# Hosla – An Android Based Women Safety Application

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*Abstract*
*Woman safety in India has always been an issue and it has greatly aggravated with advent of 21st century. However, there is a new hope with the rise in the technology and increase in the awareness; people have started paying attention towards these flaws in the society. There is an immediate need for an easy and effective solution for this situation. Individuals have been trying to get rid of this problem in India, however the growing crime rate against woman indicate otherwise. During earlier times, crimes against women did not receive enough importance, as it should have. Especially in India where unruly practices such as sati, dowry and female infanticide were predominant, the thought of female empowerment was a taboo. These practices in the Indian society is due to lack of education, awareness and stubbornness. The Indian society failed to adapt to the changing times and as a result, the female population had to suffer which led to the degradation of the Indian society as a whole. HOSLA aims at delivering a simple yet operational elucidation to this problem. Currently, mobile application development plays an important role with operating systems such as Windows, Android, and IOS, among others. This mobile application is primarily used to improve the health of women. It may be used to locate and assist women in crisis situations. It displays the correct location of the individual and sends the point of interest to her family, guardians, and friends via Short Message Service (SMS). In this research paper, we are going to see what are the benefits of our Android based application, our project scope and its application.*
*Keywords: SQLite, Dependencies, API, Constraint Layout, Accelometer, GPS, Biometric, Fingerprint*

## I.  INTRODUCTION

There has been a rise in the female workforce in the urban areas. There has also been an increase in the MNCs hiring individuals in India and because of that are many female employees, which work, and their shifts are regulated as per the MNCs' schedule. This leads to female employees commuting at disproportionate time, hence leading to vulnerability. Factors that negatively affect the female population are:
 Rape
 Kidnapping & Abduction
 Dowry deaths
 Assault
 Trafficking

Flimsy police regulation as well as parochial mind-set of the society has further exacerbated the situation. HOSLA tries to connect the person in danger directly to their loved ones with just a shake of their devices. Without even using the phone, a distress signal could be directly sent from the user's mobile phone to the guardian phones along with their current location. The guardian on the other hand does not need to open the application and check every time. The application opens up automatically when the distressed signal is shake. Once the application opens, it displays a map along with a map that shows the fastest route from the guardian to the person in distress and hence he/she could be saved in time.

### 1.1.1   Overview

The Thompson Reuters Foundation today published a list of the most perilous nations in which to be born a woman. According to Reuters, 213 experts from five continents were asked to classify the world's countries into six high-risk categories: "health hazards, sexual violence, non-sexual violence, detrimental cultural practices, tradition, and/or religion, lack of access to economic resources, and human trafficking."

According to the poll, female feticide, underage marriage, and high levels of trafficking and domestic slavery make the world's biggest democracy the fourth most hazardous location for women.

   100 million people, mostly women and girls, are involved in trafficking in one way or another, according to former Indian Home Secretary Madhukar Gupta.
   Up to 50 million girls are "missing" over the past century due to female infanticide and feticide.

☐ 44.5 % of girls are married before the age of 18.

Over three lakh women were abducted, raped, assaulted, and, in extreme cases, killed by males throughout the country last year. This represents a nearly 27 percent increase since 2012, and a year after the world's attention was given to the scourge of assault against women in India.

Cases of violent abuse of women have consistently grown since 2009, according to data from the National Crime Records Bureau, the government organization that maintains track of the country's crime rate. By 2013, the number of such instances had climbed by more than half. Every day, over 848 women are harassed, raped, or killed after being abducted. Some are traffickers' prey.
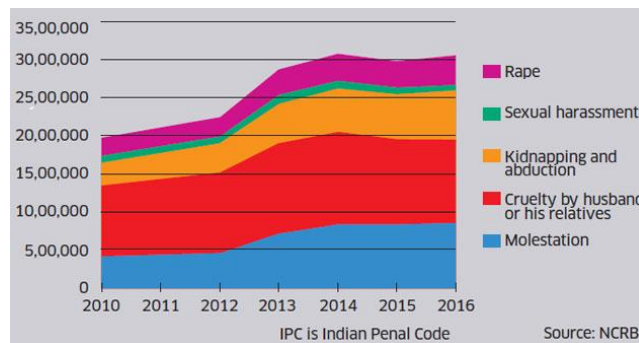


Fig. 1- Statistics of violence against women

The rate of female labor-force participation has gradually grown in metropolitan areas, which is directly related to the rise in female literacy rates. In rural regions, women's engagement is declining while men's participation is stable.

*Some shocking data:*
1. Every 20 minutes, a new case of crime against women is filed in India.
2. In 2011, 206 rape cases were filed in India, according to the National Crime Records Bureau. According to statistics, the number of assaulted in the nation more than quadrupled between 1990 and 2008.
3. According to a BBC investigation from February 2013, about 7,200 children are assaulted in India each year.
4. Following the December 2012 Delhi gang-rape case, Parliament passed modifications to the Indian Penal Code in April 2013, making several improvements to India's anti-rape legislation.
5. According to NCRB data, Maharashtra is one of the ten worst states in terms of conviction rates for most crimes against women.
6. According to the National Crime Records Bureau (NCRB), close relatives and friends are the accused in 98 percent of documented incidents of molestation and rape in the nation.
7. In India, a total of 24,923 rape and molestation incidents were reported in 2012.
8. According to the NCRB data, Lakshadweep is the only administrative division in the country where no rapes or molestation of minors have been reported since 2007.
9. Spending on safety nets accounts approximately 1 to 2 percent of GDP in emerging and transition nations on average, however it can be much less or much more in some cases. Gross domestic product (GDP) is a standard measure of the value added generated by a country's production of goods and services over a certain time period.
10. During the year 2009, about 68,000 rape and molestation cases were reported across the country. However, just 16,000 of them were condemned to jail.
11. Rape, dowry killings, sexual harassment, abduction, trafficking, and other crimes against women increased by 6.4 percent in 2012 compared to the previous year.
12. The city of Delhi had the greatest number of rapes.

**1.1.2  Purpose**

HOSLA mainly aims at providing a simple and effective interface to help a person in distress by sending SOS signal to their loved ones as well as to their guardian, along with the location. There have been cases where the location of victim is unknown and due to this, help could not be dispatch timely. The primary goal of this application is to:

- Provide a fully functioning application, which is able to receive signal from a mobile device to generate location. This location is then sent to the guardian's phone along with the fastest route to reach the victim.

### 1.1.3 Significance

We focus on the mind-set of the person in distress. Just the shake of a mobile device is far easier than calling for help. We make sure that that the victim's phone are connected to the network in order for them to communicate. To develop a fully functional android application for women safety to provide recue and help when a need arises. The victim can send the distress signal whenever there's any danger. The application has been developed on android platform. Once the application opens, it displays a map along with a map that shows the fastest route from the subscriber to the person in distress and hence he/she could be saved in time. There have been cases where the location of victim is unknown and due to this, help could not be dispatch timely. One of the major factors on developing this application is by looking at these statistics only. A country that has been tormented by the shackles of social stigmas, something is not in place when it comes to woman safety. It may be due to negligence of administration or due to carelessness of the police force. A clear solution must be carved out for the woman of India- 'HOSLA'.

### 1.1.4 Objective

- Fetching real-time location of the victim with just the shake of a mobile device
- Sending the location to the guardian phone.
- Achieve near about accuracy while sending the location.
- Auto boot the application when receiving the location.
- Use of cost effective technology.
- Help the people in distress.

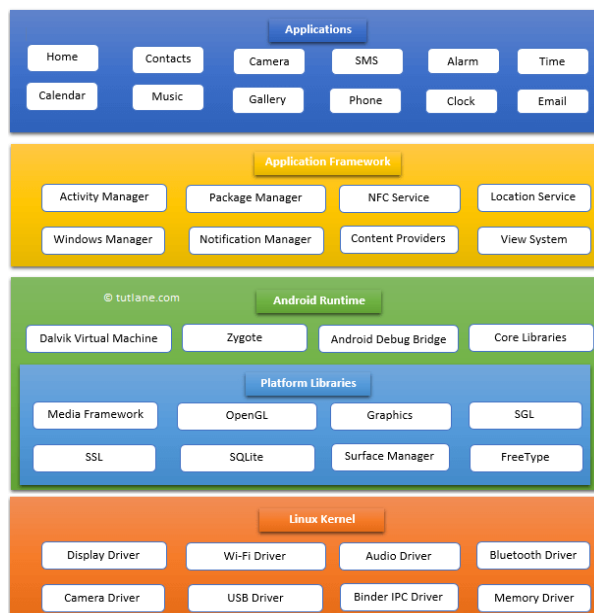## II.    PLATFORM AND TECHNOLOGY USED

### 2.1    Android



Fig. 2 - Android Architecture

Android architecture includes a variety of components to meet the demands of any Android device. Android software includes an open-source Linux Kernel with a suite of C/C++ libraries that are accessed via application framework services. Among all the components, the Linux Kernel delivers the primary functionality of the operating system to smartphones, while the Dalvik Virtual Machine (DVM) offers a basis for executing an Android application.

### 1.    Linux Kernel

Linux 3.6 is near the bottom of the layers, with around 115 fixes. This offers a degree of abstraction between the device hardware and includes all of the necessary hardware drivers such as camera, keyboard,

display, and so on. Furthermore, the kernel handles all of the things that Linux excels at, such as networking and a huge number of device drivers, which make connecting to peripheral hardware a breeze.

### 2.    *Libraries*

On top of the Linux kernel, there is a set of libraries that includes the open-source Web browser engine WebKit, the well-known library libc, the SQLite database, which is a useful repository for storage and sharing of application data, libraries to play and record audio and video, SSL libraries responsible for Internet security, and so on.

### 3.    *Android Runtime*

This is the third component of the architecture, and it is accessible from the bottom of the second stratum. This section contains a critical component known as the Dalvik Virtual Machine, which is a kind of Java Virtual Machine specifically created and optimized for Android. The Dalvik virtual machine makes advantage of Linux fundamental characteristics such as memory management and multi-threading, which are inherent in the Java programming language. Every Android application may operate in its own process, with its own instance of the Dalvik virtual computer, thanks to the Dalvik VM. The Android runtime also includes a set of fundamental libraries that allow Android application developers to create Android apps in the standard Java programming language.

### 4.    *Application Framework*

In the form of Java classes, the Application Framework layer provides various higher-level services to applications. These services may be used by application developers in their apps.

The following major services are included in the Android framework:

### a)    **Activity Manager**

The Activity Manager manages the whole application lifecycle and activity stack.

### b)    **Content Provider**

Content Providers enable apps to publish and share data with one another.

### c)    **Resource Manager**

Access to non-code embedded resources like as strings, colour settings, and user interface layouts is provided through the Resource Manager.

### d)    **Notification Manager**

Notifications Manager enables programmers to show the user alerts and notifications.

### e)    **View System**

A view system is an extendable set of views that is used to develop application user interfaces.

### 5.    *Applications*

The top layer of Android architecture is applications. Pre-installed programmers like as home, contacts, camera, gallery, and so on, as well as third-party applications downloaded from the play store such as chat apps, games, and so on, will be put solely on this layer. It uses the classes and services supplied by the application framework to execute within the Android run time.
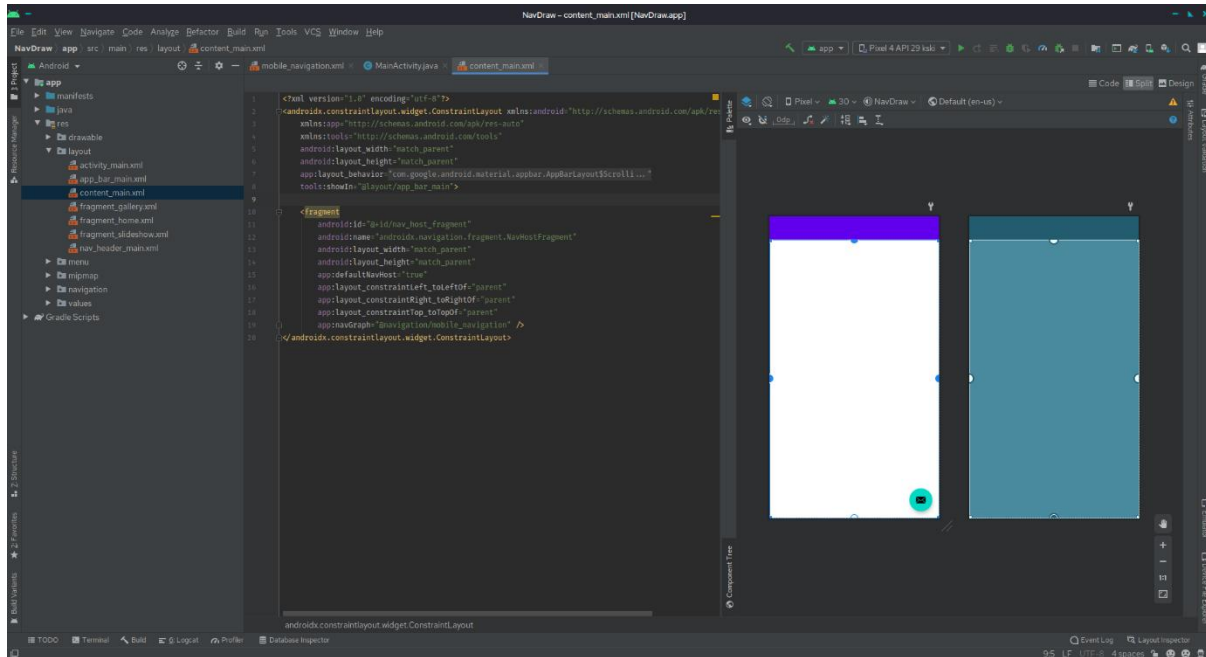
## 2.2     Android Studio



Fig. 3- Android Studio 2021.1.1 running on Windows

## 2.3     Java



Fig. 4 – Java Version 8

Java is a programming language as well as an operating system. Java is a high-level programming language that is powerful, object-oriented, and secure. Java was created in 1995 by Sun Microsystems (which is now an Oracle company). James Gosling is often regarded as the "Father of Java." It was called Oak before Java. Because Oak was already a registered firm, James Gosling and his team renamed it Java.

It is a programming language that may be used for a variety of purposes designed to allow programmers to write once and run anywhere (WORA), which means that generated Java without the requirement for recompilation, code can execute on any platform that supports Java. Java programmes are often converted into bytecode capable of running on any Java virtual machine (JVM), independent of computer architecture. Java's syntax is comparable to those of C and C++, although it has fewer low-level features than any of them. The Java runtime provides dynamic features (such as reflection and runtime code change) that traditional compiled languages do not. J2EE offered technology and APIs for corporate applications that normally operate on servers, whereas J2ME had APIs tailored for mobile apps. J2SE was the moniker given to the desktop version.

**2.4    SQLite Database**

SQLite is a library that runs in the background enables a serverless, transactional SQL database engine with zero setup. It is a zero-configuration database, which means that, like other databases, you do not need to setup it on your system. SQLite engine is not a stand-alone process like other databases; it may be linked statically or dynamically with your application depending on your needs. SQLite directly accesses its storage files. SQLite supports bindings for a wide range of computer languages. It follows PostgreSQL syntax in general but does not impose type checking. This implies that, for example, a string can be inserted into a column specified as an integer. Prior to each release, SQLite does automatic regression testing. SQLite versions have had 100 percent branch test coverage, one of the components of code coverage, since the August 10, 2009 release of SQLite 3.6.17.  The testing and test equipment are both free and commercial.

SQLite is incredibly tiny and light weight, taking up less than 400KiB when fully configured and less than 250KiB when optional features are disabled. SQLite is self-contained, which means it does not require any external dependencies. SQLite transactions are completely ACID-compliant, which allows for secure access from different processes or threads. SQLite is developed in ANSI-C and has a basic and straightforward API. SQLite's release includes a standalone command-line tool. It is capable of creating a database, defining tables, inserting and changing rows, running queries, and managing a SQLite database file. It also functions as a model for developing SQLite-based apps.

## III.    LITERATURE REVIEW

As stated earlier, the recent times have acted as a boon as well as a bane for female population. India has seen a growth in the literacy rate of women as well as a rise in the female workforce and in the decision-making councils. However, there has also been an upsurge in the crimes committed against woman. Under Section 376 of the Indian Penal Code (IPC), the number of rape cases have grown from 16496 in 2000 to 36735 in 2014. The number of kidnapping and abductions, under section 363 to 373 of the Indian Penal code, has risen from 15023 to 57311 from 2000 to 2014 respectively. The number of cases of cruelty by husband or relative, under section 498-A of IPC, have augmented from 45778 in 2000 to 122877 in 2014.

Throughout the making of this project, we came across various shocking facts about the condition of female population in India and how it should be given more importance. The government of India releases datasets as well as detailed statistics on various aspects of India and how it has changed. Since these government figures, there might be some deviation from the actual figures however, an estimate could be generated just by looking at these statistics. With the rise in female workforce contribution, there is surprising rise in crime committed against women. This is surprising because such a culture exist where people are unaware and uneducated. In a developing country, such as India, these statistics are cringe worthy.

| Year | Rural | | | Urban | | | Combined | | |
|---|---|---|---|---|---|---|---|---|---|
| | Female | Male | Total | Female | Male | Total | Female | Male | Total |
| 1951 | 4.87 | 19.02 | 12.1 | 22.33 | 45.6 | 34.59 | 8.86 | 27.15 | 18.32 |
| 1961 | 10.1 | 34.3 | 22.5 | 40.5 | 66 | 54.4 | 15.35 | 40.4 | 28.31 |
| 1971 | 15.5 | 48.6 | 27.9 | 48.8 | 69.8 | 60.2 | 21.97 | 45.96 | 34.45 |
| 1981 | 21.7 | 49.6 | 36 | 56.3 | 76.7 | 67.2 | 29.76 | 56.38 | 43.57 |
| 1991 | 30.17 | 56.96 | 36 | 64.05 | 81.09 | 67.2 | 39.29 | 64.13 | 52.21 |
| 2001 | 46.7 | 71.4 | 59.4 | 73.2 | 86.7 | 80.3 | 53.67 | 75.26 | 64.83 |
| 2011 | 58.75 | 78.57 | 67.8 | 79.92 | 89.67 | 84.1 | 65.46 | 82.14 | 74.04 |
| % Increase in 2011 over 2001 | 26% | 10% | 14% | 9% | 3% | 5% | 22% | 9% | 14% |

Fig. 5 – Literacy rates in Post Independent India

The above figure gives a clear idea about the literacy rate of female population in India. There has been a continuous rise in the female literacy rate and this leads to greater female contribution in the workforce. This contribution is mainly in the urban areas since the work in urban areas are not attributed to the physical strength. In rural areas, physical strength plays a vital role. The workforce participation rate has steadily increased in the

urban areas that is directly proportional to the rise in the literacy rate of the female population. In rural areas, we can see a decline in participation of woman while the participation of men remains constant.

One of the major factors on developing this application is by looking at these statistics only. A country that has been tormented by the shackles of social stigmas, something is not in place when it comes to woman safety. It may be due to negligence of administration or due to carelessness of the police force. A clear solution must be carved out for the woman of India- 'HOSLA'.

### 3.1 Google Survey
We conducted a survey across 45 women belonging to different age groups using google forms, and here is the statistical data that we collected through it.
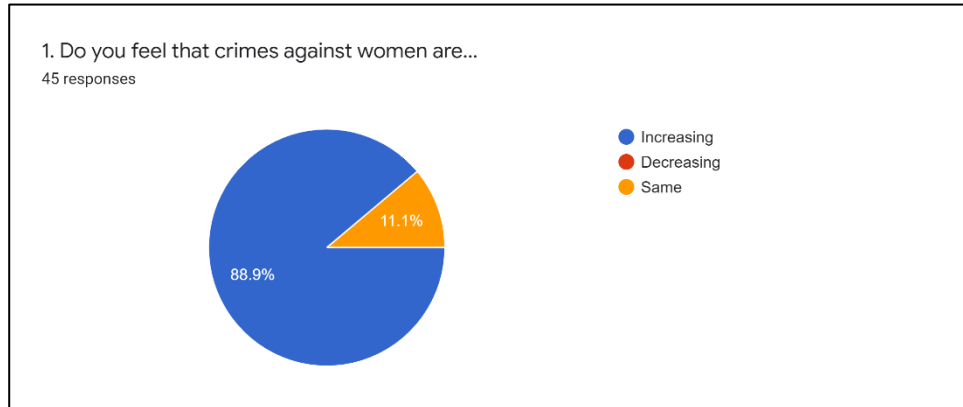


88.9 % of the users agreed that crimes against women are increasing. The rest of 11.1 % of users think that it is same that means the crimes against women are increasing and decreasing simultaneously.
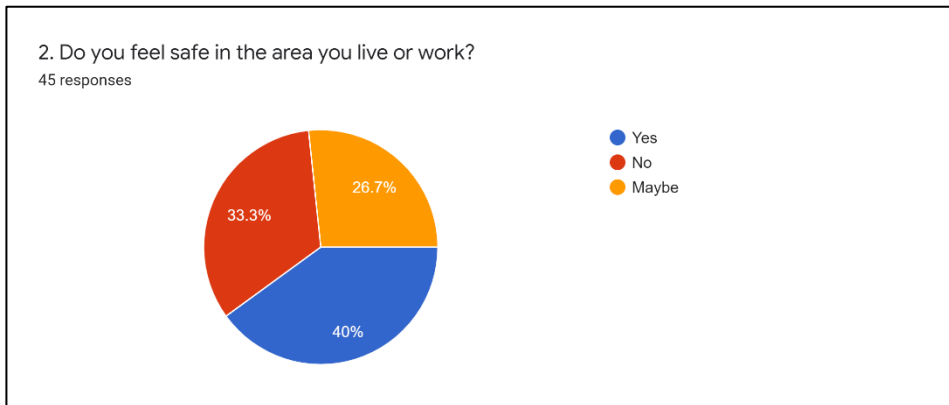


33.3 % of the users agreed that they feel unsafe in the area where they work and live. The rest of 40 % of users think that they feel safe while they are at work or where they live.
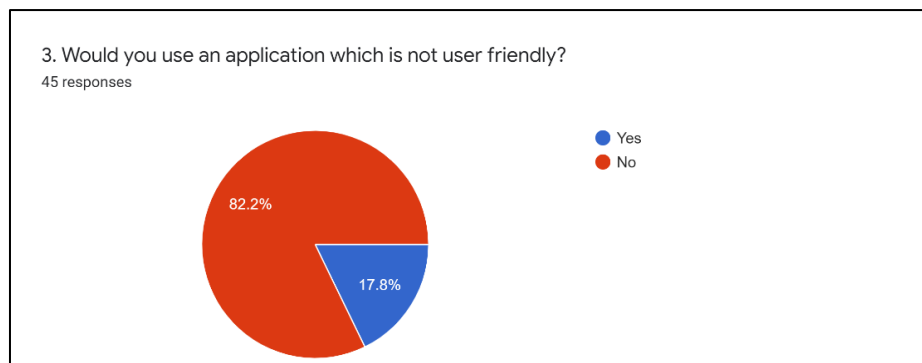


17.8 % of the users think that the application needs to be user friendly but the rest of the users thinks that products and other factors matter more.

**4. While using an application what matters to you User Interface or User Experience?**
45 responses

- User Interface
- User Experience
- Both

77.8%

15.6%
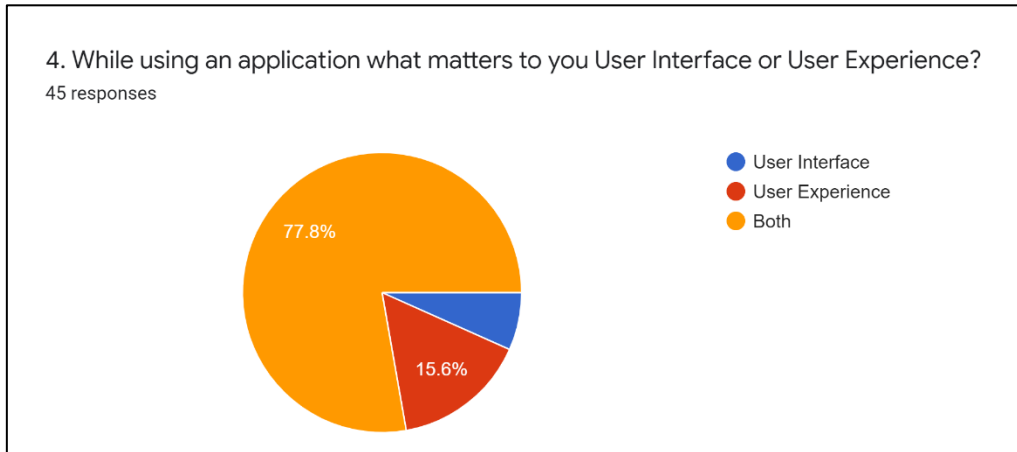
22.3 % of people in total either chose user interface or user experience individually. The rest of 77.8 % of users voted for both i.e. for them user interface and user experience both matter equally.

**5. During the past few months have you carried with you something that can be used for self-defence, as a precaution for threatening situations?**
45 responses

- Never
- Sometimes
- Often
- All time

42.2%

8.9%

46.7%
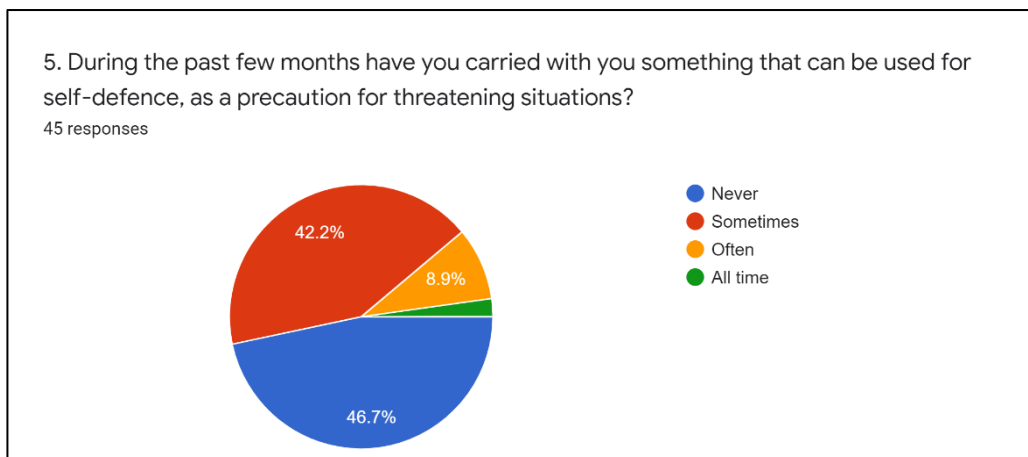
42.2 % of people sometimes carry something that can be used for self-defense as a precautionary tool for situations. The rest of 46.7 % of users never carried anything for self-defense as a precautionary tool.

**6. Do you believe there are mobile applications addressing violence against women ?**
45 responses

- Yes
- No

40%

60%
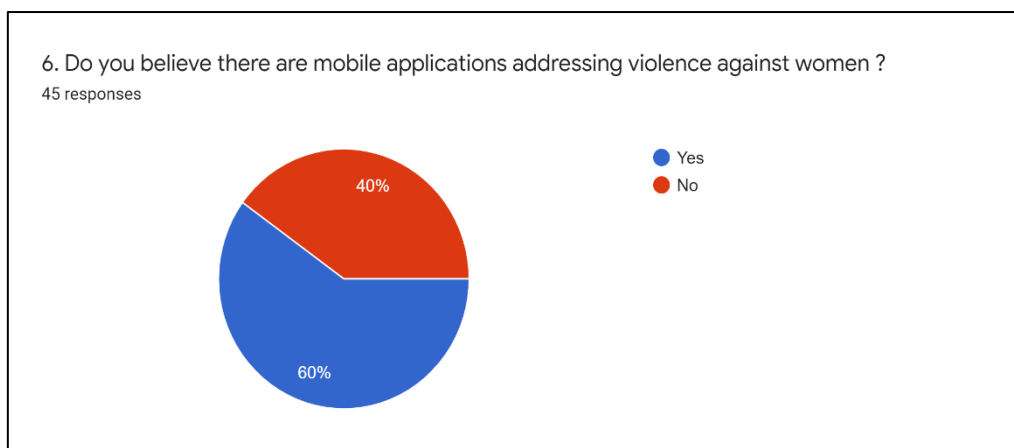
60 % of peoples believe that there are mobile applications that addresses violence against women. The rest of 40 % of peoples believe that there are no mobile applications that addresses violence against women.

7. What type of mobile application do you think would be more useful to fulfil its function?
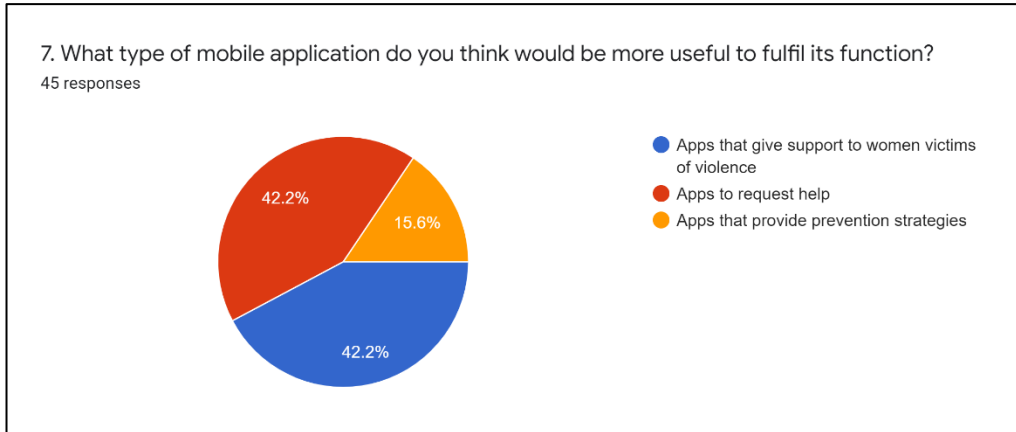
84.4 % of peoples in total will use apps that give support to women victims of violence and applications that request help. The rest of 15.6 % of peoples believe that there should be apps that provide prevention strategies.



8. If you can call any emergency contacts or Helpline numbers like Police, Fire, etc in case of need by a phone call, you...
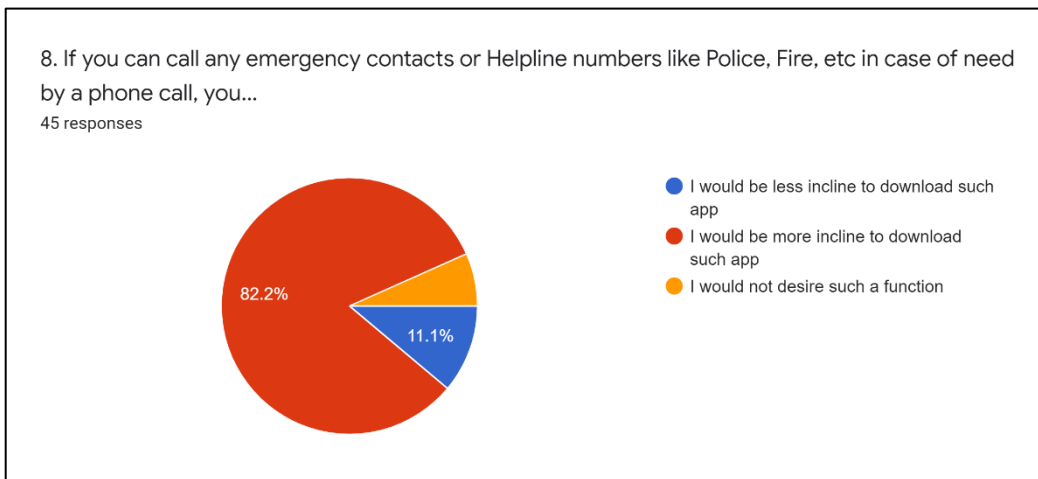
82.3 % of peoples will be more incline to download an app where they can call any emergency contacts in case of need. Wherein, 6.7 % of peoples will not desire such a function.



9. If your GPS location was sent automatically just by shaking your mobile device to your emergency contacts in case of need by a text mess, you...
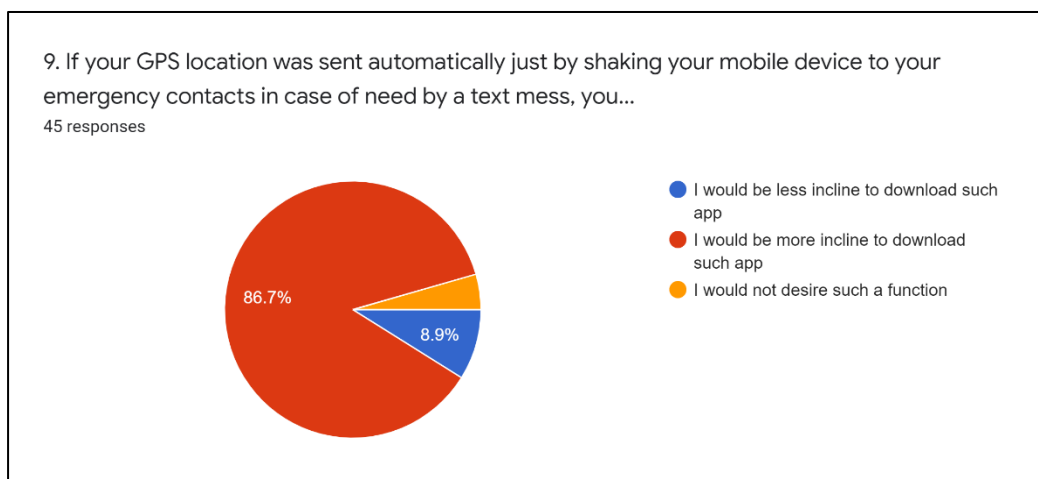
86.7 % of peoples will be more incline to download an app where they can call any emergency contacts in case of need. Wherein, 4.4 % of peoples will not desire such a function and 8.9 % will be less incline.

10. Are you aware of help line numbers or the emergency contacts those are recognised by Indian Helpline.com

45 responses

- Yes
- No
- Maybe
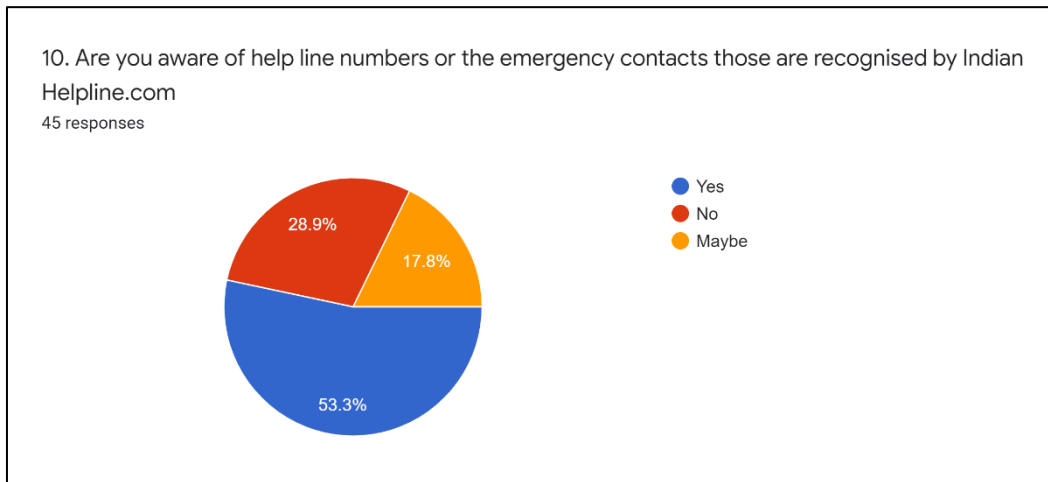
53.3 % of peoples are aware of help-line numbers those are recognized by IndianHelpline.com . Wherein, 28.9 % of peoples are not aware of such help-line numbers.

## IV.     USE-CASE DIAGRAM

At its most basic, a use case diagram is a representation of a user's interaction with the system that depicts the specifications of a use case. A use case diagram can depict the various types of system users and the various ways in which they interact with the system. This type of diagram is typically used in conjunction with a textual use case and is frequently accompanied by other types of diagrams. Because of their simplicity, use case diagrams may be an effective tool for stakeholder communication. The designs seek to simulate the real environment and give a perspective for stakeholders to comprehend how the system works will be constructed.
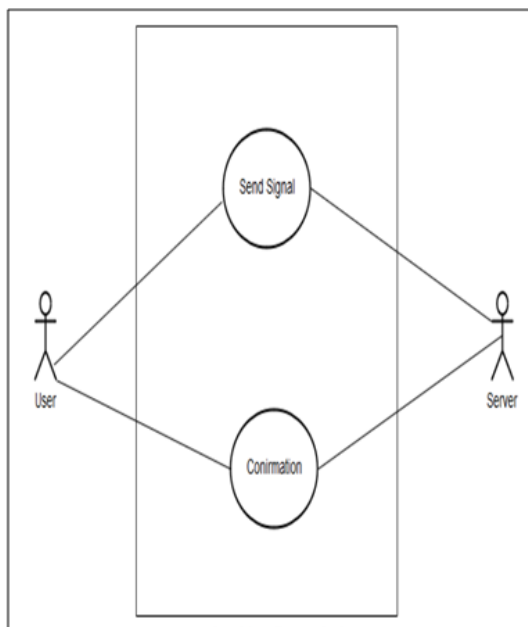


Fig. 6: Use-Case Diagram Iteration 1
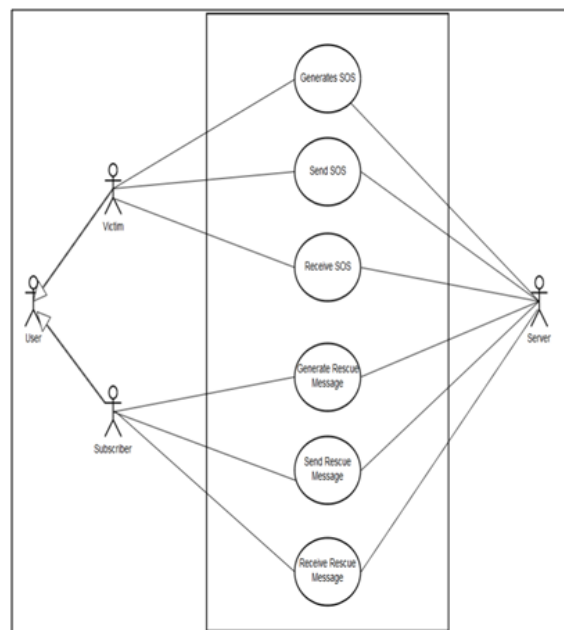


Fig. 7: Use-Case Diagram Iteration 2

# V. OUTPUT OF OUR APPLICATION



Fig. 7: Database Structure

Fig. 7: Database Structure



Fig. 8: Database of our application
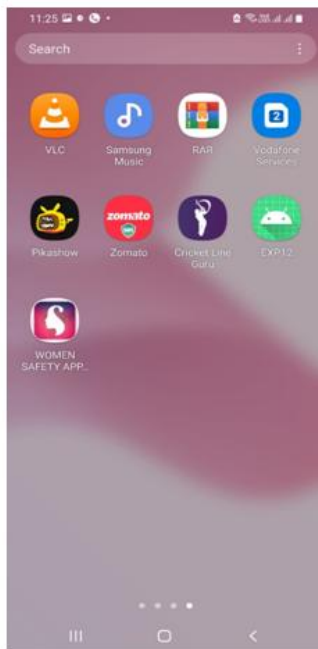


Fig. 9: Look for our app icon



Fig. 10: Welcome Screen
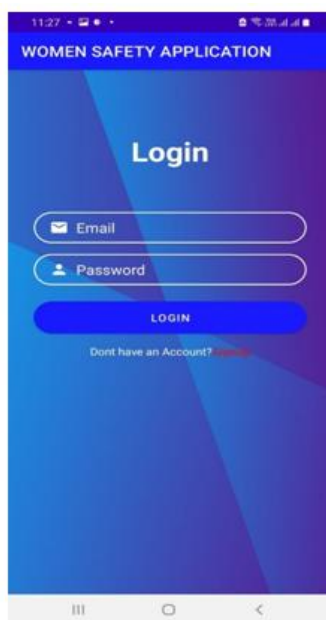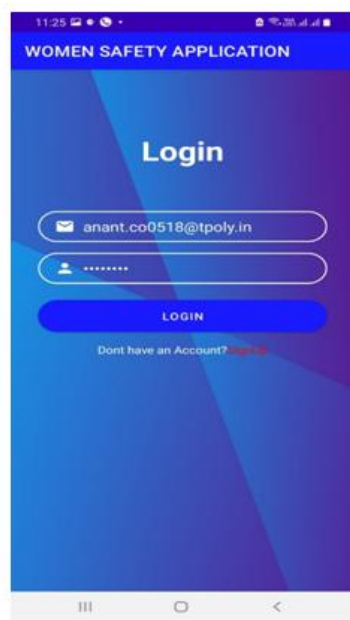


Fig. 11: Login Screen (Before)
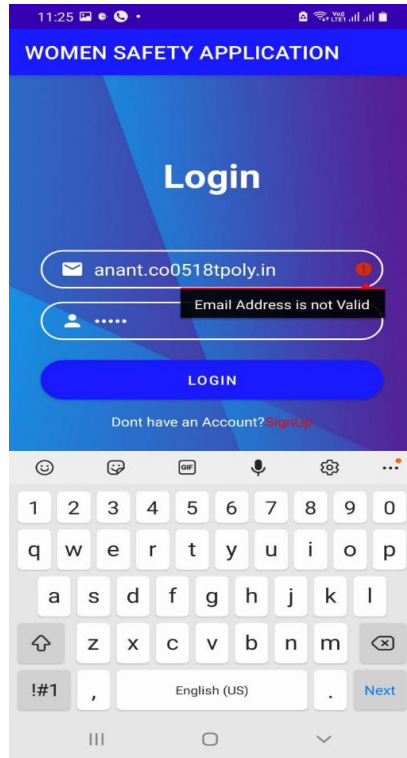


Fig. 12: Login Screen (After)

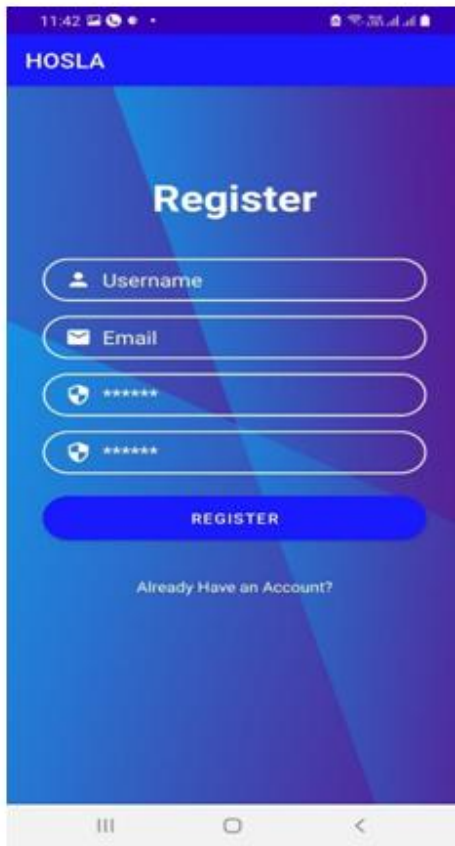Fig. 13: Error will be generated if user enter invalid email address
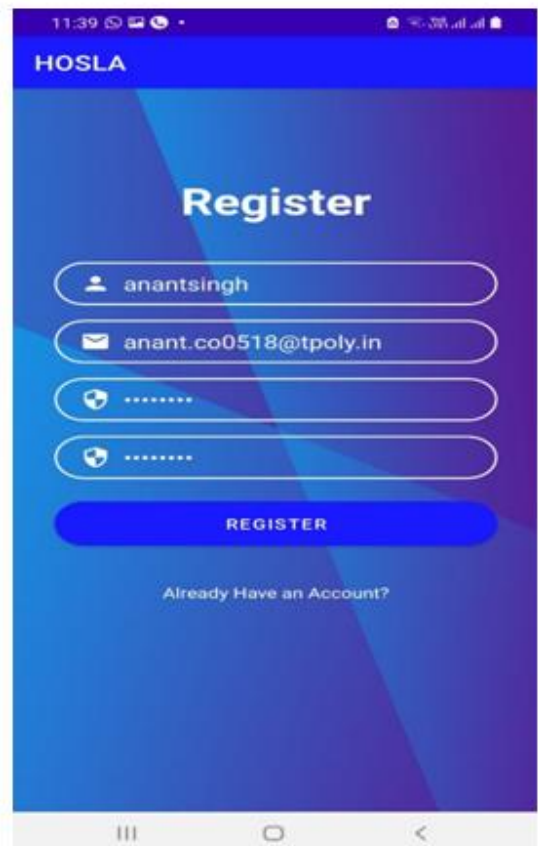


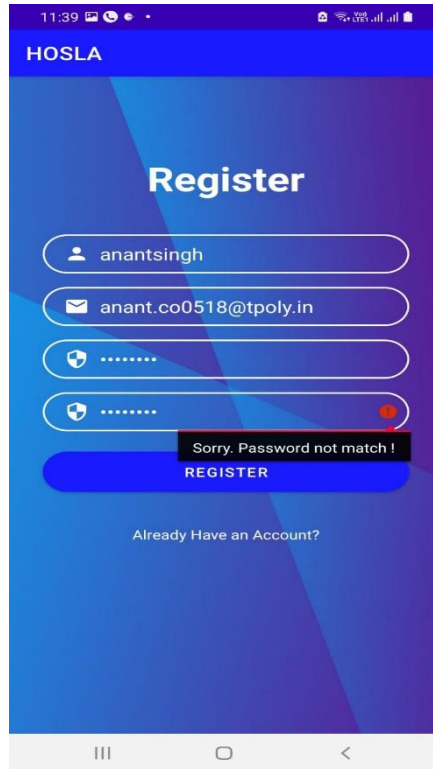Fig. 14: Registration Screen (Before)



Fig. 15: Registration Screen (After)

Fig. 16: Error will be generated if both enter password not match



Fig. 17: After successfully login user will be redirected to BioMetric Authentication Page
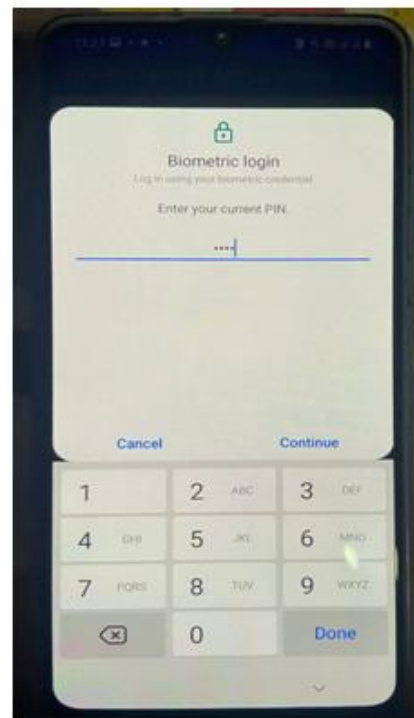
Fig. 18: Fingerprint Authentication Page



Fig. 19: Biometric Login using PIN



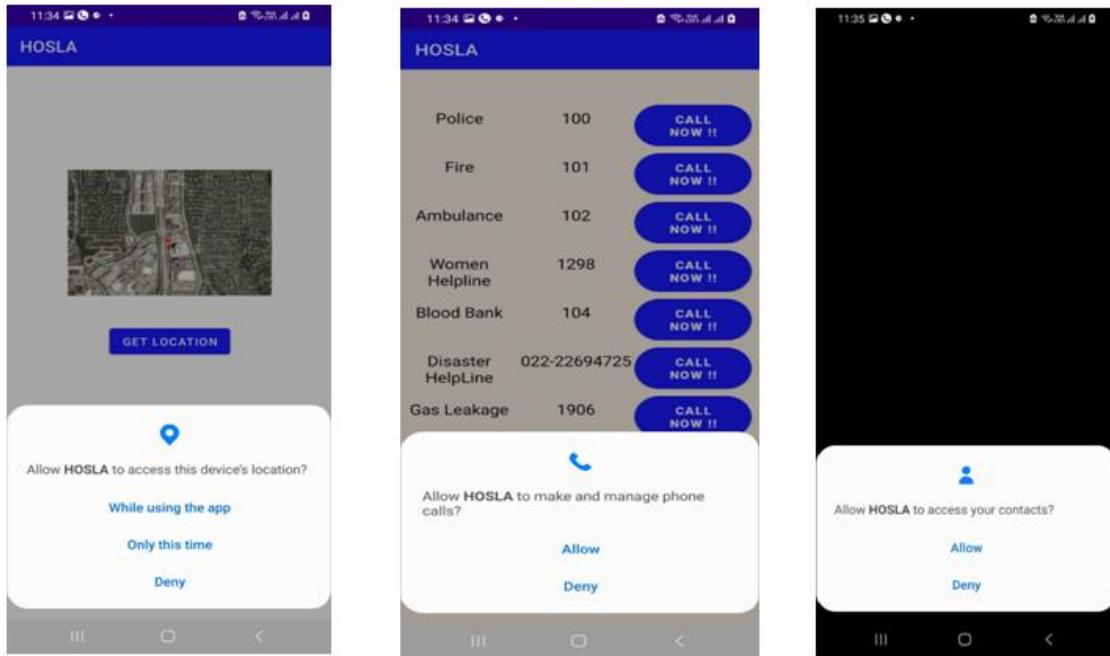Fig. 20: After successful Biometric Login user will be redirected to Home Screen of our Application

Fig. 21: As you open the APP, it asks for some permissions, Grant and allow all the permissions.
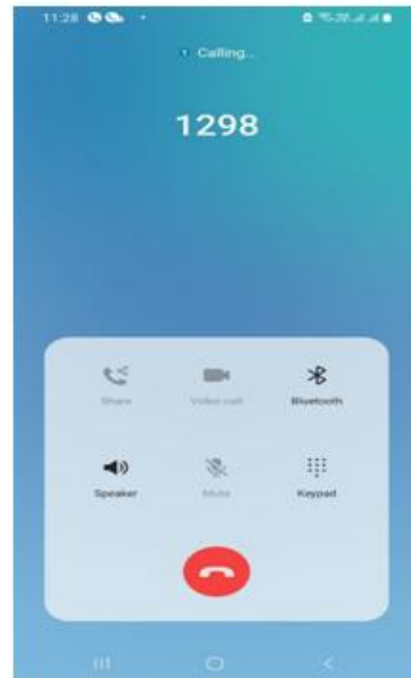


Fig. 22: Emergency Call Page



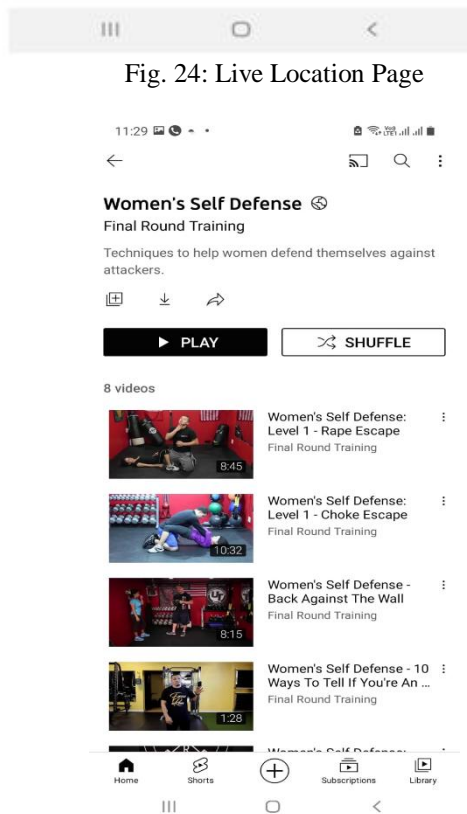Fig. 23: Calling via Dial Pad

Fig. 24: Live Location Page



Fig. 25: User will be redirected to the YouTube Playlist as soon as they click on "Self-Defence" Button

Fig. 26: Add Contacts Page
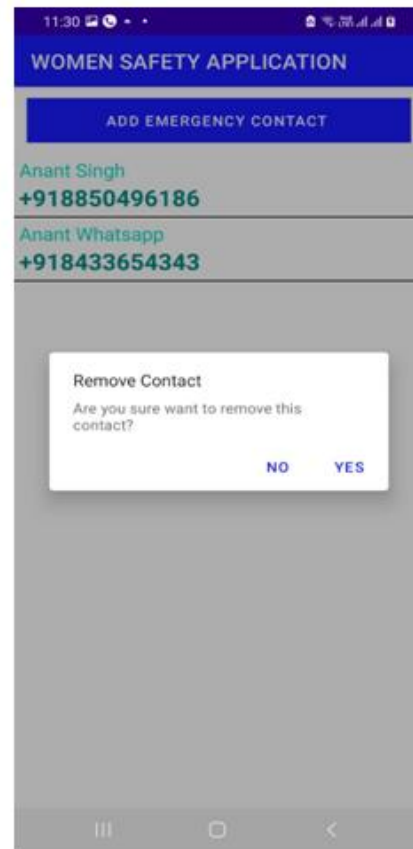(Max. 5 Contacts Min. 1 Contacts)



Fig. 27: Long Press on a particular contact
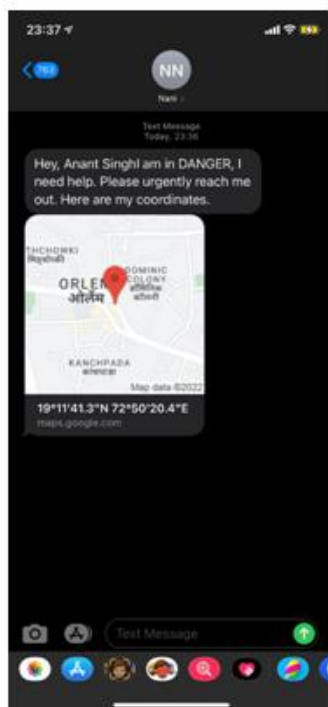number to delete it from the list





Fig. 28: After adding the Emergency contacts, Shake the phone and you will observe that the predefined SMS message with the current location will be sent to all the contacts which is been saved as an emergency contacts.
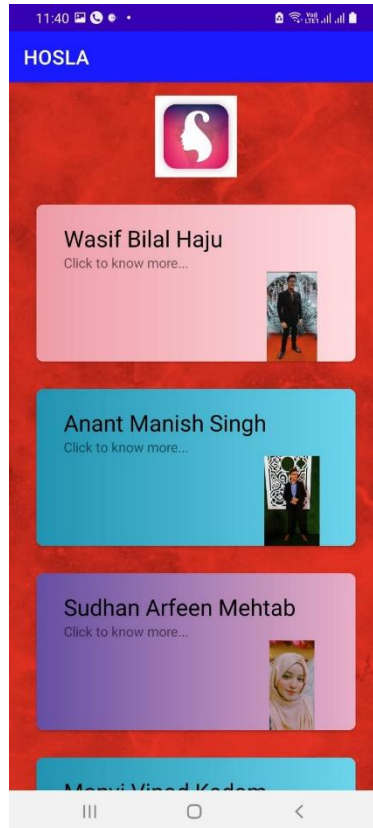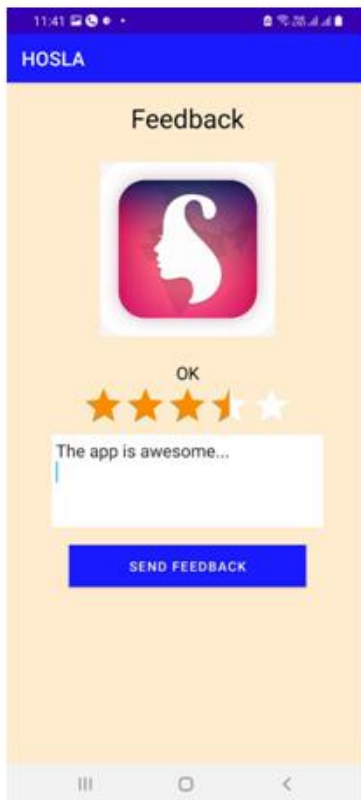
Fig. 29: About Us Page



Fig. 30: Feedback Page



Fig. 31: After giving Feedback the user will be redirected to the Home Screen
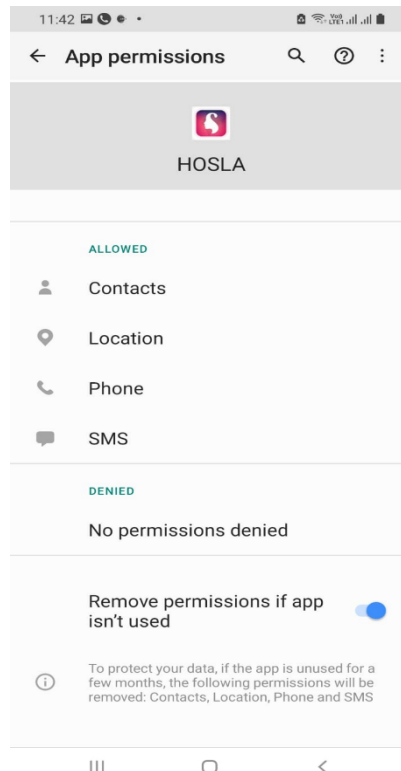
Fig. 32: App permission required for our application

## VI.      CONCLUSION

The development of the project HOSLA has been wonderful learning experience for us as it took us through various phases of project development and application development in the world of software engineering. The thrill of tackling the problems involved and dealing with various bugs and logic issues gave us the feel developer industry. We gained a lot of knowledge about the working, structure and uses of API's, google console like Google Maps, client and server, android OS and several hardware component and various technologies and platforms. There was aimed to provide a safety equipment for women so that they can always stay connected to their relatives and friends and can send them a message stating their location and direction to the location whenever the need arises. Violence against women is still prevalent in our communities, both as an everyday occurrence and in severe situations.  While making the application we kept in mind to make it user friendly so that everyone can use it without any significant trouble. Just like in case of software development where there are always some shortcoming and room for improvement this application has it too. Application has been analyzed, designed, developed, tested, and deployed successfully. By means of this application, we hope to create a safe and stable environment for women throughout India thus helping it to achieve greater goals. Because of the advanced times, it is of paramount importance that India gives greater importance towards woman safety as well as gender equality. This application just provides a bridge to fill that gap. However, we hope to change the parochial mindset of the individuals of the society and get them to act against the social stigmas that have been crumbling the very foundation of position of women in the Indian society. According to the poll, the cause of safety concerns is a lack of a gender-friendly atmosphere and inadequate functional infrastructure, such as the drinking of alcohol.  Alcohol and drugs in an open place, little illumination, safe public restrooms, walkways, ineffective police service, and a lack of  adequately operating helpline numbers, etc. a large proportion of women are skeptical that police can prevent such harassment. cases. There is an immediate need to comprehend and resolve this issue dilemma of women's safety in order for them to flourish equally men in their own land.

## VII.      FUTURE SCOPE

Although we tried to cover almost all of the aspects during our developmental phase, however we were forced to leave some aspects because of lack of time as well as monetary and other reasons.

Just like in the field of software development where there are always some shortcomings and room for improvement our application can be enhanced further:-

1) The application can include various government organization to help act faster.
2) The dataset obtained from the application can be used for predictive analysis to determine prone areas and include special method for tackling the problem in those areas.
3) Emergency signal in case of network failure and internet connection loss.
4) Tackling victim's movements.
5) Improved Google positioning system's precision.
6) The client part of application can be integrated in a single intelligent device.

For analysis purpose, we could use machine learning (ML) algorithms as well as data mining applications. There is a sub branch of machine learning known as time series analysis (TSA), which could be used to predict and analyze the data obtained through this application. Time series analysis is used to predict crop production as well as sales in different quarter.

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