Robot

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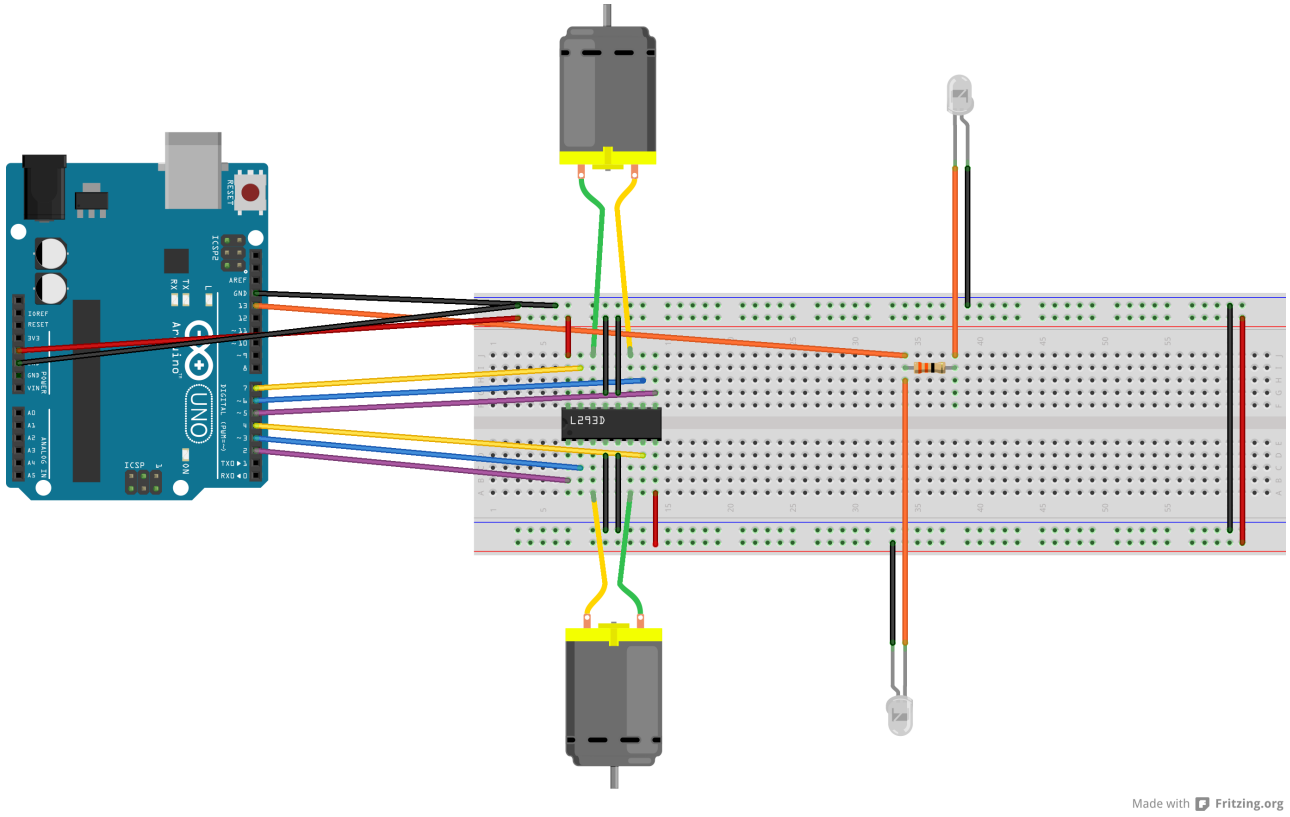
1 Introduction

This robot was conceived to be used and controled by an interactive table. The robot was made with an Arduino Uno board and some salvaged motors.

The table can send instructions to the robot by using a serial communication.

2 Electronics



Two infrared leds are placed on the robot to be recognized by the table. One of them have more brightness than the other so the table can recognize where is the front of the robot and what is its angle. As you can see on the schematics, the led at the back the robot is put behind a 33 ohms resistor. Notice that the leds are controled by the pin 13 because it has an integrated resistor that prevent the leds to burn out.

The other digital pins of the Arduino are only used to control the H-Bridge(L293D microchip). The H-bridge controls the direction of rotation of the DC motors.

3 Communication Protocol

The table communicate with the robot by using a serial communication at 9600 bauds. A node.js server is used to forward the tcp messages from the web page on the serial port with the npm module serialPort2.

The actions are coded on a byte :
'F' : move foreward
'B' : move backward
'R' : turn right
'L' : turn left
'S' : stop

4 Code

```
// Global declarations
int led = 13;
int enable1 = 2;
int motorpin1 = 3;
int motorpin2 = 4;
int enable2 = 5;
int motorpin3 = 6;
int motorpin4 = 7;
int incomingByte = 0;

// Init function
void setup() {
  Serial.begin(9600);
  pinMode(led,OUTPUT);
  pinMode(enable1,OUTPUT);
  pinMode(enable2,OUTPUT);
  pinMode(motorpin1,OUTPUT);
  pinMode(motorpin2,OUTPUT);
  pinMode(motorpin3,OUTPUT);
  pinMode(motorpin4,OUTPUT);
}

// Loop
void loop() {
  // Turn the leds on
```

```
  digitalWrite(led,HIGH);

  // If the serial communication is activated
  if (Serial.available() > 0) {
      // Read the incoming byte:
      incomingByte = Serial.read();

      if (incomingByte == 'B') { // Go backward
        digitalWrite(enable1,HIGH);
        digitalWrite(enable2,HIGH);
        digitalWrite(motorpin1,LOW);
        digitalWrite(motorpin2,HIGH);
        digitalWrite(motorpin3,LOW);
        digitalWrite(motorpin4,HIGH);
      } else if (incomingByte == 'F') { // Go foreward
        digitalWrite(enable1,HIGH);
        digitalWrite(enable2,HIGH);
        digitalWrite(motorpin1,HIGH);
        digitalWrite(motorpin2,LOW);
        digitalWrite(motorpin3,HIGH);
        digitalWrite(motorpin4,LOW);
      } else if (incomingByte == 'L') { // Turn left
        digitalWrite(enable1,HIGH);
        digitalWrite(enable2,HIGH);
        digitalWrite(motorpin2,HIGH);
        digitalWrite(motorpin1,LOW);
        digitalWrite(motorpin3,HIGH);
        digitalWrite(motorpin4,LOW);
      } else if (incomingByte == 'R') { // Turn right
        digitalWrite(enable1,HIGH);
        digitalWrite(enable2,HIGH);
        digitalWrite(motorpin1,HIGH);
        digitalWrite(motorpin2,LOW);
        digitalWrite(motorpin4,HIGH);
        digitalWrite(motorpin3,LOW);
      } else if (incomingByte == 'S') { // Stop
        digitalWrite(enable1,LOW);
        digitalWrite(enable2,LOW);
      }
  }

  delay(1);
}
```

5 Known Issues

The robot slip on the table, it could be fixed by changing the wheels or the matter of the surface of the table.

The npm module serialPort2 sometimes loses the connection with the arduino.

It could be fixed by finding another serial port library or by using a WiFi module.

The motors are not strong enough to pull the usb cable if nobody hold it. It could be fixed by changind the motors or by using a WiFi module.

If you try to run the robot with a laptop, you will maybe need to use external batteries for the motors because of the too low current USB ports.