Wearable Location Tracker During Disaster

Submitted in partial fulfilment of the requirements

of the degree of

Bachelor of Engineering

by

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CERTIFICATE

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Declaration

We declare that this written submission for B.E project entitled " Wearable Location Tracker during Disaster" represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ACKNOWLEDGEMENT

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INDEX

ABSTRACT

The goal of this project is to design a Wearable Location Tracker During Disaster based on Global Positioning System(GPS) and Global Service for Mobile Communication(GSM). With recent technological advancement of modern science people are now expecting the information about the location of any object for tracking purposes. Location is one of the common things that is always in search as the location of a particular person, a vehicle or a particular place also. People always look for them for their own needs at different moments. GPS (Global Positioning System) is a network of orbiting satellites that send precise details of their position back to the Earth and track the exact location of the GPS receiver. GPS is a system which is already implemented and everyone can access it without any restriction. Having the facility of GPS to develop this system we need a GPS device to calculate the location from the information taken from GPS.

A wearable smart locator jacket is an electronic device which can be worn by the individual to monitor and keep an eye on them. When a disaster occurs, activities like search, rescue, recovery, and clean up are carried out by emergency responders. This paper proposes a new framework for supporting the safety and health of emergency responders by locating their position and monitoring their vital signs using a Wireless Wearable Device. Location is one of the most common things that people look for, whether it's the location of a specific person, a vehicle, or a specific location. People are always looking for them to meet their own needs at various times. GPS (Global Positioning System) is a network of orbiting satellites that send precise position data back to Earth and track the exact location of the GPS receiver. If it is mounted on a vehicle or even on a person in the form of wearable devices, it is possible to track the location in times of need or even disasters.

LIST OF FIGURES

LIST OF TABLES

Chapter 1

INTRODUCTION

SIGNIFICANCE

The goal of this project is to design a Wearable Device which can show live location of the user when stuck in any kind of natural calamity. This device is extremely handy when we need to know about the location of user. Disasters might strike at any time in our world of unpredictability. A disaster might be natural (e.g., the tsunami in Japan in 2011) or man-made (e.g., the earthquake in Haiti in 2010). (Bhopal gas leakage,1984). However, it has the potential to bring serious harm to humanity in the long run. As a result, with the aid of GPS, people can be rescued relatively quickly in these situations. A GPS trans-receiver pair should be attached to both the victim and the rescue crew for this purpose. This signal will be received by a receiver module at the rescue team's command center. The rescue crew will begin searching for a rescue operation after studying that signal. The signal will pinpoint the disaster's location.

The rescue squad will also receive a signal from the local public in the catastrophe location. The signal's precision will be improved in this way. A GPS tracking system, for example, could be installed in a vehicle, on a cell phone, or on specialized GPS devices that can be stationary or portable. GPS works by providing precise position information. It may also track a car or a person's movement. A GPS tracking system, for example, can be used by a corporation to track the route and progress of a delivery truck, by parents to check on the whereabouts of their children, or even to track high-valued goods in transit.

1.2 BACKGROUND

Wearable device is a location tracker which is worn by user. Whenever the user gets stuck in disaster he/she can call for help by using this wearable device.

Traditionally, these operations that are usually performed by the local volunteers, voluntary organizations and the emergency agencies. Light Search and Rescue is a procedure carried out at primary stages, initially to find out persons with injuries in disasters, or even without any injuries and needing assistance, and to help them exit. In this process it is not possible to find every single victim who needs help. For this purpose, wearable location tracker can be used as each and every victim can call for help themselves.

1.3 SCOPE

The purpose of this project is to create a wearable location tracker during a disaster using the Global Positioning System (GPS) and the Global Service for Mobile Communication (GSM). A wearable smart locator jacket is an electronic device that an individual can wear to monitor and keep an eye on them. For this purpose, a GPS trans-receiver pair should be attached to both the victim and the rescue crew. This signal will be received by a receiver module at the command center of the rescue team. After studying that signal, the rescue crew will begin looking for a rescue operation. The signal will pinpoint the location of the disaster.The rescue team will also receive a signal from the local public in the disaster area.

Chapter 2

LITERATURE REVIEW

2.1 HISTORY

This article proposed a system that acts as a wearable location tracker in the event of a disaster. If you are involved in a disaster such as an earthquake, fire, collapse of a building or bridge, or emergency medical care, you should follow up in the above situation. Each device can be a mini watch and should be installed on a wearable like the wrist watch Then, when user presses a button, the individual is sent to the next rescue team. Rescuing the tracked victims from the area of disaster(SoumyaDipta Boral, Abhisek Das, Aditya Khare, Ambalika Gupta, Chaitali Bhattacharyya,SusmitaDas-2020).[1]

This article gives us information about the Design and Implementation of Android Based Wearable Smart Locator Band for People with Autism, Dementia, and Alzheimer wearable smart locator based on Android. The developed device is used to access a location. In this device, an Android-based application is developed that automatically opens the wearer's location on Google Map in a fraction Of seconds when it receives a message containing latitude and longitude, eliminating the need for caregivers to manually open it as in other existing devices. The major goal of this research is to track persons with disorders including autism, dementia, and Alzheimer's, as well as elderly people.(Isha Goel, Dilip Kumar-2014).[2]

This article gives us the information about the purpose system that is the Android mobile platform is becoming more popular to the users for its multi-dimensional purposes. Thus, this proposed system namely “GPS-based Location Tracking System via Android Device” uses GPS and any mobile phones having an Android operating system to track the location of a person whenever necessary.(Md. Palash Uddin, Masud Ibn Afjal,Masud I,Md Nadim-2013).[3]

This paper represents the proposed system of Smart Life Tracking and Rescuing Disaster Management System. This work is mainly focusing on disaster, shortest distance algorithm. They used GSM,GPS and RF technology. Heart beat sensor which used to detect pulse of victim which enable us to understand the victim is alive or died. They made a onesoftware which includes registering, monitoring and assigning rescuers to pick up point and people to shelter. (Nagashree C, Kavya Rao B, Maria Jyothi Lobo, Harshitha B S and Antony P J-2012).[5]

2.2 COMPARISON WITH EXISTING IMPLEMENTATIONS

1. **Wearable Location Tracker During Disaster.**

   Context: Location is one of the most common things that people look for, whether it's the location of a specific person, a vehicle, or a specific location. People are always looking for them to meet their own needs at various times. GPS (Global Positioning System) is a network of orbiting satellites that send precise position data back to Earth and track the exact location of the GPS receiver. The systems that are commonly used for location tracking and only provide the victims location. However, during a disaster, our smart location tracker provides an exact location as well as live video streaming of the location where the disaster occurred. They also used Arduino in this system, whereas we used a Raspberry Pi as a microcontroller in ours. Raspberry pi has its own operating system. [1]

2. **Locating and monitoring emergency responder using a wearable device**.

   Context: When a disaster occurs, activities like search, rescue, recovery, and cleanup are carried out by emergency responders. This paper proposes a new framework for supporting the safety and health of emergency responders by locating their position and monitoring their vital signs using a Wireless Wearable Device. As an initial step towards the development of a wireless wearable tracking and monitoring system for emergency responders, this system uses an iterative localization based scheme, which provides the exact position of each emergency responder, and monitors their vital signs like skin temperature and pulse rate. Any change in the vital signs can be easily sensed and tracked, and could be used to provide warnings when critical events are detected. To overcome the drawbacks of the existing system as they are using microcontroller. We implement the project using Raspberry Pi.[11]

3. **GPS-based Location Tracking System via Android Device.**

Context: A GPS device can assist us in determining our exact location at any given time. Not only can a GPS tell us the name of the street we're on, but many GPS systems can also tell us the exact latitude and longitude of where we are. On the other hand, the Android mobile platform is gaining popularity among users due to its multi-faceted capabilities. Thus, the proposed system, dubbed "GPS-based Location Tracking System via Android Device," employs GPS and any mobile phone running the Android operating system to track a person's location as needed. On other hand, Wearable Location Tracker will be used during Natural calamity. At the time of disaster it is possible that the victim might not have his/her android device like mobile phone, Tablet, Computer with them. Also, for mobile phone it is compulsory to have a network but in crises it is possible that network will not be available.[3]

Literature Summary

A literature review is an objective, critical summary of published research literature relevant to a topic under consideration for research. The summary is presented here:

SN	Paper	Advantages and Disadvantages
1.	Wearable Location Tracker During Disaster[1]	Advantages: 1.rescue team get some signal sent by the local publics of the area of the disaster. 2.This system is more suitable for commercial use of GPS. Disadvantage:1. This will not help us in tracking lost objects more easily and 2.More conveniently through stored database.
2.	Design and Implementation of Android Based Wearable Smart Locator Band for People with Autism, Dementia, and Alzheimer[2]	Advantages: 1.Due to its dual band 50/1900 MHz, it is a flexible connector and suitable for long distance data transmission. 2.Its international roaming feature has the advantage of improving the battery life of the and providing data with baud rates up to 9600bps. Disadvantages: 1. The weight of system is heavy compared to other system. 2.Battery life is also less.
3.	GPS-based Location Tracking System via Android Device[11]	Advantages: 1.Instead of using GPS we have chosen an android mobile phone as GPS because in android phone have built in function Smartphones with Android OS. 2.The web server will store the visiting path as a summation of some co-coordinating points. Disadvantages:1.We need to depend on Internet connection to store the information to the web server. 2.I there is some problem with Internet connection or lack of necessary bandwidth,we may not be able to send the data correctly.

2.3 PROBLEM DEFINITION

The name of the project is “Wearable Location Tracker During Disaster". If a person gets stuck in any sort of natural calamity he/she can send their location to the rescue team. Both the victim and the rescue crew should be equipped with a GPS trans-receiver pair for this reason. A receiver module at the rescue team's command centre will receive this signal. After evaluating the signal, the rescue crew will begin looking for a rescue operation. The signal will locate the location of the disaster.

To execute the above concept we are designing smart device based on Raspberry pi and using LCD, to display the massage with other components like GPS module, GSM module. GPS module is used for communication with satellite and to receive data.

CHAPTER 3

SYSTEM REQUIREMENT AND ANALYSIS

3.1 HARDWARE REQUIREMENTS

Sr.No	Description	Qty.
1	Raspberry Pi	1
2	GPS Neo6m	1
3	GSM 400	1
4	Power Supply 9V	1
5	LED	1
6	Resistors	2
7	Wires	20

Table 3.1-Hardware Requirement

3.2 RASPBERRY PI

Description
The system has been designed using Raspberry Pi3, GPS, GSM. Design of this device consists of Raspberry pi board to which we are supplying 5V power. sensor is used for taping, based on the input provided by the user authorized person gets the notification via SMS or email. By using this rescue team can track the victim location.
Raspberry Pi 3 Model B is the earliest model of the third-generation Raspberry Pi. It replaced Raspberry Pi 2 Model B in February 2016. See also Raspberry Pi 3 Model B+, the latest product in the Raspberry Pi 3 range.

GENERAL SPECIFICATION:

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

PIN CONFIGURATION OF RASPBERRY PI 3B

Pin	Partical	Description
GPIO0	-	I2C data line used to identify Pi Hats
GPIO1	-	I2C clock line used to identify Pi Hats
GPIO2	SDA	I2C data line
GPIO3	SCL	I2C clock line
GPIO4	D0	Digital IO
GPIO5	D4	Digital IO
GPIO6	D5	Digital IO
GPIO7	CE1	SPI chip enable 1, digital IO
GPIO8	CE0	SPI chip enable 0, digital IO
GPIO9	MISO	SPI master-in slave-out
GPIO10	MOSI	SPI master-out slave-in
GPIO11	SCK	SPI clock
GPIO12	D13/A4	Digital IO
GPIO13	D6	PWM-capable digital IO
GPIO14	TX	UART hardware serial transmit
GPIO15	RX	UART hardware serial receive
GPIO16	D14/A5	PWM-capable digital IO
GPIO17	D1	Digital IO
GPIO18	D9/A0	PWM-capable digital IO
GPIO19	D7	PWM-capable digital IO
GPIO20	D15/A6	Digital IO
GPIO21	D16/A7	Digital IO
GPIO22	D3	Digital IO
GPIO23	D10/A1	Digital IO
GPIO24	D11/A2	Digital IO
GPIO25	D12/A3	Digital IO
GPIO26	D8	Digital IO

Table 3.2 Pin Configuration of Raspberry Pi 3

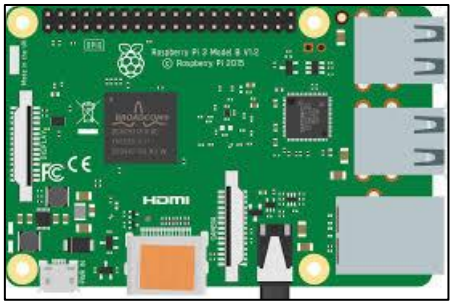


Fig 3.1: Raspberry Pi

3.3 LCD DISPLAY

DISPLAY: Various display device such as seven segment display. LCD display, etc can be interfaced with microcontroller to read the output directly. In our project we use a two line LCD display with 16 characters each.

LCD
Liquid crystal Display (LCD) displays temperature of the measured element, which is calculated by the microcontroller. CMOS technology makes the device ideal for application in hand held, portable and other battery instruction with low power consumption.

GENERAL SPECIFICATION:
Drive method: 1/16 duty cycle
Display size: 16 character * 2 lines
Character structure: 5*8 dots.
Display data RAM: 80 characters (80*8 bits)
Character generate ROM: 192 characters
Character generate RAM: 8 characters (64*8 bits)
Both display data and character generator RAMs can be read from MPU.
Internal automatic reset circuit at power ON.
Built in oscillator circuit.
Net Media 2x16 Serial LCD Display Module

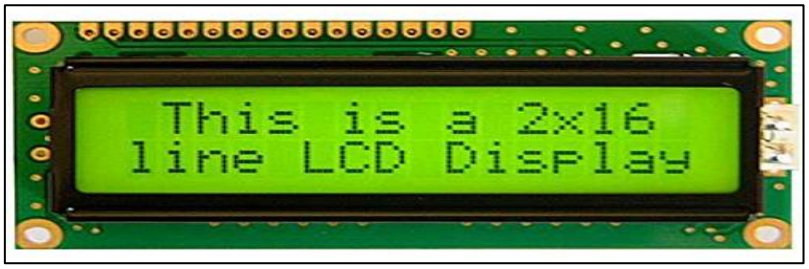


Fig 3.2: LCD display

JP1/JP14 Pins 1 – 8	Description	JP1/JP14 Pins 9 -16	Description
Pin1	Ground	Pin9	D2 (Not Used)
Pin2	VCC (+5)	Pin10	D3 (Not Used)
Pin3	Contrast	Pin11	D4
Pin4	Data/Command (R/S)	Pin12	D5
Pin5	Read/Write (W)	Pin13	D6
Pin6	Enable (E1)	Pin14	D7
Pin7	D0 (Not Used)	Pin15	VCC (LEDSV+)
Pin8	D1 (Not Used)	Pin16	Ground

Table 3.3 : Pin Configuration of lcd display

3.4 GSM MODEM

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities. For the purpose of this document, the term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.

Fig 3.3: GSM SIM900

3.5 GPS

GPS is based on a global navigation satellite system for determining speed, position, direction, and time. It uses a constellation of 24/32 active satellites in orbit to send accurate microwave signals through a GPS receiver on the ground. GPS receivers require at least three or four satellites and their two dimensions to calculate the distance. Latitude and longitude, or 3D, or NS. Latitude, longitude and elevation position.

Features

- Single-chip, high-quality voice recording & playback solution
- No external ICs required
- Minimum external components
- Non-volatile Flash memory technology
- No battery backup required
- User-Selectable messaging options
- Random access of multiple fixed-duration messages
- Sequential access of multiple variable-duration messages
- User-friendly, easy-to-use operation
- Programming & development systems not required
- Level-activated recording & edge-activated play back switches

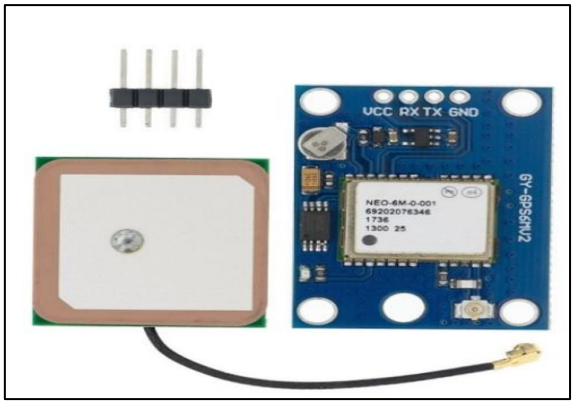


Fig 3.4: GPS Neo 6m

CHAPTER 4

METHODOLOGY

4.1 BLOCK DIAGRAM

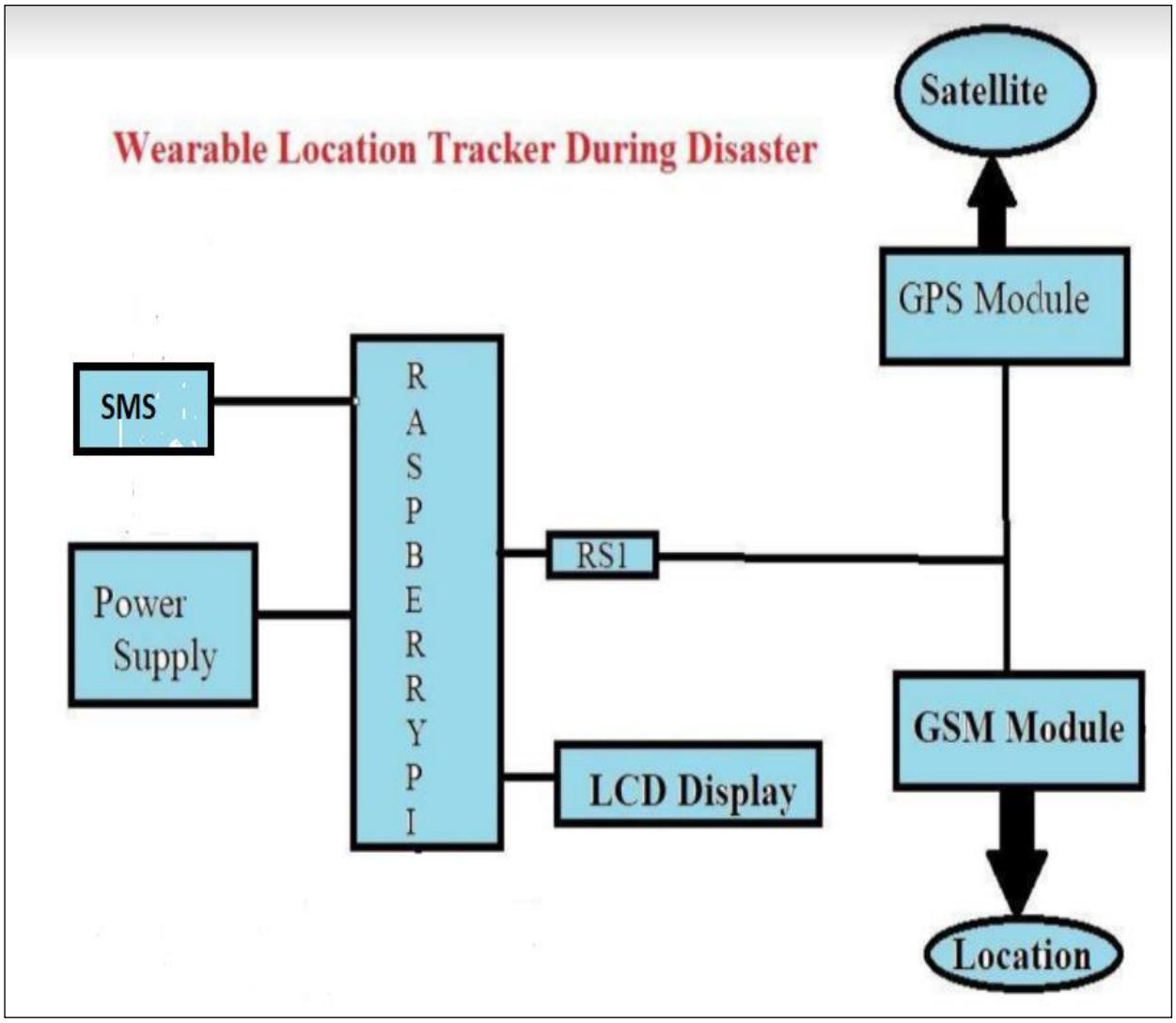


Figure 4.1: BLOCK DIAGRAM

4.2 CIRCUIT DIAGRAM

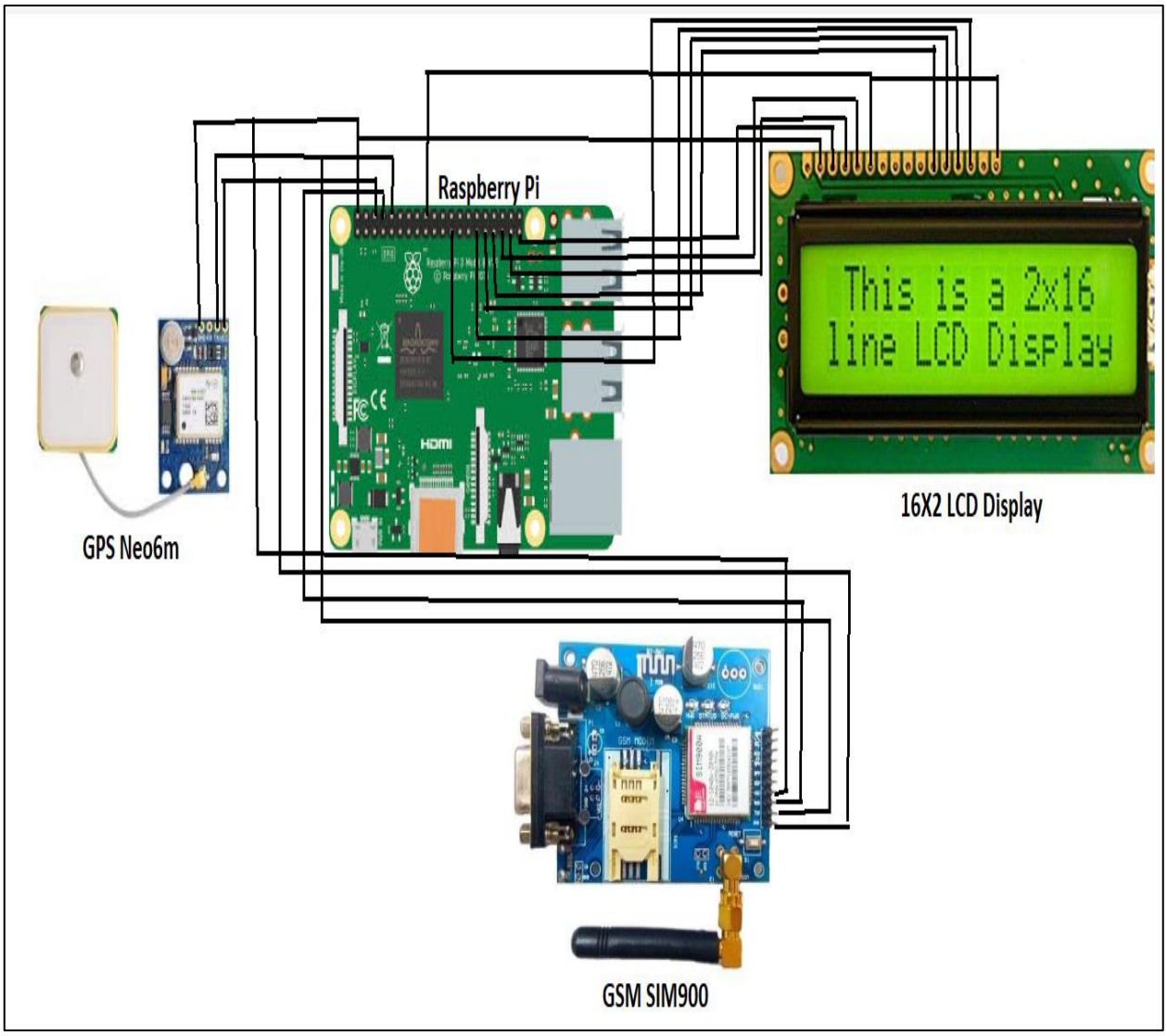


Figure 4.2: CIRCUIT DIAGRAM FOR WEARABLE LOCATION TRACKER DEVICE DURING DISASTER

CHAPTER 5

HARDWARE AND SOFTWARE IMPLEMENTATION

5.1 WORKING

Heart of the project is Raspberry Pi since it controls all devices being interface with it. This controller needs 3 things to work i.e. power supply, clock and reset. It is 40 pins controller. There are 40 pins on a Raspberry Pi 3 board. On the Raspberry Pi, we have four power pins, two of which are 5v pins and the other two are 3.3v pins. We can use the 5v power pins to run low-power apps because they are directly connected to the Raspberry Pi's power input. There are also ground pins to consider. There are eight ground pins, all of which are connected to one another, and you can utilise any of them for your projects. That leaves us with 28 GPIO pins, starting with GPIO 0 and working our way up to GPIO 27.

LCD is 16x2 which can store 16 characters. Ground pin is connected to ground. There is another pin known as contrast pin. A variable 10k resistor is connected across that. By varying the resistance value we can vary the brightness of the LCD. There are 3 control pins. The name of the 1st control pin is data command. The 2nd pin is read/write. The 3rd pin is enabling. All the 3 pins are joined here.D4-D7 are data pins. Only 4 bits are used for the data. This is thus called 4 bit mode. In 4 bit mode 4 bit data is used twice. We will connect a resistor across the 5V supply. So at port 0, LCD is done.The next main and important thing is GSM modem. GSM is a digital cellular communication system which is used to a comprehensive range of services and features to the users not available on analog cellular. In this system GSM module is to send the information to the Admins mobile phone. We will use port 3 for this. First 2 pins of port 3 are Rx and Tx. These 2 pins are fixed pins i.e. there function cannot be interchanged. We will take a GSM modem. We will connect a antenna to that modem and will give a supply of 12V.There is a slot for SIM card to l insert a SIM card. Pin no 2 and 3 are Rx and Tx pins respectively. Pin no 5 is grounded. The voltages of Rx and Tx pins of the GSM modem and the Rx, Tx pins of the Port 3 are different. For port 3 it is around 0-5V and for the modem it is -10 to 10V. We will send and receive the data through the serial port. First the modem number will transmit and after that the message.

The GPS tracking system uses 24 satellites and 12 Ground stations. This module determines the position of user having a GPS receiver by the reception of user having a GPS receiver by the reception of three signals from four satellites using a method called trilateration. The NEO-6M is a navigation module that uses the GPS (Global Positioning System). The module simply determines its position on the globe and outputs the longitude and latitude of its position. The module contains four output pins, which are used to power the module as well as to communicate with it. Here, we have use LCD LM016L custom, which is used for dispays message received from user side GPS module.

5.2. SOFTWARE IMPLEMENTATION

The code of the project is written in the “Python language”.

Basics of Python language:

VNC viewer is used for compilation purpose. As we are using raspberry pi 3 as the main controller then for obvious reasons the software programming language will be Python. For raspberry pi, we can use software programming languages like Python. The Complete system is implemented with the Raspberry pi connected with the GPS and GSM module to meet the requisite.

- **Advanced IP Scanner:**

  It is a fast and free network scanning software. This allows to quickly detect and access all network computers. With just one click, one can turn your remote PC on and off and connect via Radmin. Reliable and free network scanner to analyze LAN. The program shows all network devices, gives you access to shared folders, provides remote control of computers (via RDP and Radmin), and can even remotely switch computers off.

- **VNC (Virtual Network Computing):**

  Free integration into the Raspbian operating system for non-commercial purposes-Access your Raspberry Pi from any other computer, tablet, or smartphone. Either via your home network or the internet. This walkthrough uses a VNC viewer and VNC server to quickly connect to your Raspberry Pi from your Windows PC and Android smartphone.

CHAPTER 6

DISCUSSION AND RESULTS

The complete development of the project was discussed and this system was divided into the following stages:

Problem definition stage;

Designing block diagram;

Designing circuit diagram;

Purchasing parts from the market;

Testing individual components;

Testing and Troubleshooting;

Writing individual part of software;

Compiling the code;

Testing and Running.

Problem definition stage

This is the very first stage to develop any project. It actually defines the aim and the concept of the project. The aim of **"Wearable location tracker during disaster"** is to design a device which will give location of the user whenever he/she is stuck in disaster. Rescue team reaches to help user as soon as rescue team gets the live location. So the concept of the device is to be very helpful in all types of situations and help a person in crisis.

Designing block diagram

At this stage we have categorized the whole system into different individual modules. These modules (block diagrams) will be helpful in understanding the concept and working of the integrated system. It also simplifies the entire debugging and testing process. So the result was the block diagram of the project.

Designing circuit diagram

In this stage a circuit diagram of the device was made showing how the different components will be linked to each other. The circuit diagram is very useful in understanding the real working of the project as it shows how each and every component is connected and working. So the circuit diagram of the project was ready at the end of this stage.

Purchasing parts from the market

After the circuit diagram was made the components that were required to make the project were purchased from the market.

Testing individual components

In this stage all the components were tested that they are working fine before they are implemented. This stage was very much necessary as it would have been difficult to manage if any component would had been found faulty after it was actually implemented.

Testing and Troubleshooting

It is required to check that all the components are working fine after implementation is done. If any problem occurs then it is rectified and solved properly.

Writing individual part of software

After the development of the algorithm we write the code for all the individual parts in the project. Code is written in “Python” language.

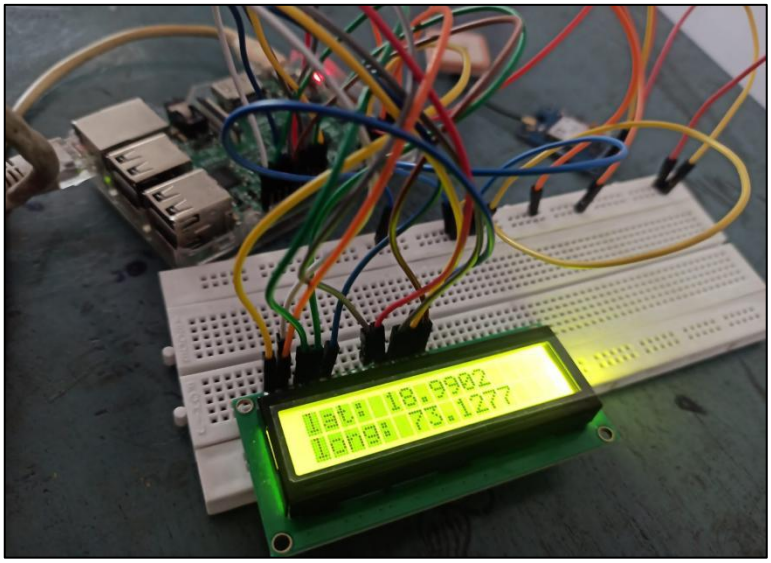
Compiling the code

The code is implemented on the computer for which we have used a compiler name Thonny pre-installed on PC. The BASCOM8051 is a Computer Aided Program which is used for burning the program code into the microcontroller.

Testing and Running

This time we tested our project for actual working, after loading the software into the microcontroller. Any errors found were removed successfully. This is the last and final stage of development of our project.

Result: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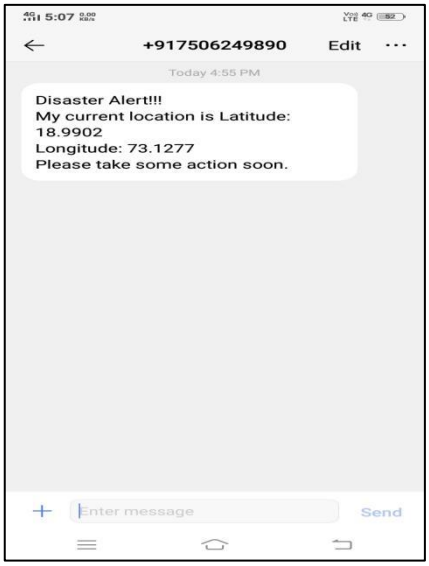
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Disaster Alert!!!
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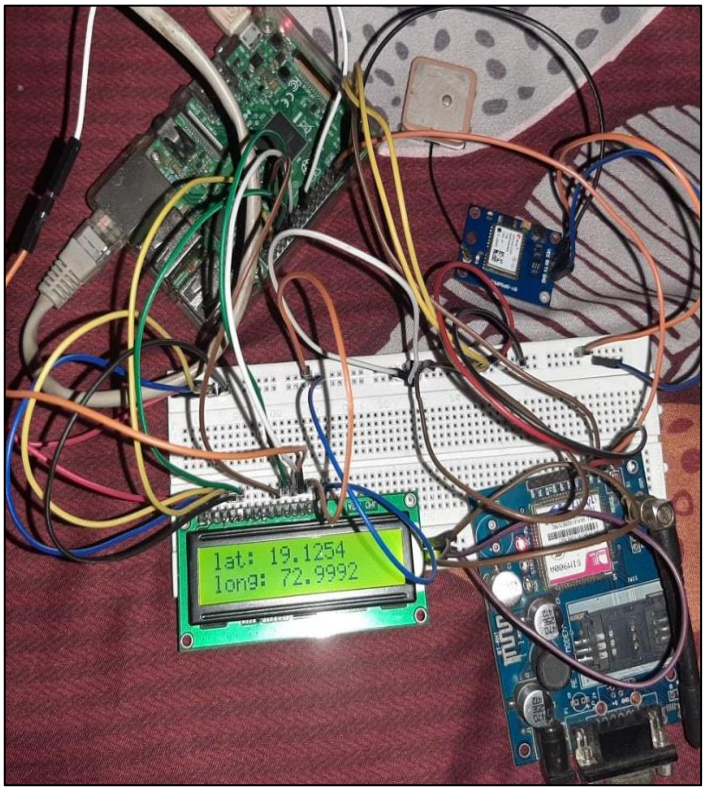
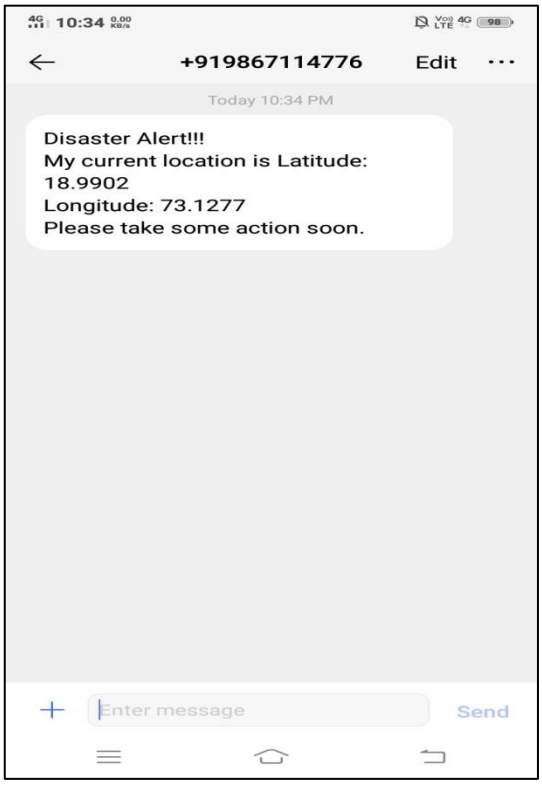
Longitude: 73.1277
Please take some action soon.
Enter message
Send


lat: 19.1254
long: 72.9992


10:34
+919867114776
Edit
Today 10:34 PM
Disaster Alert!!!
My current location is Latitude:
18.9902
Longitude: 73.1277
Please take some action soon.
Enter message
Send

CHAPTER 7

CONCLUSION

Rescuing victims from disaster sites has become easier and more sophisticated in recent years. Using latitudes and longitudes to pinpoint the precise location or position of a person or object. This research describes a Wearable Device architecture with a location tracking method that can be used to track and monitor people in a crisis. Different hybrid approaches are explained in this article, as well as a comparative study of the various methodologies stated above. In this project raspberry pi is used for controlling GPS. Huge processing power in a compact board Having the facility of GPS to develop this system required a GPS device to calculate the location from the information taken from GPS. This will make it easier and more convenient for us to track down lost objects using the stored database. The system is easily expandable to a real-world application for dealing with natural disasters. The proposed system could be very useful in the current situation, where natural disasters occur on a regular basis. The GPS device will obtain the current location from a satellite. We will find the location again if certain conditions are met. We may count the location again after a certain distance has passed.

FUTURE SCOPE

This project has scope because we can record the live location of the user but in future we can also implement a pi camera. Pi camera will help the rescue team to see the exact condition of disaster affected area. We can make this project more advanced by implementing it in more compact size like wrist watch, waist belt and neck tie.

Only one individual is connected to the GSM modem in this project, hence SMS will only be sent to that person. However, we can change it so that many individuals may connect and SMS can be sent to a large number of people. In order to operate SMS service via GSM modem, both hardware and software are interconnected.

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APPENDIX

CODE OF THE PROJECT

```
import time

import serial

import string

import pynmea2

import RPi.GPIO as gpio

import Adafruit_CharLCD as LCD

import RPi.GPIO as GPIO

import os

from random import randrange

gpio.setmode(gpio.BCM)

GPIO.setmode(GPIO.BOARD)

lcd = LCD.Adafruit_CharLCD(rs=26, en=19,

                    d4=13, d5=6, d6=5, d7=11,

                    cols=16, lines=2)

lcd.message("Disaster Alert")

time.sleep(2)
```

```
lcd.clear()

lcd.message("Help!!!!")

time.sleep(2)

lcd.clear()

lcd.message("Save Me…")

time.sleep(2)

lcd.clear()



port = "/dev/ttyAMA0" # the serial port to which the pi is connected.

#create a serial object

ser = serial.Serial(port, baudrate = 9600, timeout = 0.5)

try:

        while 1:

                try:

                        data = ser.readline()

                except:

                         print("loading")

 #wait for the serial port to churn out data
```

```
            if data[0:6] == '$GPGLL': # the long and lat data are always contained in the
        GPGLL string of the NMEA data

                msg = pynmea2

               latval = msg.lat #parse the latitude and print

                concatlat = "Lat:" + str(latval)

                print(concatlat)

                lcd.set_cursor(0,0)

                lcd.message(concatlat)

               #parse the longitude and print

                longval = msg.lon

                concatlong = "Long:"+ str(longval)

                print(concatlong)

                lcd.set_cursor(0,1)

                lcd.message(concatlong)

               6

                time.sleep(0.5)#wait a little before picking the next data.
except KeyboardInterrupt:

        lcd.clear()

        time.sleep(2)
```

```
# Enable Serial Communication

port = serial.Serial("/dev/ttyUSB0", baudrate=115200, timeout=1)

# Transmitting AT Commands to the Modem

# '\r\n' indicates the Enter key

port.write('AT'+'\r\n')

rcv = port.read(10)

print rcv

time.sleep(.1)

port.write('ATE0'+'\r\n')      # Disable the Echo

rcv = port.read(10)

print rcv

time.sleep(.1)

port.write('AT+CMGF=1'+'\r\n')  # Select Message format as Text mode

rcv = port.read(10)



print rcv

time.sleep(.1)

port.write('AT+CNMI=2,1,0,0,0'+'\r\n')   # New SMS Message Indications

rcv = port.read(10)
```

```
        print rcv
        time.sleep(.1)
        # Sending a message to a particular Number
        port.write('AT+CMGS="8108246407"'+'\r\n')
        rcv = port.read(10)
        print rcv
        time.sleep(.1)
        port.write("+'\Disaster Alert!!! \n')  # Message
        port.write("+'\Please take some action soon \n')  # Message
        rcv = port.read(10)
        print rcv
        port.write("\x1A") # Enable to send SMS
for i in range(10):
         rcv = port.
```