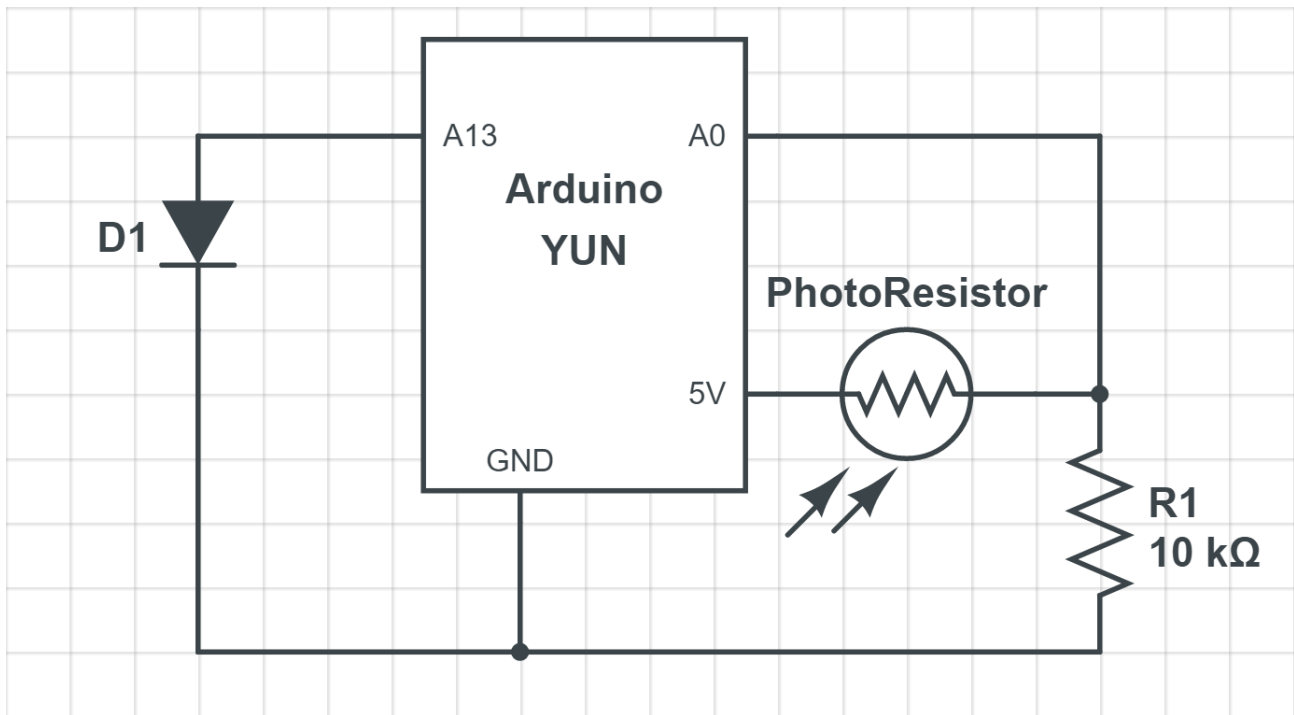


Objective

The main focus of this project was to build a laser trip wire that would send a text message upon being triggered. I used a micro-controller and basic circuit elements for the trip wire and integrated Twilio and Temboo public APIs for the messaging functionality.

Circuit Schematic



The only required part of this circuit is the right half, the LED *D1* is there for debugging and real time feedback. *A0* gets a different voltage reading depending on whether a laser is shining on the photo resistor or not. We can calibrate our micro-controller to recognize the difference between the two scenarios and for when the laser wire is not shining on the resistor (or breaks contact, i.e. gets triggered) we can code it to send a text. I also connected a LED to *A13* and coded it to light up when the laser wire gets tripped; picking port *A13* made the most sense for my design since it is also connected to an embedded LED on the Arduino Yun.

Code Design and Implementation

The code files below show my entire code design, excluding the file *myAccount.h* which contains my account information for Temboo and Twilio.

File 1: Main Function

```
1 //Laser Sensor and Text Code
2
3 /*
4  * Danish Vaid
5  * DoorAlert Project
6  * Summer 2016
7  */
8
9 #include <Bridge.h>
10 #include <Temboo.h>
11 #include <SoftwareSerial.h>
12 #include "myAccounts.h"
13
14
15 int photoRes = 0;      // Input for laser
16 int laser = 4;        // Controller for photoResistor
17 int ledControl = 13;  // Controller for LED
18
19 void setup() {
20     Serial.begin(9600);
21     pinMode(photoRes, INPUT);
22     pinMode(laser, OUTPUT);
23
24     delay(1000);
25     Bridge.begin();
26     Serial.println("--- Sensor Mode Initiated ---");
27 }
28
29 void loop() {
30     digitalWrite(laser, HIGH);
31     delay(50);                                     //Small
32     ↪ Delay to not clutter up the serial monitor
33     Serial.println("Checking . . . ");
34     if (analogRead(photoRes) < 400) {
35         Serial.println("Trip Wire Triggered");
36         digitalWrite(ledControl, HIGH);
37         Serial.println("Sending text Notification...");
38
39         Serial.println("Sending SMS");
40
41         TembooChoreo SendSMSChoreo;
42
43         // Setting up the Temboo Client
44         SendSMSChoreo.begin();
45         SendSMSChoreo.setAccountName(TEMBOO_ACCOUNT);
46         SendSMSChoreo.setAppName(TEMBOO_APP_KEY_NAME);
47         SendSMSChoreo.setAppKey(TEMBOO_APP_KEY);
48
49         // Run Choreo
```

```
50     SendSMSChoreo.addInput("AuthToken", AUTH_TOKEN);           // AUTH
        ↳ TOKEN
51     SendSMSChoreo.addInput("To", textTo);                     // cell
        ↳ number that you want the text to go to
52     SendSMSChoreo.addInput("From", textFrom);                 // Twilio
        ↳ phone number
53     SendSMSChoreo.addInput("Body", "Laser Trip Wire Alert"); //
        ↳ Message
54     SendSMSChoreo.addInput("AccountSID", accSSID);           //
        ↳ Account SID
55     SendSMSChoreo.setChoreo("/Library/Twilio/SMSMessages/SendSMS");
56     SendSMSChoreo.run();
57     SendSMSChoreo.close();
58
59     Serial.println("Waiting For Reset...");
60     delay(10000);                                           // wait
        ↳ 10 seconds between SMS signals
61     Serial.println("--- Reset ---");
62
63 }
64
65 digitalWrite(ledControl, LOW);
66 }
```

File 2: Function for Environment Calibration

```
1 //Calibration Info for Laser
2
3 /*
4  * Danish Vaid
5  * DoorAlert Project
6  * Summer 2016
7  */
8
9 int cal_laser = 4;
10
11 void setup() {
12     pinMode(cal_laser, OUTPUT);
13     Serial.begin(9600);
14 }
15
16 void loop(){
17     digitalWrite(cal_laser, HIGH);
18     Serial.println(analogRead(0));
19 }
```

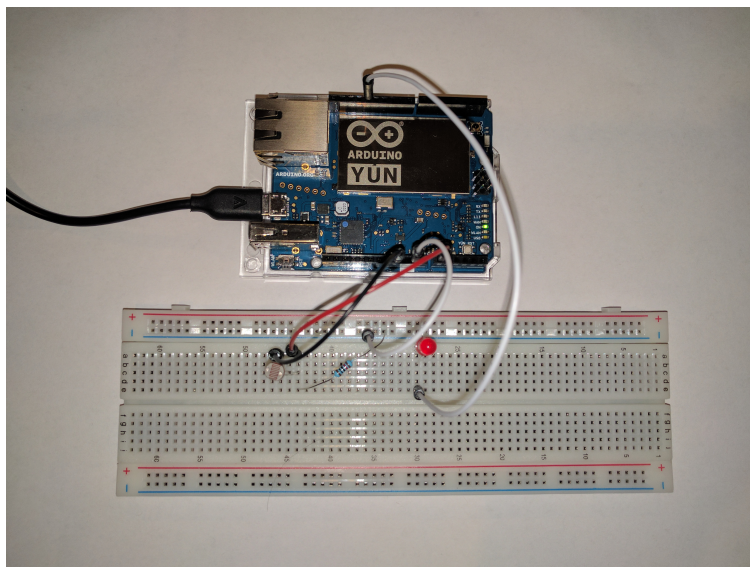
File 3: Calibration Tester using LED

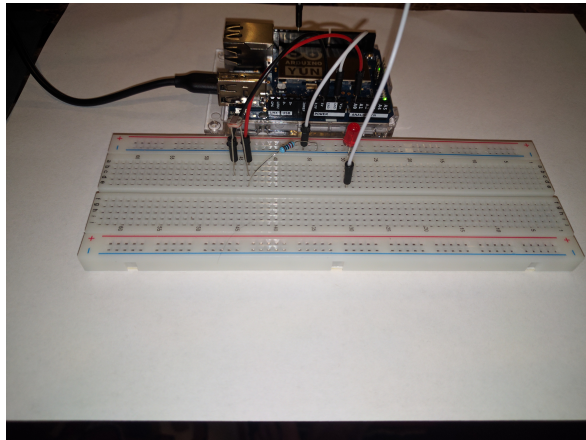
```
1 //Calibration Test for Laser
2
3 /*
```

```
4  * Danish Vaid
5  * DoorAlert Project
6  * Summer 2016
7  */
8
9
10 int photoRes = 0;
11 int cal_laser = 4;
12 int ledControl = 13;
13
14 void setup() {
15     pinMode(cal_laser, OUTPUT);
16     Serial.begin(9600);
17 }
18
19 void loop(){
20     digitalWrite(cal_laser, HIGH);
21     Serial.println(analogRead(0));
22
23     if (analogRead(photoRes) < 400){
24         digitalWrite(ledControl, HIGH);
25     }
26     else {
27         digitalWrite(ledControl, LOW);
28     }
29 }
```

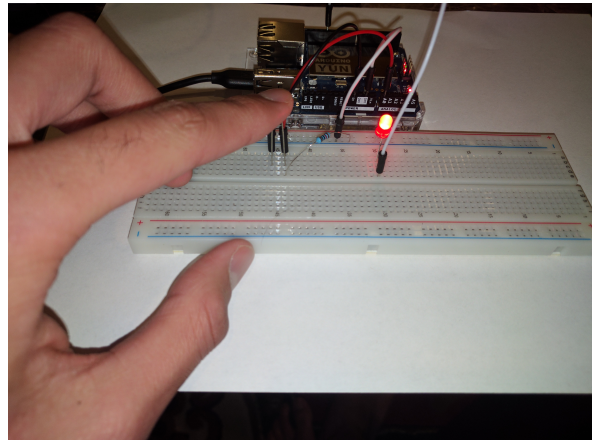
Pictures and Results

Figure 1: Top of the circuit





(a) Side of the Circuit



(b) Side of the circuit - *Triggered*

Figure 2: Side of Circuit

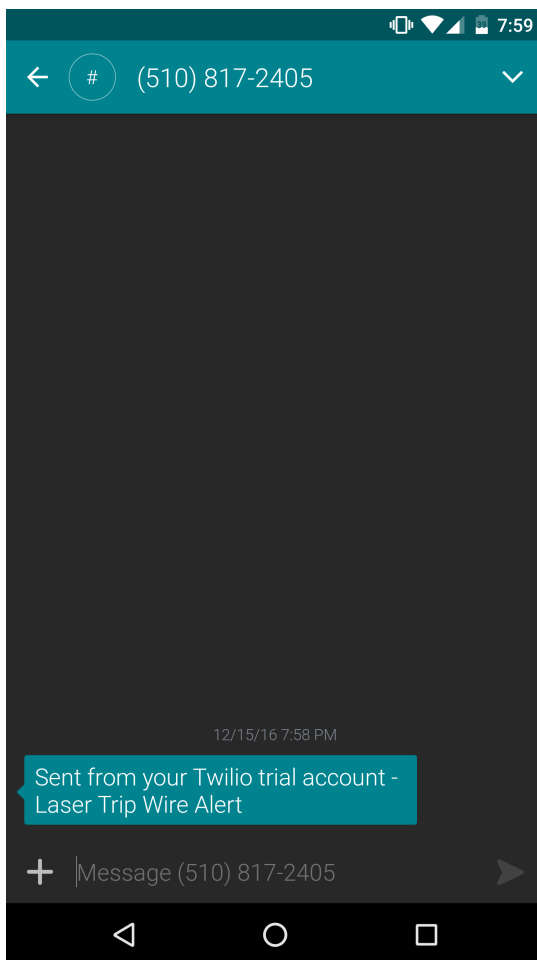


Figure 3: Example text message for completed project

Future Plans

I plan to make it so that the design has real time calibration for the photo resistor.