# DARPAN

# Detail Solution Design & Architecture

**Version 1.0**

**06/23/2020**

# Table of Contents

# 1. Introduction

We propose to have a gadget which is the reconciliation of various gadgets, the hardware part of this device involves a wearable safety locket and a wearable safety band. We have named this project as “DARPAN”. The total device additionally guarantees to give self-preservation application which encourages women to get away from critical situations. This framework can be utilized at places like bus stations, railroad stations, workplaces, pathways, shopping centres, markets, and so forth.

**PURPOSE AND THE PROPOSED SYSTEM:**

The main purpose of this project is to ensure the safety of women. The proposed work aims at designing an IoT based safety device that relies on providing security to women by using a pulse rate sensor and alerting nearby people and police when a woman is not safe. The proposed women safety device provides assistance to a woman who might be in an unsafe situation. The device is essentially ready for all the situations that might go against the will of the woman. Many brilliant gadgets and applications are likewise accessible in the market, but there are drawbacks as well and they do not necessarily provide an effective solution.

In this device we have used multiple sensors and devices like heart beat sensor, buzzer, flashlight, GPS module, usb camera module and audio recorder which are used to detect the heartbeat, trace the location, capture the image and record the audio respectively. Heartbeat sensor is connected to the nodemcu. The GPS module, NEO-6M is also fixed to the nodemcu and is used to track the location of the women.

The women safety locket comprises of the audio recorder ISD1820, led flash light and the USB camera module which are connected to the Arduino.

**THE ACTIVITIES THAT RESULTED IN THE DEVELOPMENT OF THIS PROJECT:**

The situation now-a-days is quite critical. Women around the world face various problems that makes them question their safety.

These difficult circumstances faced by each and every woman offered a sense of inspiration for us to think of a security gadget than can assist the ladies at critical times. The application of this device encourages women to go out and work without any fear.

**EXISTING SYSTEM:**

In an Existing system when women face a threat, the precautionary measures are low.

When it comes to women safety measures and devices, the system mostly uses GPS and street images to identify the location of the women, the system sends locations periodically. This periodical data is not required mostly and also is against the privacy of women.
In our proposed system, the data is sent to the registered contacts only when the woman is in danger.
Our goal is to mostly make the world a better and hence a safer place to live in and work independently.

## 1.1 Technical Architecture

The current system is applicable for online processing. The major application components include Pulse sensor, Audio recording device, GPS module, USB camera module, Nodemcu and Arduino Uno. The programming language is the current system built in is embedded C. The system has an end-user interface which is application base. In this project, we have used Twilio as a cloud platform for storage of the data. The major application of the propose project is in the field of women safety and security area.

We are proposing an idea that will change the way that everyone contemplates security for women. We are looking unto a day when media communicates more achievements for women rather than the harassment, they face every day. For the final storage and application, we have used cloud services from Amazon Web Services.

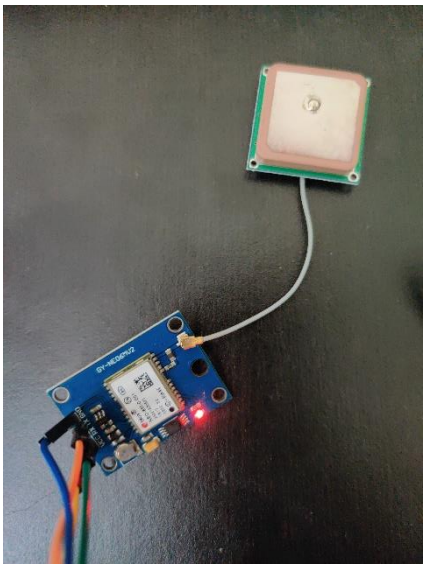
## DEMO VIDEO:


## SENSORS AND DEVICES USED:

- PULSE SENSOR:

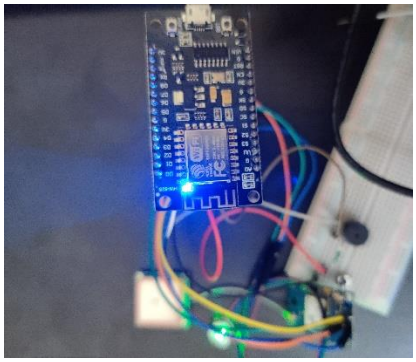
This plug-and-play heart-rate sensor will be connected to nodemcu directly to calculate the heart rate in beats per minute (BPM).

- GPS MODULE NEO-6M:



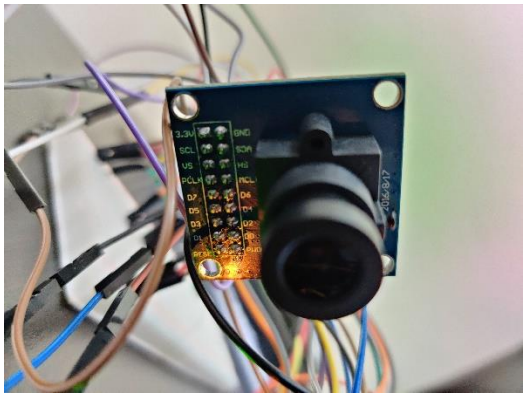
Global Positioning System (GPS) is able to determine the latitude and longitude of the victim’s position.

- NodeMCU ESP8266:



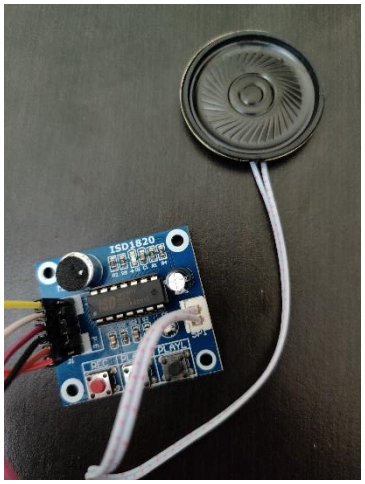
We have connected the pulse rate sensor and the GPS Module to the ESP8266. This can work as a potential women safety wrist band.

- USB CAMERA MODULE:



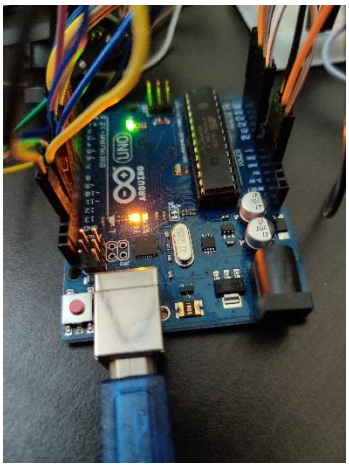
The USB Camera module captures the image of the culprit.

- AUDIO RECORDER ISD1820:



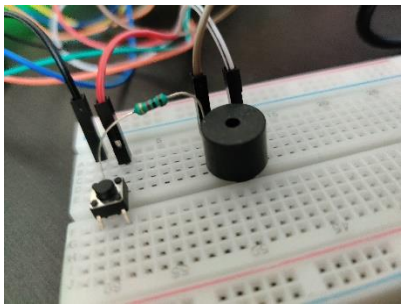
It can offer true single-chip voice recording, no-volatile storage, and playback capability around 10 seconds.

- ARDUINO UNO:



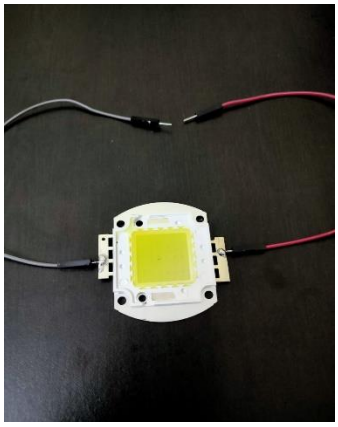
We have connected the audio device and camera module in the Arduino interface. This will work as a safety locket for women in need.

- BUZZER:



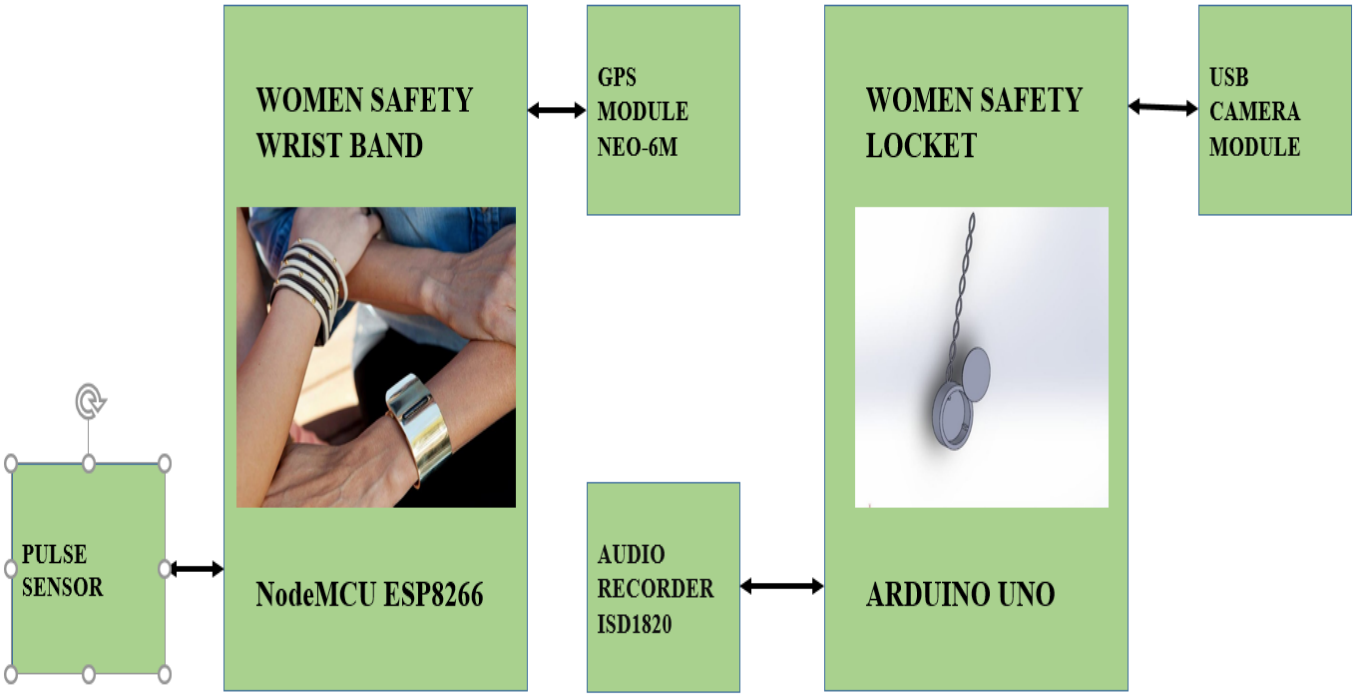
In this device, the buzzer has been used to alert the people who are nearby to the place of crime.

- FLASHLIGHT:

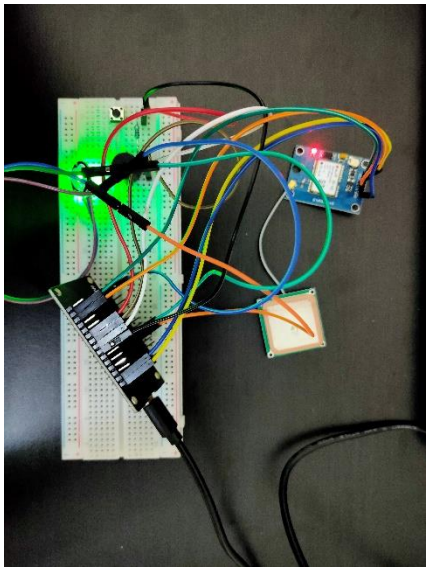


The self-defence feature is capable of glowing the led flash on the eyes of the culprit. This can help in making the vision blur when the attacker is at a shorter distance.

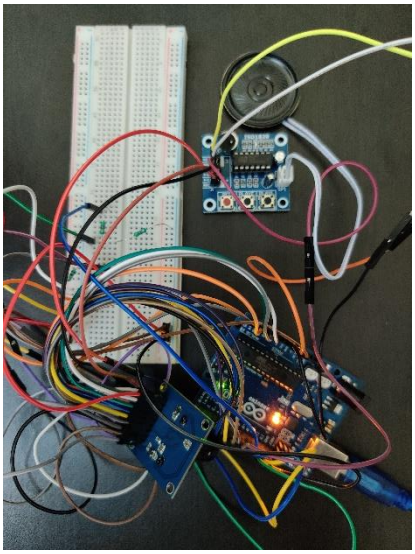
## DEVICES IN APPLICATION:



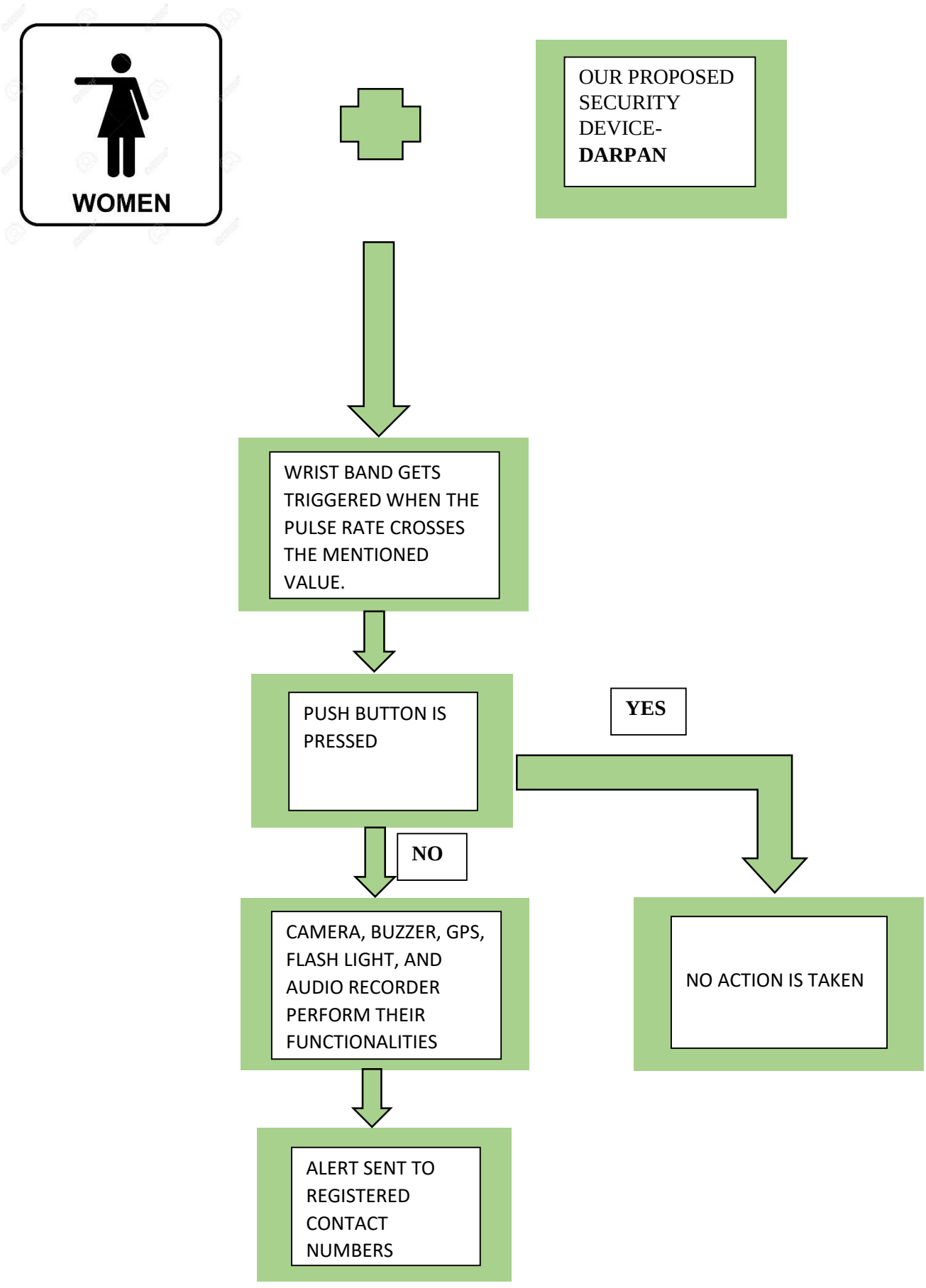

## NODEMCU CIRCUIT/ CIRCUIT FOR WRISTBAND:



## ARDUINO CIRCUIT/ CIRCUIT FOR SAFETY LOCKET:



**WORKING:**


WOMEN
OUR PROPOSED SECURITY DEVICE- **DARPAN**
WRIST BAND GETS TRIGGERED WHEN THE PULSE RATE CROSSES THE MENTIONED VALUE.
PUSH BUTTON IS PRESSED
YES
NO
CAMERA, BUZZER, GPS, FLASH LIGHT, AND AUDIO RECORDER PERFORM THEIR FUNCTIONALITIES
NO ACTION IS TAKEN
ALERT SENT TO REGISTERED CONTACT NUMBERS

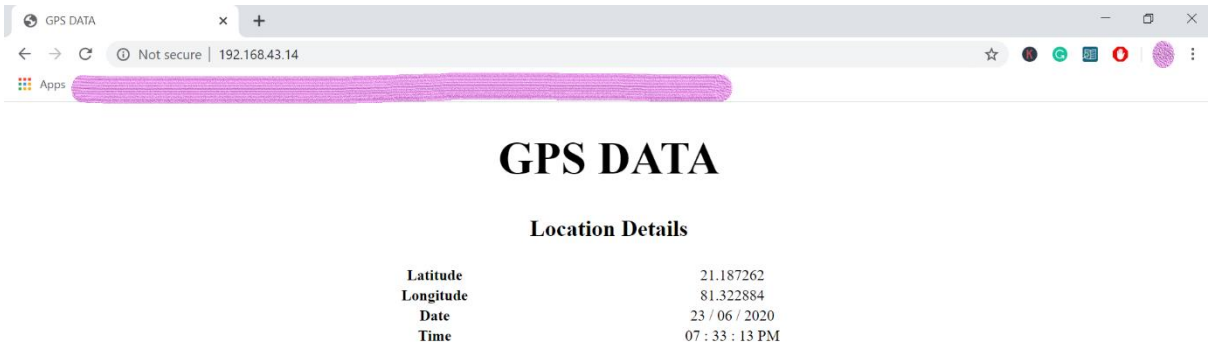
## RESULTS:

CAMERA MODULE IN CMD PROMPT:

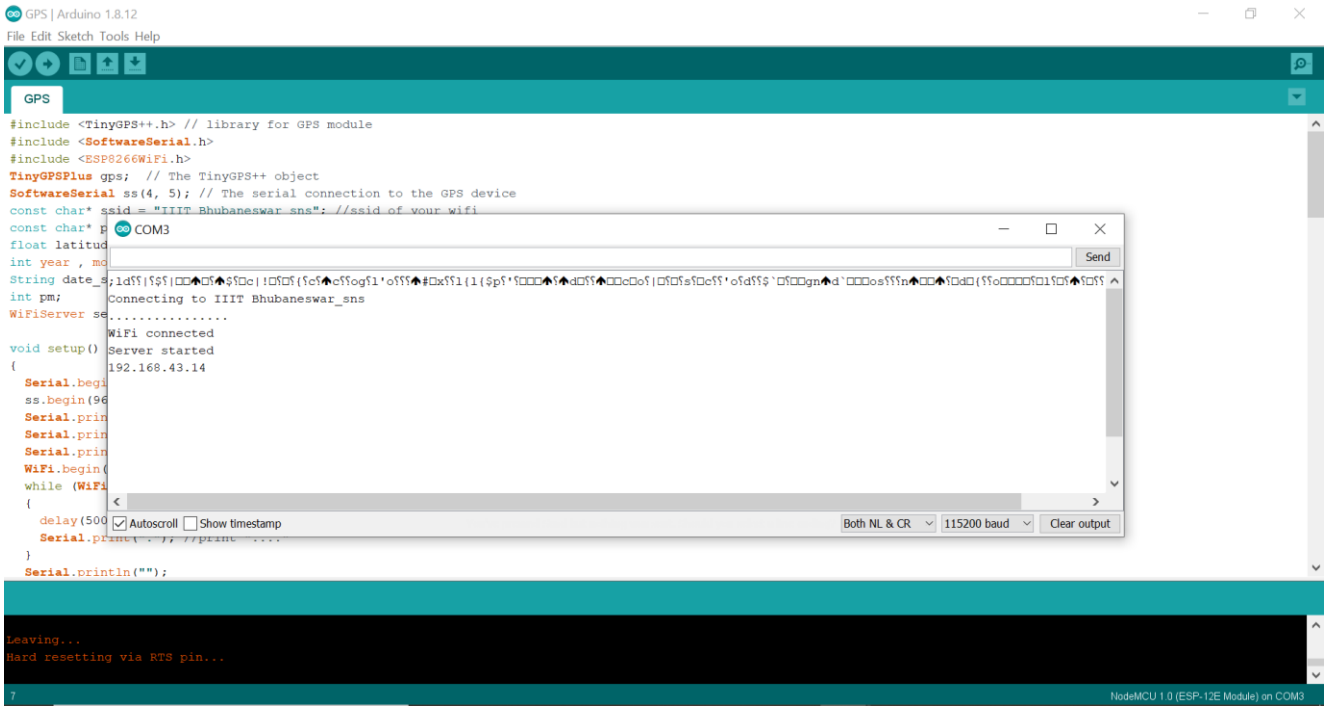
```
Command Prompt - java  code.SimpleRead
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\[redacted]>cd c:\

c:\>cd Program Files (x86)\Java\jdk1.8.0_251\bin

c:\Program Files (x86)\Java\jdk1.8.0_251\bin>java code.SimpleRead
Port name: COM4
Looking for image
Found image: 0
Saved image: 1
Looking for image
Found image: 1
Saved image: 2
Looking for image
Found image: 2
Saved image: 3
Looking for image
Found image: 3
Saved image: 4
Looking for image
Found image: 4
Saved image: 5
Looking for image
Found image: 5
Saved image: 6
Looking for image
Found image: 6
Saved image: 7
Looking for image
Found image: 7
Saved image: 8
Looking for image
Found image: 8
Saved image: 9
Looking for image
Found image: 9
Saved image: 10
Looking for image
Found image: 10
```

SAMPLE IMAGE CAPTURED BY CAMERA MODULE:

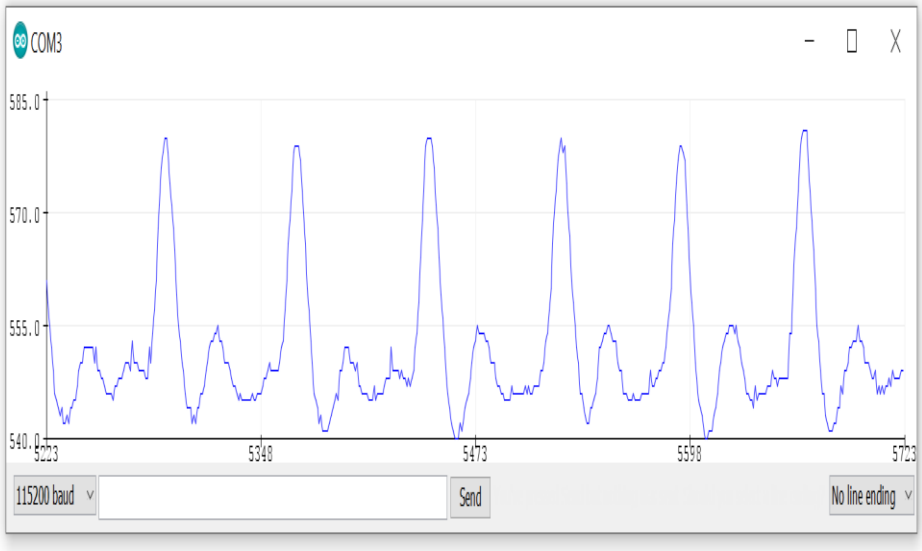
SAMPLE GPS LOCATION DETAILS:

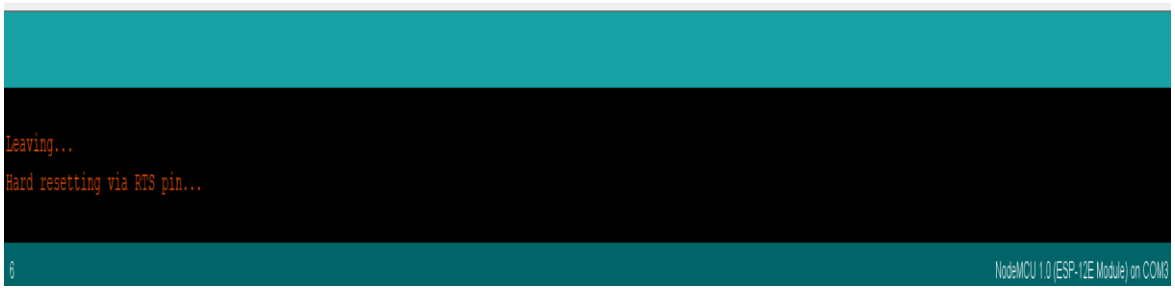



SAMPLE GPS RESPONSE:



SAMPLE PULSE RATE PLOT:



# 2. Factors Influencing Design

This section describes the standards, assumptions, and constraints that influence the technical design of the proposed system.

## 2.1 Assumptions and Dependencies

Our project, Darpan has start-to-start dependency.


The predecessor must start before its successor can start. Predecessor and successor don't have to simultaneously, the successor can start any time after the predecessor has started.

For instance, the moment pulse rate rises and the push button is not pressed, tall the sensors and trackers such as location, audio, image and buzzer start working accordingly

Assumptions:

- Human resource availability: All key project team members are available and have the necessary skills and knowledge to work on the project.
- Budget availability: The determined budget is accurate and covers all project expenses.
- Scheduling accuracy: The set deadlines and milestones are achievable and the project can be finished on time.
- Performance of contractors, suppliers and vendors: All necessary equipment and goods are available whenever we need them.

## 2.2 Constraints

A lot of hardware components have been used in our proposed system. This needs to be implemented and designed in a more practical and portable way.

All deliverables must be reliable – i.e., the characteristics have been quality tested/ checked to the extent specified, so that they function as agreed.