

SAVITRIBAI PHULE PUNE UNIVERSITY

A PROJECT REPORT ON

“IoT Based Smart System for Human Safety ”

SUBMITTED TOWARDS THE
PARTIAL FULFILLMENT OF THE REQUIREMENTS OF

BACHELOR OF ENGINEERING (Computer Engineering)

BY

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UNDER THE GUIDANCE OF
Prof. S. S. THOKAL



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2017-18



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C E R T I F I C A T E

This is to certify that the Project entitled

IoT Based Smart System for Human Safety

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PROJECT APPROVAL SHEET

A PROJECT TITLE

IoT Based Smart System for Human Safety

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Abstract

Today in the current global scenario, the prime question in every girls mind, considering the ever rising increase of issues on women harassment in recent past is mostly about her safety and security. Not for only Women , There are many Old Age Peoples and Physically Weak Peoples. This paper suggests a new perspective to use technology for Human safety. We propose an idea which changes the way everyone thinks about Human safety. A day when media broadcasts more of womens achievements rather than harassment, its a feat achieved! Since we (humans) cant respond aptly in critical situations, the need for a device which automatically senses and rescues the victim is the venture of our idea in this paper. We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable Smart Device which continuously communicates with Smart phone that has access to the internet. The application is programmed and loaded with all the required data which includes Human behavior and reactions to different situations like anger, fear . This generates a signal which is transmitted to the smart phone. The software or application has access to GPS and Messaging services which is preprogrammed in such a way that whenever it receives emergency signal, it can send help request along with the location co-ordinates to the nearest Police station, relatives and the people in the near radius who have application. This action enables help instantaneously from the Police as well as Public in the near radius who can reach the victim with great accuracy.

Keywords:Smart Device;GPS Technology;Bluetooth;Smart Phone Application;Body Sensor Network

Acknowledgement

It gives us great pleasure in presenting the preliminary project report on "IoT Based Smart System for Human Safety" and to express our deep regards towards those who have offered their valuable time and guidance in our hour of need.

*We would like to take this opportunity to thank our internal guide **Prof. S. S. THOKAL** for giving us all the help and guidance we needed. We are really grateful to them for their kind support. Their valuable suggestions were very helpful.*

*We are also grateful to **Dr. S. R. TODMAL**, Head of Computer Engineering Department, ICOER for his indispensable support, suggestions.*

*We are also glad to express our gratitude and thanks to our Principal **Dr. D. D. SHAH** for his constant inspiration and encouragement.*

Finally, we would like to express once again our gratitude and thanks to all those who are involved directly and indirectly in achieving our project a success.

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Chapter 1

SYNOPSIS

1.1 Project Title

IoT Based Smart System for Human Safety

1.2 Project Option

Industry Sponsored

1.3 Internal Guide

Prof. S. S. Thokal

1.4 Sponsorship and External Guide

Dream Navigator Association, Hadapsar, Pune

1.5 Technical Keywords (As per ACM Keywords)

- Smart Device
- GPS Technology
- Bluetooth
- Smart Phone Application
- Body Sensor Network

1.6 Problem Statement

To provide safety to Women's from harassment and threatening and to secure human being from medical emergency by using concept of IoT.

1.7 Abstract

Today in the current global scenario, the prime question in every girls mind, considering the ever rising increase of issues on women harassment in recent past is mostly about her safety and security. Not for only Women , There are many Old Age Peoples and Physically Weak Peoples. This paper suggests a new perspective to use technology for Human safety. We propose an idea which changes the way everyone thinks about Human safety. A day when media broadcasts more of

womens achievements rather than harassment, its a feat achieved! Since we (humans) cant respond aptly in critical situations, the need for a device which automatically senses and rescues the victim is the venture of our idea in this paper. We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable Smart Device which continuously communicates with Smart phone that has access to the internet. The application is programmed and loaded with all the required data which includes Human behavior and reactions to different situations like anger, fear . This generates a signal which is transmitted to the smart phone. The software or application has access to GPS and Messaging services which is pre-programmed in such a way that whenever it receives emergency signal, it can send help request along with the location co-ordinates to the nearest Police station, relatives and the people in the near radius who have application. This action enables help instantaneously from the Police as well as Public in the near radius who can reach the victim with great accuracy.

1.8 Goals and Objectives

Goals

- To provide safety for human being.
- To monitor health on real time basis.

Objectives

- To build compact and comfortable wearable device.
- To make the device cost efficient.

1.9 Relevant mathematics associated with the Project

Let S(be a main set of)= $\{DB, C, U, S, A, R\}$

where,

DB-database.This database is responsible for storing user information related to user transaction.It also training dataset.

C-set of clients or user i.e.C= $\{C_1, C_2, C_3, \dots, C_n\}$

U-set containing user based on their type i.e.U= $\{E, N\}$ E-existing user and N is a new user.

S-the server component of the system responsible for registering and authenticating users.

A-set of algorithms used for recommendation.A= $\{T, CB\}$

R-Result

1.10 Names of Conferences / Journals where papers can be published

- IEEE/ACM Conference/Journal 1
- Conferences/workshops in IITs
- Central Universities or SPPU Conferences
- IEEE/ACM Conference/Journal 2
- IJARCCE International Journal of Advanced Research in Computer and Communication Engineering
- IJCSIT International Journal of Computer Science and Information Technologies
- IJSART International Journal for Science and Research in Technology

1.11 Review of Conference/Journal Papers supporting Project idea

- **Title:-**Design of a women safety devices”,2016 IEEE Region 10 Humanitarian Technology Conference (R10-HTC),2016 [1]
Author:-Divya Chitkara; Nipun Sachdeva; Yash Dev Vashisht
Description:-This device has a small and very light weighted fly-back transformer. It is used because the ratio of turns of the winding is very high and hence use in the applications which requires high voltage and low current.
- **Title:-**”Prototype of an Intelligent System based on RFID and GPS Technologies for Women Safety”2016 5th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO),2016 [2]
Author:-Shaik Mazhar Hussain; Shaikh Azeemuddin Nizamuddin; Rolito Asuncion; Chandrashekhar Ramaiah; Ajay Vikram Singh
Description:-This paper describes the GPS technology so that the location of the victim can be traced using latitudes and longitudes
- **Title:-**”Design and Development of an IOT based wearable device for the Safety and Security of women and girl children”,2016 IEEE International Conference on Recent Trends in Electronics, Information and Communication Technology (RTEICT),2016 [3]
Author:-Anand Jatti; Madhvi Kannan; R M Alisha; P. Vijayalakshmi; Shrestha Sinha
Description:-This device continuously monitors the individual wearing it, the data being accessible world over enabled by the benefits of cloud computing

- **Title:-**”Design and Implementation of a Rescue System for Safety of Women”,2016 International Conference on Wireless Communications, Signal Processing and Networking (WiSP-NET),2016 [4]

Author:-Madhura Mahajan; KTV Reddy; Manita Rajput

Description:-In this paper, they have proposed the designing and implementation of a safety system for women in the form of partial wearable. Going serially as per the objectives mentioned, a location tracking subsystem was successfully implemented and the corresponding results were logged.

- **Title:-**”A Secure IoT-based Healthcare System with Body Sensor Networks”,IEEE Access,2016 [5]

Author:-Kuo-Hui Yeh, Senior Member, IEEE

Description:-In this paper, it demonstrated a secure healthcare system for IoT-oriented BSN infrastructures in which two authentication processes are proposed to satisfy major security requirements.

- **Title:-**”Smart Foot Device for Women Safety”,2016 IEEE Region 10 Symposium (TEN-SYMP),2016 [6]

Author:-Nandita Viswanath; Naga Vaishnavi Pakyala; G. Muneeswari

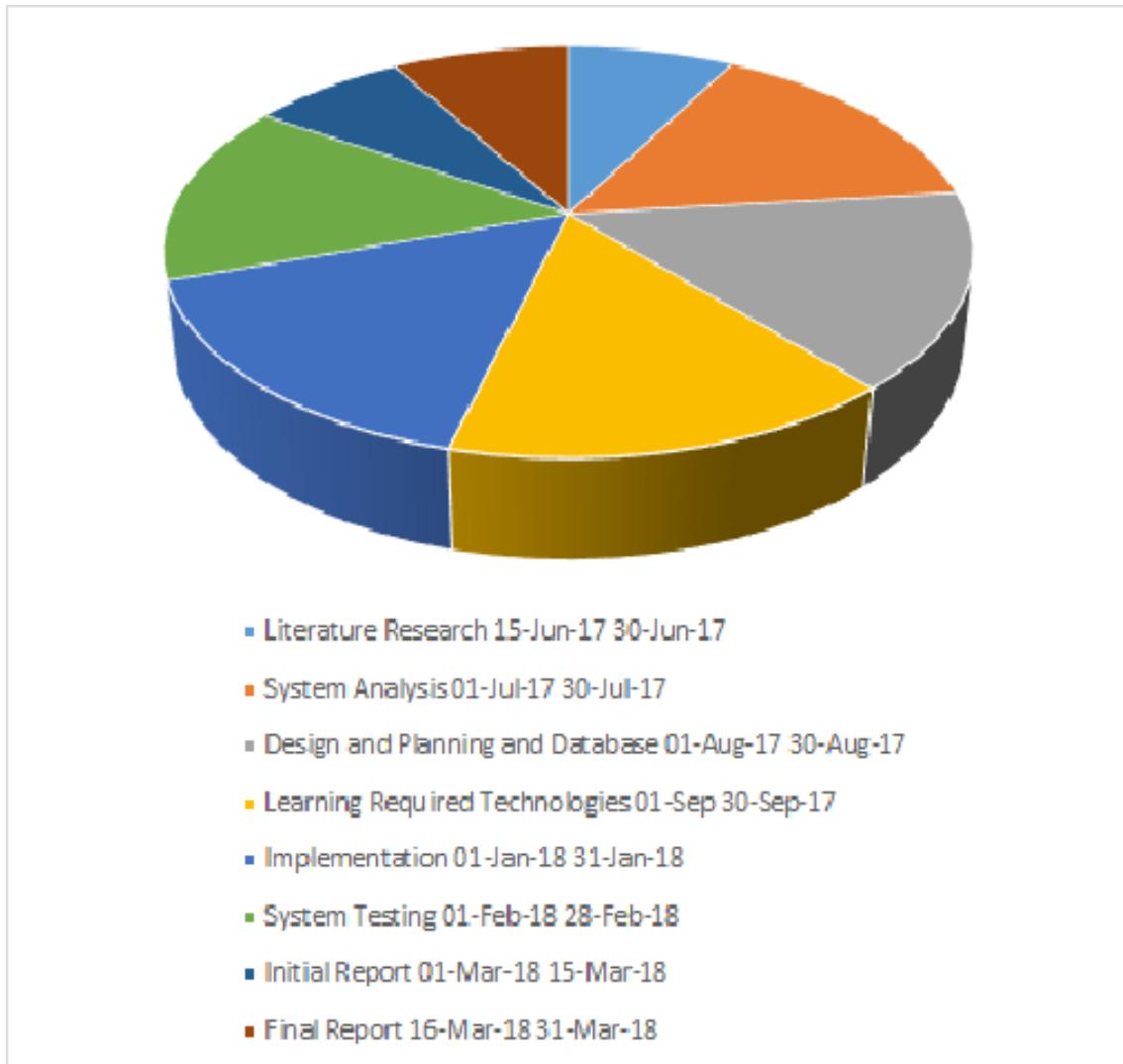
Description:-This device is clipped to the footwear of the user. The automated system gave a high accuracy of 100% in the tapping scenario and 95% in the walking scenario. This low cost system does not require the user to have physical access to her smartphone and the device is well hidden.

- **Title:-**”Design and Implementation of Safety Armband for Women and Children using ARM7”, 2015 International Conference on Power and Advanced Control Engineering (ICPACE),2015 [7]

Author:-Glenson Toney; Fathima Jabeen; Puneeth S

Description:-This paper proposes a device that would be turned ON by an action of human hand. The main idea is to not only have alert systems but also a device that would collect evidence

1.12 Plan of Project Execution:-



Chapter 2

TECHNICAL KEYWORDS

2.1 Area of project

Internet Of Thing(IoT)

The Internet of things (IoT) is the network of physical devices, vehicles, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data.

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of about 30 billion objects by 2020.

Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a smart grid, and expanding to areas such as smart cities.

”Things”, in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, cameras streaming live feeds of wild animals in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring, or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest regarding ”things” as an ”inextricable mixture of hardware, software, data and service”.

2.2 Technical Keywords (As per ACM Keywords)

Please note ACM Keywords can be found : <http://www.acm.org/about/class/ccs98-.html>

- Smart Device
- GPS Technology
- Bluetooth
- Smart Phone Application

- Body Sensor Network

Chapter 3

INTRODUCTION

3.1 PROJECT IDEA

Now a days in most of the countries innocent women are brutally harassed by some of the people. Women are facing such a problem very oftenly. The day by day increase in such situation women are afraid of leaving the house at night. So basically women are bounded to such situation in some of countries women doesn't feel safe at night.

Harassment is not only the issue. In most of countries children are threaten and get kidnapped. Now a days this is one of the major issue.

One of the major factor for doing this project is some of people has health related issues. Sometime they did not get proper medication on time. In some situation it might leads towards the death that person if did not get any kind of help from any one.

These three are the major aspect for doing this project. These three aspect motivated us to do this project which will help humans in a better way.

3.2 MOTIVATION

- Developing an application for citizens to efficiently secured lifestyle
 - Day by day increase in women harrasement.
 - The need of an advanced system to serve the purpose of alerting someone for help.
 - This device is an answer to all the women who deserve a safe and secure world.

3.3 Literature Survey

1. **Title:-**”Design of a women safety devices”,2016 IEEE Region 10 Humanitarian Technology Conference (R10-HTC),2016

Author:-Divya Chitkara; Nipun Sachdeva; Yash Dev Vashisht

Description:-This device has a small and very light weighted fly-back transformer. It is used because the ratio of turns of the winding is very high and hence use in the applications which requires high voltage and low current.

2. **Title:-**”Prototype of an Intelligent System based on RFID and GPS Technologies for Women Safety”2016 5th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO),2016

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4. **Title:-**”Design and Implementation of a Rescue System for Safety of Women”,2016 International Conference on Wireless Communications, Signal Processing and Networking (WiSP-NET),2016
Author:-Madhura Mahajan; KTV Reddy; Manita Rajput
Description:-In this paper, they have proposed the designing and implementation of a safety system for women in the form of partial wearable. Going serially as per the objectives mentioned, a location tracking subsystem was successfully implemented and the corresponding results were logged.

5. **Title:-**”A Secure IoT-based Healthcare System with Body Sensor Networks”,IEEE Access,2016
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7. **Title:-**”Design and Implementation of Safety Armband for Women and Children using ARM7”, 2015 International Conference on Power and Advanced Control Engineering (ICPACE),2015
Author:-Glenson Toney; Fathima Jabeen; Puneeth S
Description:-This paper proposes a device that would be turned ON by an action of human hand. The main idea is to not only have alert systems but also a device that would collect evidence

Chapter 4

PROBLEM DEFINITION AND SCOPE

4.1 PROBLEM STATEMENT

To provide safety to Women's from harassment and threatening and to secure human being from medical emergency by using concept of IoT.

4.2 Goals and objectives

Goals

- To provide safety for human being.
- To monitor health on real time basis.

Objectives

- To build compact and comfortable wearable device.
- To make the device cost efficient.

4.3 Statement of scope

The project is based on building a smart device for human safety. The device will help humans to track their real time location in any kind of physical and threatening/harassment emergency.

4.4 SOFTWARE CONTEXT

- Android studio
- Windows
- Arduino

4.5 Major Constraints

- Determining the exact specific opinion about user's situation.
- Creating user oriented system to effectively mine and extract all the data to help the user
- Result representation

4.6 Methodologies of Problem solving and efficiency issues

- The single problem can be solved by different solutions. This considers the performance parameters for each approach. Thus considers the efficiency issues.
- We can use a divide and conquer approach for our problem.
- Divide and conquer strategy works better than a traditional linear approach, it also requires a distributed or multi-core environment.

4.7 Scenario in which multi-core, Embedded and Distributed Computing used

Client-server relationship exists in our human safety system. Here Client is front end of the system. Back end of the system is the server(database). User interacts through GUI and user queries are taken. Whereas server processes these user queries and generates result by using appropriate algorithm and sends the data to various users.

4.8 Outcome

- Citizen across the country will get the emergency help regarding health or threatening/harassment.
- A quick response can save multiple life.

4.9 Applications

- Real time usage to achieve human safety.
- Interactive information exchange on the users.

4.10 Hardware Resources Required

- Hardware
 1. RAM : 4GB for faster processing
 2. CPU : 2GHz for sufficient processing power
 3. Arduino
 4. Sensors

4.11 Software Resources Required

1. Platform : Android Studio, Arduino, MySQL workbench, Eclipse
2. Operating System: Windows 7
3. Programming Language : Java, XML
4. Framework : JSP and ANDROID

Chapter 5

Project Plan

5.1 Project Estimates

5.1.1 Reconciled Estimates

Cost estimates

1. IDE - Free
2. Hardware and software cost

ARDUINO	2500
BLUETOOTH SENSOR	500
PULSE RATE SENSOR	500
TEMPERATURE SENSOR	250
WARABLE BAND	500
TOTAL	4250

Time Estimates

Procedure	Time
Literature Research	15 days
System Analysis	30 days
Design and Planning and Database	30 days
Learning Required Technologies	30 days
Implementation	31 days
System Testing	27 days
Initial Report	15 days
Final Report	16 days

5.1.2 Project Resources

ID	Name of Person	Responsibility
1	Prof.S. S. Thokal	Internal Guide
2	Akash Wadhawane	Developer
3	Amir Attar	Developer
4	Priyanka Ghodke	Developer
5	Prasad Petkar	Developer

- Hardware
 1. RAM : 4GB for faster processing
 2. CPU : 2GHz for sufficient processing power

- 3. Arduino
- 4. Sensors
- Software
 - 1. Platform : Android Studio, Arduino, MySQL Workbench, Eclipse
 - 2. Operating System: Windows 7
 - 3. Programming Language : Java, XML
 - 4. Framework : PHP and ANDROID

5.2 Risk Management with respect to NP Hard analysis

Risk is a possibility of loss or injury.Risk management is the identification assessment and prioritization of risks followed by coordinated and economical application of resources to minimize and control that would probability and impact of unfortunate events or to maximise the realization of opportunities. Risk can come from uncertainty in financial markets, project failures (at any phase in design, development, production and sustainment life cycles), legal liabilities, credit risks, accidents, natural causes and disasters as well deliberate attack from an advisory of uncertain and unpredictable cause.

Using risk management techniques we alleviate the harm or laws n software project or risk cannot be avoid but by perform in risk management we can attempt to ensure that right risks are taken at right time. Risk taking is essential to progress and failure is often key part of learning.

5.2.1 Risk Identification

Our development identified some potential risks to the project. These risks were analyzed and were classified into various categories depending upon the threat they posed to the project. Some of these risks were generic risks while others were product specific risks. A considerable amount of time was spent in analyzing the product specific risks.

- 1. Have top software and customer managers formally committed to support the project?
 - The software manager and the customer mangers are fully committed to the project
- 2. Are end-users enthusiastically committed to the project and the system/product to be built?
 - The end-users have also committed to the project and to the product to be built
- 3. Are requirements fully understood by the software engineering team and its customers?
 - Requirements for citizens are fully understood by whole team from consistent feedback of citizens

4. Have customers been involved fully in the definition of requirements?
 - Yes, citizens have been fully consulted and are involved in the process.
5. Do end-users have realistic expectations?
 - End users tend to have some unrealistic expectations, typically, on the various features of the product to be quickly delivered in a constrained manner.
6. Does the software engineering team have the right mix of skills?
 - The team consists of the people with Managerial, Designing as well as Developing skill set.
7. Are project requirements stable?
 - Project requirements are stable
8. Is the number of people on the project team adequate to do the job?
 - Number of people to do the job, are adequate, but interns may be necessary as the users grow in size.
9. Do all customer/user constituencies agree on the importance of the project and on the requirements for the system/product to be built?
 - Citizens have consistently agreed on the parameters of the project and its feasibility, and of the requirements for product to be built effectively.

5.2.2 Risk Analysis

The risks for the Project can be analyzed within the constraints of time and quality

ID	Risk Description	Probability		Impact	
			Schedule	Quality	Overall
1	Usage of Product	Low	Low	High	High
2	Financial Requirement	Med	Med	High	High

5.2.3 Overview of Risk Mitigation, Monitoring, Management

Risk ID	1
Risk Description	Errors Aries due to Sensor's data
Category	End User's Enviornment
Source	Noisy Data collected by sensors
Probability	Medium
Impact	Medium
Response	Mitigate
Strategy	Best quality of sensors will resolve the issue
Risk Status	Identified

Risk ID	2
Risk Description	Database Maintenance
Category	Development Environment
Source	Registration of users
Probability	Medium
Impact	High
Response	Serious
Strategy	Access Control Methods
Risk Status	Identified

Risk ID	3
Risk Description	End User's Satisfaction
Category	End User's Environment
Source	During actual use of system
Probability	High
Impact	High
Response	Seriouse
Strategy	Maintenacne of user's Requirement
Risk Status	Identified

Risk ID	4
Risk Description	Knowledge of software developer
Category	Implementation Environment
Source	Software Developer
Probability	Low
Impact	High
Response	Mitigate
Strategy	Train Software Engineers/Replace them with good one
Risk Status	Identified

Risk ID	5
Risk Description	Low Acceptability and Usage
Category	User Base Generation
Source	Software requirement Specification document.
Probability	Medium
Impact	High
Response	Group Creation typically Club for quick boost
Strategy	Endorsement and Advertising
Risk Status	May Occur

Risk ID	6
Risk Description	User Base not using the product
Category	User Base
Source	Software Design Specification documentation review.
Probability	Low
Impact	High
Response	Adding new features consistently
Strategy	High Level Advertising in Newspapers, Journals
Risk Status	May Occur

5.3 Project Schedule

5.3.1 Project task set

Major Tasks in the Project stages are:

- Task 1: Literature Research
- Task 2: System Analysis
- Task 3: Design & Planning and Data-set
- Task 4: Learning Required Technologies
- Task 5: Implementation
- Task 6: System Testing
- Task 7: Initial Report
- Task 8: Final Report

5.3.2 Task Network

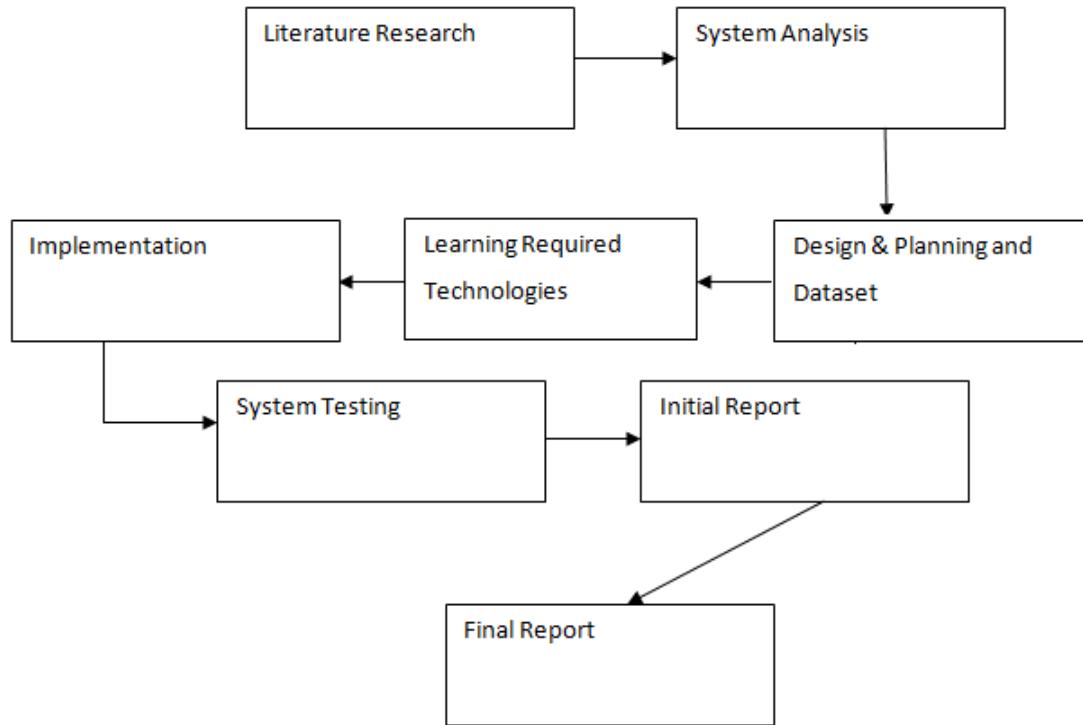
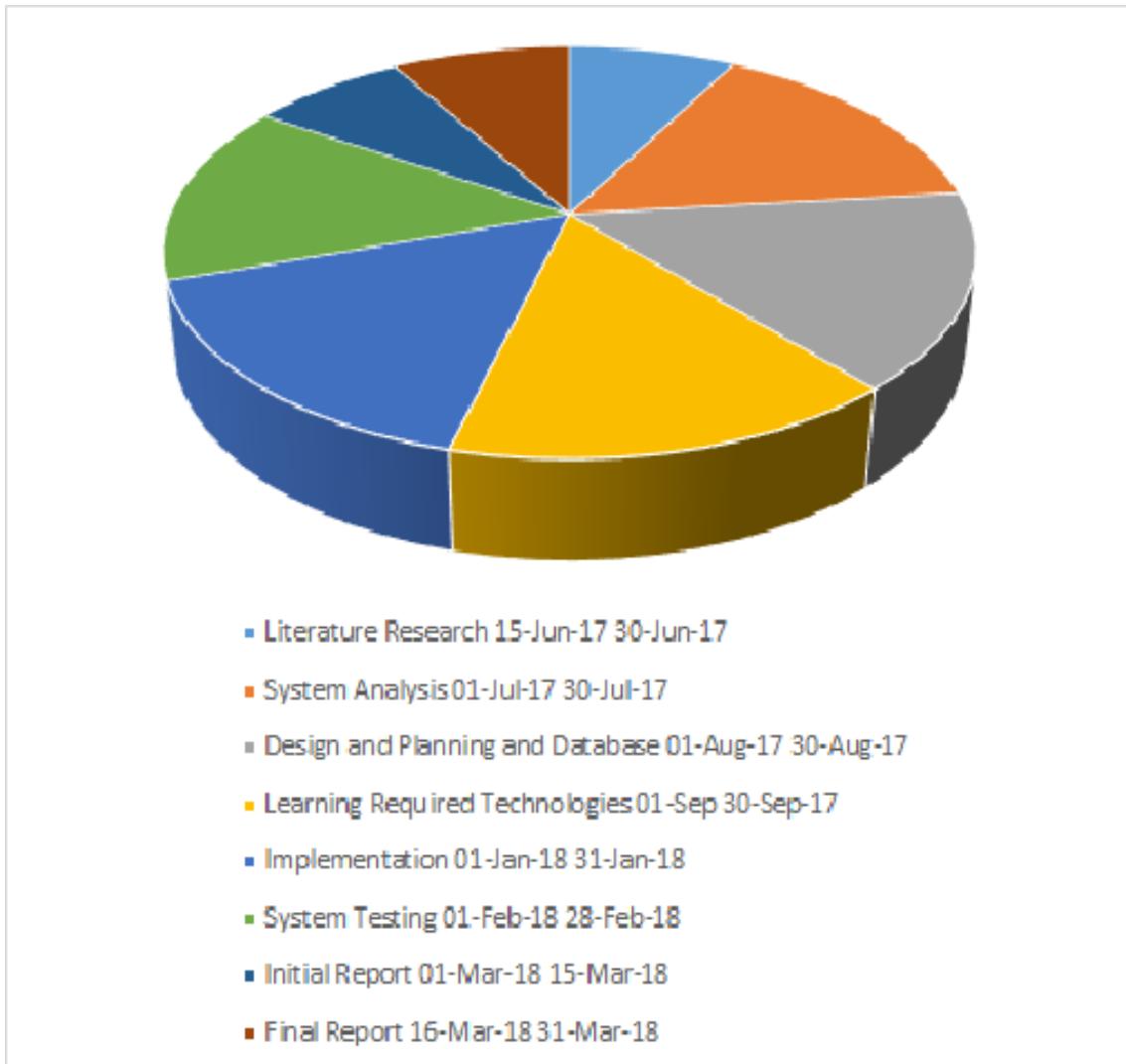


Figure 5.3.1: Task Network

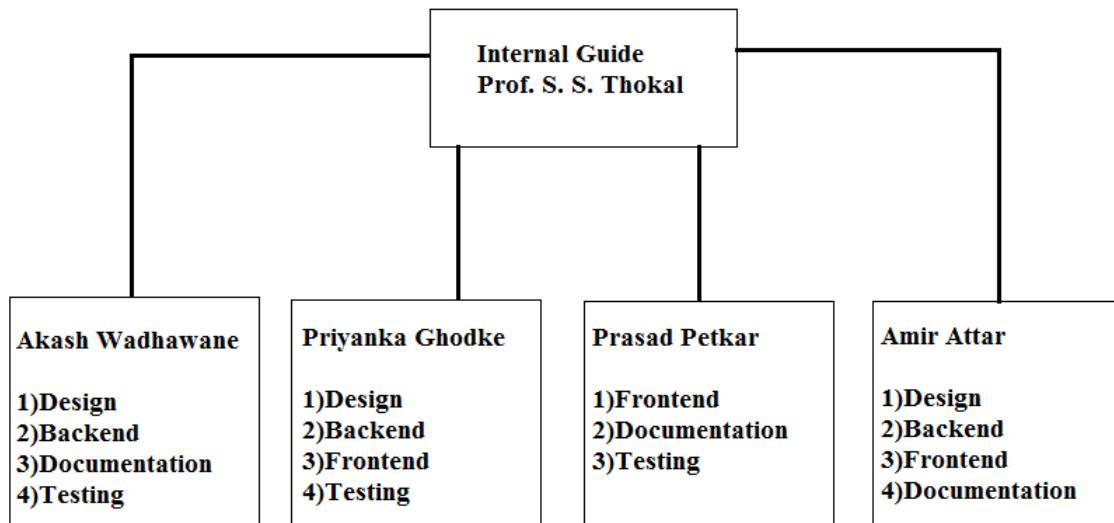
5.3.3 Timeline Chart



5.4 Team Organization

Sr. No.	Design/Develop	Name of Designers/Developers
1	Design	<ol style="list-style-type: none">1. Akash Wadhawane2. Amir Attar3. Priyanka Ghodke
2	Backend	<ol style="list-style-type: none">1. Akash Wadhawane2. Amir Attar3. Priyanka Ghodke
3	Front end	<ol style="list-style-type: none">1. Amir Attar2. Priyanka Ghodke3. Prasad Petkar
4	Documentation	<ol style="list-style-type: none">1. Akash Wadhawane2. Amir Attar3. Prasad Petkar
5	Testing	<ol style="list-style-type: none">1. Akash Wadhawane2. Priyanka Ghodake3. Prasad Petkar

5.5 Team structure



Chapter 6

Software Requirement Specification

6.1 Introduction

6.1.1 Purpose and Scope of Document

- **Purpose :** A software requirements specification (SRS) is a description of a software system to be developed, laying out function and non-function requirements, and may include a set of use cases that describe interaction the users will have with the software. Software requirement specification establishes the basis for an agreement between customer and contractor or suppliers (in market-driven projects, these roles may be played by the marketing and development division) on do. Software requirement specification permits a rigorous assessment of requirements before design can begin and reduces later redesign. It should also provide a realistic basis for estimating product costs, risks, and schedules.
- **Scope :** The software requirement specification document enlists enough and necessary requirements that are required for the project development. To derive the requirements we need to have clear and thorough understanding of products to be developed or being developed. This is achieved refined with detailed and continuous communication with the project team and customer till the completion of the software. the SRS may be one of a contract deliverable Data item Description or have other forms of organizationally mandated content.

6.1.2 Overview of responsibilities of Developer

The following activities are carried out:

- Design : Akash Wadhawane, Amir Attar, Priyanka Ghodke
- Backend : Akash Wadhawane, Amir Attar, Priyanka Ghodke
- Front end : Amir Attar, Priyanka Ghodke, Prasad Petkar
- Documentation : Akash Wadhawane, Amir Attar, Prasad Petkar
- Testing : Akash Wadhawane, Priyanka Ghodake, Prasad Petkar

6.2 Usage Scenario

This section provides various usage scenarios for the system to be developed.

- Gathering opinion from databases
- Organizing Information

6.2.1 User profiles

The profiles of all user categories are described here.(Actors and their Description)

- Citizens
- Administrator
- Ambulance
- police station

6.2.2 Use-cases

1. Usecase-system
2. Description-usecase shows working and cases of project.
3. Actors-Users

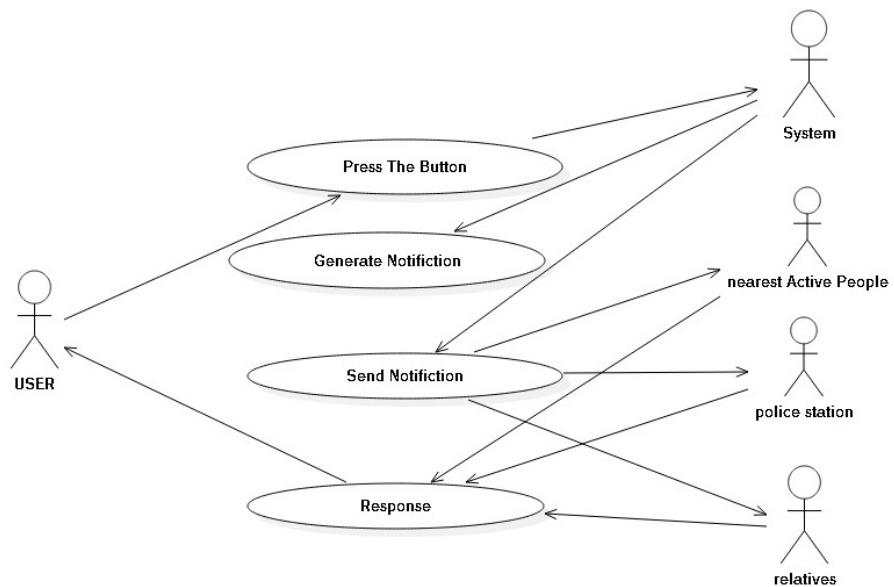


Figure 6.2.1: Usecase Diagram

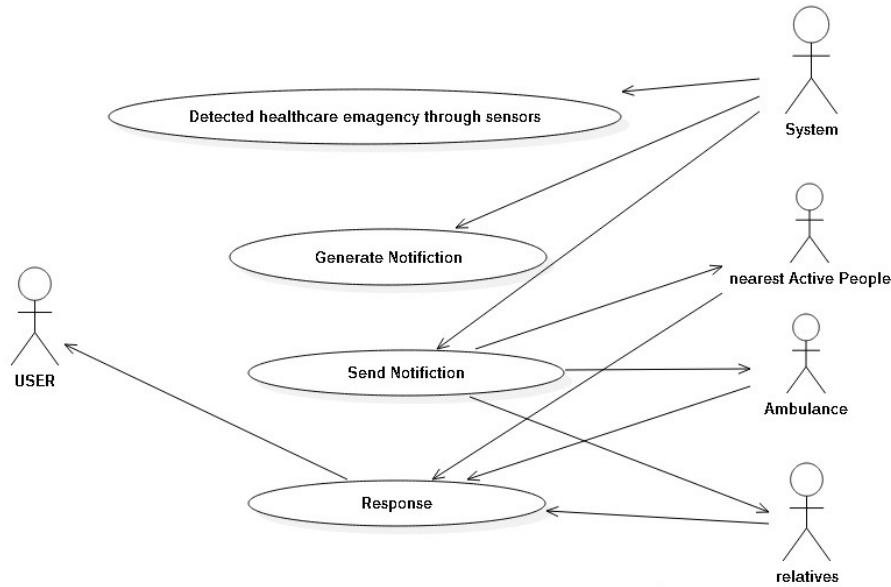


Figure 6.2.2: Usecase Diagram

6.3 Data Model and Description

6.3.1 Data Description

Data objects that will be managed/manipulated by the software are described in this section. The database entities or files or data structures required to be described. For data objects details can be given as below

- Queries
- Processing
- Processed
- Result

6.3.2 Data objects and Relationships

Data objects and their major attributes and relationships among data objects are described using an ERD- like form.

6.4 Functional Model and Description

A description of each major software function, along with data flow (structured analysis) or class hierarchy (Analysis Class diagram with class description for object oriented system) is presented.

6.4.1 Data Flow Diagram

- Data Flow Diagram



Figure 6.4.1: DataFlow Diagram

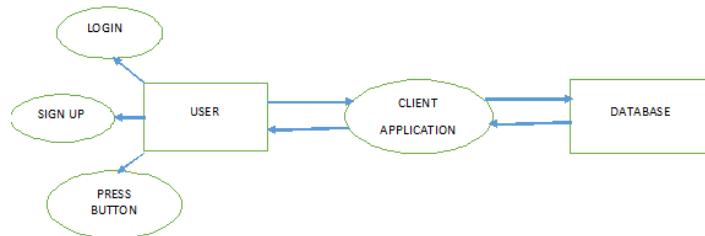


Figure 6.4.2: DataFlow Diagram

6.4.2 Activity Diagram:

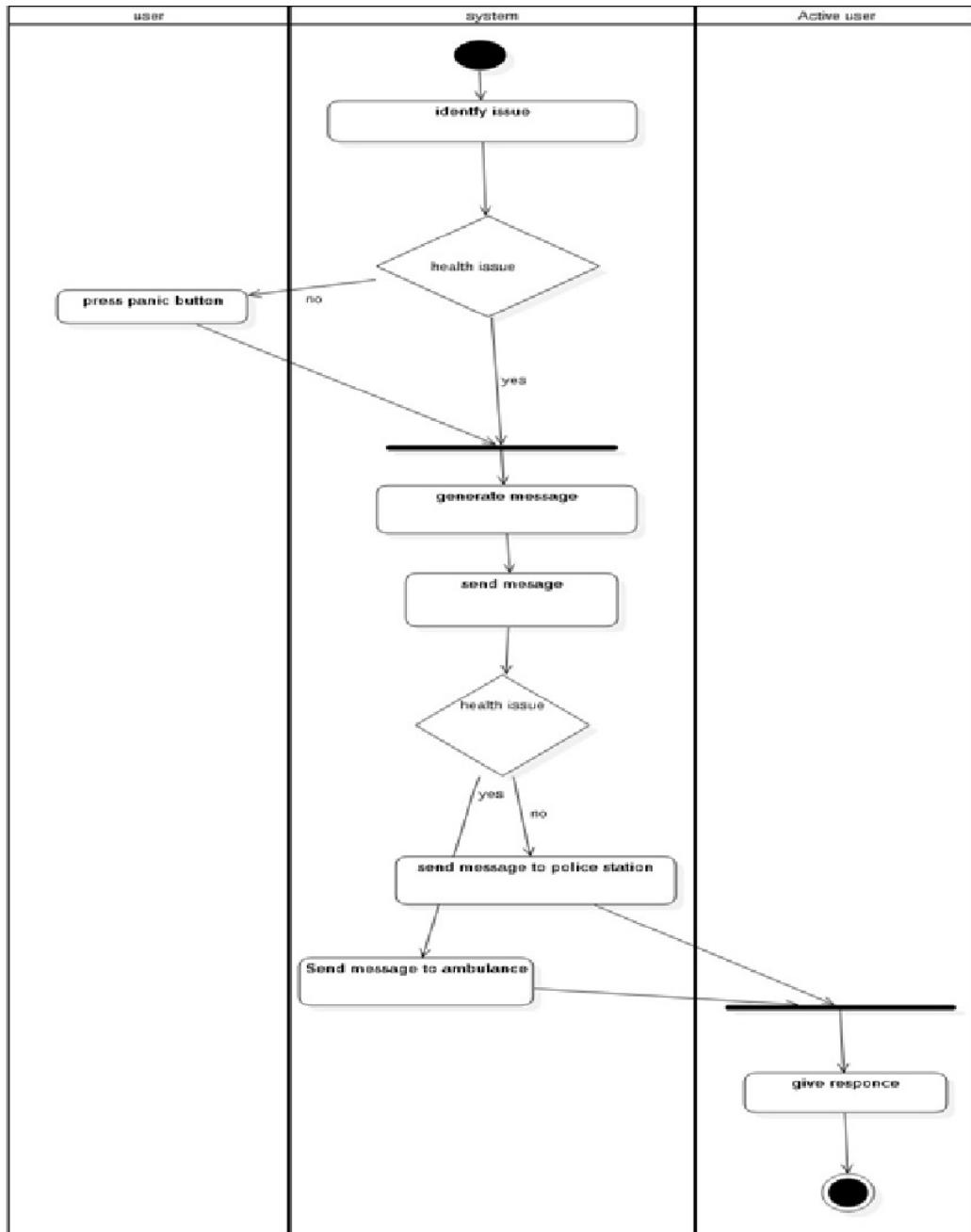


Figure 6.4.3: Activity Diagram

6.4.3 Non Functional Requirements:

- **Interface Requirements:** The interface should be easy to use and intuitive.
- **Performance Requirements:** The system should give an effective and high performance.
- **Software quality attributes:** Availability, Reliability, Re-usability, Scalability, Performance, Usability

The system considers following non-functional requirements to provide better functionalities and usage of system.

Usability: The system is designed keeping in mind the usability issues considering the end-users who are developers/programmers. Effort required in learning, operating, preparing input, and interpreting output are to be minimized. It provides detailed help which would lead to better and faster learning. Navigation of system is easy.

Agility: Improves with users able to rapidly and inexpensively re-provision technological infrastructure resources. The cost of overall computing is unchanged, however, and the providers will merely absorb up-front costs and spread costs over a longer period.

Consistency: Uniformity in layout, screens, colors scheme, via dynamic (“on-demand”) provisioning of resources on a fine-grained, self service basis near real-time, without users having to engineer for peak loads.

Performance: Performance depends on the users familiarity with the usage of the system.

Extendability: Templates can be imported from different applications, adding more features in workflow.

Reusability: The native files provided in the system can be used any number of times for faster execution. New native files can be created and saved which again can be made available. Since the application is network host based, it can be used anywhere anytime by a single user.

Reliability: Protection of data from malicious attack and unauthorized access. Improves through the use of multiple redundant sites, which makes mobile agents suitable for business continuity and disaster recovery.

6.4.4 State Diagram:

State Transition Diagram

The states are represented in ovals and state of system gets changed when certain events occur. The transitions from one state to the other are represented by arrows. The Figure shows important states and events that occur while creating new project.

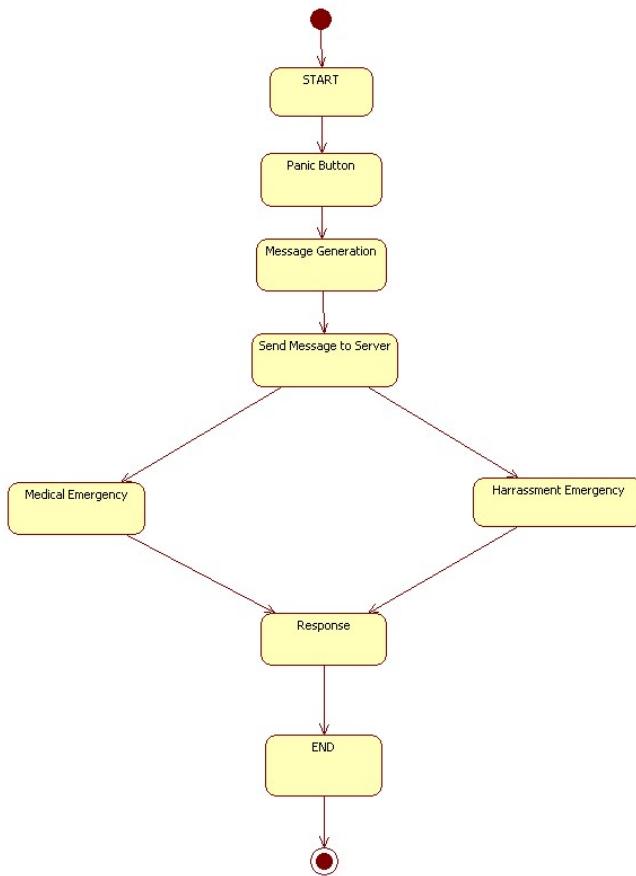


Figure 6.4.4: State Diagram

6.4.5 Design Constraints

Any design constraints that will impact the subsystem are noted. There is a necessity to study design patterns in detail. Depending upon the various kinds of patterns available, different design constraints may be encountered such as supporting multiple operating systems which may not be possible due to using the .NET framework. The schedule is tight and deadlines prove a reasonable constraint while adding features.

6.4.6 Software Interface Description

The interface must be easy to understand and use. It must be intuitive and explain the use at a glance. The software also needs to interface with existing search engines. This will be handled using an API or a web scraper.

Chapter 7

Detailed Design Document

7.1 Introduction

This document specifies the design that is used to solve the problem of Product.

7.2 Architectural Design

A description of the program architecture is presented.

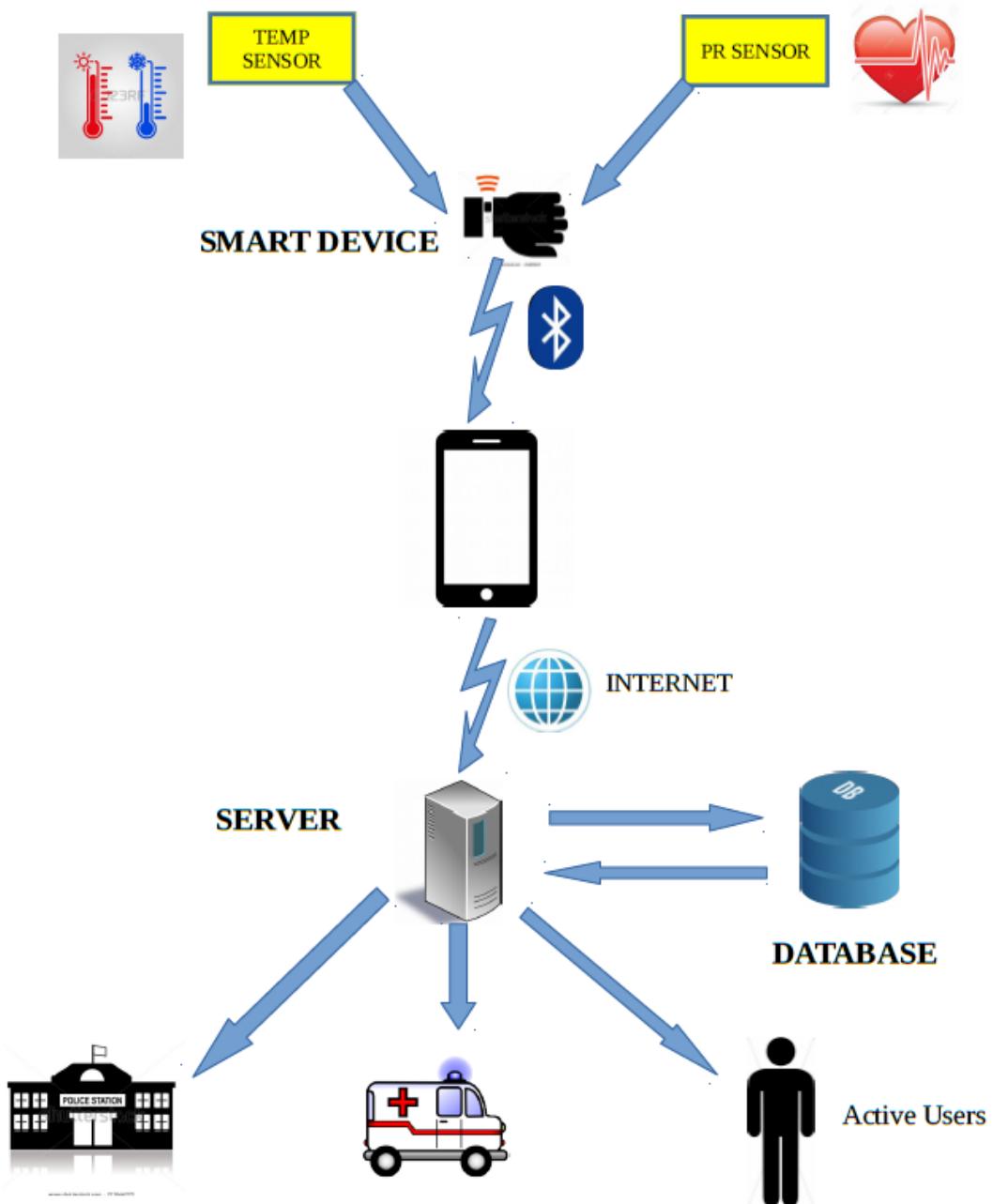


Figure 7.2.1: Architecture

7.3 Data design

A description of all data structures including internal, global, and , database design (tables), file formats.

7.3.1 Internal software data structure

- Sensor based

7.3.2 Global data structure

Data structured that are available to major portions of the architecture are described.

- Android Based

7.3.3 Database description

The database will be used to store user details.

7.4 Component Design

7.4.1 Class Diagram

Class diagrams are the most common diagrams used in UML. Class diagram is main building block of any object oriented solution. It shows the classes in system, attributes and operations of each class and the relationship between each class. Class diagrams are static in nature.

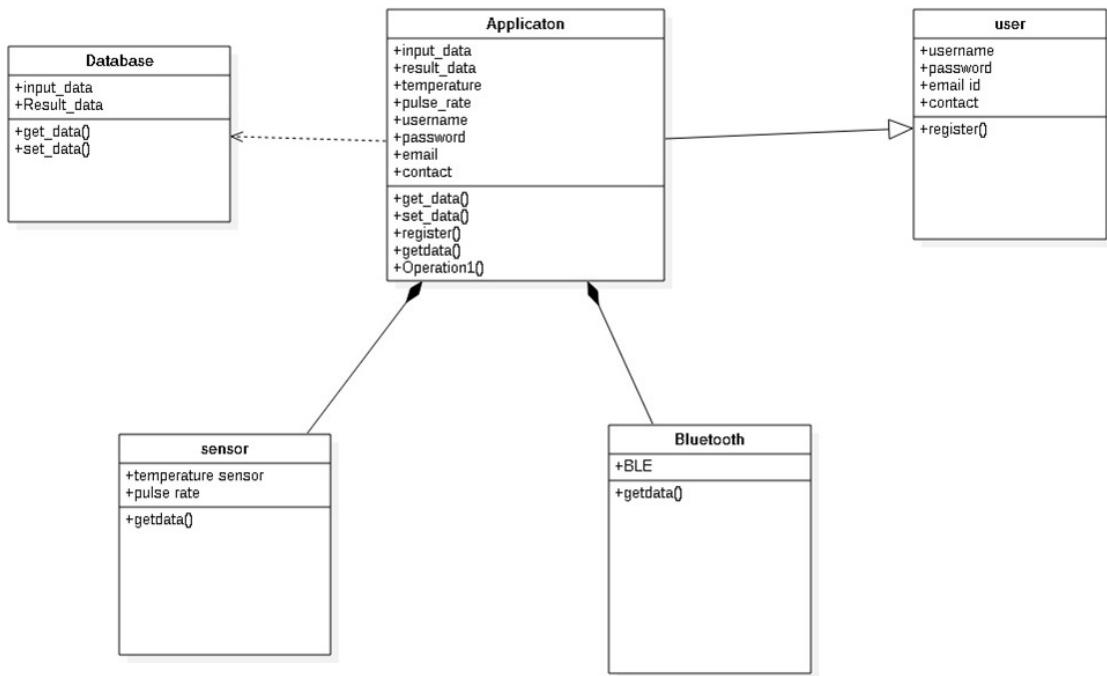


Figure 7.4.1: Class Diagram

Chapter 8

Project Implementation

8.1 Tools and Technologies Used

1. Android Studio

Android Studio is widely known as the official IDE for Google's Android OS, it is built on Jet-Brains' IntelliJ IDEA software and it is mainly used for Android development. It is available for OS such as Windows, macOS and Linux. It is an alternative or replacement for Eclipse Android Development Tools as first IDE for native Android application development.

On May 16, 2013 Android Studio was announced at the Google I/O conference. It is started developing in early access first stage started from version 0.1 in May 2013, then at version 0.8 started using beta stage which was released in June 2014. The first actual build was released in December 2014, starting from version 1.0. Now a days we are using version 3.1 which is released in March 2018.

Features

The following features are provided in the latest version:

- It supports Gradle-based build.
- It uses Android-specific refactoring and quick fixes.
- To catch performance, usability, version compatibility and other problems, it used Lint tools.
- It has ProGuard integration and app-signing capabilities.
- It has template-based wizards to create common Android designs and components.
- It has layout editor that is used for drag-and-drop UI components, option to preview layouts on multiple screen configurations.
- It supports building Android Wear apps.
- Android Virtual Device (Emulator) to run and debug apps in the Android studio.

Android Studio supports all the same programming languages of IntelliJ, and PyCharm e.g. Python, and Kotlin; and Android Studio 3.0 supports "Java 7 language features and a subset of Java 8 language features that vary by platform version." External projects backport some Java 9 features

2. Android Software Development

Android software development is the process by which new applications are created for devices running the Android operating system. Officially, apps can be written using Java, C++ or Kotlin using the Android software development kit (SDK). Third party tools, development environments and language support have also continued to evolve and expand since the initial SDK was released in 2008.

Android SDK The Android software development kit (SDK) includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and tutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, and Windows 7 or later. As of March 2015, the SDK is not available on Android itself, but software development is possible by using specialized Android applications.

Android applications are packaged in .apk format and stored under /data/app folder on the Android OS (the folder is accessible only to the root user for security reasons). APK package contains .dex files(compiled byte code files called Dalvik executables), resource files, etc

3. PHP

PHP: Hypertext Preprocessor (or simply PHP) is a server-side scripting language designed for web development but also used as a general-purpose programming language. It was originally created by Rasmus Lerdorf in 1994, the PHP reference implementation is now produced by The PHP Group. PHP originally stood for Personal Home Page, but it now stands for the recursive acronym PHP: Hypertext Preprocessor.

PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management systems, and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command-line interface (CLI) and can be used to implement standalone graphical applications.

PHP has been widely ported and can be deployed on most web servers on almost every operating system and platform, free of charge.

4. Arduino Uno

The Arduino UNO is a widely used open-source microcontroller board based on the **ATmega328P microcontroller** and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins. It is programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Soft-

ware (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform. The ATmega328 on the Arduino Uno comes preprogrammed with a bootloader that allows to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol. The Uno also differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. The Arduino UNO is generally considered the most user-friendly and popular board, with boards being sold worldwide for less than 5\$

5. C Language

C is a general-purpose, imperative computer programming language, supporting structured programming, lexical variable scope and recursion, while a static type system prevents many unintended operations. By design, C provides constructs that map efficiently to typical machine instructions, and therefore it has found lasting use in applications that had formerly been coded in assembly language, including operating systems, as well as various application software for computers ranging from supercomputers to embedded systems.

C was originally developed by Dennis Ritchie between 1969 and 1973 at Bell Labs, and used to re-implement the Unix operating system. It has since become one of the most widely used programming languages of all time, with C compilers from various vendors available for the majority of existing computer architectures and operating systems

Chapter 9

Software Testing

9.1 Introduction

Software testing is the process of evaluation a software item to detect differences between given input and expected output. Also to access the feature of a software item. Testing assesses the quality of the product. Software testing is a process that should be done during the development process. In other words software testing is a verification and validation process.

Verification: Verification is the process to make sure the product satisfies the conditions imposed at the start of the development phase. In other words, to make sure the product behaves the way we want it to.

Validation: Validation is the process to make sure the product satisfies the specified requirements at the end of the development phase.

9.2 Type Of Testing Used

Testing:

The definition of testing is "the process of questioning a product in order to evaluate it", where the "questions" are things the tester tries to do with the product, and the product answers with its behavior in reaction to the probing of the tester. Although most of the intellectual processes of testing are nearly identical to that of review or inspection, the word testing is connote to mean the dynamic analysis of the product putting the product through its paces. The quality of the application can and normally does vary widely from system to system but some of the common quality attributes include reliability, stability, portability, maintainability and usability. Refer to the ISO standard ISO 9126 for a more complete list of attributes and criteria.

1. Unit testing:

Unit testing, also known as component testing, refers to tests that verify the functionality of a specific section of code, usually at the function level. In an object-oriented environment, this is usually at the class level, and the minimal unit tests include the constructors and destructors.

These types of tests are usually written by developers as they work on code (white-box style), to ensure that the specific function is working as expected. One function might have multiple tests, to catch corner cases or other branches in the code. Unit testing alone cannot verify the functionality of a piece of software, but rather is used to ensure that the building blocks of the software work independently from each other.

Unit testing is a software development process that involves synchronized application of a broad spectrum of defect prevention and detection strategies in order to reduce software development risks, time, and costs. It is performed by the software developer or engineer during

the construction phase of the software development lifecycle. Rather than replace traditional QA focuses, it augments it. Unit testing aims to eliminate construction errors before code is promoted to QA; this strategy is intended to increase the quality of the resulting software as well as the efficiency of the overall development and QA process.

Depending on the organization’s expectations for software development, unit testing might include static code analysis, data flow analysis, metrics analysis, peer code reviews, code coverage analysis and other software verification practices

2. Black box testing:

Strategies for Black Box Testing Ideally, wed like to test every possible thing that can be done with our program. But, as we said, writing and executing test cases is expensive. We want to make sure that we definitely write test cases for the kinds of things that the customer will do most often or even fairly often. Our objective is to find as many defects as possible in as few test cases as possible. To accomplish this objective, we use some strategies that will be discussed in this subsection. We want to avoid writing redundant test cases that wont tell us anything new (because they have similar conditions to other test cases we already wrote). Each test case should probe a different mode of failure. We also want to design the simplest test cases that could possibly reveal this mode of failure test cases themselves can be error-prone if we dont keep this in mind.

3. Integration testing: Integration testing is any type of software testing that seeks to verify the interfaces between components against a software design. Software components may be integrated in an iterative way or all together (“big bang”). Normally the former is considered a better practice since it allows interface issues to be located more quickly and fixed.

Integration testing works to expose defects in the interfaces and interaction between integrated components (modules). Progressively larger groups of tested software components corresponding to elements of the architectural design are integrated and tested until the software works as a system.

4. System testing: System testing, or end-to-end testing, tests a completely integrated system to verify that it meets its requirements. For example, a system test might involve testing a logon interface, then creating and editing an entry, plus sending or printing results, followed by summary processing or deletion (or archiving) of entries, then log off.

In addition, the software testing should ensure that the program, as well as working as expected, does not also destroy or partially corrupt its operating environment or cause other processes within that environment to become inoperative (this includes not corrupting shared memory, not consuming or locking up excessive resources and leaving any parallel processes unharmed by its presence).

5. Functional Testing:

Functional testing is to testing the functionality of the software application under test. Basi-

cally, it is to check the basic functionality mentioned in the functional specification document. Also check whether software application is meeting the user expectations. We can also say that checking the behavior of the software application against test specification.

This type of testing is mandatory and irrespective of what type of application this should be exercised. In Functional testing, we need check the each components are functioning as expected or not, so it is also called as Component Testing.

Functional testing is a software testing process used within software development in which software is tested to ensure that it conforms with all requirements. Functional testing is a way of checking software to ensure that it has all the required functionality that's specified within its functional requirements.

6. Acceptance testing: At last the system is delivered to the user for Acceptance testing. White-box testing (also known as clear box testing, glass box testing, transparent box testing and structural testing) tests internal structures or workings of a program, as opposed to the functionality exposed to the end-user. In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT).

While white-box testing can be applied at the unit, integration and system levels of the software testing process, it is usually done at the unit level. It can test paths within a unit, paths between units during integration, and between subsystems during a systemlevel test. Though this method of test design can uncover many errors or problems, it might not detect unimplemented parts of the specification or missing requirements.

- API testing (application programming interface) testing of the application using public and private APIs
- Code coverage creating tests to satisfy some criteria of code coverage (e.g., the test designer can create tests to cause all statements in the program to be executed at least once)
- Fault injection methods intentionally introducing faults to gauge the efficacy of testing strategies
- Mutation testing methods
- Static testing methods

Code coverage tools can evaluate the completeness of a test suite that was created with any method, including black-box testing. This allows the software team to examine parts of a system that are rarely tested and ensures that the most important function points have been tested. Code coverage as a software metric can be reported as a percentage for:

Function coverage, which reports on functions executed

Statement coverage, which reports on the number of lines executed to complete the test 100 percent statement coverage ensures that all code paths or branches (in terms of control flow) are executed at least once. This is helpful in ensuring correct functionality, but not sufficient since the same code may process different inputs correctly or incorrectly.

Black-box testing treats the software as a "black box", examining functionality without any knowledge of internal implementation. The testers are only aware of what the software is supposed to do, not how it does it. Black-box testing methods include: equivalence partitioning, boundary value analysis, all-pairs testing, state transition tables, decision table testing, fuzz testing, model-based testing, use case testing, exploratory testing and specification-based testing.

Specification-based testing aims to test the functionality of software according to the applicable requirements. This level of testing usually requires thorough test cases to be provided to the tester, who then can simply verify that for a given input, the output value (or behavior), either "is" or "is not" the same as the expected value specified in the test case. Test cases are built around specifications and requirements, i.e., what the application is supposed to do. It uses external descriptions of the software, including specifications, requirements, and designs to derive test cases. These tests can be functional or non-functional, though usually functional.

Specification-based testing may be necessary to assure correct functionality, but it is insufficient to guard against complex or high-risk situations.

One advantage of the black box technique is that no programming knowledge is required. Whatever biases the programmers may have had, the tester likely has a different set and may emphasize different areas of functionality. On the other hand, black-box testing has been said to be "like a walk in a dark labyrinth without a flashlight. Because they do not examine the source code, there are situations when a tester writes many test cases to check something that could have been tested by only one test case, or leaves some parts of the program untested.

7. Security Testing:

It is a type of non-functional testing. Security testing is basically a type of software testing that's done to check whether the application or the product is secured or not. It checks to see if the application is vulnerable to attacks, if anyone can hack the system or login to the application without any authorization.

- It is a process to determine that an information system protects data and maintains functionality as intended.
- The security testing is performed to check whether there is any information leakage in the sense by encrypting the application or using a wide range of softwares and hardwares and firewall etc.

- Software security is about making software behave in the presence of a malicious attack.
- The six basic security concepts that need to be covered by security testing are: confidentiality, integrity, authentication, availability, authorization and non-repudiation.

9.3 Test Cases And Test Results

TC	Test Objective	Expected Result	Paas/Fail
01	Enter correct Username and Password and Press Login button	It should allow user to proceed	Pass
02	Enter incorrect Username or Password and press Login button	By entering incorrect username or password then an error message should be appear as "Please enter correct username or password	Pass
03	Pressing healthcare Button in Mobile Application	It should be notify nearest active users, nearest ambulance, friends and relatives	Pass
04	Pressing Panic Button in Mobile Application	It should be notify nearest active user, nearest Police station, friends and relatives	Pass
05	Connecting to wearable device	connect device Successfully and upload sensor data on database	Pass
06	health care related data send by sensor	It should be notify nearest active users, nearest ambulance, friends and relatives	Pass
07	Pressing Panic Button in wearable device	It should be notify nearest active user, nearest Police station, friends and relatives	Pass

Chapter 10

Result

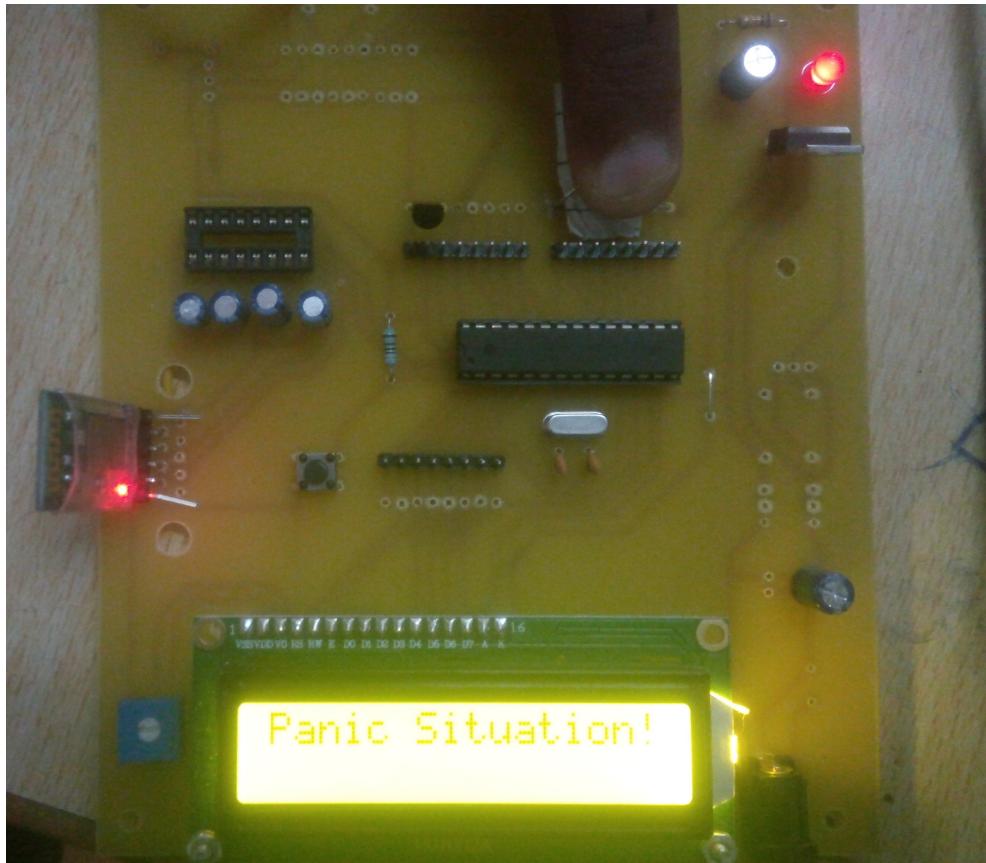


Figure 10.0.1: Wearable Device

In above figure shows the prototype of wearable device. In that on the PCB board one micro-controller is embedded. The name of that micro-controller is ATmega328P. Their is One LED display. The size of that LED display is 16X2. Their are two sensor are embedded on it one is Temperature sensor and another one is Heart-rate Sensor. The Temperature sensor is LM35 and Heart-rate sensor is HeartRate. Their is One Bluetooth module is embedded.

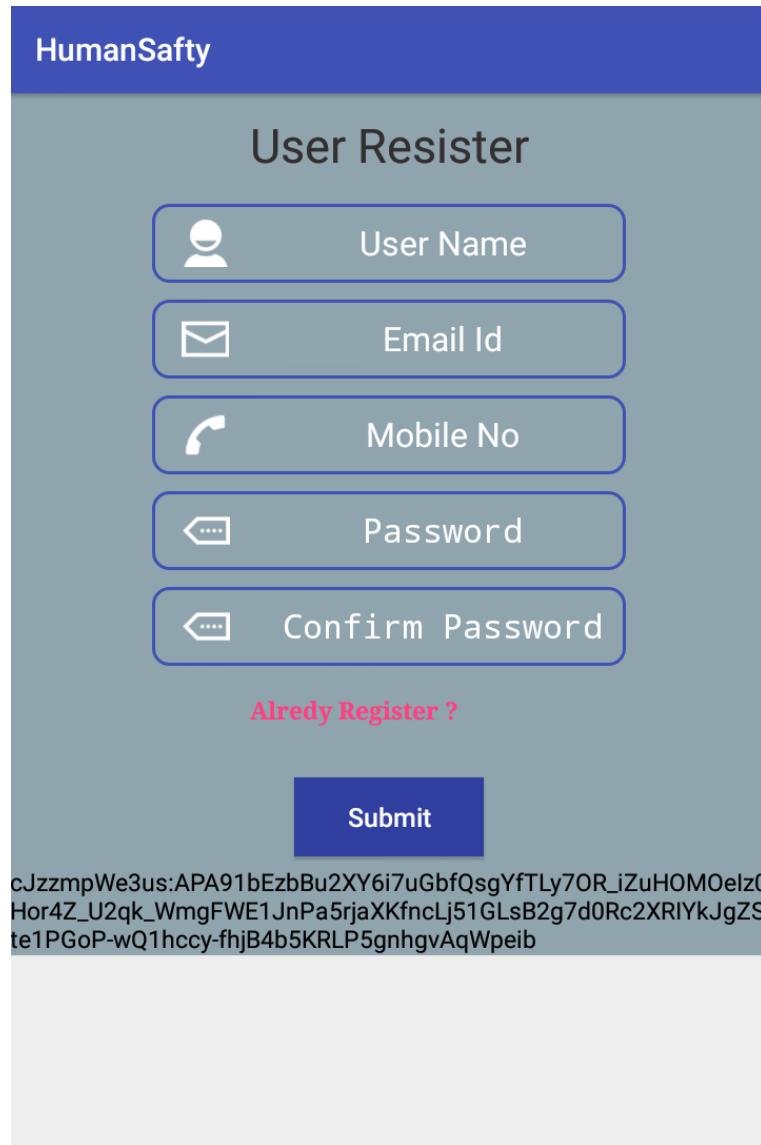


Figure 10.0.2: Registration Page

Registration page contain the five basic field where the user data is stored. These fields are User-name, Email Id, Mobile Number, Password and Confirm Password. This page will be situated in the android application. This is basically used for new user registration. After registering on this page the user may able to access the facilities of the android application. Every user must need to register there self to the application with the help of this page.

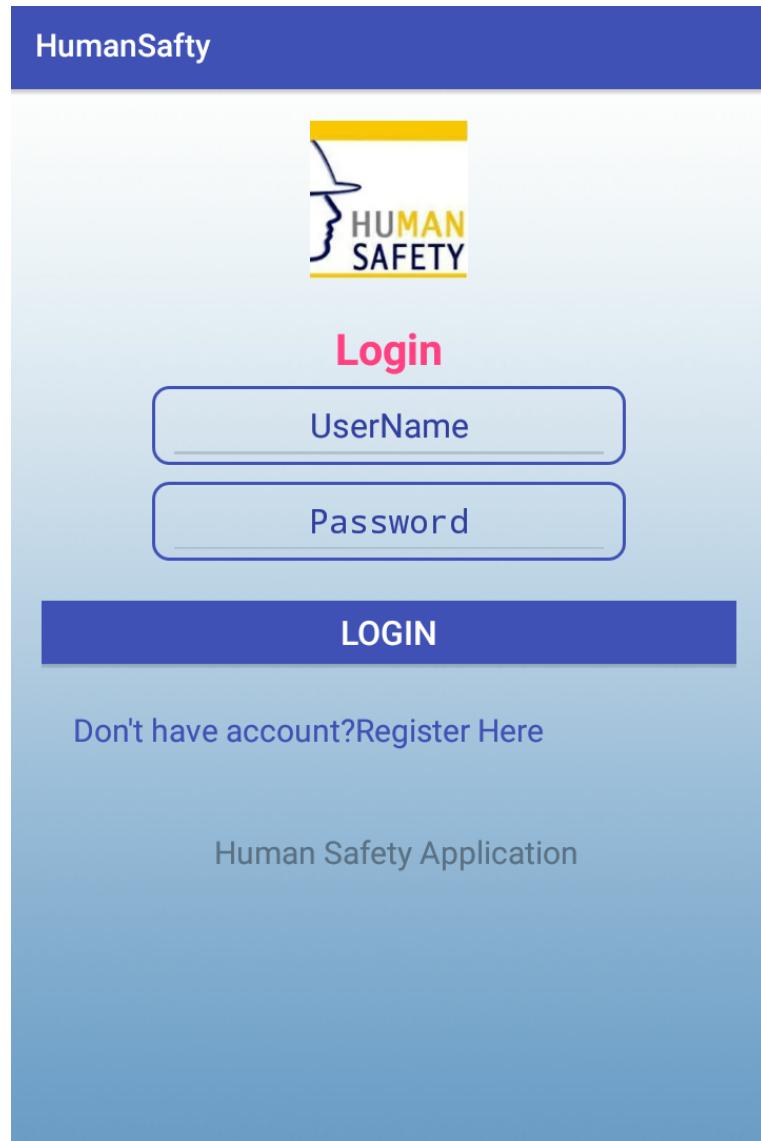


Figure 10.0.3: Login Page

Login page is the page where the user comes after the Registration process is done. After Registration the user will get a user id and password with the help of that id and password the user may be able to login with the application.

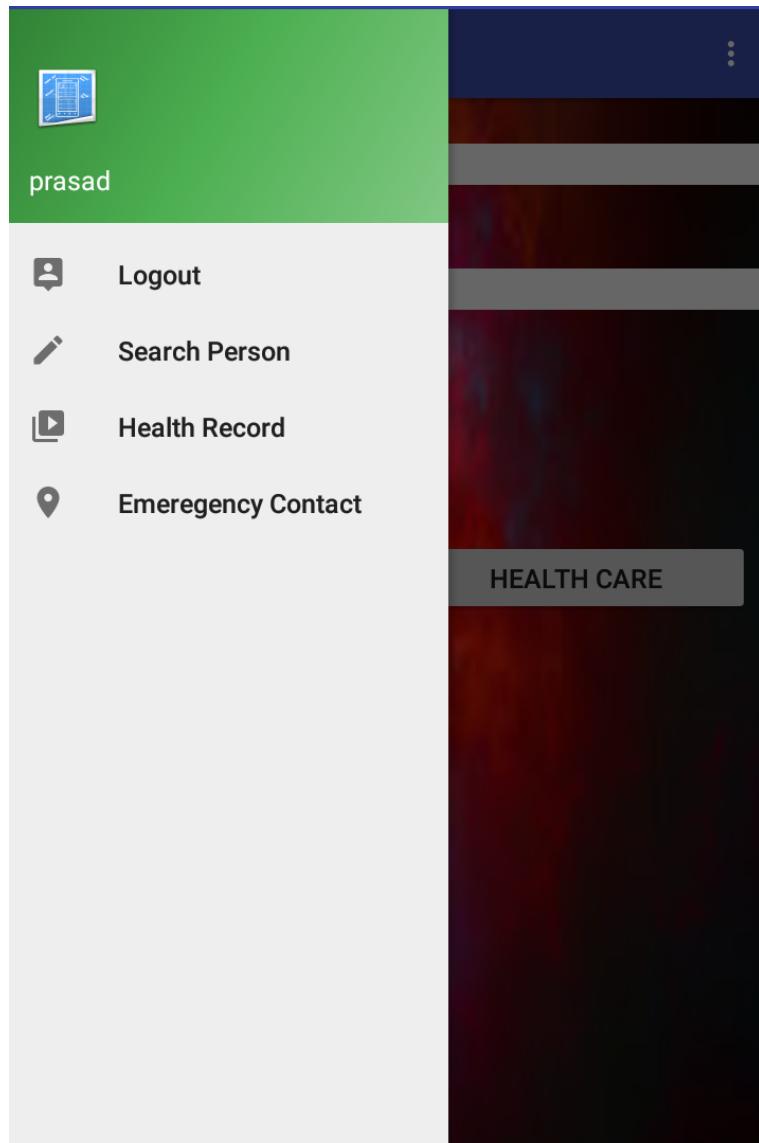


Figure 10.0.4: Navigation Drawer

In the android application the Navigation drawer is used to store the various buttons with the help of these button the user can access various features of the android application. The navigation drawer of this project contains logout, search person, health record and emergency contact. With the help of logout button the user can logged out of the application. The search person button is used to find the other users which are in the users contact list. this many be possible with the help of GPS technology. Health records button contain the users real time health data. The gets continuously saved in the android application and web application. Emergency contacts are used to get emergency help. The Emergency contact is stored by User at the time of Registration.

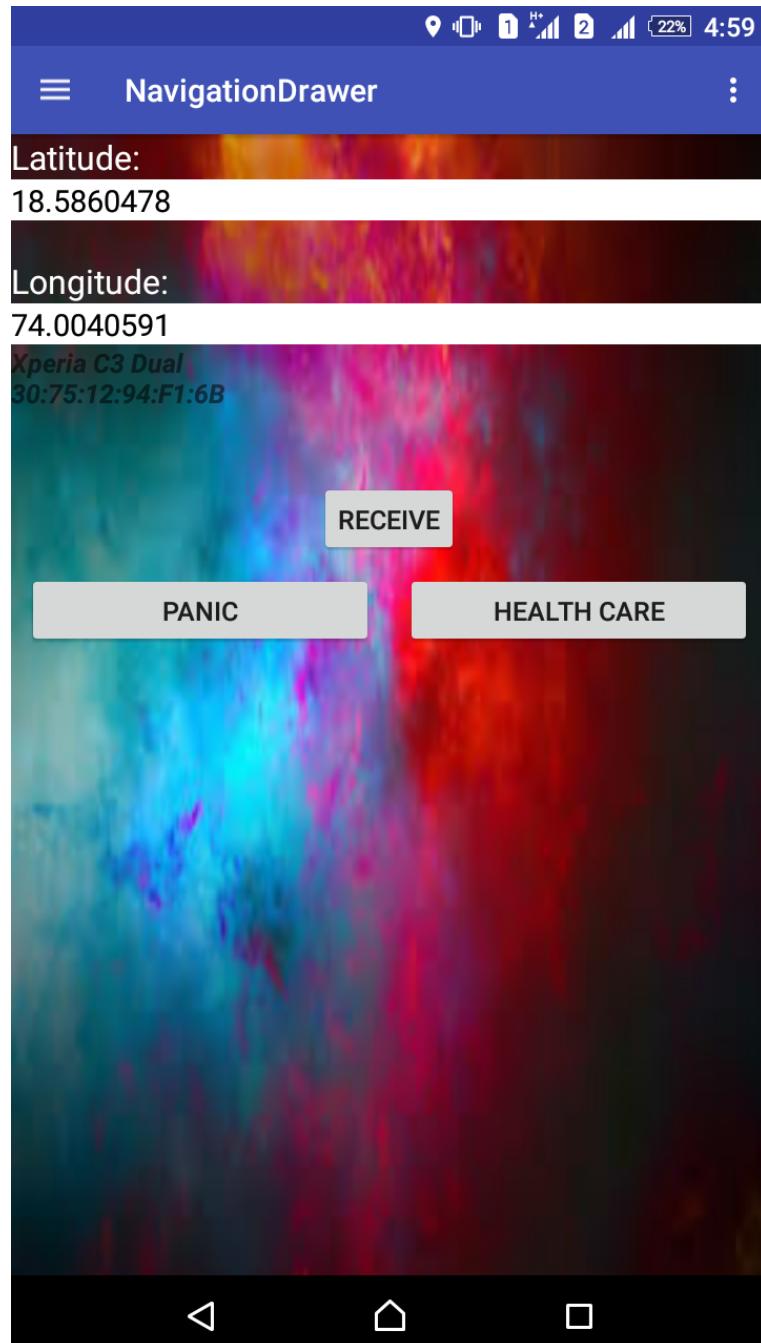


Figure 10.0.5: Overall View

The User interface of the android application has navigation drawer, panic button, health care button, the GPS co-ordinates and received button. Received button is help to shared Health care record on mobile phone.

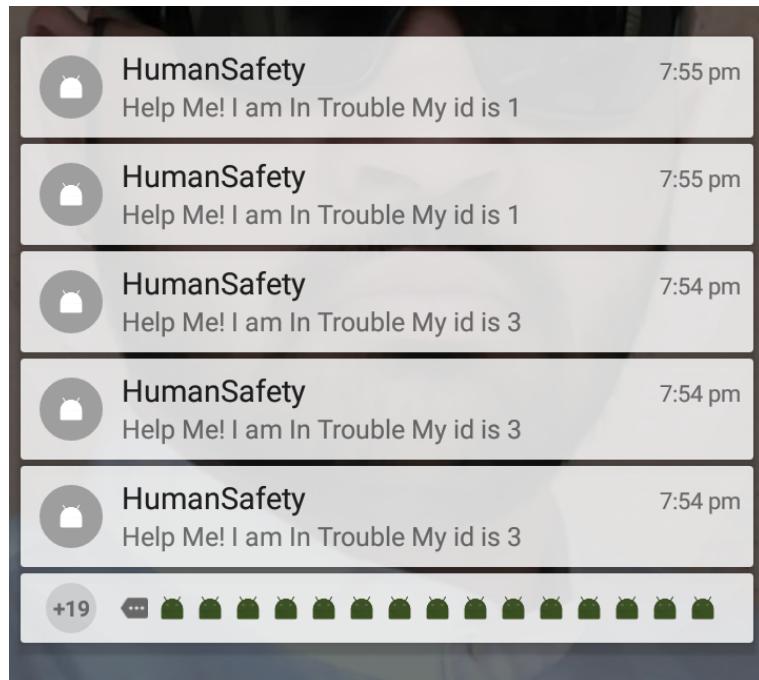


Figure 10.0.6: Notification

After pressing the panic button the notification will be get send to the nearest police station, nearest ambulance, active users and relatives. Such a notification can be seen on the notification bar of the mobile phone with the help of these notification the police, nearest active user and nearest ambulance can track the users location.

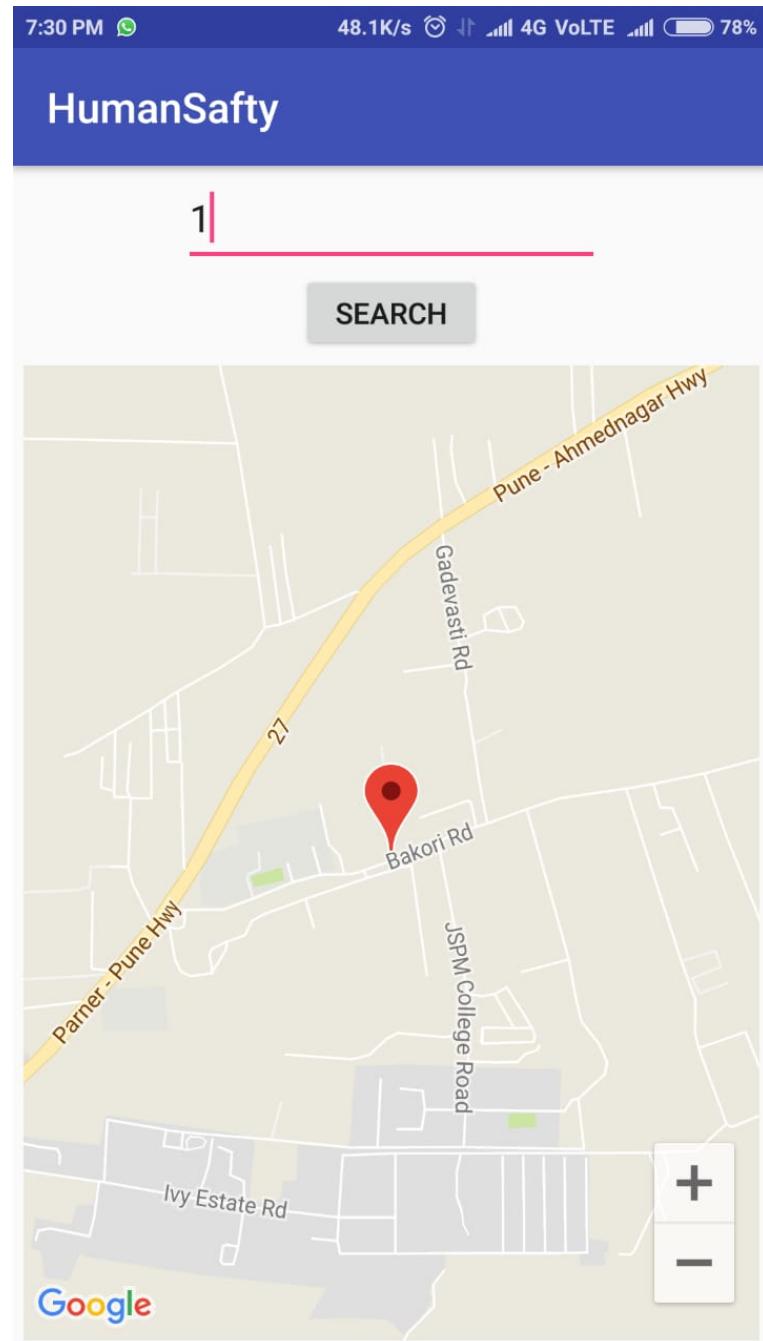


Figure 10.0.7: Search People by ID

In this we can search another user with help of there ID. We can simply put there ID in the search box and can get the location of the person/user.

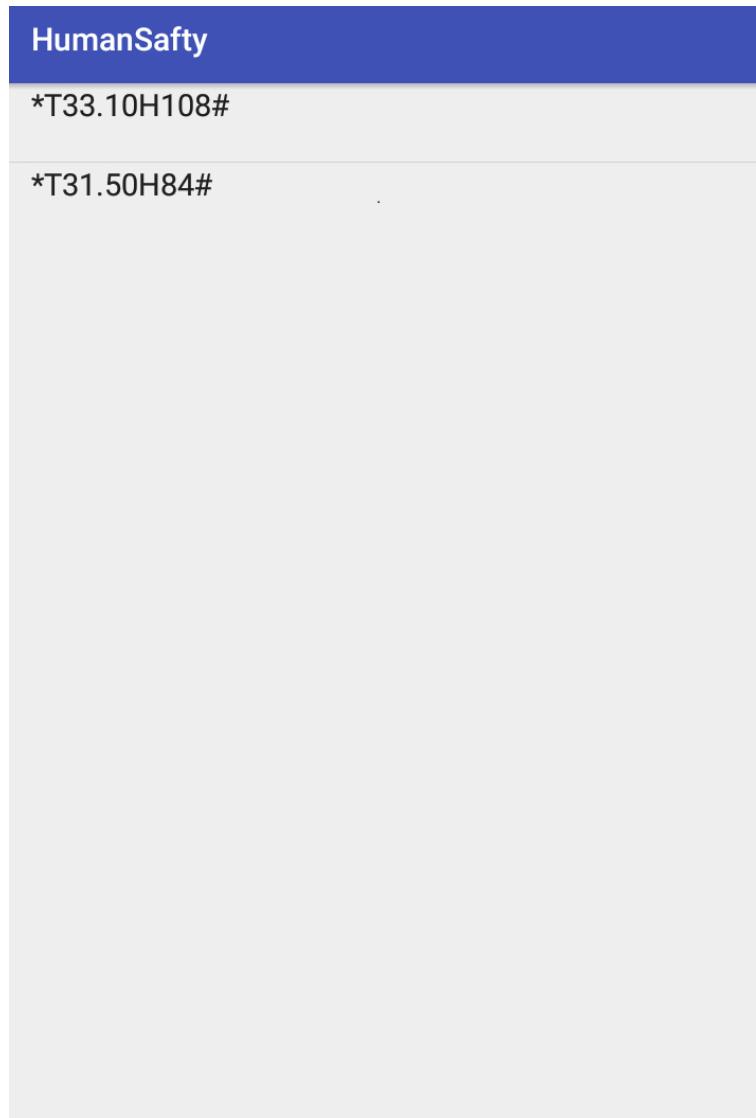


Figure 10.0.8: Healthcare Record

The health care record tab has all the health care related data of the user such as temperature of the the user and the heart beat of the user.

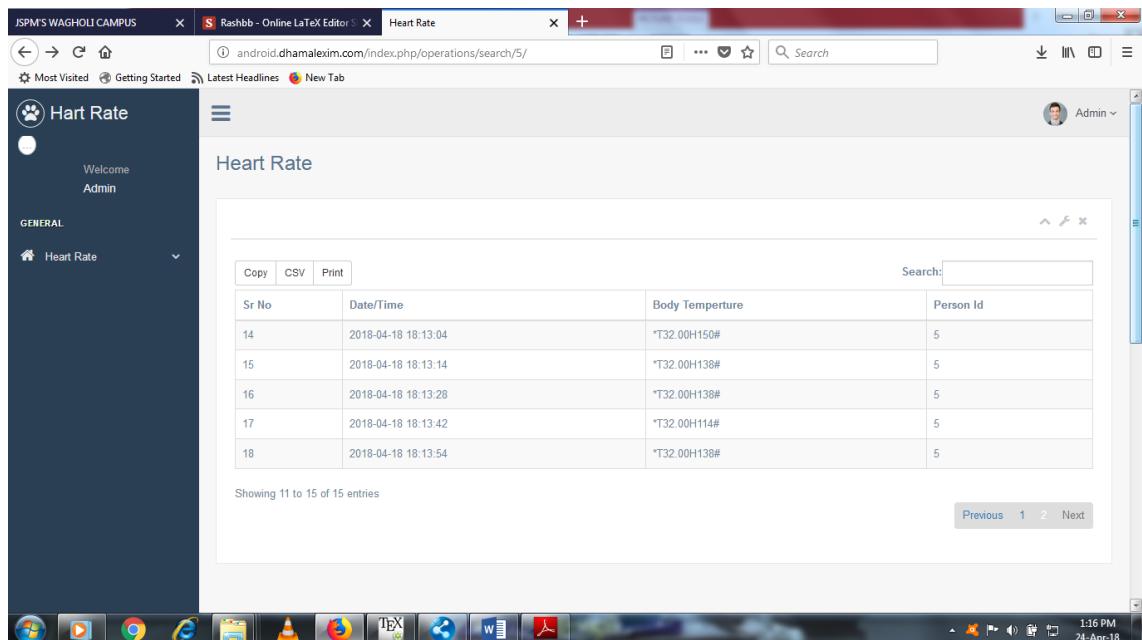


Figure 10.0.9: WebBased Healthcare Record

The web based health care record is stored at the doctors side. All the health care related data of the user gets stored in the web page such a data can be used by the doctor to treat the user. Here also data is continuously stored.

Chapter 11

DEPLOYMENT AND MAINTENANCE

11.1 Installation and un-installation

1. Find humansafety.apk from wherever you saved it. Then double-click it. It will open with the default installation windows.
2. When you are installed the application the first you need to register on the application. Following windows is used for Registration for new user.

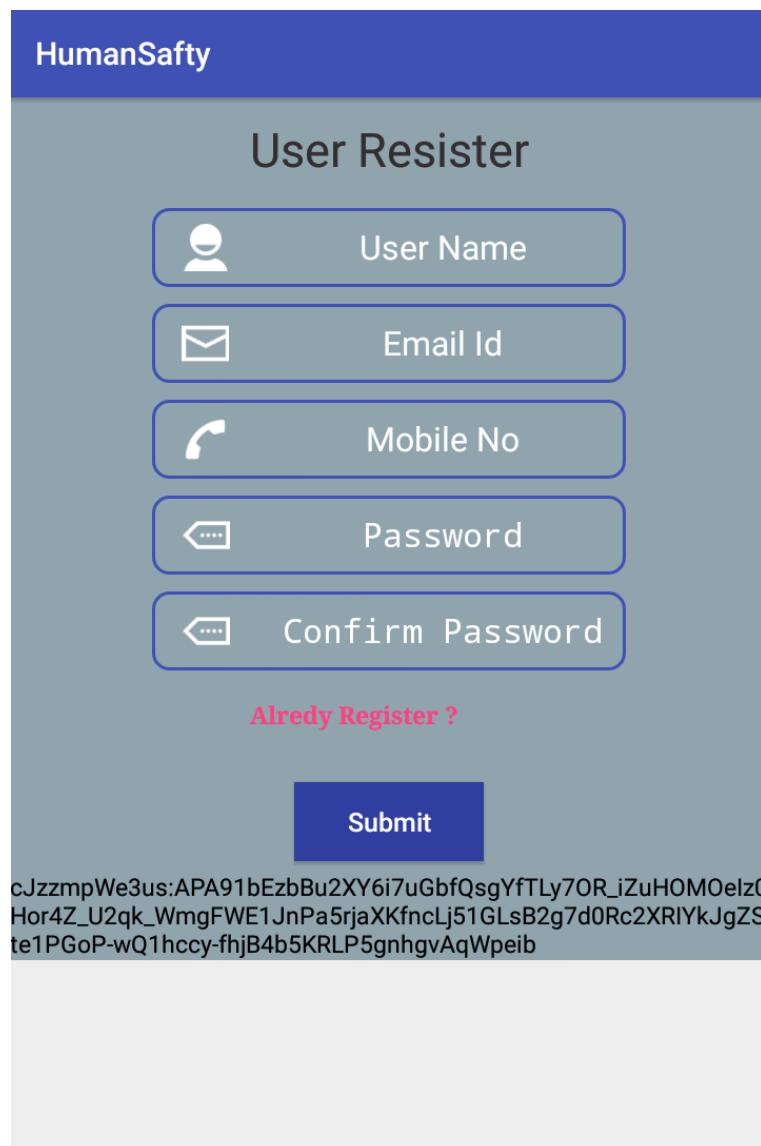


Figure 11.1.1: Registration page

3. You are registered user with application and you want to used that application again that time you need to login. Following windows is used for Login.

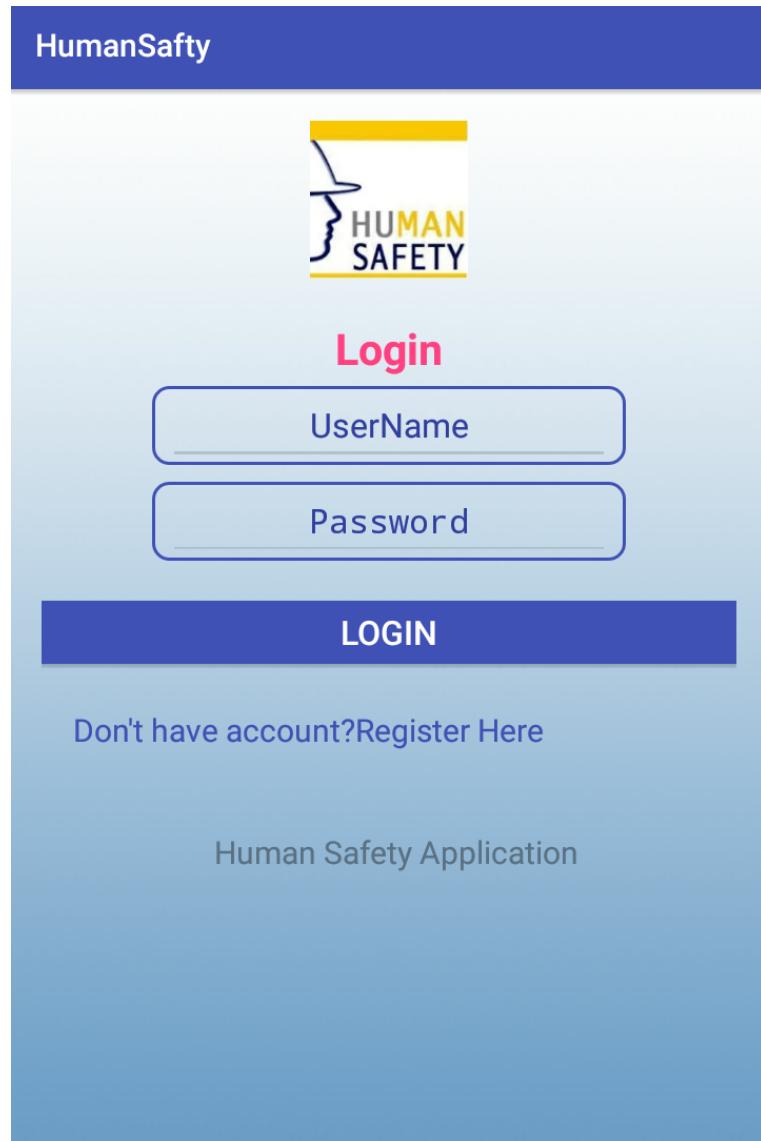


Figure 11.1.2: login Page

4. When you are no need to Human Safety application that time you can Uninstalled app as you uninstalled any other mobile application.

11.2 Maintenance

Maintenance is the mandatory part of every project. As far as "IoT Based Smart System for Human Safety" is considered very few maintenance activities are required. Software maintenance in software engineering is the modification of a software product after delivery to correct faults, to improve performance or other attributes. The implementation processes contains software preparation and transition activities, such as the conception and creation of the maintenance plan, the preparation for handling problems identified during development, and the follow-up on product conuguration management.

Chapter 12

Conclusion And Future Scope

This type of an Idea plays vital role towards ensuring human safety as fastest as possible Automatically. This proposed idea deals with two main type of issues i.e. health care emergency and harassment related emergency faced by human and will help solve those issues by internet of things.

This mobile application is very much helpful for any human. Because when a human is in danger position then he/she simply touch this Human Safety mobile app and alert their guardians that they are in danger. By simply triggering the panic button it sends the message and notification for the first added relatives number and sends the message that they are in danger and sends the location message to the all saved relatives and nearby active users . Through this mobile app we can alert the people at home that a human belonging to their house is safe or not.

12.0.1 Future Scope

This mobile application is helpful in future when any problem arises in travelling or any kind of situations.

1. As the technology emerges, it is possible to upgrade the system and can be adaptable to desired environment.
2. Because it is based on object-oriented design, any further changes can be easily adaptable.
3. Based on the future security issues, security can be improved using emerging technologies

Chapter 13

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Appendices

Appendix A

Assignments on Project Analysis of Algorithmic Design

I	D	E	A
<u>INCREASE:</u> Accuracy of the data retrieved and processed.	<u>DRIVE:</u> System driven safety awareness, Innovation (Include new ideas in Project and Safety Measures)	<u>EDUCATE:</u> The API can be used by libraries ,industries and government authorities.	<u>ACCELERATE:</u> Data Analysis Process, Functionality and Time complexity(Process Data and Analysis)
<u>IMPROVE:</u> Safety And Security	<u>DELIVER::</u> Data Analytics, and knowledge and Associative value	<u>EVALUATE:</u> High Performance, Cost efficient, compact device	<u>ASSOCIATE:</u> To collect the data and giving quick solution.
<u>IGNORE:</u> criticize (Com- parison and Piracy)	<u>DECREASE: :</u> Manual Efforts, Time	<u>ELIMINATE:</u> Dependency and Other factor affecting system	<u>AVOID:</u> Short Cuts, Misuse, Manipulated Results, Redundancy

- The Project Matrix is a project management model of a software development project. This model requires no special resources other than those normally assigned to a software development project and has proved to be effective in coordinating the work of many people, managing the operations of the project, reducing the complexity of the software development process, and producing high quality results.

Keywords: software engineering project management, project planning, requirements tracking, project control

- Introduction

The assignment focuses on a simple model for technical project management, the Project Matrix. We have found this model to be effective in coordinating the work of many people, managing the operation of a software development project, reducing the complexity of the development process and producing high quality software. Further, this approach requires no special resources other than those normally assigned to a development project, and can therefore be operated on a single-project scale, needing no particular institutional structure (such as a Technical Writing or Quality Assurance Department). Finally, the model is easy to explain and simple to grasp it has intuitive appeal for people of a technical orientation.

- **Project Matrix :** The Project Matrix is a project management model of a software development project. This model requires no special resources other than those normally assigned to a software development project and has proved to be effective in coordinating the work of many people, managing the operations of the project, reducing the complexity of the software development process, and producing high quality results.

Keywords: software engineering project management, project planning, requirements tracking, project control

- The Project Matrix Model

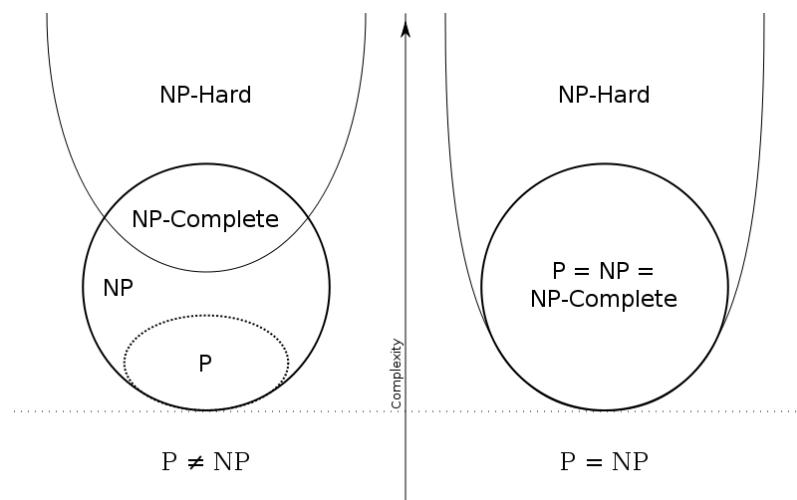
The Matrix Proper

The Project Matrix is a model of the software development work of a project. In this model, the work is represented by a matrix of activities, such as that shown in Figure 1. Each row of the matrix represents a type of task (for example, writing specifications, developing an information model, coding, etc.) and each column represents a subsystem for which the task must be performed. Each box on the matrix therefore represents an activity, preferably of a few weeks duration, for which there is a well-defined output object: a requirements document, a set of structure charts, a collection of code, or the like.

As the activities of the matrix are undertaken, the output objects, or documents, are produced. All of the documents related to a single subsystem are collected together and ordered like the rows of the matrix to which they correspond.

Complexity of Problem

In computational complexity theory, NP is one of the most fundamental complexity classes. The abbreviation NP refers to "nondeterministic polynomial time."



Intuitively, NP is the set of all decision problems for which the instances where the answer is "yes" have efficiently verifiable proofs of the fact that the answer is indeed "yes". More precisely, these proofs have to be verifiable in polynomial time by a deterministic Turing machine. In an equivalent formal definition, NP is the set of decision problems where the "yes"-instances can be accepted in polynomial time by a non-deterministic Turing machine. The equivalence of the two definitions follows from the fact that an algorithm on such a non-deterministic machine consists of two phases, the first of which consists of a guess about the solution, which is generated in a non-deterministic way, while the second consists of a deterministic algorithm that verifies or rejects the guess as a valid solution to the problem.

The complexity class P is contained in NP, but NP contains many important problems, the hardest of which are called NP-complete problems, whose solutions are sufficient to deal with any other NP problem in polynomial time. The most important open question in complexity theory, the $P = NP$ problem, asks whether polynomial time algorithms actually exist for NP-complete, and by corollary, all NP problems. It is widely believed that this is not the case.

Appendix B

Laboratory assignments on Project Quality and Reliability Testing of Project Design

Strategy for implementation of system based on type of user (by using D and C):

Divide and Conquer :

Divide and conquer is an algorithm design paradigm based on multi-branched recursion. A divide and conquer algorithm works by recursively breaking down a problem into two or more sub problems of the same (or related) type(**divide**), until these become simple enough to be solved directly (**conquer**). The solutions to the sub-problems are then combined to give a solution to the original problem. Effectively divide the users in various categories for effective division of the resources to be given to the particular user for recommendation:

- new user
- existing user

Thereby, categorizing the users, so that system can be managed in an efficient way. Here first subproblem is if the user is new user. Then after his registration process content based algorithm . The second subproblem is if the user is existing user. This second subproblem is again divided into two subproblems i.e. user with existing account will start the service of location with the GPS Technology . All users location infomations saved in our database. After trigger button this GPS location . The algorithm calculates the Nearby Peoples which has to notify. Finally results of both subproblems will be combined to give the output in the form of recommended books.

Morphism:

1) Set Theory:-

Let S (be a main set of) = {DB, C, U, S, A, R}

where,

DB-database. This database is responsible for storing user information related to user transaction. It also training dataset.

C-set of clients or user i.e. C = {C₁, C₂, C₃.....C_n}

U-set containing user based on their type i.e. U = {E, N } E-existing user and N is a new user.

S-the server component of the system responsible for registering and authenticating users.

A-set of algorithms used for recommendation. A = {T, CB}

R-Result

2) Functionalities:-

DB=Registered User(uid,password,fullname,address,country,contact,email).

Strategies to be implemented for effectively managing the system:

1. **Authenticity Controls** -Authenticity control are exercised to verify the identity of the individuals or process involved in a system i.e. the type of User (Existing user or new user,user identification by using username and password).
2. **Accuracy Control** -Accuracy control ensure the correctness of data entered while effectively registering for the system, ensuring all data is correct in nature. e.g.(program validation check for book name field contains username and password should accept special characters also). GPS co-ordinates is also a main factor in the project and it will accurately locate the device location.
3. **Completeness Control** -Completeness control attempt to ensure that no data is missing and that all processing is carried through to its proper conclusion. Completeness of the signup ensuring its filled out in a complete way. (E.g. program validation check, sequence check etc).
4. **Privacy Controls** -Privacy controls ensure that data is protected from inadvertent or unauthorised disclosure. Privacy of the user is completely protected using AES encryption, thereby protecting the data from external sources.
5. **Existence Controls** -Existence controls attempt to ensure the ongoing availability of all system resources (e.g., database dump and logs for recovery purposes duplicate hardware, preventive maintenance, check point and restart control).
6. **Asset Safeguarding Controls** -Safeguarding control attempt to ensure that all resources within a system are protected from destruction or corruption (e.g. physical barriers, availability of Internet etc).
7. **Effectiveness Controls** -Effectiveness control attempt to ensure that systems achieve their goals(E.g. right location awareness for recommended to user).
8. **Efficiency Controls** -Efficiency controls attempt to ensure that a system uses minimum resources to achieve its goals.

Divides modules:-

1 Registration Module:-

First user will register himself with details like name, address with pin code, contact no , email address. In this registration process user must add Relatives/Friends for further notification for them when they are in Emergencies.After Successful registration they are registered for taking services from the server .

2 Application Module :-

In this module , we are developing the server and database programs/software's. In server, There are algorithms to find out nearest objects with the help of database. In Application Module, to provide the service to the user/clients there is server program/software

which provides services. Handling of databases , which is main concern of the project and will handle this by the server which has its own databases. After the sending the notification to the nearest people or objects this will respond to the user that he/she is coming or not. That active users , police stations, ambulance are also registered in the databases of the system. There should be one application for them to accept the notification.

The main application of the system is , this system can work also without the internet. It sends the general text message having GPS co-ordinates to the server and other work will done by the system.

Software Testing:-

Software testing is the process of evaluation a software item to detect differences between given input and expected output. Also to access the feature of a software item. Testing assesses the quality of the product. Software testing is a process that should be done during the development process. In other words software testing is a verification and validation process.

Verification:

Verification is the process to make sure the product satisfies the conditions imposed at the start of the development phase. In other words, to make sure the product behaves the way we want it to.

Validation:

Validation is the process to make sure the product satisfies the specified requirements at the end of the development phase. In other words, to make sure the product is built as per customer requirements.

Basics of software testing:

There are two basics of software testing:

- black-box testing
- white-box testing

Black-box Testing:

Black box testing is a testing technique that ignores the internal mechanism of the system and focuses on the output generated against any input and execution of the system. It is also called functional testing.

White-box Testing:

White box testing is a testing technique that takes into account the internal mechanism of a system. It is also called structural testing and glass box testing. Black box testing is often

used for validation and white box testing is often used for verification.

Types of testing:

There are following types of testing:

- Unit Testing
- Integration Testing
- Functional Testing
- System Testing
- Stress Testing
- Performance Testing
- Usability Testing
- Acceptance Testing
- Regression Testing
- Beta Testing

Unit Testing:

Unit testing is the testing of an individual unit or group of related units. It falls under the class of white box testing. It is often done by the programmer to test that the unit he/she has implemented is producing expected output against given input.

Integration Testing:

Integration testing is testing in which a group of components are combined to produce output. Also, the interaction between software and hardware is tested in integration testing if software and hardware components have any relation. It may fall under both white box testing and black box testing.

Functional Testing:

Functional testing is the testing to ensure that the specified functionality required in the system requirements works. It falls under the class of black box-testing.

System Testing:

System testing is the testing to ensure that by putting the software in different environments(e.g., Operating Systems) it still works. System testing is done with full system implementation and environment. It falls under the class of black box-testing.

Stress Testing:

Stress testing is the testing to evaluate how system behaves under unfavorable conditions. Testing is conducted at beyond limits of the specifications. It falls under the class of black

box testing.

Performance Testing:

Performance testing is the testing to assess the speed and effectiveness of the system and to make sure it is generating results within a specified time as in performance requirements. It falls under the class of black box-testing.

Usability Testing:

Usability testing is performed to the perspective of the client, to evaluate how the GUI is user-friendly? How easily can the client learn? After learning how to use, how proficiently can the client perform? How pleasing is it to use its design? This falls under the class of black box testing.

Acceptance Testing:

Acceptance testing is often done by the customer to ensure that the delivered product meets the requirements and works as the customer expected. It falls under the class of black box testing.

Regression Testing:

Regression testing is the testing after modification of a system, component, or a group of related units to ensure that the modification is working correctly and is not damaging or imposing other modules to produce unexpected results. It falls under the class of black box testing.

Beta Testing:

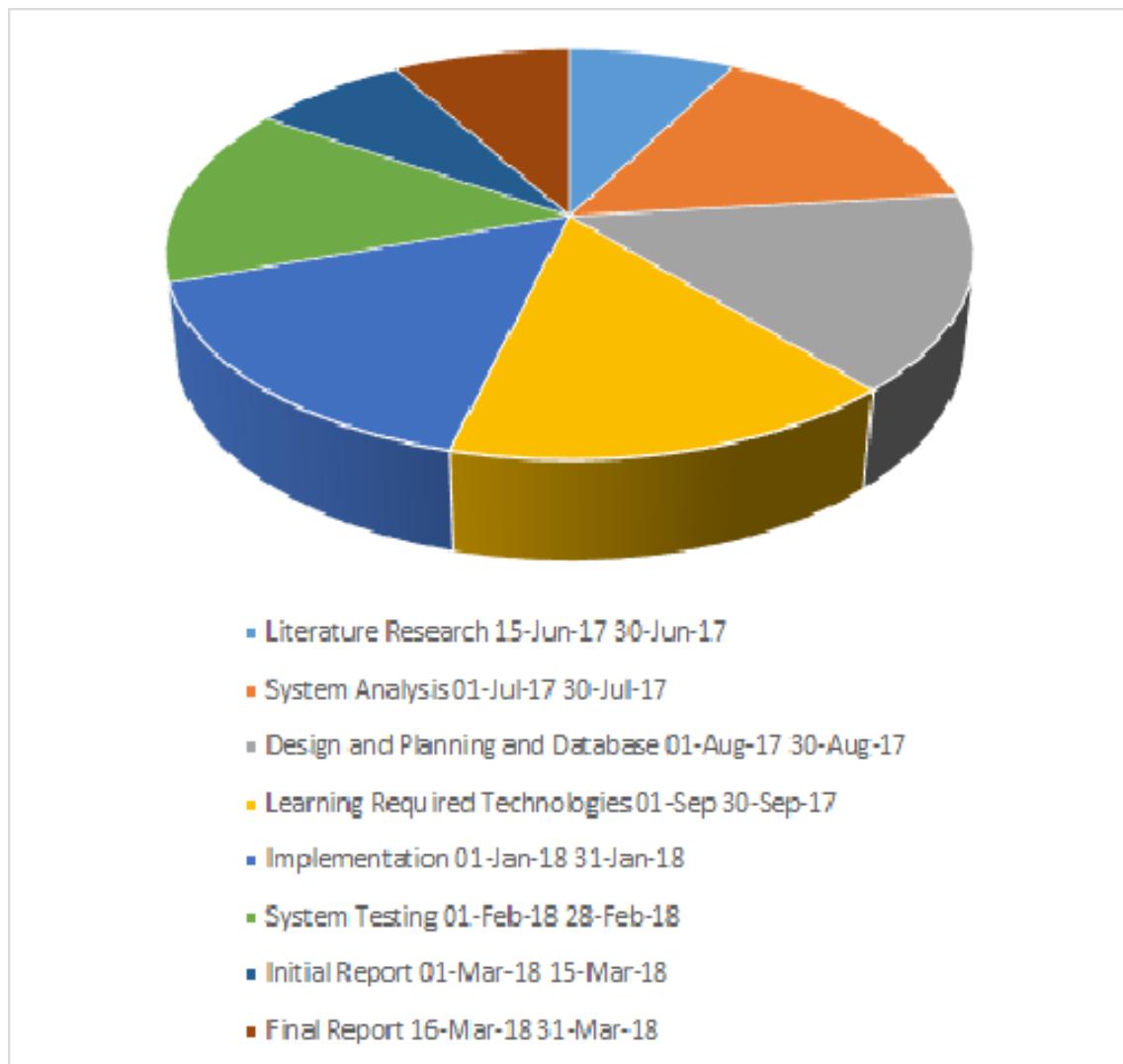
Beta testing is the testing which is done by end users, a team outside development, or publicly releasing full pre-version of the product which is known as beta version. The aim of beta testing is to cover unexpected errors. It falls under the class of black box testing.

GUI:

- User Request Page
- Enter Username Password
- Submit(User Request sent to 3 sub Admins)
- Login Page
- Enter Username and Password(Provided by main admin)
- Log In
- Upload/Download Your File(Using key provided by Main admin through email)
- Logout

Appendix C

Project Planner



Appendix D

Reviewers Comments Of Paper Submitted

Publication: Published in International Journal of Computer Applications(IJCA) December 2017 Edition

Paper Title : IoT Based Smart System for Human Safety

Paper Reference ID:28745-2017916012



REFEREE'S REPORT: SUMMARY SHEET

Paper Title: IoT based Smart System for Human Safety

EVALUATION CRITERIA	SCORE (0-10)
1. Relevance of Topic	6
2. Scholarly Quality	6
3. English Usage	6
4. Use of Theory	5
5. Novelty and Originality of the idea	6
6. Technical Content and Correctness	6
7. Critical Qualities	6
8. Clarity of Conclusions	5
TOTAL SCORE %	57.5%

RECOMMENDATION

- [] ACCEPT
[] ACCEPT WITH MINOR REVISIONS
[] ACCEPT WITH MAJOR REVISIONS
[] REJECT

The following are indicative score ranges:
* Accept (without qualification): 75-100%
* Accept with minor revisions: 55-75%
* Accept with major revisions 35-54%
* Reject: Below 35%

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REFEREE'S COMMENTS

Referee Comments:
<p>1. Authors should observe that even if the survey is mere a literature study, same must be presented in a way that distinctive features are surfaced with authors own interpretation of the research.</p> <p>2. The results are not significant enough. Comprehensive evaluations are needed. Authors should present the experimental results and its corresponding analysis in detail supported by graphical and tabular data.</p> <p>3. All the listed references must be properly cited in the body of the paper using the numbered format of IJCA. E.g. [1], [2], [3] etc.</p> <p>4. Conclusion needs to be presented mentioning the future scope of the idea.</p> <p>5. The research paper should be written in perspective of third person. Words such as 'I' 'we' 'our' etc. needs to be avoided.</p> <p>6. The presentation of the paper needs improvement. The paper does not comply with the IJCA paper template. The headings and sub-headings are not numbered according to the template.</p> <p>The paper is suitable for publication with IJCA after minor revisions. Use IJCA paper template for preparation of camera ready copy (CRC) of the paper.</p>

Final Checklist for authors:

- Perform Spell and grammar check.
- No word breaks at the end of lines.
- References appear consecutively in the paper.

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Appendix E

Plagiarism Report

 Print  Save



Plagiarism Checker X Originality Report



Plagiarism Quantity: 38% Duplicate

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Words	6393 Plagiarized Words / Total 16989 Words
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Remarks	Medium Plagiarism Detected - Your Document needs Selective Improvement.

SAVITRIBAI PHULE PUNE UNIVERSITY A PROJECT REPORT ON IoT Based Smart System for Human Safety SUBMITTED TOWARDS THE PARTIAL FULFILLMENT OF THE REQUIREMENTS OF BACHELOR OF ENGINEERING (Computer Engineering) BY AKASH B. WADHAWANE Exam No:B120514316
PRIYANKA R. GHODKE Exam No:B120514238 PRASAD C. PETKAR Exam No:B120514281 AMIR L. ATTAR Exam No:B120514206 UNDER THE GUIDANCE OF Prof. S. S. THOKAL DEPARTMENT OF COMPUTER ENGINEERING JSPM's IMPERIAL COLLEGE OF ENGINEERING AND RESEARCH, WAGHOLI, PUNE 412 207 2017-18 DEPARTMENT OF COMPUTER ENGINEERING JSPM's IMPERIAL COLLEGE OF ENGINEERING AND RESEARCH, WAGHOLI, PUNE 412 207 2017-18 C E R T I F I C A T E This is to certify that the Project entitled IoT Based Smart System for Human Safety Submitted by AKASH B. WADHAWANE Exam No:B120514316 PRIYANKA R. GHODKE Exam No:B120514238 PRASAD C. PETKAR

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Appendix F

TERM-II PROJECT LABORATORY ASSIGNMENTS

1. Review of design and necessary corrective actions taking into consideration the feedback report of Term I assessment, and other competitions/conferences participated like IIT, Central Universities, University Conferences or equivalent centers of excellence etc.
 2. Project workstation selection, installations along with setup and installation report preparations.
 3. Programming of the project functions, interfaces and GUI (if any) as per 1 st Term term-work submission using corrective actions recommended in Term-I assessment of Term-work.
 4. Test tool selection and testing of various test cases for the project performed and generate various testing result charts, graphs etc. including reliability testing.
- Additional assignments for the Entrepreneurship Project:**
5. Installations and Reliability Testing Reports at the client end. College

Appendix G

INFORMATION OF PROJECT GROUP MEMBERS



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December 2017 Edition
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- (h) Paper Published:Published in International Journal of Computer Applications(IJCA)
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