

SHIELD: Personal Safety Application

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Abstract - It is becoming increasingly unsafe for a person to travel alone at night. The best way to avoid being a victim of a violent crime is to identify and call on resources to help you out of unsafe situations. Whether you are in trouble or get separated from friends during the night and do not know how to get home, having assistance at hand when we require it is a relief. Hence we present SHIELD, a personal safety application. SHIELD which means protection, to save, to guard or to defend yourself from danger. This application tracks the location of the user through GPS and allows an individual to immediately request for help in disastrous situations with just a tap. It transmits the user's location and an alert message to the user's trusted and registered contacts when the user feels unsafe. These contacts can track the user's location in real time and provide the required help.

Key Words: GPS, Google Maps, SOS, Google API, Firebase.

1. INTRODUCTION

The rise in crime rates in the past few years has resulted in dire need of modern, quick and easy to use safety measures to be developed. Help must always be at hand. New Year's celebration in Bangalore, turned into mass sexual harassment as women were cornered and molested. Mumbai 2014, in a boys hostel a student was brutally assaulted and beaten up. When his friends found him he was completely unconscious and was then taken to the hospital. In a blog, a woman describes her feeling unsafe while returning home late night from work as a man was continuously staring at her making her feel uncomfortable and unsafe.

The safety of an individual is of utmost importance and now-a-days, highly questionable. The usage of smart phones equipped with GPS navigation unit has rapidly increased from 3% to more than 80% in the past eight years. Hence, a smart phone can be used efficiently for personal safety or various other protection purposes especially for women. With the increase in use of smartphones equipped with GPS technology we have come up with a system that allows an individual to immediately request for help in disastrous

situations with just a tap. We present SHIELD, a personal safety application. SHIELD, which means protection, to save, to guard or to defend yourself from danger. It sends an emergency message along with your location to all your trusted contacts. These contacts can track your location in real time and provide the required help. This system is for everyone. It is fast, easy to use and private.

The key features of our application are:

- Real-time location tracking.
- Normal mode: This is a mode where you can add your emergency contacts (up to 5 contacts) and request various helps with just a swipe.
- Campus mode: This is a separate portal within the app designed especially for university campuses.
- Automate mode: Going somewhere? Feed your Route in our system and we will track you continuously.
- Emergency Mode: This mode will be activated automatically when you are in a danger. You just need to press the power button 5 times and all your emergency contacts will be informed with your current location and help message.
- Rescue mode: Will be unlocked only when a friend is in danger and has requested for help. Track your friend's location in real time

2. PROJECT IDEA

In today's world, it is not safe for a person to travel alone at night especially for women. The good way to reduce chances in becoming a victim of violent crime (robbery, sexual assault, rape, domestic violence) is to identify and call on resources to help you out of unsafe situations. Whether you are in instant trouble or got separated from friends during night and do not know to reach home, having these apps on your phone can diminish our risk and bring assistance when

we require it. Hence we present SHIELD, an application for smart phones working over android platform.

SHIELD which means protection, to save, to guard or to defend yourself from danger.

3. GOALS AND OBJECTIVES

Dealing with present scenarios security is a big concern to people, our application focuses mainly on women safety.

- i) Primary Objective: To develop an Android application that focuses on personal safety.
- ii) Secondary Objective: To make this application available on other platforms.

4. MOTIVATION OF THE PROJECT

Everybody wants to be independent but what stops them to be carefree? The answer to above question is their security specifically in case of women. This is a very important issue to discuss and existing application for security purpose is not enough as these applications may not be used by victim due to a long operating procedures for requesting help. The above situation gives rise to our main purpose that is ease of using security application. We try to make an easy and friendly user interface which also provides direct shortcuts for contacting emergency contacts with just a gesture swipe. This is useful feature as it is less time consuming for the victim to operate their device and ask for help.

5. RELATED WORK

1. WOMEN SECURITY. [5]

This app is developed by AppSoftIndia. The key features of the app are: the user has to save some details. These details include: Email address and password of the user, Email address and mobile number of the recipient and a text message. Then, app is loaded as a widget, so that when the user touches the app, it alerts the recipient. Another key feature of app is that it records the voice of surroundings for about 45 seconds and this recorded voice, text message containing location coordinates of the user is sent to the recipient mobile number.

2. VithU. [8]

Developed by Star India Pvt. Ltd. This is an emergency App that, at the click of the power button of your smartphone 2 times consecutively begins sending out alert messages every 2 minutes to your contacts that you feed into the app as the designated receivers or guardians.

3. BSAFE- PERSONAL SAFETY APP. [6]

This app is developed by Bipper Inc. On March 6, 2015. The apps motto is Never Walk Alone. This app helps the user to create a gang of 'Guardians' and SOS message will be received by them when the user is in trouble. Also another good feature of this app is one of the guardians will also be called. The SOS message also includes location of user via GPS. The user can also enable the GPS tracker and let the friends know location at any time.

4. SCREAM ALARM. [7]

Scream Alarm, an android application developed by Go Pal AppMaker in November 2013. By clicking this app, it generates a very high volume scream in times of distress when the lungs of a person fail in screaming in trouble. The generated scream is in a woman's voice is severely helpful in discouraging the potential strong trouble makers. The only work done by this application is whenever the person pushes or touches the application, the phone screams loudly with a woman's voice.

6. PROPOSED SYSTEM

The proposed system is an android application that takes user contact details and personal information during sign up process. On the main page of the app it firstly makes user to configure its account by adding emergency contacts and enable necessary modes of operations. This application requires permission to access Internet, Contacts, Location, Phone and Messaging which needs to be provided by the user. In order to provide real-time location tracking this app makes use of Google maps API and firebase cloud. Database required by this application is maintained in firebase cloud.

7. ARCHITECTURAL DESIGN

Fig.1. shows the architecture of proposed system in which there are different modules with different functionality.

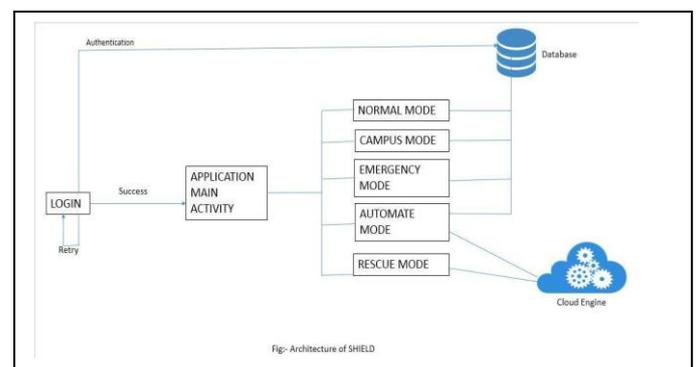


Fig 1: Architecture of Proposed System

The working of this application is divided into 5 modules called as modes. These modes are also the features introduced in our application. They are described as follows.

1. Normal mode:

This is a mode where you can add your emergency contacts (up to 3 contacts) and request various helps with just using message button. You can either send request to all your contacts or just the selected ones.

1. Message Button: Send predefined message like “request for pickup”, “I am in danger”, “please call me” to your selected contacts.

2. Phone Button: Call the selected contacts.

2. Campus Mode:

This is a separate portal within the app designed especially for university campuses. Make it a must have tool for every student in your campus and when they are in danger they can simply switch to campus mode and request for help. A help request along with the location of the victim will be sent to the college security and all the trusted contacts of the victim stored in the campus mode as well as the contacts stored in normal mode.

3. Emergency Mode:

This mode will be activated automatically when you are in a danger. You just need to press the Volume button 3 times and all your emergency contacts (including normal and campus mode) will be informed with your current location and help message. Now your emergency contacts can track you in rescue mod.

4. Automate Mode:

Going somewhere? Feed your Route in our system and we will track you continuously. If u go off the route for more than 30 minutes we will send an emergency text and your location to your contacts. Location tracking will stop once you mark I am safe in the app.

5. Rescue mode (Will be unlocked only when a friend is in danger and has requested for help):

Friend in Danger? Track your friend’s location in real time. All the emergency contacts can track the location of the friend who is in danger as well as each other’s location during rescue operation.

8. METHODOLOGIES AND WORKING

The proposed system is an android application that takes user contact details and personal information during sign up process. On the main page of the app it firstly makes user to configure its account by adding emergency contacts and enable necessary modes of operations. This application requires permission to access Internet, Contacts, Location, Phone and Messaging which needs to be provided by the user. Data is stored and synced with our NoSQL Cloud database, Firebase. The Firebase Real-time Database lets you build rich, collaborative applications by allowing secure access to the database directly from client-side code. In order to provide real-time location tracking this app makes use of Google maps API and firebase cloud.

The primary functionality of SHIELD is based on location tracking. It is completely dependent on the GPS to track the location and update it to the database in real time. In SHIELD the real-time changes in user’s location is determined and updated to the database. The update gets reflected to the database within 0.5 seconds depending upon the Internet connection which constitutes the second requirement of the application.

Pre-requisites of SHIELD (Mandatory)

- Android Device V4.4 or above.
- GPS in high accuracy mode for accurate performance.
- Working Internet Connection

The key component responsible for the entire functionality of the application is the backend database and cloud engine (Firebase). It is responsible for providing Authentication, Social Integration, Storage and Real-time database.

SHIELD maintains a user-defined list of “Trusted Contacts” for both Normal and Campus mode. These contacts will be alerted by push notification and SMS in case of any emergency when triggered by the victim. It allows the trusted contacts/emergency contacts to track the victim’s location in real-time in a Map portal provided in Rescue Mode. To enter the rescue mode it is mandatory for the “Trusted Contacts” to have the application installed. The user can select at maximum 3 trusted contacts from the phone book of the device for each normal and campus mode. The list of these contacts is maintained in the database.

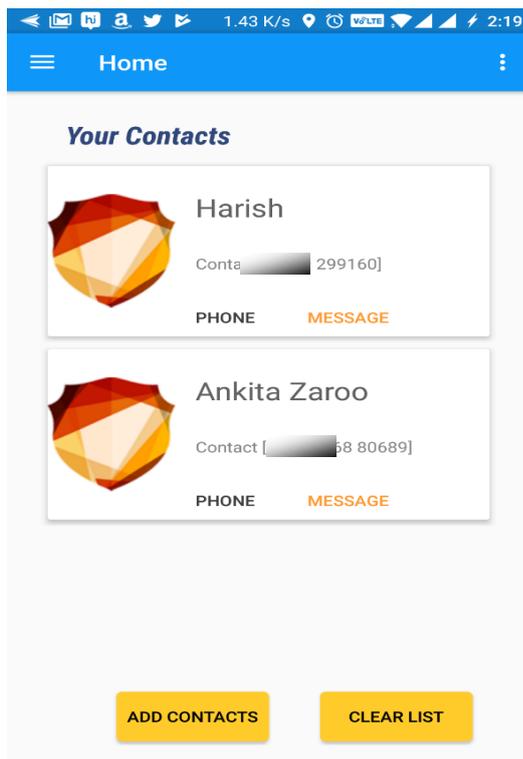


Fig 2A: UI to add emergency contacts

Fig 2B shows the database structure of the saved emergency contacts for both Normal and Campus mode.

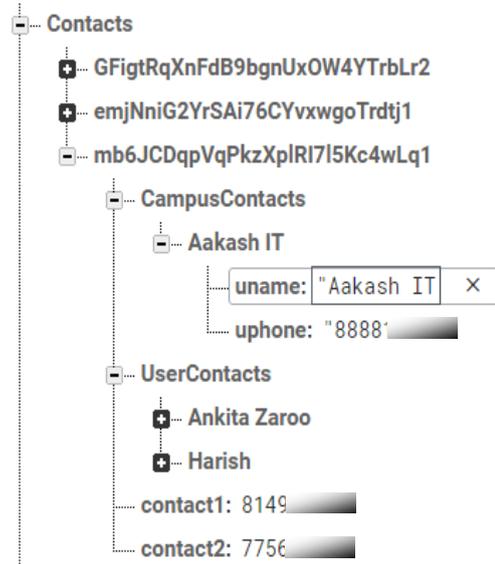


Fig 2B: Database structure of user contacts

In fig 3 along with the contacts some other attributes of the user is also maintained in the database like its Name, Email, Phone, Latitude, Longitude, Id etc. Below is the database structure.



Fig 3: Database structure of user

SHIELD also allows you to send preloaded emergency texts to your trusted contacts. For SMS notifications operator charges may apply. On the contrary the, mobile notifications are free of cost. SHIELD has its own push notification mechanism as shown in the fig 4.

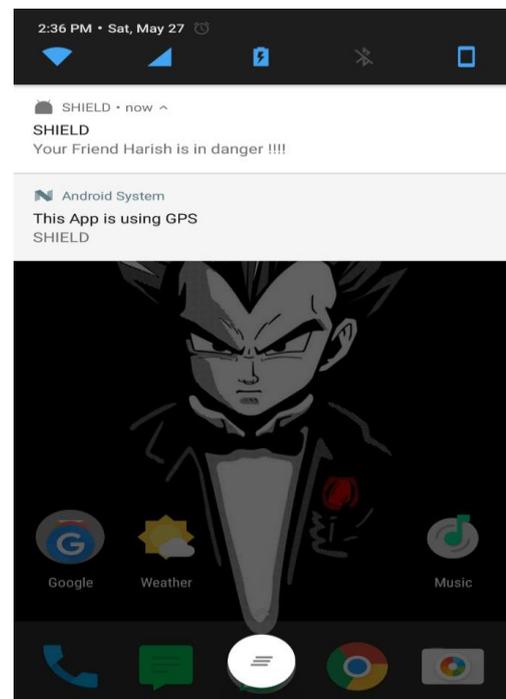


Fig 4: Application Push Notification

When an alert is triggered by the victim all the trusted contacts gets notified and then they can either call emergency hotlines provided in the app or they can also track the victims location in the rescue mode of the application as shown in the fig 5A and 5B.



Fig 5A: Emergency Hotlines

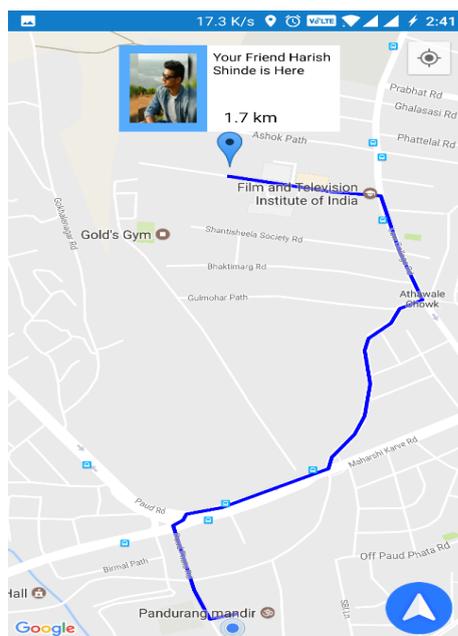


Fig 5B: Rescue Mode

The tracking of the user’s location in the rescue mode will remain active until the user is marked safe.

9. CONCLUSION

We developed a system that works for safety of an individual mainly focusing on women safety. Building a real time access system, we provide continuous tracking of the user. Adding special features to our application we provide a user friendly and easy interface. We build a network of relationship with your family and friends providing quick access to help when in a hazardous condition. Quick access provided in our application helps the victim to get out the situation easily and help the victim. Providing self-confidence to an individual by providing them our system that help them to be independent without worrying about security issues that may occur. Targeting the increase in no. of smart phone users we get scope of our application in market. This application will be available to android users first and then analysing the scope of the project we would extend its use to other platforms too.

10. ACKNOWLEDGEMENT

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