radio.read(&flexValue, sizeof(flexValue));
    // Print received flex sensor value
    Serial.println("Flex Sensor Value Received: ");
    Serial.println(flexValue);
    // Map flex val to servo
    int servoPos = map(flexValue, 520, 775, 0, 180);
    myservo.write(servoPos); // Move servo to mapped position
  }
  else {
    // Print the flex sensor value
    Serial.println("No Message Received: ");
  }
```

Wiring Diagram: Transmitter

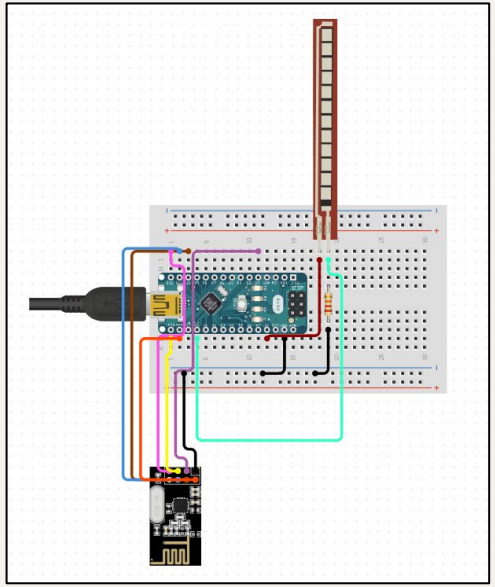
Made with https://www.circuito.io/



Wiring Diagram - Transmitter

Flex Sensor:

- Power to 5V with 3 10k ohm resistors and Pin A0 and ground to GND

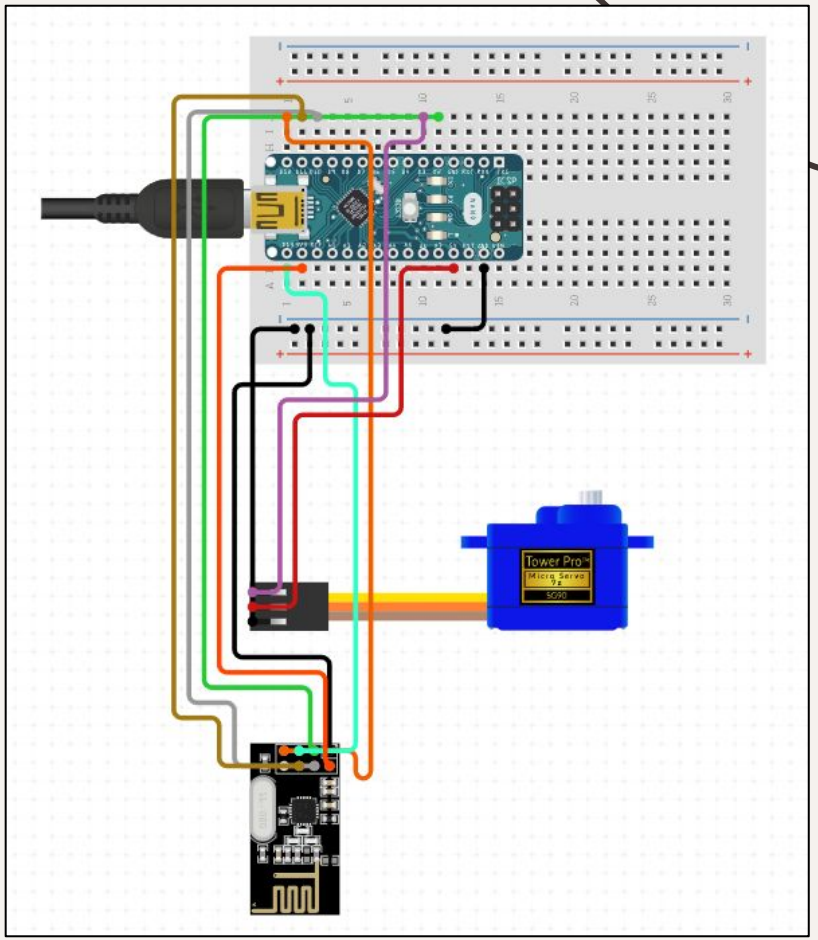


Transceiver:

CE - 8
CSN - 10
SCK - 13
MO - 11
MI - 12
5V - 5V
GND - GND

Wiring Diagram: Receiver

Made with https://www.circuito.io/



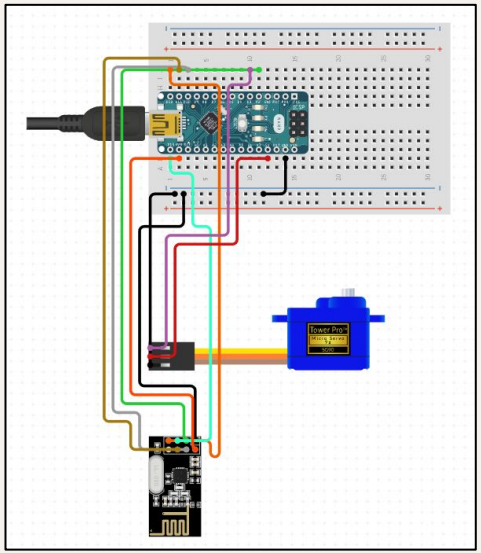
Wiring Diagram - Receiver

Servo Motor:

- Power to 5V, ground to GND, pin to 7

Transceiver:

CE - 8
CSN - 10
SCK - 13
MO - 11
MI - 12
5V - 5V
GND - GND

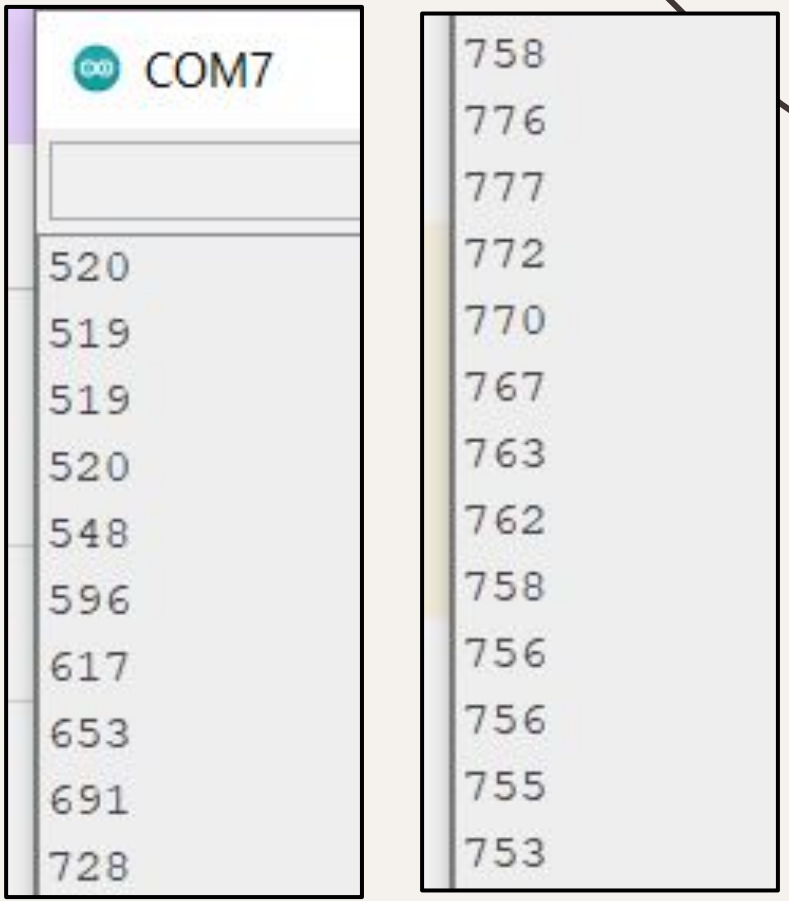


Data

Flex sensor readings:

520 - 775

(straightened to bent one way)



Team Member Contributions

Danny and Mason - build and design

Joshua - wiring and integration

Greta - wiring, programming, integration