

Smart Human Alerting System

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Abstract — Many great changes have taken place over the past few years in the status of women in India. According to a poll conducted in 2011 by Thomson Reuter, India is the most dangerous country in the world. Another poll was conducted in 2017 October where it was declared that Delhi is among the fourth most dangerous megacity in the world when it comes to rape risks, sexual harassment. Among the G20 countries, India is the worst country for women. Even in the 21st-century women feel unsafe to step out of their house for job purpose especially night shifts. So for their safety, there are many devices that came into existence like SONATA WATCH, SAFER SMART PENDANT, NIRBHAYA APP, VithUAPP etc. All these devices and applications are connected either to Bluetooth or Wi-Fi etc. To get connected with these devices we need smartphones. Without connectivity with smartphones, we cannot proceed further with the use of devices or applications. Looking at all these limitations, we are trying to implement a device where we won't need any connectivity with smartphones. We will be using GPS which will help to gain the exact location of the person who needs help. Through URL the desired contacts will get the exact location with directions. This location will be sent by GSM. Heartbeat sensors and temperature sensor will be used to gain the hearts rate and temperature of the person. Arduino UNO is the controller which will help to connect the other components like temperature sensor, heartbeat sensor, GPS and GSM.

Index Terms — Arduino Uno, Global Positioning System (GPS), SMS Sender, Security, GSM, Temp sensor, heartbeat sensor, Security Band.

I. INTRODUCTION

Women are considered as the backbone of the future of our country. Earlier women used to stay at home to fulfill their domestic duties, but now a day woman participate in every field, walking hand in hand with men. These days' women even have been working for night shifts but are not safe. IT sector is hiring women for late night shifts, but no safety measure is provided for them. In almost seven decades of independence, we all know women in India have made progress in every field, but still, they have to suffer much physical harassment. There are many evil and masculine forces in modern Indian society that resist the forward march of women. It the responsibility of the firm to provide safety for women working at night shifts. Now day's companies are providing transportation facilities. This device consists of GPS, GSM, heartbeat sensor, Temperature sensor. GPS will help the victim to send its location through GSM to the desired contacts and as per requirements the message will be sent to Police and Doctors also. The developed system will be a band like a device so it will be easy to carry anywhere and everywhere. And as it sends the message with location, the victim will get the help as earlier as possible. And we can reduce the harm. Also, additional features like temperature sensing and heartbeat monitoring are added in this device, it will

help physically challenged people. We have also added a web application so that the doctor will get to know about the health of the person continuously. And in case of emergency, the doctor can reach to the patient by knowing his location. So it is safety like a device.

The raspberry - pi 0 acts as an embedded computing system and it controls the activities of all the subsystems. The raspberry pi is interfaced with all the other modules of the device.

II. SYSTEM ARCHITECTURE

The system architecture is shown in the above figure. This device has three buttons. These three buttons

work according to the priority of emergency i.e. Red button is having the highest priority like in case of physical harassment or kidnapping etc. The GPS model is used to detect the location, this location and trouble message will be sent by using the GSM to the Police, family, and friends. The green button is having average priority i.e. in case of any health issue like heart attack, increased body temperature, etc. And the location & message will be sent to the doctor and family. The green button is having the lowest priority as if a bike or car is punctured or necessity of petrol etc. The location and message will be sent to family and friends. The contact numbers of police, family, and friends are registered in programming. After pressing one of the three buttons the control is passed to the controller i.e. Arduino. Arduino will get the location from GPS and make GSM work to send the message. So using this device we can reduce the harm by getting help as soon as possible. All components in the device are integrated using different pins. The three buttons are integrated with Arduino UNO using pins 2, 3 & 4. GPS is connected to the controller through pin 5 & 6. through pin 9 & 10. In such a way the working of the system takes place. Also, this hardware part is integrated with a web application in which we will register the doctors, and these doctors will be able to monitor the health of the person and can reach to him/her when he/she is having any health issue.

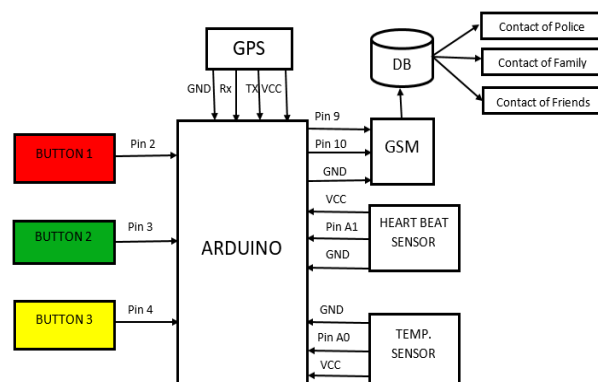


Figure 1: System Architecture

A. Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language and the Arduino Software (IDE), based on Process .its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux.

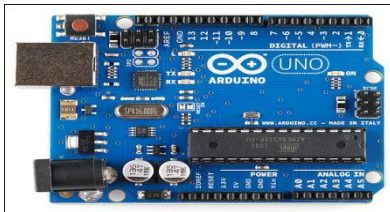


Figure 2: Arduino

B. GSM:

GSM (Global System for Mobile communication) is a digital mobile network that is widely used by mobile phone users in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies: TDMA, GSM and code-division multiple access (CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 megahertz (MHz) or 1,800 MHz frequency band.

The GSM network has four separate parts that work together to function as a whole: the mobile device itself, the base station subsystem (BSS), the network switching subsystem (NSS) and the operation and support subsystem (OSS).

The mobile device connects to the network via hardware. The subscriber identity module (SIM) card provides the network with identifying information about the mobile user.



Figure 3: GSM

C. Global Positioning System:

The Global Positioning System (GPS) is a navigation system The Global Positioning System (GPS) is a navigation system designed by the U.S. Department of

Defense that makes use of satellites orbiting the earth and was primarily used in vital military applications. It was developed in 1973 as a method to overcome old navigation systems. It became fully operational in 1994, at which time it was also made available to civilians.

Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object. GPS technology was first used by the United States military in the 1960s and expanded into civilian use over the next few decades. Today, GPS receivers are included in many commercial products, such as automobiles, smartphones, exercise watches, and GIS devices.



Figure 4: GPS

D. Temperature Sensors:

A Temperature Sensor is the instrumentation equipment which is used to measure temperature or heat on the operating machine part. Temperature sensing is performed by equipment called Thermocouple. A thermocouple is a temperature-measuring device consisting of two dissimilar conductors that contact each other at one or more points. It produces a voltage when the temperature of one of the points differs from the reference temperature at other parts of the circuit

A Temperature Sensor consists of two different types of metals, joined together at one end. When the junction of the two metals is heated or cooled, a voltage is created that can be correlated back to the temperature.



Figure 5: Temperature Sensors

E. Heartbeat sensor:

Heartbeat sensor is designed to give the digital output of heat beat when a finger is placed on it. When the heartbeat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

Features

- Microcontroller based SMD design
- Heat beat indication by LED
- Instant output digital signal for directly connecting to a microcontroller



Figure 6: Heartbeat sensor

III. LITERATURE SURVEY

Mohamad Zikriya, Parmeshwar M G, prepared a "Smart Gadget for Women Safety Using IOT" This device is used with connectivity to smartphones that have access to the internet. This device captures the image of the culprit and sends it to the registered E-mail ID along with the location. This is a smart pendant which consists of Led flash an emergency alert for safety.

A.H.Ansari, prepared a "Women Security System using GSM and GPS" This device consists of a panic switch which will help to record the incident using audio and video recording. Also, it has a buzzer that produces high sound. This will help to send a girl's location through GPS using GSM.

Dr. N. Revathy, RemyaE..K prepared a "One Touch Alarm System for Women Safety Using Gsm" This is a wearable device which can be attached to daily wearing obstacle like footwear, jacket, etc. It consists of a GPS and GSM module which help in tracking the location of the person in danger and send the message to the desired contacts and police.

J.Preethika, P. Priya, V. P. Ramya prepared an "Anti-kidnapping System for Women with Security Alert" These security kits consist of voice board, button, heartbeat sensor, and accelerometer sensor. By pressing the button or saying the password the kit will be activated and send messages to pre-defined numbers. Heartbeat sensor is used for monitoring the heartbeats.

S. Shambhavi, M. Nagarajaprepared a "Smart Electronic System for Women Safety" This device can be fitted in the vehicle. It has display keypad GPS, GSM, and embedded board. While going on journey women can enter her friends, family or relatives number so that they get all the notification of the person. Women can add their destination also.

Snehal Lokesh, Avadhoot Gadgil prepared a "SAFE: A Women Security System" This device consists of android application and portable camera. The main device consists of raspberry p, GPS/GSM along with manually operated pepper spray. This device is wearable on bags strap which will help capture the event and that event will be stored in micro SD card. In case of emergency, the person can use pepper spray.

M. Hymavathi, Dr. K. Riyazuddin, prepared "IOT based Security System for Women and Children Safety" This device consists of GPS that will track the location and the location will be displayed on the LCD. After pressing the button latitude and longitude information will be sent to the authorized person through Wi-Fi. Also, voice alert is given to surrounding people.

Wellington, Vishnu, Prasad prepared a "Review On Women Safety In System Access Control Using RFID Technique" This device consists of RFID based tracking

for locating women's predefined areas

Dr. Sridhar Mandapati, Sravya Pamidi, Sriharitha Ambati prepared for "A Mobile Based Women Safety Application." Many incidents have been taking place in the woman's case. In 2013 a 23-year-old woman was gang-raped in a bus in New Delhi at 9:30 PM. In Mumbai, another incident took place when a woman who left her native place after Christmas holidays was been kidnapped and killed. Here are such incidents that have taken place in day to day life of women these days. To overcome such incidents faced by women the I Safety (women security apps) which is mobile based applications.

Poonam Bhilare, Akshay Mohite, Dhanashri Kamble, Swapnil Makode, and Rasika Kahane, prepared for Women's safety is the most critical issue in today's world. The following paper describes a "GPS and GSM based vehicle tracking and women employee security system" that provides alerts and messages with an emergency button. The device provides vehicle information which can be viewed on Google maps. As the IT companies are looking forward to the security problem so they require a system that will efficiently evaluate the problem of women employees' security working in night shifts.

Basavaraj Chougula and Archana Naik prepared a "Smart Girls Security System". This paper suggests a perspective to use technology to guard girls. The system resembles a traditional belt that once activated, tracks the situation of the victim victimization GPS and sends emergency message victimization GSM, to 3 emergency contacts and therefore the police room. The system additionally incorporates a screaming alarm that uses period clock, to decision out for facilitate and additionally generates an electrical shock to injure the wrongdoer for self-defense. The advantage of this method is that the user doesn't need a smart phone in contrast to alternative applications that are developed earlier.

Mohammed Ali Mazidi and Janice gillispiemazidi prepared for "The Arm Microcontroller & Embedded System". This emergency app is initiated by a popular Indian series "GUMRAH" channeled on V channel. In case of emergency, we need to press the power button twice of our mobile. After pressing this button our location is sent through a message in every two minutes to the contacts fed in the app.

M D Singh and K.B. Khanchandan prepared for "Power Electronics". This garment is designed by three engineers from Chennai. This garment consists of an electric circuit that can generate 3800kv of current that can help the victim to escape. If there are multiple attacks, it sends approx 82 electric shocks. The fabric is bilayer, so the user is not affected. It can also send emergency messages to the fed contacts.

Pragna B R, et. Al [4] provides an ideology for Women Safety using different devices and applications. They provide an efficient mechanism with high-performance for safety.

Ms. Sonali S.Kumbhar provides a mechanism for "Women Security System Using Quick Response Mechanism Using GPS and GSM" When someone is in trouble, she can press the button and the location information is sent as a message. It also provides child tracking facility.

Ramya Sree Yadlapalli works on women security with "Smart Intelligent Security For Women". System develops wrist band and spectacles with tear gas and pressure switch for daily life.

Sriranjini R works on "GPS and GSM Based Self Defense System." The system used microcontroller PIC 16877A for real-time response based application for

girls.

Ravi Kant CEO, Watches and Accessories Division [8] prepared a system for SONATA watch for women safety. The Sonata act watch is integrated with a mobile application that can be downloaded on the user smart phone and using Bluetooth. The watch will interface with the mobile to send location and message to the register contacts.

Abhijit Paradkar and Deepak Sharma proposed "All In One Intelligent System For Women Security". a women security mechanism with 100% safe environment. The system also provides gender equality in a safe environment. The system provides intrusion detection system within the home for a handicapped person, senior citizen, and women. Also, it contains security for a child using an area zone module.

IV. ALGORITHMS

1. Temperature Sensing Algorithm

Temperature sensing algorithm is used to sense live temperature.

Step 1: Start

Step 2: import temperature sensor DHT files

Step 3: Temperature sensor connected to pin A0 and output generated on pin 3

Step 4: Set val = analogRead(tempPin);

Apply float mv = (val/1024.0)*5000;
Apply float cel = mv/100;
Apply float farh = (cel*9)/5 + 32;

Step 5: Print temperature

Step 6: Stop

2. Heartbeat Sensing Algorithm

Heartbeat sensing algorithm is used to sense heartbeat.

Step 1: Start

Step 2: import heartbeat sensor files

Step 3: Heartbeat sensor connected to pin A1 and output generated on pin 3

```
if (QS == true) // A Heartbeat Was Found
{
    // BPM and IBI have been Determined
    // Quantified Self "QS" true when Arduino finds a
    heartbeat
    serial outputWhenBeatHappens(); // A Beat Happened,
    Output that to serial.
    QS = false; // reset the Quantified Self flag for next
    time
```

Step 4: Print Heartbeat

Step 5: stop

3. Human Security Algorithm

Human security algorithm is used with different security aspects with three buttons red, yellow and green.

Step 1: Start

Step 2: User using the smart band

Step 3: If the user is in trouble press one of the three buttons

If Pressed Red button then "I am in trouble" send to the Police, family, and friends.

If Pressed Green button then "I need help" send to the Doctor, family, and friends.

If Pressed Yellow button then "I am alone" send to the family and friends.

Step 4: Security is acquired

Step 5: Stop

V. IMPLEMENTATION DETAILS

A. Temperature Sensor

A Temperature Sensor is the instrumentation equipment which is used to measure temperature or heat on the operating machine part. Temperature sensing is performed by equipment called Thermocouple. A thermocouple is a temperature-measuring device consisting of two dissimilar conductors that contact each other at one or more points. It produces a voltage when the temperature of one of the points differs from the reference temperature at other parts of the circuit

```
void temp()
{
    val = analogRead(tempPin);
    float mv = ( val/1024.0)*5000;
    floated = mv/100;
    floatfarh = (cel*9)/5 + 32;

    //Serial.print("TEMPERATURE = ");
}
```

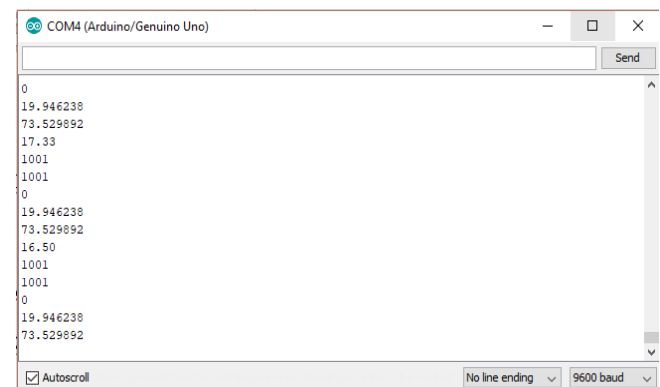


Figure 7: Temperature sensor Reading

B. Heartbeat Sensor

Heartbeat sensor is designed to give a digital output of heat beat when a finger is placed on it. When the heartbeat detector is working, the beat LED flashes in unison with each heartbeat. This digital output can be

connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

```
void pulse()
{
  serialOutput();

  if (QS == true) // A Heartbeat Was Found
  {
    // BPM and IBI have been Determined
    // Quantified Self "QS" true when
    Arduino finds a heartbeat
    serial_outputWhenBeatHappens(); // A Beat
    Happened, Output that to serial.
    QS = false; // reset the Quantified
    Self flag for next time
  }
}
```

```
delay(20); // take a break
```

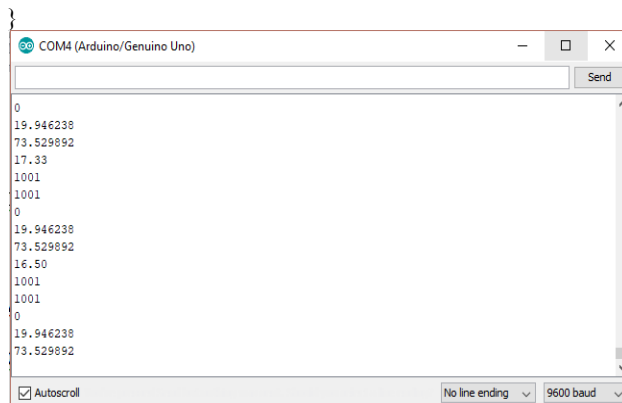


Figure 8: Heartbeat sensor Reading

A. Human Security Notification Device

Notification device will send a notification to the following members by GSM module with longitude and latitude.

```
SendFamily(String str)
{
  mySerial.println("AT+CMGS=\"+917218521163\"\\r
  \");
  Replace x with mobile number
}

SendFriend(String str)
{
  mySerial.println("AT+CMGS=\"+918975753485\"\\r
  \");
  Replace x with mobile number
}

\\ if victim press Green button
SendDoctor(String str)
{
  mySerial.println("AT+CMGS=\"+917066089027\"\\r
  \"); // Replace x with mobile number
}

\\ if victim press Red button

SendPolice(String str)
{
```

```
mySerial.println("AT+CMGS=\"+919168073573\"\\r
  \"); // Replace x with mobile number
}
```

Notification Message (Output):-

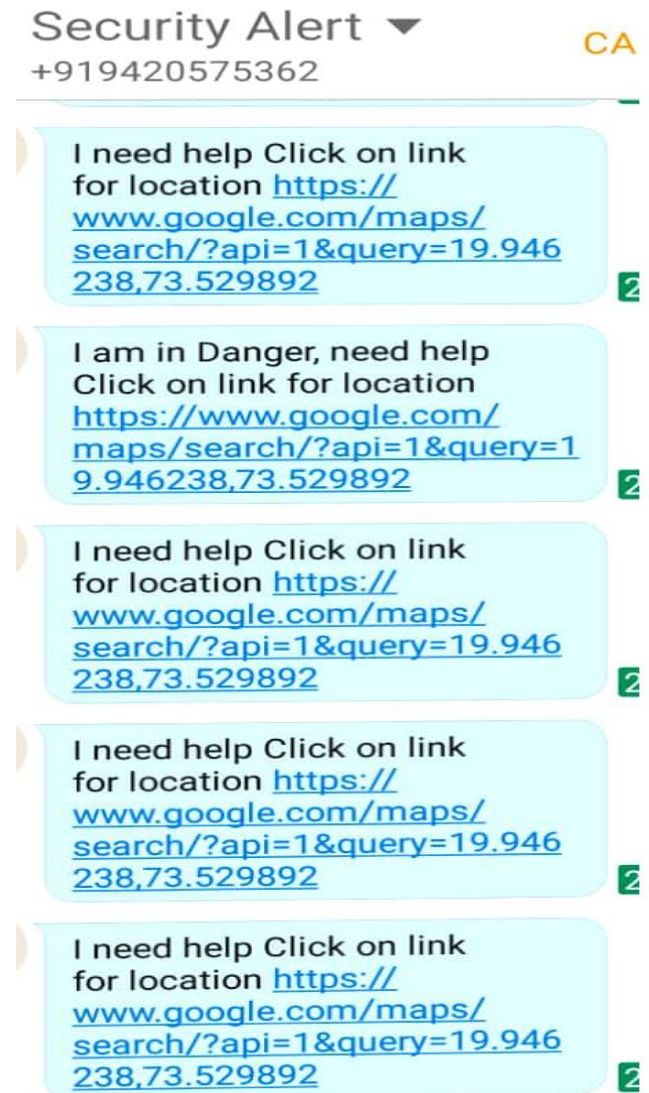


Figure 9: Human Security Notification Device

OUTPUT (DOCTOR)

Device ID	Soldier Name	Soldier Mobile	Doctor Email	Doctor Mobile	Temperature	Pulse Rate	Action
1001	Gaurav Jambekar	9925911233	gauravj@gmail.com	980010045	16.58	0	View Location

Figure 10: Human Security Notification Device for Doctor

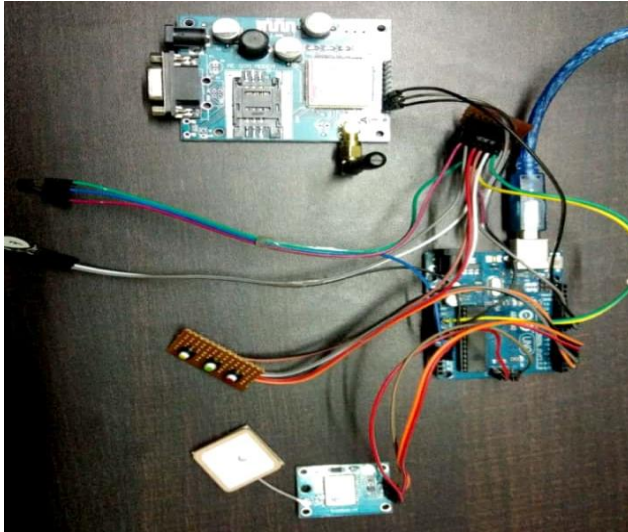
System Module:

Figure 11: System Module

CONCLUSION

The wireless machine drove security system for ladies having some deficiencies that unit lined by the planned system. The society might or may not modification for enhanced; the power of being really power positive come back from this device. This device will positively offer true knowledge as a physical device offers a guarantee. Our primary goal is that every women, child, or men in our society need to keep safe and secured. This methodology is expected on the GSM technology and main elements used square measure Raspberry Pi zero, GPS, temperature sensing element, and Heartbeat sensing element. This device is considerably helpful to ladies, whenever they went outside alone. This project is for the short term measure against ladies for daily harassment as the style of options. The system contains completely different notification buttons for various conditions like Red, inexperienced and Yellow. Additionally, the system provides notification for heartbeat numeration and for temperature sensing. so planned system offers a much better resolution for human security.

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