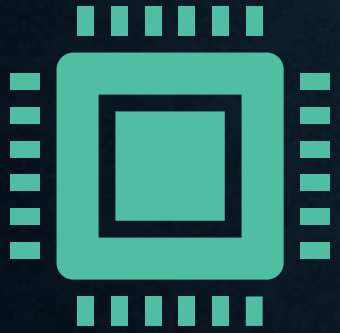
SECURITY BASED ON DAY/NIGHT LIGHT CONDITIONS

By:

Joshua Estrada and Nicholas Noodwang

INTRODUCTION



This project is a Self Arming Security System that Arms and Disarms based on day/night light conditions with System Status available on the web.

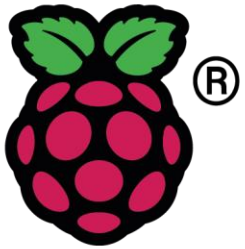


This could be a great tool for places like parks and forest preserves that close at dusk, or even offices and homes. It would alert the trespassers they've been caught and allow owners to check for intrusions.

PROJECT OBJECTIVES

1. Detect intrusion using an ultrasonic sensor
2. Display local system status using an LED
3. Alert that the System was tripped with Buzzer
4. Provide a web-based interface for monitoring and control
5. Detect Light Conditions with photoresistor (LDR).





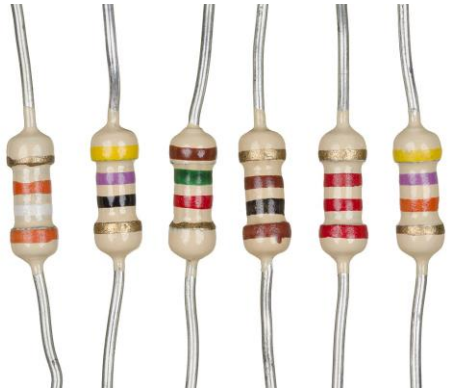


SOFTWARE COMPONENTS

1. Python
2. Bottle Web Framework
3. GPIO Zero
4. Time Library
5. Threading Library
6. Local web server

HARDWARE COMPONENTS

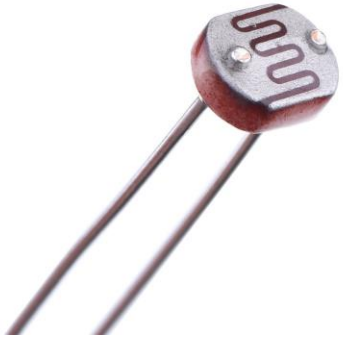
1. Raspberry Pi
2. Breadboard
3. Jumper Wires
4. Photoresistor (LDR)
5. 330 omega resistor (2x)
6. Piezo buzzer
7. 470 omega resistor
8. Ultra Sonic distance sensor





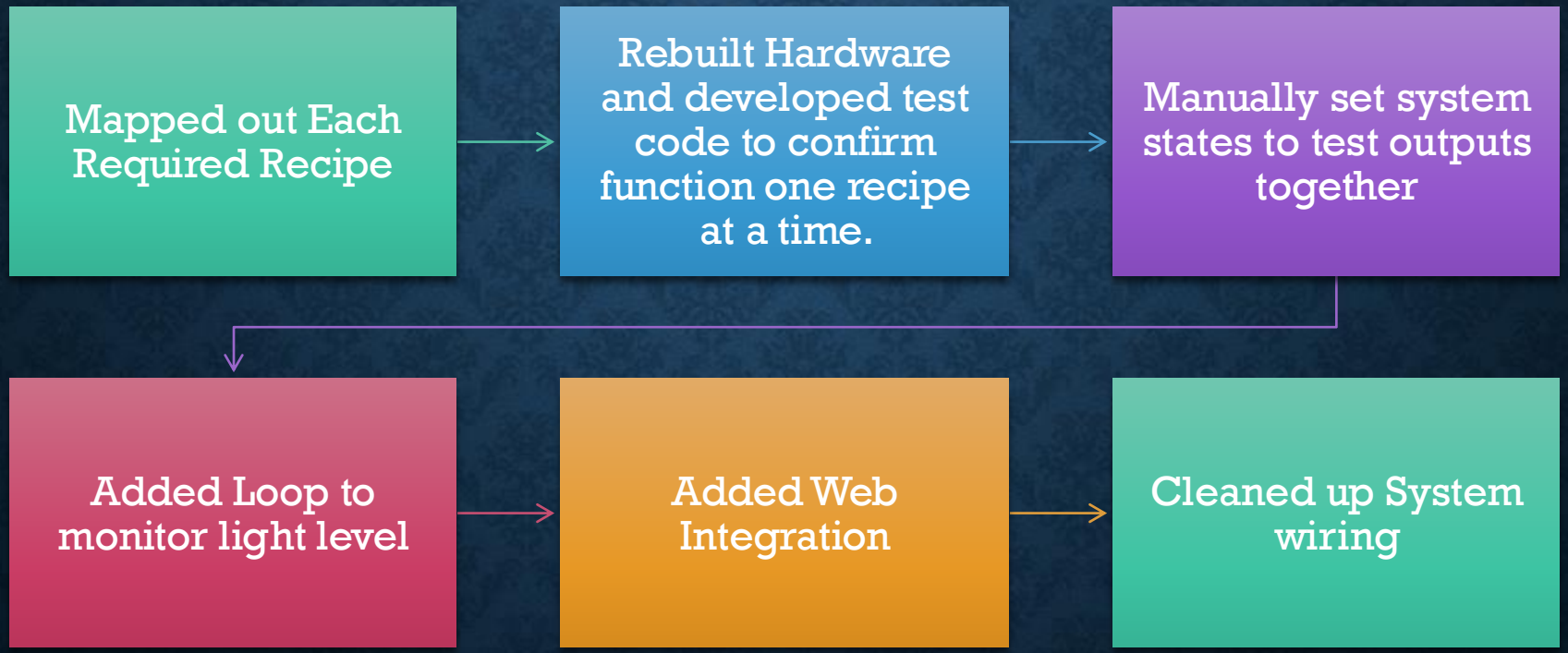








PROJECT APPROACH



CODE

State Logic

```
# --- STATE LOGIC ---
# DO NOT override if already triggered
if State != 2:

    if light == 0:
        State = 1   # Disarmed (light outside)

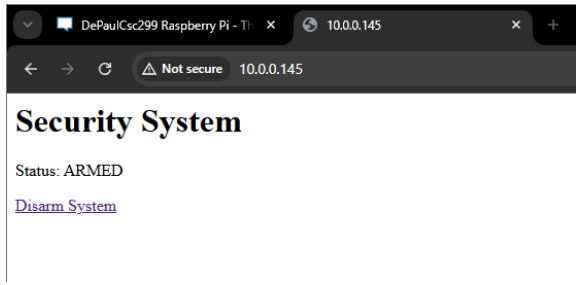
    elif light == 1:
        if distance != -1 and distance < 20:
            State = 2   # Triggered
        else:
            State = 0   # Armed
```

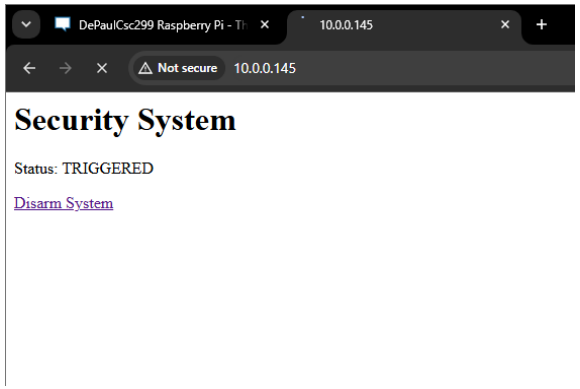
Web Browser

```
@route('/')
def home():
    global State

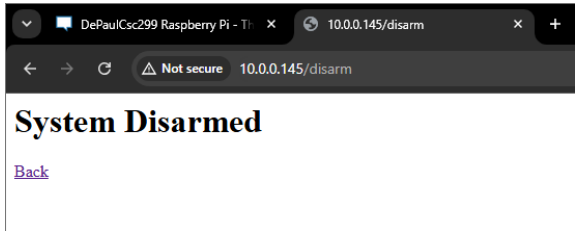
    if State == 0:
        status = "ARMED"
    elif State == 1:
        status = "DISARMED"
    elif State == 2:
        status = "TRIGGERED"

    return f"""
    <meta http-equiv="refresh" content="2">
    <h1>Security System</h1>
    <p>Status: {status}</p>
    <a href="/disarm">Disarm System</a>
    """
```


DePaulCsc299 Raspberry Pi - Th
10.0.0.145
Not secure
10.0.0.145
Security System
Status: ARMED
Disarm System


DePaulCsc299 Raspberry Pi - Th
10.0.0.145
Not secure
10.0.0.145
Security System
Status: TRIGGERED
Disarm System

WEB BROWSER:


DePaulCsc299 Raspberry Pi - Th
10.0.0.145/disarm
Not secure
10.0.0.145/disarm
System Disarmed
Back


DePaulCsc299 Raspberry Pi - Th
10.0.0.145
Not secure
10.0.0.145
Security System
Status: DISARMED
Disarm System

CONCLUSION

- What Worked Well
  - Buzzer and LED Integration was quick
  - Website Refreshing every two seconds ensures no stale information
- Challenges Faced
  - Implementation of the LDR without the built in ADC was difficult
  - Initial overcomplicating of the wiring
  - SD Card Failed Saturday Morning
- Future Improvements
  - Allowing Users to Arm system during the day.
  - Disable the Alarm for the night.
  - Text Notifications when the system changes states
  - Camera integration to capture trespassers

