Smart Device for Women's Safety Designed Using IoT and Virtual Instrumentation Browser

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Nagarjuna Telagam[1](✉), Nehru Kandasamy[2], U. Soma Naidu[3]
[1] GITAM University, Bangalore, India
[2] Madanapalle Institute of Technology and Science, Madanapalle, India
[3] Institute of Aeronautical Engineering, Hyderabad, India
nagarjuna473@gmail.com

Abstract—In the present technological developments, the internet of things (IoT) technology connects all interconnected networks. The attacks on women are increasing daily in Indian countries. If the woman is not carrying a mobile phone or device, she cannot contact the police station or other family members. This proposed method will help the women identify the exact location and inform the police station in such a scenario. The Emergencies, the women can press the button once the location information is tracked. The purpose of this project is to help women in emergencies. The group messages from the device, Location tracking, and short service messages are also sent to the family members and nearby police stations. Additional features, such as group messages from the women's phone are also implemented, and the victim audio recording is saved on the Virtual instrumentation server.

Keywords—IoT, Device, LCD, VI server, SMS

1 Introduction

There are many crimes against women in many countries, and the product Women safety device and application (FEMME) will help women and act as a security system. The Advanced Reduced Instruction Set Computing Machine (ARM) controller is chosen because of its low power and has no other issues. The mobile and microcontrollers are synchronized with Bluetooth technology. The audio can be recorded and will be used for further investigation. The tracking of live location and intimation to the emergency contacts can be sent to emergency contacts. The hidden camera is another feature that ensures more privacy [1]. This article uses global mobile systems to send alert messages to known contacts. The push-button, piezoelectric buzzer and sim 808 are mainly used in case of emergency [2]. The IoT device with Android applications has more accuracy than other push-button devices for women's safety. The proposed device's primary advantage is that it works in online and offline modes [3]. The researchers suggest various safety devices in which the different critical situation leads to location tracking of the user. In this article, the advantages and drawbacks of location-tracking methods are broadly discussed [4]. This device will send the videos and images of

the surrounding people at the exact location to the emergency contacts. This device uses amazon web services with secure channel communication [5]. This article proposes a Fleet tracking system to prevent these vehicles' misuse and ensure the passengers are safe. The proposed IoT device is inserted in the user vehicle with inbuilt sensors to detect unauthorized access.

ARM controller and Android application are used in synchronising both the device and the smartphone using Bluetooth. Hence both can be triggered independently. It can record audio for further investigation, give an alert call and message to the pre-set contacts with the instant location every 2 minutes, and be tracked live using the application. A hidden camera detector is also a distinct feature used which ensure privacy. The ultrasonic sensors and GPS will help women in dangerous situations [6]. The LabVIEW programming is used to analyze the intelligent sensor network for high-quality air pollution monitoring, and all various sensor data are stored in charts [7]. The VI LabVIEW programming was used in the radio frequency concepts for 5G candidate waveforms with both encoder and decoder VIs. The bit error rate plot and its response chart are shown in this article. The graphical programming will help the user quickly understand and analyze the input and output values [8]. Industrial parameters such as temperature and moisture can be analyzed from any part of the world using a virtual instrumentation server, which works with IoT technology [9]. The intelligent sensor network-based robot rescues fire operations are explained [10]. The 4G candidate waveform OFDM application digital audio broadcasting was designed and developed using LabVIEW programming, the four modes of operation are explored in this article [11]. The simulation of analogue modulation schemes is analyzed using LabVIEW programming models, and the amplitude, frequency and phase modulation waveforms are plotted using various graphs in the block diagram panel [12].

1.1 Motivation and contributions of the paper

The challenging situations facing each woman nowadays gave me the motivation to develop a security device to help women do the work they like to do. The application allows women to overcome fear, roam freely, and complete their jobs. The main motivation of the paper is to protect women from abuse and violence. Each woman suffers from acts of violence in their lifetime. The significant contribution of the article is that the proposed system is designed for all in one system, i.e. the user does not need to carry multiple devices. The GPS, audio recording, when the battery is low, pre-stored contacts will receive emergency messages. The proposed device can be activated with voice commands. The VI web browser using LabVIEW programming was designed and had significant advantages as follows:

- GPS location tracking can be seen live in the VI web browser
- Users can access live data in any part of the world
- High data storage is possible in this browser because the charts store past data.
- No hardware component requirements, such as a GPS module is not required,
- Flexibility in cost,
- High response time.

2 The proposed system

The existing system's alert system for women is designed through the application. The applications contain the SOS number for security purposes, which will alert the victim's family members. The major disadvantages of the existing system are Victim's phone may lose, and his battery may die The Arduino microcontroller is the main component used in this proposed system. It communicates with input and output data and analyzes the responses. The python language code is used to control the commands, and the code is dumped into the devices using IDE software.

Here we have divided the work into two parts, as shown in Figure 1. First, the algorithm is explained with a flow chart, as shown in Figure 2.

- Part-1: When the person/woman is in normal condition, they don't press the button. So the result is as if he is in good condition.
- Part 2: When they press the button, it is a sign of danger that the buzzer sounds, and then the SMS and GPS location of the person being sent.

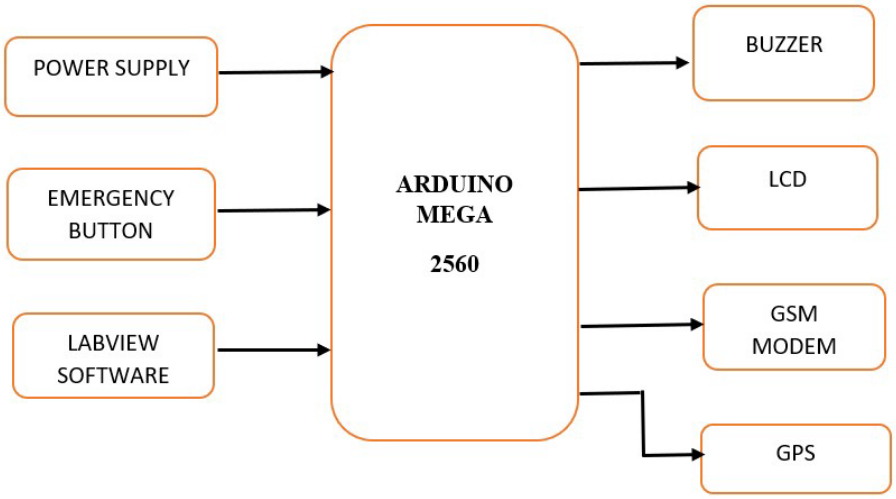

Fig. 1. Block diagram of the proposed system

Algorithm

STEP:1 - Start and initialize the Arduino board and the remaining devices.

STEP:2 – Arrange the GPS and GSM with desired connections.

STEP:3 – Give the power supply with an adapter and connect the Arduino to the laptop.

STEP:4 – Open the LabVIEW software-connected file and run the file.

STEP:5 – Run the code in Arduino IDE and import the file into the Arduino board.

STEP:6 – Press the Emergency button.

STEP:7 – GSM sends messages that the person is in trouble, along with GPS location, to the concerned persons.

STEP:8 – GPS location automatically opens in Google chrome with the help of LabVIEW.

STEP 9 – If the person is not pressed the emergency button, then it states that the person is in good condition.

Figure 2 shows the flow chart of how the device works in sequence. The Arduino will make the decision when the user presses the button. The sequence of steps is shown in the below figure. Figure 3 shows the LabVIEW programming structure for the web browser. It is implemented in a flat sequence structure. The URL icon is mentioned in pink colour, and this entire URL runs on for loop.

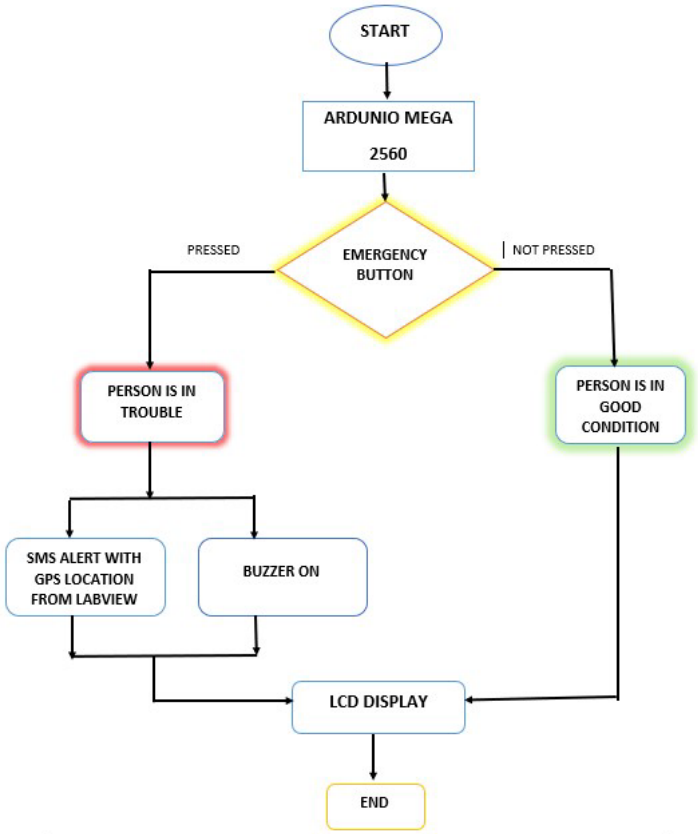

Fig. 2. Flow chart of the proposed system

2.1 Working flow of the system model

Initially, the GSM module is verified whether it is properly connected and configured, as shown in Figure 2. After configuring the GSM module, the device prompts the user. The woman turns the device ON manually when the switch is pressed in particu-

larabuse. The Arduino board will activate when it receives a signal from the push button. It triggers the camera to capture the image, and GPS tracks the location and the GSM module will send the image and location as a message to the respective person. Here, the TTL module will be operated as a bridge for the GSM module and GPS. It also shares the data between the GSM and GPS. The captured image and location will be sent to emergency contact and emergency mail in your phone and police via the smartphone.

First, create a flat sequence structure in the block diagram panel. The next step is to create a web browser in the front panel with the .Net and ActiveX icons. Figure 3 and Figure 4 are the block diagram and front panel of the web browser. This web browser helps in understanding the location of the user. You type the URL in a location input from the Front Panel, and LabVIEW navigates to the web page. The code will guide the user to reload, forward, backward steps, and search options. While executing the LabVIEW code, the user has a specified file and history menu. The user program has multiple functions that work with Invoke and property Nodes to control the operation of the web browser.

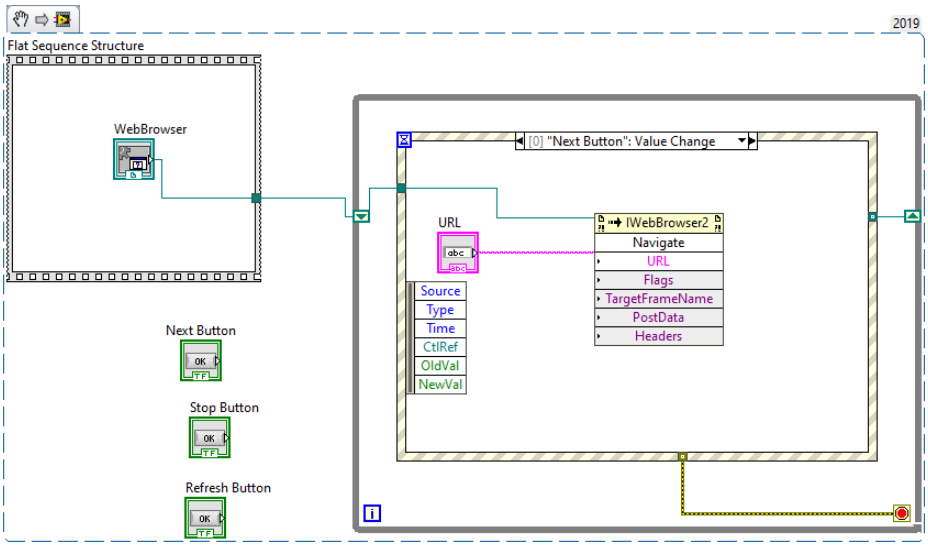

Fig. 3. Block diagram of VI browser

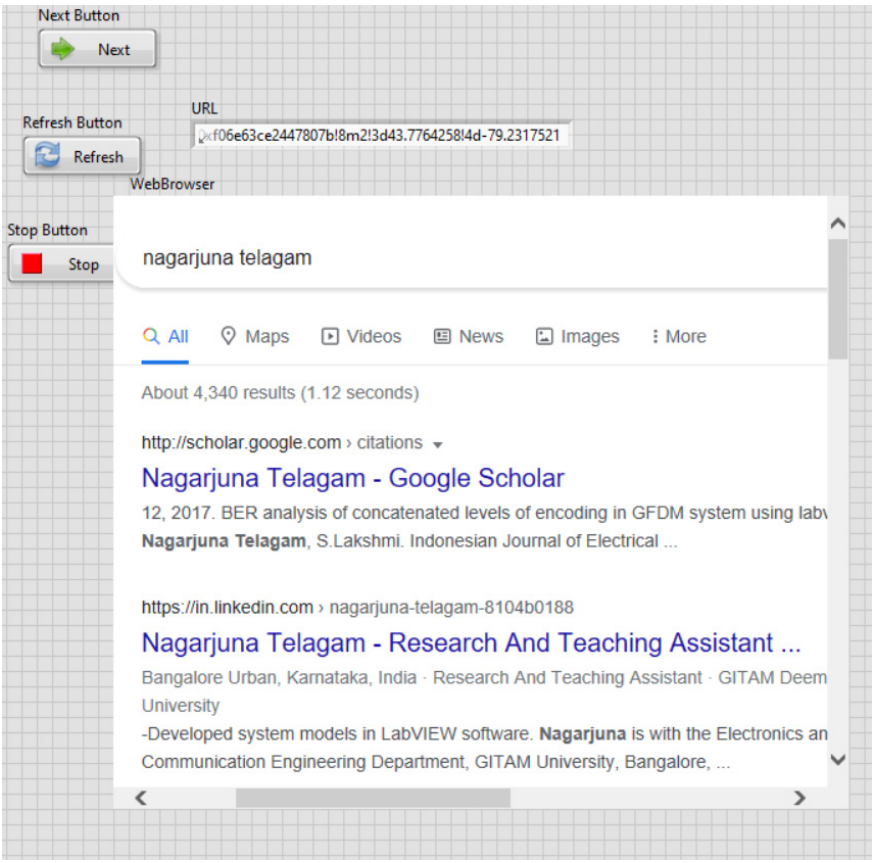

Fig. 4. The front panel of Web browser creation

3 Results and discussions

The primary goal was to develop a reliable IoT system to monitor women in safe or dangerous zone. She will press a button given to him. Then automatically, an SMS and GPS location will be shared with concerned persons like her parents or relatives who have a problem. Table 1 and Figure 5 show the details.

Table 1. Hardware components and values

Devices	Value/ID
Arduino Mega 2560	16 MHz
Power supply	0-9 volts
16*2 LCD	250 kHz clock frequency
GPS	Input supply voltage 2.7 - 6
GSM modem	Supply voltage: 3.8V - 4.2V
Buzzer	Operating Voltage: 4-8V DC.

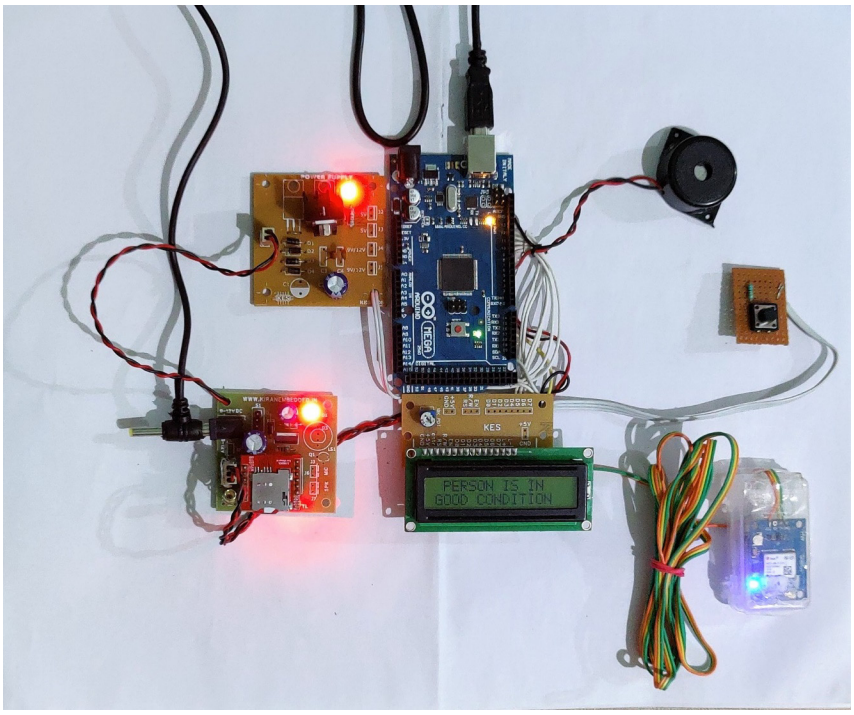

Fig. 5. The person is in normal or good condition

It is when the person doesn't click the emergency button. Then, the LCD will display the women in the safe zone. Similarly, if she is in panic mode, the button is pressed after running the LabVIEW program and pushing the emergency button LabVIEW server redirects to Google maps. The corresponding location is sent to emergency contacts, as shown in Figure 6.

Figure 7 shows the VI snippet of web browser programming, which communicates with serial three computer ports to the women's safety device. The sensor data, GSM, and GPS modules will instantly coordinate with the VI snippet. Here, the picture shows the message received by the concerned person with the GPS location after pressing the emergency button. GSM and GPS initialized and sent the message to the concerned persons with the GPS location. The received message screenshot is shown in Figure 8.

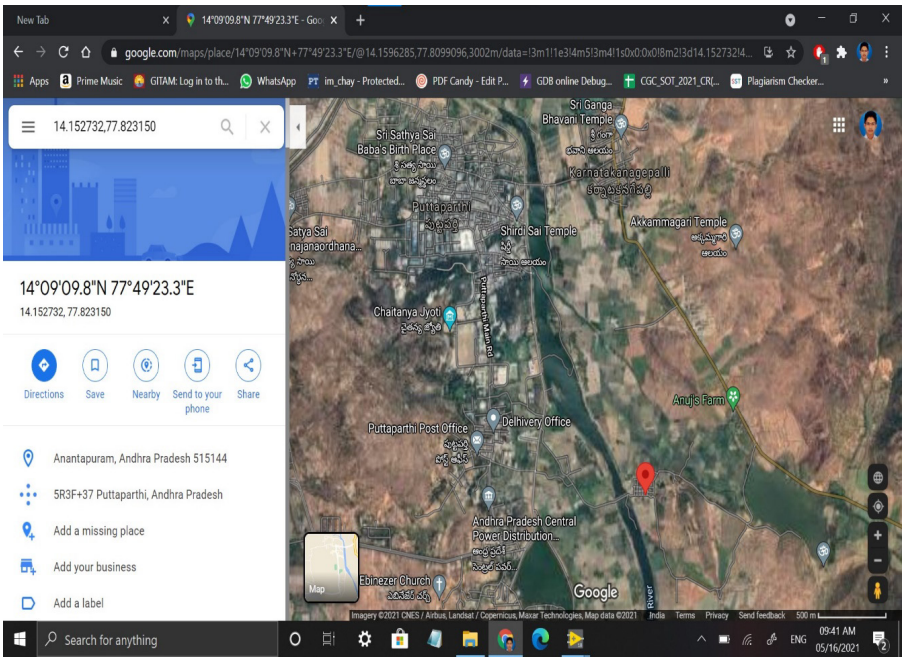

Fig. 6. The location that person is located

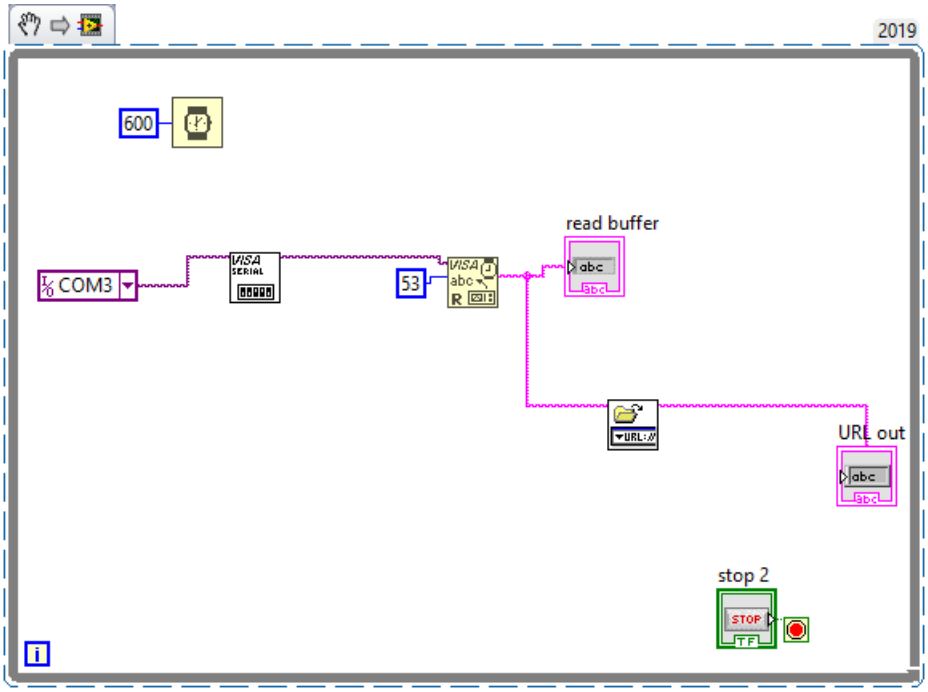

Fig. 7. VI Snippet for the web browser

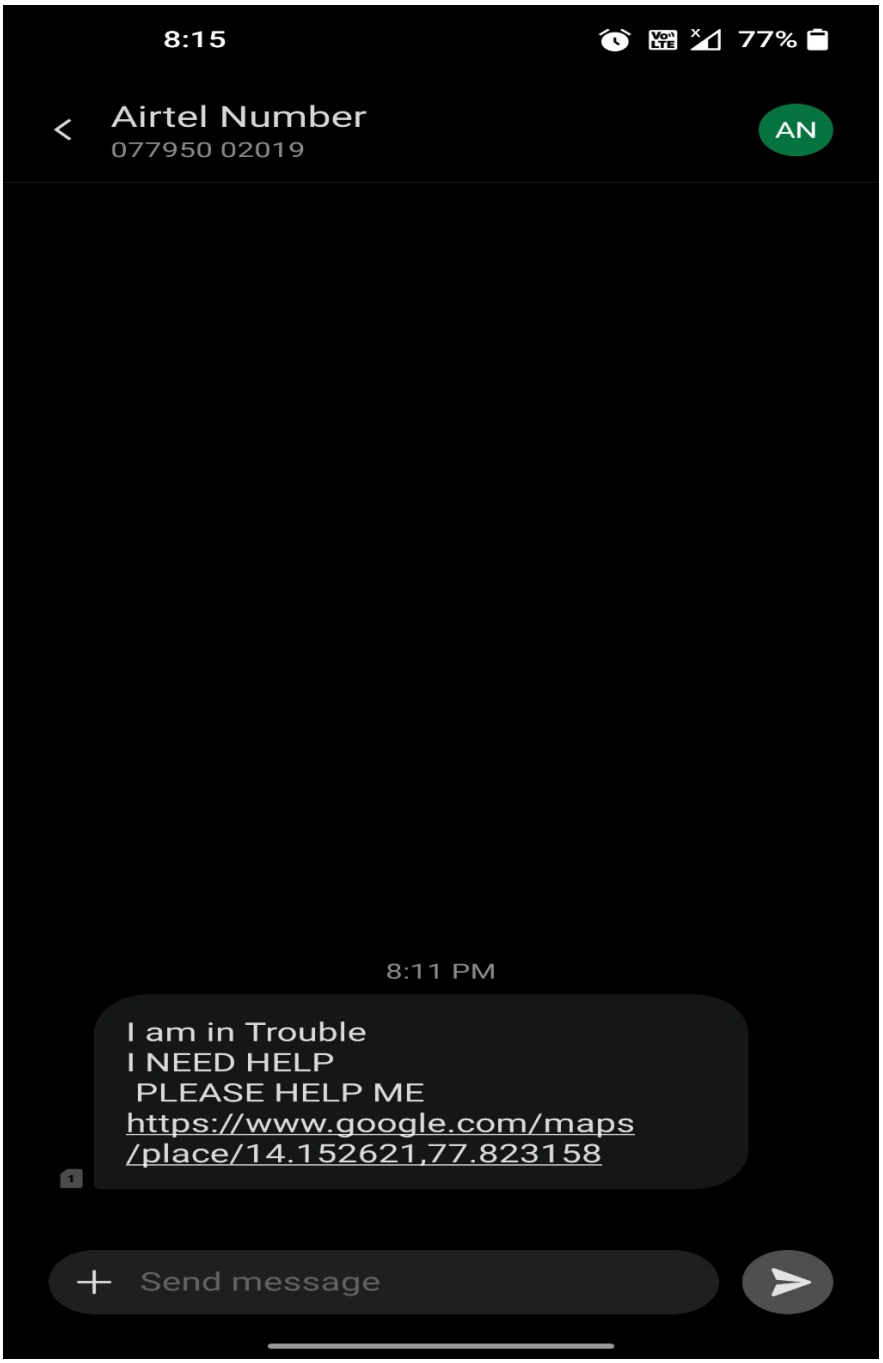

Fig. 8. Screenshot of emergency contacts

```
Program or markup code
void loop()
{st:
SWalert = digitalRead(SW);
if (SWalert == LOW)
{
lcd.setCursor(0,0);
lcd.print(" PERSON IS IN ");
lcd.setCursor(0,1);
lcd.print("TROUBLE");
digitalWrite(BUZZ,HIGH);
Serial.print("https://www.google.com/maps/place/");
Serial.print(latitude,6);
Serial.print(",");
Serial.print(logitude,6);
delay(2000);lcd.clear();lcd.print("Sending SMS ");
delay(2000);Send();delay(2000);goto st;
}
```

4 Conclusion and future scope

This project was designed to provide security for women in all dangerous scenarios. The project system shows various factors such as tracking, VI browser, messaging services, and emergency buttons with a smart device for women's safety. This paper discusses different techniques used for women's safety against fraudulent people. She was sending text messages to ensure that close relatives and police get alerted to the victim's location. The current mechanism is not robust enough to keep women from being criminalized. This project will allow them to immediately identify themselves with authority concerned when she is in danger.

The Children‘s safety: In addition to improving the conditions in terms of women‘s safety in India, this project can also be used for parents to detect their children‘s location.

Banking safety: In banks, this project will help the manager and the staffs to do an emergency call to the police when a robbery takes place.This project can be used by common man in daily life whenever he witnesses a crime or anti-social behaviour by individuals or gangs of people. This project can be used in significant institutions like railways whenever a bridge has collapsed or any real-time death incident or major injuries to call an ambulance and police.

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6 Authors

Nagarjuna Telagam is with the Electronics and Communication Engineering Department, GITAM, Bangalore, India.

Nehru Kandasamy is with ECE department in Madanapalle Institute of Technology and Science, he can be reached at nnehruk@gmail.com.

U.Somanaidu is working as assistant professor in IARE college, he can be reached at u.somanaidu@iare.ac.in.

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