

# EMERGENCY ALERT SYSTEM



# IA123133OT

IOT

*Safety*



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# EMERGENCY ALERT SYSTEM

## 1. HIGH-LEVEL PROJECT INTRODUCTION

### 1.1 Abstract

Now-a-days people are getting educated and well settled in every domain but they are not having enough security in the society. The main theme of this project is to promote safety. In this project we are going to use two modules they are GPS and Bluetooth module to track the location and provide the complete location information to user over mobile phone. We proposed this project using Arduino UNO. This project is controlled by using the Arduino programming language. This project is portable and can be accessed anywhere. It also works at the remote areas and the areas like forests, etc.. This project works as the safety tool where it can send messages to the emergency agencies like hospitals and police stations and also our close relatives. The signals will be sent if the button in the device is pressed. This project is mainly used for safety and also those whose need help in dangerous situation.

### 1.2 Introduction of your project

Now a days its very difficult to go to far places individually so ,here we are with a solution with all the technology available to us in recent times, it's not hard to build a safety device for people which will send a message to your friends, family, or concerned person if they are in trouble.

To do all this we are going to use Neo 6m GPS module and Bluetooth module along with AURDUINO UNO and generating gadget which will send your location by an SMS to your friends ,family or concerned person.

This gadget is useful for all the people who are are in need and dangerous situation.

### 1.3 Problem Statement

This project focuses on a security system that is designed solely to serve the purpose of providing security to people. This will send messages to the nearby police station or our concerned persons if we press the button when we are in dangerous situation.

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## 1.4 Solution Proposed

We are probably living in the worst time our modern society has ever seen in terms of women security. We aim at giving power to those without whom we cease to exist. Our idea is to design a system which shall make every place and every hour safer for women again.

This system locates and send alert message to the nearest police station, close contacts and everything just at a click of a button. The idea is to make up for the time it takes police and the closer ones whom the message was received to arrive at the location

## 1.5 Domain Introduction

### **Safety:**

Safety is a state in which hazards and conditions leading to physical , psychological or material harm are controlled in order to preserve the health and well being of individuals and the community.

## 2. IMPLEMENTATION AND METHODOLOGY

### 2.1 Introduction to the Technology/Technologies Demonstrated

#### **IOT:**

The Internet of Things (IOT) describes the network of physical Objects -- "things"-- that are embedded with sensors, software and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. Iot is network of interconnected computing devices which are embedded in everyday objects, enabling them to send and receive data. This technology allows for the collection and sharing of data from a vast network of devices, creating opportunities for more efficient and automated systems.

### 2.2 Technology Trend and Market Research

The increasing number of devices connected to the internet brings new vulnerabilities and exposures to companies and private users. Demand for IoT is significantly increasing owing to raising demand for connected device such as smart cars, smart meters and machine to machine (m-m) communications, such factors are increasing demand for the IoT.

The global IoT market size in terms of revenue was reasonably estimated at 300.3 billion dollars in 2021 and is anticipated to rise to 650.5 billion dollars by 2026, presenting a CAGR of 16.7%.

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## 2.3 Used Components and Their Description

Components list that we are used in this project is :

- Arduino UNO
- Bluetooth module
- NEO 6M GPS module
- Push Button
- Battery
- Breadboard
- Jumpers

### **Arduino UNO:**

Arduino UNO is a micro controller board based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the micro controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

### **PUSH BUTTON:**

A Push Button switch is a type of switch which consists of a simple electric mechanism or air switch mechanism to turn something on or off. Depending on model they could operate with momentary or latching action function. The button itself is usually constructed of a strong durable material such as metal or plastic. Push Button Switches come in a range of shapes and sizes. We have a selection of push button switches here at Herga.

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Push button switches are used throughout industrial and medical applications and are also recognizable in everyday life. For uses within the Industrial sector, push buttons are often part of a bigger system and are connected through a mechanical linkage. This means that when a button is pressed it can cause another button to release.

### **NEO 6M-GPS MODULE:**

The NEO-6M GPS module is a popular GPS receiver with a built-in ceramic antenna, which provides a strong satellite search capability. This receiver has the ability to sense locations and track up to 22 satellites and identifies locations anywhere in the world. With the on-board signal indicator, we can monitor the network status of the module. It has a data backup battery so that the module can save the data when the main power is shut down accidentally.

The core heart inside the GPS receiver module is the NEO-6M GPS chip from u-blox. It can track up to 22 satellites on 50 channels and have a very impressive sensitivity level which is -161 dBm. This 50-channel u-blox 6 positioning engine boasts a Time-To-First-Fix (TTFF) of under 1 second. This module supports the baud rate from 4800-230400 bps and has the default baud of 9600.

#### **Features:**

- Operating voltage: (2.7-3.6)V DC
- Operating Current: 67 mA
- Baud rate: 4800-230400 bps (9600 Default)
- Communication Protocol: NEMA
- Interface: UART
- External antenna and built-in EEPROM.
- **VCC:** Input voltage pin of Module
- **GND:** Ground pin
- **RX, TX:** UART communication pins with Micro controller



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### **BATTERY:**

A lithium ion battery is a type of rechargeable battery that is charged and recharged by lithium ions moving between the anode and cathode electrodes. A lithium-ion (Li-ion) battery is an advanced battery technology that uses lithium ions as a key component of its electro chemistry. During a discharge cycle, lithium atoms in the anode are ionized and separated from their electrons.

### **JUMPERS:**

A jumper wire is an electric wire that connects all the components of the circuit with each other and allows the supply to all the components and shares information with the required components.

### **BREAD BOARD :**

A breadboard (sometimes called protoboard) is essentially the foundation to construct and prototype electronics. A breadboard allows for easy and quick creation of temporary electronic circuits or to carry out experiments with circuit design. Note electric circuits used for printed circuit boards. By attaching a jumper wire on the circuit, it can be short-circuited and short-cut (jump) to the electric circuit.

### **2.3 What comes under Performance Criteria?**

This project summarizes the various safety measures and this task goes under the piece of keen security. New perspective security caution framework with Arduino is proposed which has the capacity of sending SMS alert to the relatives of the victim so that people can go out and do things without hesitation.

In this project there are mainly three parts which will perform mainly .

They are :

1. Arduino UNO
2. Neo 6m gps module
3. Bluetooth hc-05 module

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### Performance of Arduino UNO

We can program the Arduino using pure C since the software is based on the avr-gcc compiler, and the hardware is based on Atmel AVR micro controllers. Each pin on the micro-controller consists of the following register bits: PINxn, DDxn, and PORTxn. A detailed description of these register bits can be found from the Atmega data sheet.

Two main improvements can be brought by direct port manipulation of your Arduino. Firstly, its speed. Direct port control results in much faster I/O control, thereby saving a couple of microseconds. Secondly, direct port control reduces the amount of memory of the sketch will use. For example, the two code snippets below implement a simple LED blink program. The first one uses Arduino digitalWrite() functions, while the second uses direct port control in pure

The size of the second program is 488 bytes, compared with the digitalWrite() program, which takes about 924 bytes of memory. However, there is a lot of debate on whether direct port manipulation in pure C counts as a method of code optimization for the Arduino. The Arduino software was written to simplify the process of micro-controller programming. The libraries “hide” this low-level C from us. Therefore, reverting to pure C can be seen as negating the purpose of using Arduino. this technique is used to demonstrate the memory aspects of pure C compared to the Arduino style.

By this we can clear all the memory by simply just uploading the LED blinking code and then we can upload our code to the Arduino.

In making a program that would be used in Arduino device, an Integrated Development Environment (IDE) was specifically required. The program that has been developed in the IDE was then downloaded onto the Arduino device by means of a USB connection.

### Performance of Bluetooth hc-05 module:

While communicating, the consumption of the Bluetooth device is about 20 mA.

By default the baud rate of HC-05 module is 9600. HC-05 Bluetooth Module is normally used for wireless data transmission among multiple micro controllers. It can also be used to communicate between electronic devices like mobile, laptop, computers for data transmission. It also used in different information and data logging applications.

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HC-05 has red LED which indicates connection status, whether the Bluetooth is connected or not. Before connecting to HC-05 module this red LED blinks continuously in a periodic manner. When it gets connected to any other Bluetooth device, its blinking slows down to two seconds.

This module works on 3.3V. We can connect 5V supply voltage as well since the module has on board 5 to 3.3 V regulator.

As HC-05 Bluetooth module has 3.3V level for RX/TX and micro controller can detect 3.3 V level, so, no need to shift transmit level of HC-05 module. But we need to shift the transmit voltage level from micro controller to RX of HC-05 module.

The data transfer rate of HC-05 module can vary up to 1Mbps is in the range of 10 meters. So, when we want to communicate through smartphone with HC-05 Bluetooth module, connect this HC-05 module to the PC via serial to USB converter. Before establishing communication between two Bluetooth devices, 1st we need to pair HC-05 module to smartphone for communication. Search for new Bluetooth device from your phone. You will find Bluetooth device with “HC-05” name.

Click on connect/pair device option; default pin for HC-05 is 1234 or 0000. After pairing two Bluetooth devices, open terminal software (e.g. Teraterm, Realterm etc.) in PC, and select the port where we have connected USB to serial module. Also select default baud rate of 9600 bps. In smart phone, open Bluetooth terminal application and connect to paired device HC-05.

### **Performance of neo 6m gps module:**

It can track up to 22 satellites over 50 channels and achieve the industry's highest level of tracking sensitivity i.e. -161 dB, while consuming only 45 mA current. Unlike other GPS modules, it can perform 5 location updates in a second with 2.5m horizontal position accuracy. The U-blox 6 positioning engine also has a Time-To-First-Fix (TTFF) of less than 1 second.

There is an LED on the NEO-6M GPS module that indicates the status of the ‘Position Fix’. It will blink at different rates depending on which state it is in:

No blinking – it is searching for satellites.

Blink every 1s – Position Fix is found (the module can see enough satellites)

The NEO-6M GPS module updates this information once per second (1Hz frequency) by default. But you can configure it for up to 5 updates per second (5Hz frequency). It is common for micro-controllers to read NMEA sentences and parse them in a user-friendly form. Parsing is simply extracting chunks of data from the NMEA sentence

There are many sentences in the NMEA standard. The most common are:

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\$GPRMC provides time, date, latitude, longitude, altitude, and estimated velocity.

\$GPGGA sentence provides essential fix data which provides the 3D location and accuracy data.

### 2.2 Implementation Analysis and Methodology.

To implement the plan of the project first we have to check all the components available to us or not and then we have to get all the components we want to use in the project and we have to take the references and we have to know the all the specifications and working of all the components clearly before going to start the project.

After learning all the above mentioned objectives we have to start the project.

First we have to make sample block diagram which will give us some idea of the project.

After that we have to draw a simple sketch i.e., schematic diagram which will give idea of all the connections related to the project .

The connections of our project is:

#### **9V BATTERY:**

Positive end of the battery is being connected to the VCC of the Bluetooth module  
Neagative end is being connected to the ground pin of the Aurduino UNO.

#### **AURDUINO UNO:**

Ground pin is being connected to the negative of 9v battery and ground pin of Bluetooth module.

D8 AND D9 pins of UNO is being connected to the rx and tx pins of gps module .

D10 AND D11 pins of UNO is being connected to the rx and tx pins of the Bluetooth module.

D5 pin is being connected to one end of the push button

5v pin is being connected to the VCC of gps module.

#### **NEO 6M GPS MODULE:**

Ground pin of gps module is connected to the one end of the resistor placed across push button and negative of 3.7 volt lithium battery.

Vcc is connected to aurduino uno and one end of the resistor placed across the vcc of gps module. other end of the resistor placed here is being connected to positive end of the 3.7 v battery

After making all the connections ,our project works like this when we press the push button (in any emergency situation), the button sends the signals to Arduino

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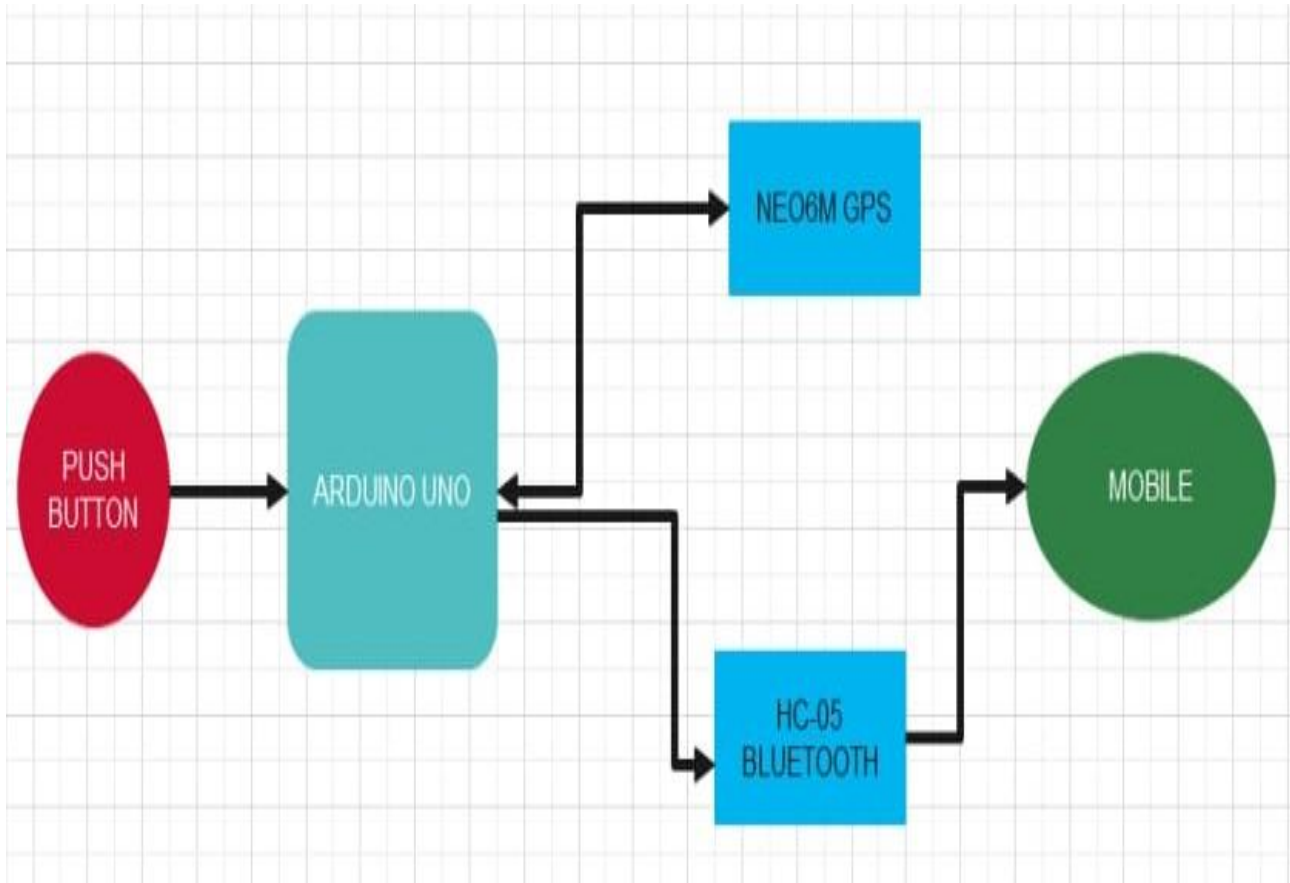
UNO(which is our main controller or you can say as the main processor)then Arduino sends the signals to GPS and Bluetooth modules to activate them at that instant. once the modules are activated GPS module starts taking the live location of the user and sends the location in the form of NMEA code to uno .uno takes the response from gps as a form of signal and sends it to the Bluetooth module then the Bluetooth module sends an alert message to the mobile which it was connected to the closer members of the user (gadget using person).

Hence our project works like this and it is useful for the people who are in dangerous situation.

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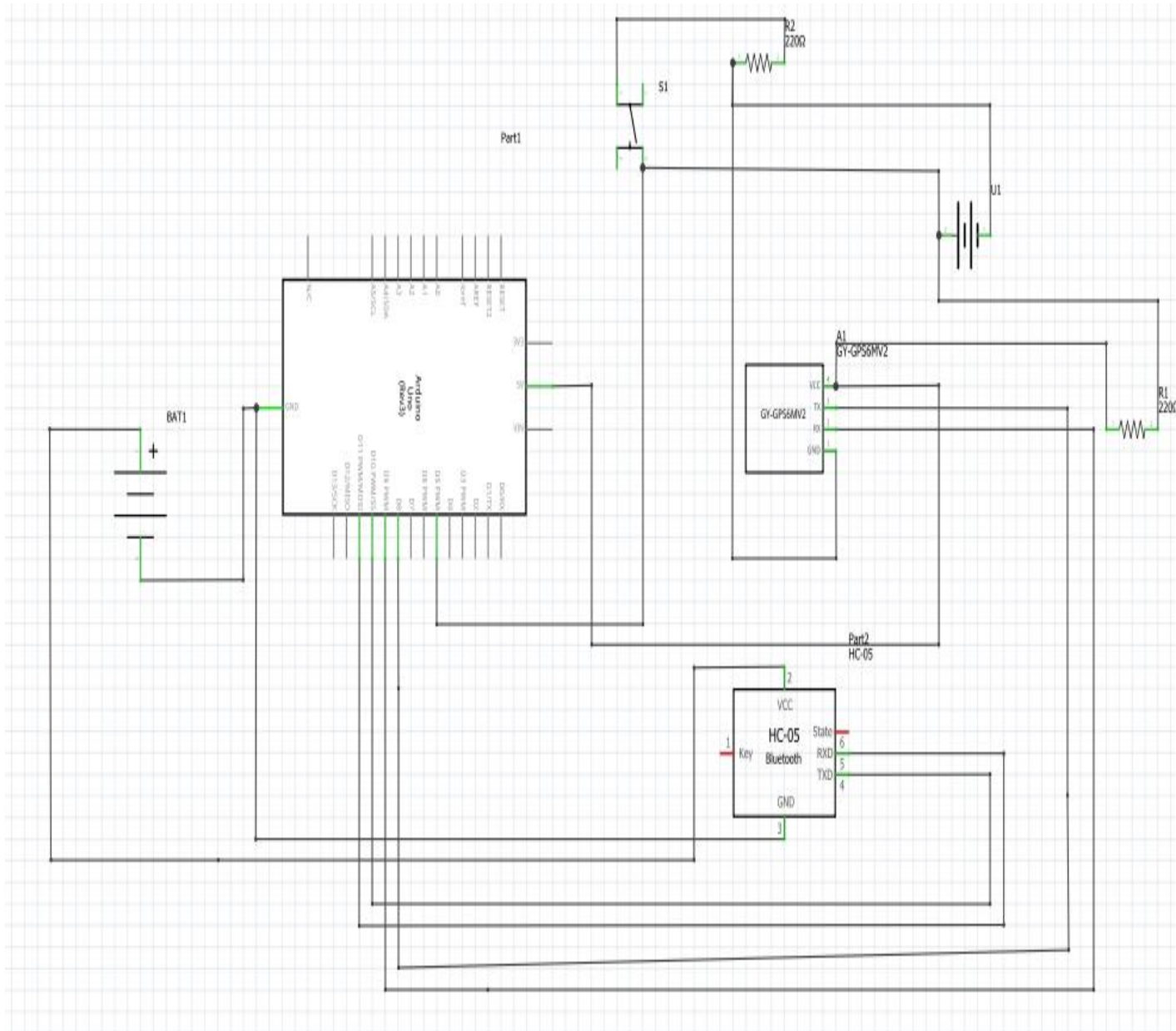
### 3.BLOCK DIAGRAM

#### 3.1 Basic Level Approach Block Diagram



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## 3.2 Circuit/Schematic Diagram



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### **3.3 Explanation of Block Diagram & Each Block of the Block Diagram**

#### **BLOCK 1:**

##### **PUSH BUTTON:**

Push button is used to press when we are in needy or-else in dangerous situation. When we press the button then that will connect to Aurduino and then to modules then a message will be send to our beloved ones or police stations.

#### **BLOCK 2:**

##### **AURDUINO UNO:**

AURDUINO UNO is used to store the code of the entire project it will receive location from NEO 6m gps module when the push button is pressed and it will share that location address and a message that we had entered in the code to the beloved persons or police stations.

#### **BLOCK 3:**

##### **NEO 6M GPS MODULE:**

NEO 6m gps module is used to track the location and send that information to the Aurduino connected to it.

When the button is pressed then gps module check the location of the person and tracks that and that will give that information to Aurduino and then it will send that message to the needy person's beloved persons or police station.

#### **BLOCK 4:**

##### **BLUETOOTH MODULE:**

Bluetooth module is used to send information of needy persons location to the nearby police stations or relatives where the module is connected to that mobiles.

Bluetooth module takes the information given by neo 6m gps module from the Aurduino UNO and sends the messages .



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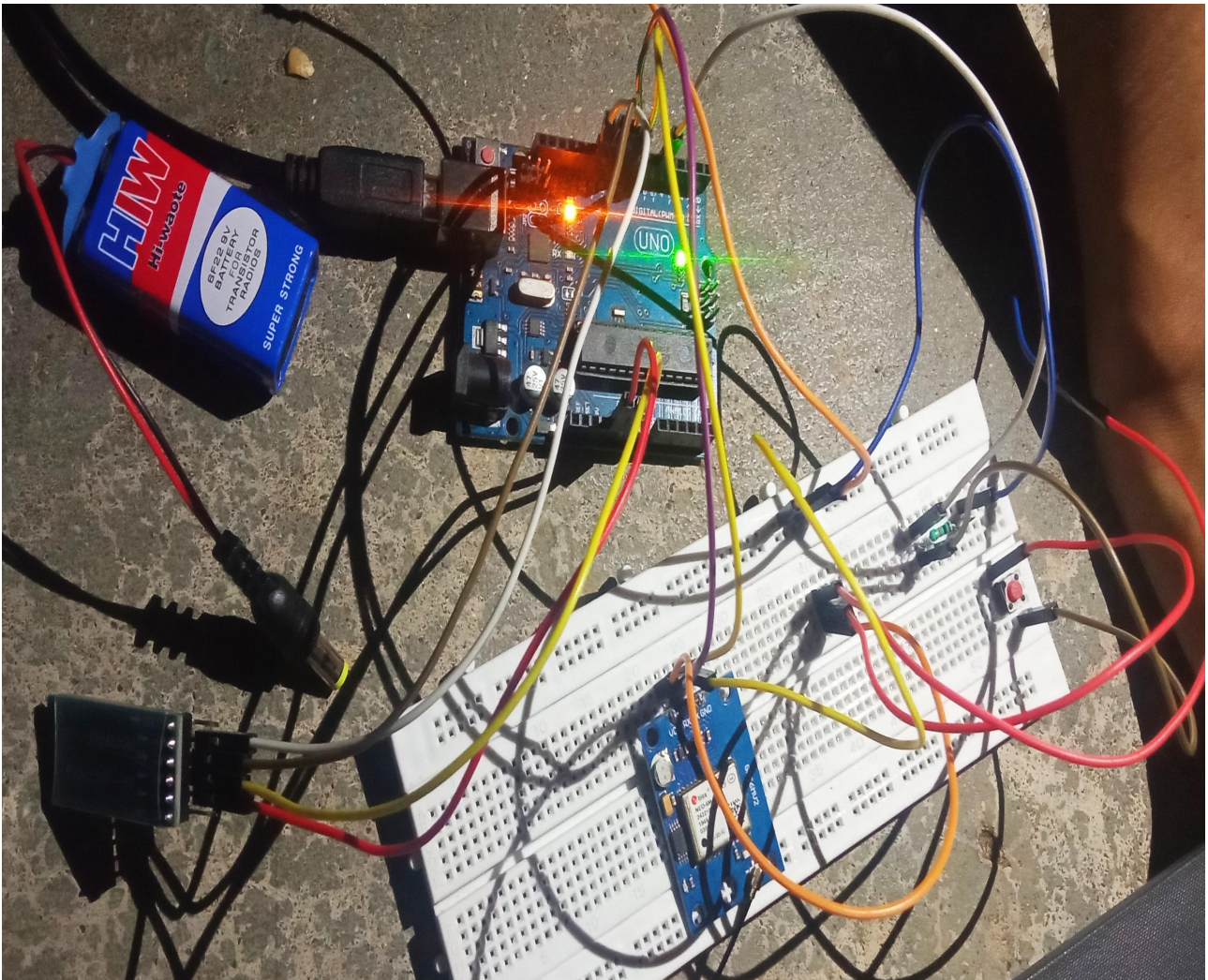
### **BLOCK 5:**

#### **MOBILE:**

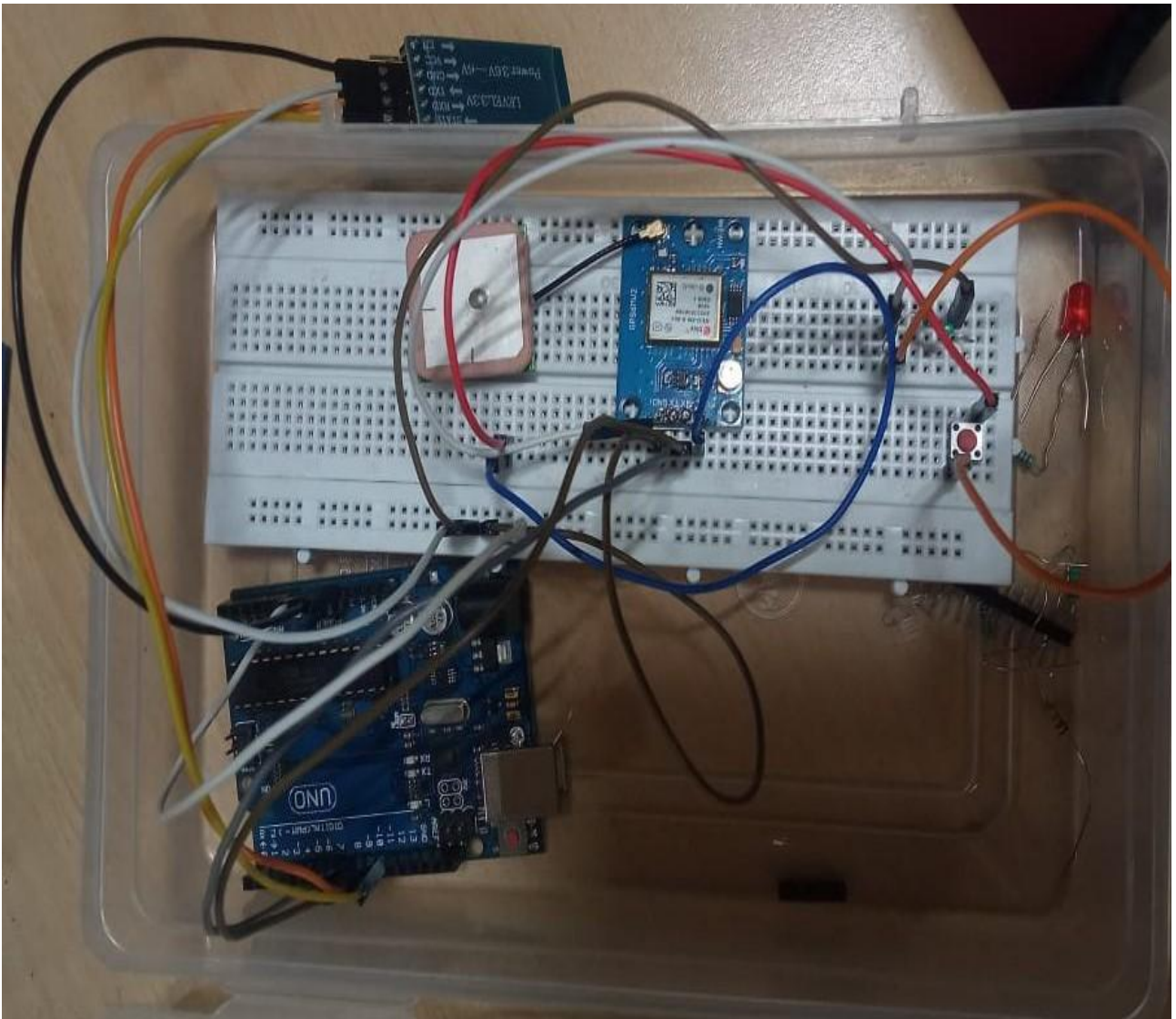
It will receive messages of the beloved persons and police stations.  
When the push button is pressed ,that information is passed to the Aurduino by gps and Bluetooth module to the phones connected to it .

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### 4. IMAGES



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## 5.CONCLUSION, REFERENCES, AND AUTHORS

### 5.1 Conclusion

We aim at giving power to those without whom we cease to exist. Our idea is to design a system which shall make every place and every hour safer for people again. This system shall geotag and send alert message and need help message to the nearest police station, close contacts and also alert people in and around the venue of the crime, everything just at a click of a button. The idea is to make up for the time it takes police to arrive at the location.

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