Public Safety and Emergency Help using Android Applications

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Abstract—**This paper presents A Public Safety and Emergency help using Android Application which uses smart phone having android operating system service to get. This paper had shown the working of system with its importance in future and day-to-day life. It tried to cover all the limitation of previous system and shows the increase needs of this system at different levels of organization. The system is able to help the peoples which are in difficult condition like accident, I fall, I wonder, Disaster Management, Earthquake. We explored the Android Operating System (OS) and software development environment and evaluated several of its capabilities by constructing a working application. This application collected speed and location information from the Global Positioning System (GPS) receiver, used the Google Maps Application Programming Interface (API) to determine the location.**

***IndexTerms*—Global Positioning System (GPS), Application Programming Interface (API).**

I. INTRODUCTION

Today mobile and mobile based applications have become a part of our day to day life. With the revolution in mobile computing many great features were added to the field and the mobiles got smaller, faster and better as the decade passed. It gave rise to the introduction of new mobile based operating systems where the programmers where presented with open source operating system named "ANDROID"[1].

With the introduction of android the programmers were free to program freely and with the much awaited programming language as the programmers did not have to learn anything new. The android was a classic mixture of java and mobile computing.

Thus a model integration of ANDROID platform with a desktop application can be utilized for public safety applications and disaster management which can be of many types varying from natural disaster, accident, fall, safe driving in school premises for the safety of the children. So we are thinking of in co-operating various constraints in our application like[2].

Injuries due to falls are among the leading causes of hospitalization in elderly persons, often resulting in a rapid decline in functionality and death. Rapid response can improve the patients outcome, but this is often lacking when the injured person lives alone and the nature of the injury complicates calling for help[2].

This paper presents an alert system for fall detection using common commercially available electronic devices to both detect the fall and alert authorities. We use a common Android-based smart phone with an integrated tri-axial accelerometer. Data from the accelerometer is evaluated with several threshold based algorithms and position data to determine a fall. The threshold is adaptive based on user provided parameters such as: height, weight, and level of activity. These variables also adapt to the unique movements that a cellphone experiences as opposed to similar system which require users to mount accelerometers to their chest or trunk. If a fall is suspected a notification is raised requiring the user's response. If the user does not respond, the system alerts pre-specified, social contacts with an informational message via SMS.When a contact responds with an incoming call the system commits an audible notification, automatically answers the call, and enables speakerphone. If a social contact confirms a fall, an appropriate emergency service is alerted. Our system provides a realizable, cost effective solution to fall detection using a simple graphical interface while not overwhelming the user with uncomfortable sensors[3].

In our exploration of smartphone technology, we developed a proof-of-concept system that addressed traffic safety in school zones. Our system addresses the need for drivers to be able to pay full visual attention to the road while still being alerted to the speed of the car. The system integrated several of the features that are becoming more commonplace on smartphones as well as information retrieved from Internet services.

The lack of efficient disaster management system that will help in times of need[1]. One common scenario during disasters is that the activity of rescue and relief is not well-coordinated. For this reason, there is a need for a system that will help in the efficient provision of rescue and relief to disaster-affected areas. Since the use of smart phones is gaining interest in people, the disaster management system was implemented as a smart phone application using Google's Android operating system. The disaster management system

Android application known as My Disaster Droid determines the optimum route along different geographical locations that the volunteers and rescuers need to take in order to serve the most number of people and provide maximum coverage of the area in the shortest possible time[1].

A. Android Application System

Android is a Linux based operating system for mobile devices developed by Google and the Open Handset Alliance, which includes an operating system, middleware, and applications. Android is often referred to as the first complete
mobile platform, open, and free[1].

1. Android Architecture :

Android operating system is a collection of software stack with different layers, where each layer is a collection of several components of the program and provide different services to the other layers.
Below are descriptions of each layer of the android operating system architecture.

• Linux Kernel: is the most basic layer of the android architecture which is an intermediate layer between the hardware and software of the operating system android.

• Libraries: is the layer that allows android device tohandle several different data types.

• Android Runtime: is the layer that allows the android operating system is run using Linux implementation.

• Applications Frameworks: is the layer where applications are designed and made.

• Applications: is the uppermost layer of the android operating system in which the user associated with application only[1].

2. Activity Cycle in Android Operating System :

In the android operating system, application's activity is governed by a system called activity stack. When an activity is started, the activity will be on top of the pile of the activities that been run before.

An activity of the android operating system has four states as follows:

• Active/running state: activity is running and being in the topmost of the pile of activity stack.

• Pause state: activity is running and visible by users, but the activity is not used.

• Stopped state: activity is no longer visible on the screen. Activity is still running but the system can easily destroy the activity.

• Destroyed state: activity is destroyed and no longer exist in memory

3. XML

XML or eXtensible Markup Language is a "markup language" designed to exchange data. XML is a standard data storage format that contains the metadata that has a description of the data itself. The word "extensible" in XML means that XML allows users to add and define "markup language" itself. In general, XML is used to define the structure of the information stored. XML is saved in a text file (ASCII) and the information in it is written in the tags that can be defined by the user.

B.GPS Technology

The Global Positioning System (GPS) is a global navigation satellite system deployed by the US Department of Defense and maintained by the US Air Force. GPS is a space based radio navigation system that provides accurate location and timing services to anyone with a GPS receiver. This service, made available to civilians in 1996 for navigation purposes, is free of charge, can support an unlimited number of users, and functions anywhere in the world. Starting in 2004, the mobile phone industry began successful tests to incorporate GPS receivers into mobile phone devices to support 911 emergency location. Most of today's smartphones are equipped with fully functional GPS receivers and supporting applications[4].

C.Google Spreadsheet

Google Spreadsheets is a Web-based application that allows users to create, update and modify spreadsheets and share the data live online. The Ajax-based program is compatible with Microsoft Excel and CSV (comma-separated values) files. Spreadsheets can also be saved as HTML.

Google's product offers typical spreadsheet features, such as the ability to add, delete and sort rows and columns. The application also enables multiple, geographically dispersed users to collaborate on a spreadsheet in real time and chat through a built-in instant messaging program. Users can upload spreadsheets directly from their computers[11].

D.Android Software

The Apple iPhone has transformed the smartphone's image from a corporate-level personal organizer to a device that could potentially benefit every consumer. Recently, Google released an alternative Operating System (OS) and Application Programming Interface (API) for mobile phones called Android.

Android joins iPhone OS and other smartphone platforms including Symbian OS, Blackberry, and Windows Mobile. Android is backed by the Open Handset Alliance (OHA), whose members include Sony, Samsung, Motorola, and Nvidia. Though these companies are relatively new to the consumer-level smartphone market, they have already shown that by melding multiple technologies together in an open manner some unique applications can result.
On a basic level, Android is a distribution of Linux that includes a Java Virtual Machine (JVM), with Java being the preferred programming language for most Android applications.

The Android Software Development Kit (SDK) includes a debugger, libraries, a handset emulator, documentation, sample code, and tutorials. Android's official integrated development environment is Eclipse using the Android Development Tools (ADT) plug-in. SQLite database support is integrated into the Android platform. The ADT plugin includes an Android emulator that allows for the simulation of GPS and Wi-Fi. The Android emulator is depicted in Fig. 1 displaying the Android desktop[4].

Figure 1.The Android desktop.

Previously, mobile phone OSs have been proprietary, leading applications to be tied to a specific carrier and phone.

The iPhone, for instance, has restrictive licensing terms that allow only applications approved by Apple to be distributed publicly. Android's open nature is intended to set a new standard for mobile phone OSs. Applications can be written once and then run on a variety of phones and carriers. As such, Android is available as open source software under the Apache License.

As an open source platform, one of the goals of Android is to enable developers to create applications that utilize the features the mobile device has to offer and to tailor its features to the needs of the consumer. Android allows for thecombination of information from the web with core features of the phone such as the camera function and text messaging.

II.RELATED WORK

We have been gathering information about how the android operating system works. How it can be programmed. How a application can be deployed and all the information related to the android. We are also studying how a desktop application can be created in C#.NET and how it can be deployed. We are also studying how to use a cloud service like GOOGLE SPREADSHEET which comes under GOOGLE DRIVE cloud service.

So we have gathered some relevant information as follows.

1. WHAT IS ANDROID?

Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language.

Features :

- Application framework enabling reuse and replacement of components
- Dalvik virtual machine optimized for mobile devices
- Integrated browser based on the open source WebKit engine
- Optimized graphics powered by a custom 2D graphics library; 3D graphics based on the OpenGL ES 1.0 specification (hardware acceleration optional)
- SQLite for structured data storage
- Media support for common audio, video, and still image formats (MPEG4, H.264, MP3, AAC, AMR, JPG, PNG, GIF)
- GSM Telephony (hardware dependent)
- Bluetooth, EDGE, 3G, and WiFi (hardware dependent)
- Camera, GPS, compass, and accelerometer (hardware dependent)

Rich development environment including a device emulator, tools for debugging, memory and performance profiling, and a plugin for the Eclipse IDE.

The following diagram shows the major components of the Android operating system. Each section is described in moredetail below.

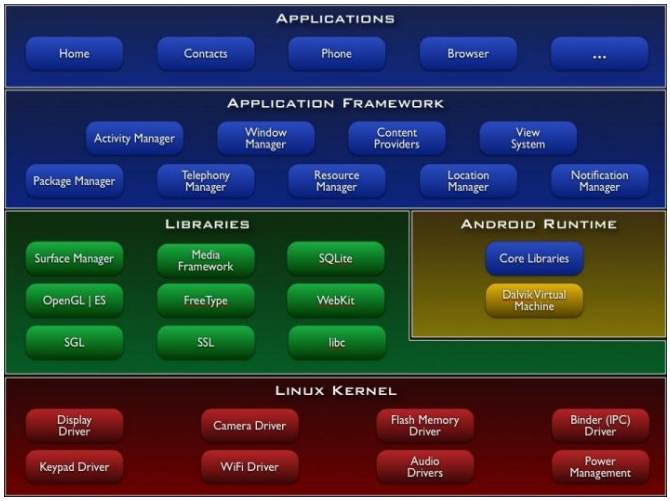

fig. Components of Android OS.

Android will ship with a set of core applications including an email client, SMS program, calendar, maps, browser, contacts, and others. All applications are written using the Java programming language[9].

The traditional system lacks the intend public safety and detecting a accident and lack of coordination after that.

Limitations of the traditional method:

There are many limitations to the existing system :-

- The traditional system is system lack public safety measures of how a much a driver can drive in a school premises.
- It cannot detect a fall or a accident resulting in to a life loss without help in given time.
- It does have a coordination system between help and the victim of a disaster during disasters.
- It cannot communicate the people in need.
- It cannot view the people on the maps.
- It cannot send message automatically during an accident.
- It cannot store the messages in the cloud.

III.TEMPLATE MATCHING ALGORITHM

1. operational transformationAlgorithm

Earlier this year, Google has launched new editors for documents and spreadsheets on Google Docs, built on a code base designed to improve collaboration and take advantage of the latest advances in the technology.

These improvements to Google Docs are designed to help businesses to move to the cloud faster and be more productive than ever before. If you've never tried web-based documents, spreadsheets and presentations, you can instantly take a test drive at docs.google.com/demo.

In this post, we will describes how Google Docs uses an algorithm called operational transformation to merge edits in real time.In documents, basically, there are three types of changes: inserting text, deleting text, and applying styles to a range of text.

When someone edits a document, theyâ€™re not modifying the underlying characters that represents the document. Instead they are appending their change to the end of the revision log. To display a document, Google replay the revision log from the beginning.

The algorithm that Google use to handle these shifts is called operational transformation (OT). If OT is implemented correctly, it guarantees that once all editors have received all changes, everyone will be looking at the same version of the document.

Collaboration in Google Docs consists of sending changes from one editor to the server, and then to the other editors. Each editor transforms incoming changes so that they make sense relative to the local version of the document. Google Docs can support up to 50 simultaneous editors, and documents let you see other peopleâ€™s changes character-by-character as they type.

2. Encoded Polyline algorithm format

Encoded polylines store two types of encoded information for any given set of points: the latitude and longitudes of those points, and the maximum zoom levels to display these points.

Levels are encoded using unsigned values, while point coordinates need to use signed values, so the encoding process is slightly different for each case. This process is noted below. If you only have a few static points, you may also wish to use the interactive polyline encoding utility.

Encoding Latitudes and Longitudes

The encoding process converts a binary value into a series of character codes for ASCII characters using the familiar base64 encoding scheme: to ensure proper display of these characters, encoded values are summed with 63 (the ASCII character '?') before converting them into ASCII. The algorithm also checks for additional character codes for a given point by checking the least significant bit of each byte group; if this bit is set to 1, the point is not yet fully formed and additional data must follow.

IV.SYSTEM ARCHITECTURE

System architecture is nothing but the structure of the system. It consist of softwareelement and properties of element.it also includes responsibilities among element.itconsist of set of component and different component connected with help of connector.

PROPOSE SYSTEM

A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures of the system.

A system architecture can comprise system components, the externally visible properties of those components, the relationships (e.g. the behavior) between them. It can provide a plan from which products can be procured, and systems developed, that will work together to implement the overall system. There have been effortsto formalize languages to describe system architecture, collectively these are called architecture description language.

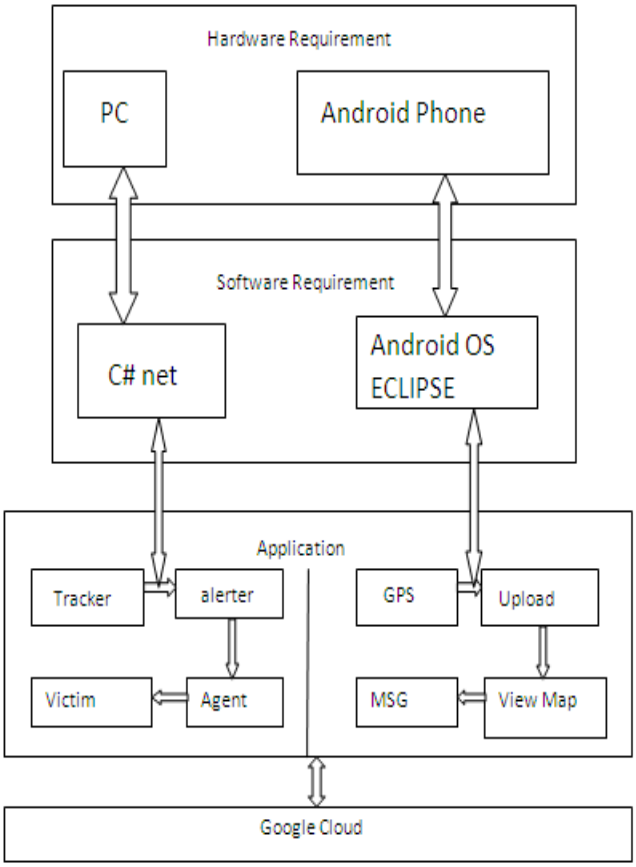

Fig. system Architecture

V. SYSTEM WORKING

The system contains the following features for help to work on the project. :-

1. GPS device :

In order to track the current position a GPS satellite should be available with a GPS device on the phone to take the user location from the satellite.

2. GPRS connection :

In order to use the web a faster GPRS connection should be available.

3. Accelerometer :

In order to detect the fall accelerometer of good quality should be present.

VI. SYSTEM DESIGN

A. DFD Level 0 :

DFD level-0 must balance with the context diagram it describes. Inputs going into a process are different from outputs leaving the process.

Data stores are first shown at this level. In level 0 of DFD, the processes could be considered as the module(s) in the system.

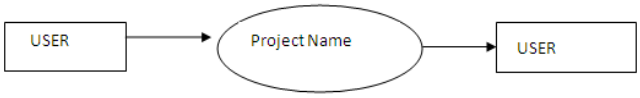

Fig. DFD level-0

B. DFD Level 1 :

DFD level-1 must balance with the Level 0 it describes. Inputs going into a process are different from outputs leaving the process.

In level 1 of DFD, the processes couldbe considered as the sub module(s) of functions of the project module.

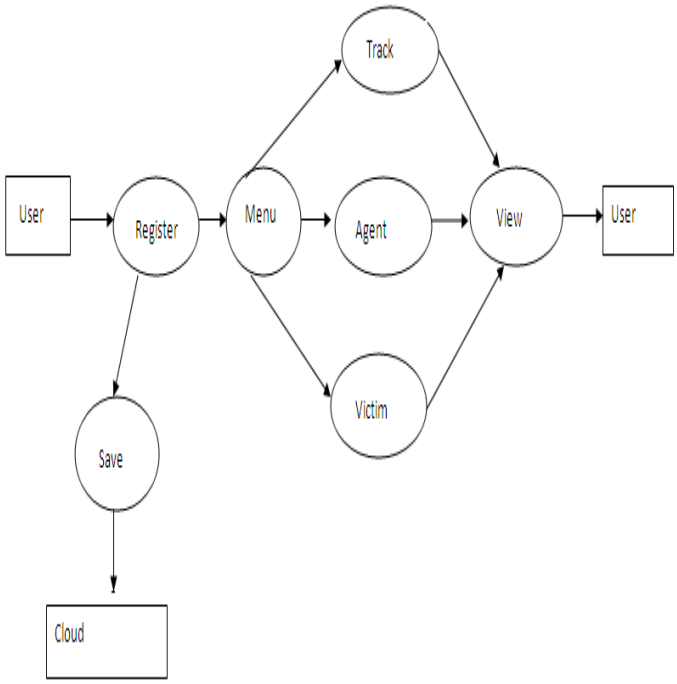

Fig. DFD level-1

C. E-R Relationship Diagram :

In software engineering, an entity relationship model (ER model) is a data model for describing a database in an abstract way.An ER model is an abstract way of describing a database. In the case of a relational database, which stores data in tables, some of the data in these tables point to data in other tables for instance, your entry in the database could

point to several entries for each of the phone numbers that are yours.

The ER model would say that you are an entity, and each phone number is an entity, and the relationship between you and the phone numbers is 'has a phone number'. Diagrams created to design these entities and relationships are called entity relationship diagrams or ER diagrams.

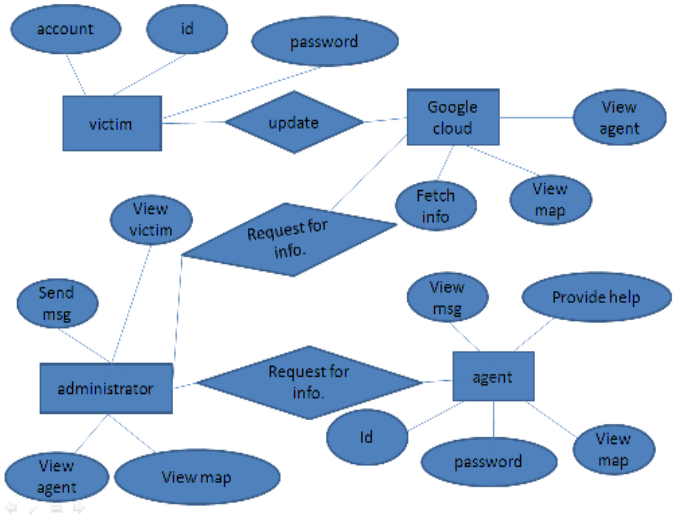

Fig. E-R Relationship Diagram

D. USE CASE DIAGRAM :

Fig. Use Case Diagram

A Use Case diagram captures use cases and relationships among actors and thesubject (system). It describes the functional requirements of the system, the manner in which outside things (actors) interact at the system boundary, and the response of the system.

VII.TESTING AND ANALYSIS

In this section, we describe the experimental results of proposed system. We get quick help within short interval of time. If victim in difficult condition then the administrator will find the location of victim, track location and send alert message to the respected agents which are located nearer from the injured victim. And whole this process will happen at cloud with the help of internet.

If agent need information about the particular victim then the agent can send message to the administrator through their mobile phones with help of free messenger application of android.

Whole the victim's and agent's entries are stored on spreadsheet. victim's entries stores automatically while agent's entries are stored by admin.

In this way, administrator handles the whole system with the help of cloud and Google spreadsheets.

SCREENSHOTS

A. Administrator side screenshots. :-

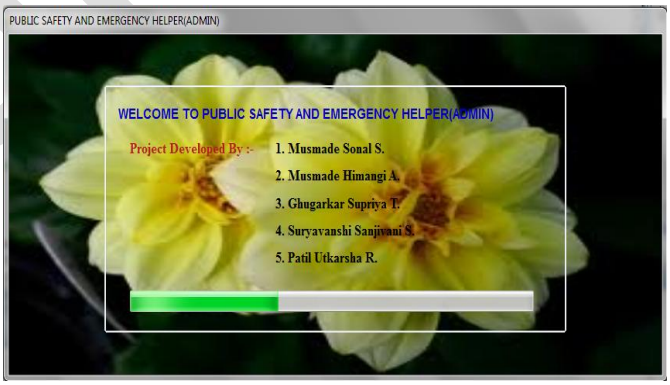

Fig. Introduction page

Fig. Login form for Admin

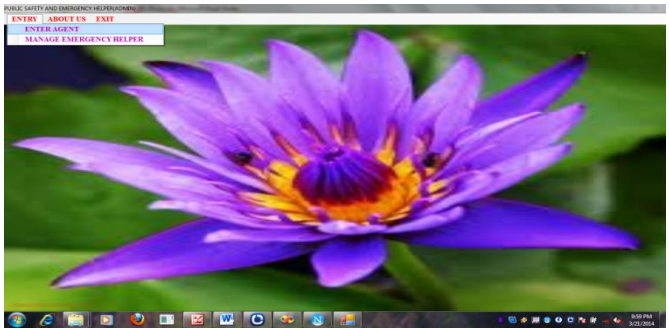

Fig. menu form after login page

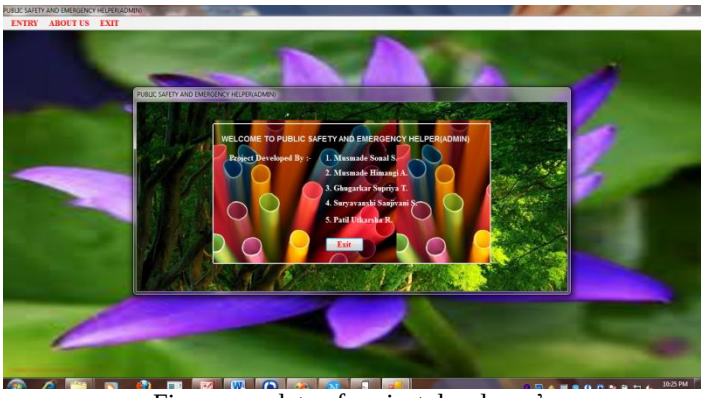

Fig. name plate of project developer's

Fig. Entry page of Agent

Fig. Helpline page of respective project.

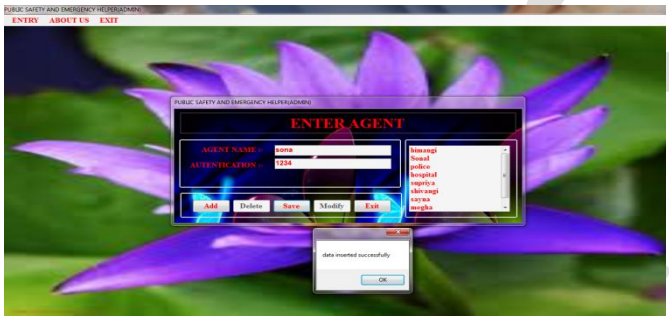

Fig. after entry, save the entry into list of agents.

B. Android side screenshots :-

Fig. accelerometer of victim's phone

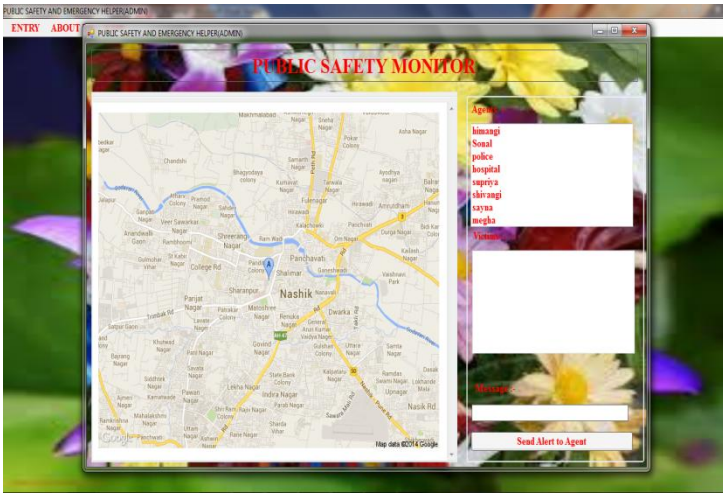

Fig.Pubic safety monitor screen.

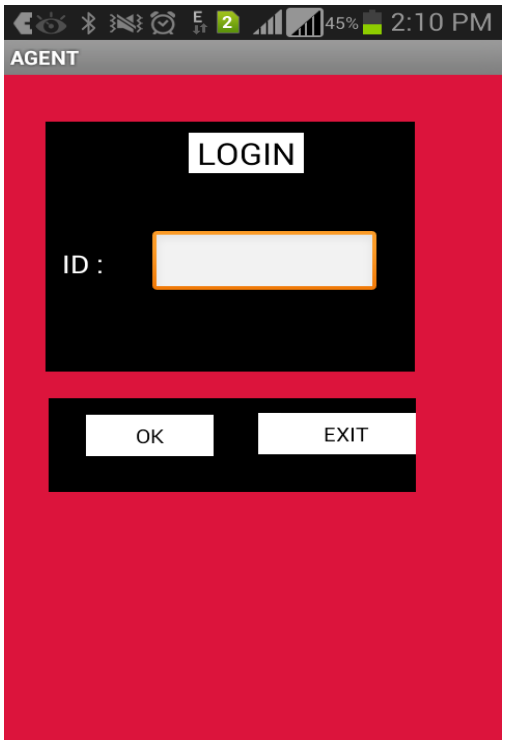

Fig. agent's login form.

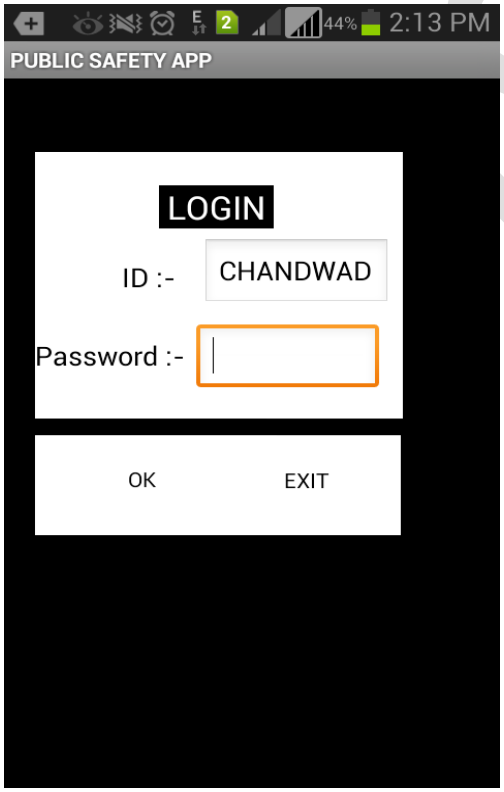

Fig. login form for victim to modify his personal data.

VIII. ADVANTAGES

- Automatic Detection:
  Automatic detection of accident
- Free messaging:
  Free messaging is available for communication between the admin and agent.
- Location Tracking :
  Load the location of victim, and track it for provide the help to the victim.
- Successful Disaster Management.
- Google Driver is used as Cloud Service.

IX. APPLICATIONS

- Android application for victim to get help:-
  In this user class, in case of a disaster the victim can select the type of problem he is in like accident, fire and theft and can get help by just selecting a category.
- Android application for agent:-
  In this user class a application for agent to help will be created and can get alert for help from desktop depending upon the alert type.
- Desktop application for centralized coordination:-
  In this a centralized coordination system is designed to coordinate between the agent and the victim.
- Free messenger :-
  In this user class the desktop can communicate with the agent for free.
- Google Spreadsheet handler :-
  In this user class the applications both desktop and Android can store information.

X. CONCLUSION

The final result of the proposed system is smart, user friendly system with ability of its detecting and tracking the position of victim with the help of applications of the smart Android phones. We introduced the structure of system and simultaneously shown the system working during operations.

Our application showed how GPS data and Google search services could be combineto keep public safe.Our Application has been successfully developed to collect data on victims of naturaldisasters on android OS platform.

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