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Advanced Children and Women Security: An Android Mobile Application

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Abstract— Security of women and children has been a major concern in our society. Rape cases and abductions have increased for women as well as children. People of different age groups are getting mentally and sexually harassed in public places like school, colleges, work places and public transport etc. Guardians and parents are worried about their children security. Many NGO's and government agency are struggling to provide an accurate solution for these social problems. To answer this need, "Child and women security application" introduces a location and security based mobile application, which works on Android devices. The App provides dedicated features to assist women and children in desperate situations, where they can ask help from police, parents and anyone nearby. Discussed app is in the constant development phase as the discussion proceeds.

Keywords— Android, Security, Emergency, Assistance, Kotlin

I. INTRODUCTION

This Smartphones have changed the world as we can do almost everything from them. Faster Internet connections, calling features and the smart user interface has attracted many people to go for smartphones and almost everyone has access to it. Many businesses are using Android smartphones to launch their app for ease of doing business. There are many scopes of android based smartphones, one such is the 'security for users', which can be achieved by using different sensors and APIs of the Android operating system. Security of women has been a major concern for our society, women feel uncomfortable walking alone at night and avoid going to deserted places. Many cases of sexual and mental harassment against women are scared to work in an environment where a number of male employees are more. Parents are scared to send their girls to night parties, hangouts, and other places. People from different age groups are also getting mentally and sexually harassed in different places like school, college, workplaces, and public transports, etc, and they keep quiet about these problems and they don't have any means to ask for help in such a situation in India. Children are also getting harassed and bullied in schools and colleges and they are unable to ask for help. According to Wikipedia, over 14% of students from high school consider suicide, and 7% of them attempt suicide. Students that bullied are around 2 to 9 times more likely to consider suicide than non-victims. A study from Britain says that in young people more than suicide is related to bullying. Since abduction cases are increasing, parents always worry when their small kid come late to home, and they always want to know their whereabouts. Many non-government and government agencies are working constantly to solve these problems. Recently many developers have come up with many solutions that can solve these problems with help of technology. Child and women security

application uses location APIs of Android to track the user location and notify them, later the location is sent to parents. A music player API is also used in the app, which is used to ask for help in harassment situations by playing a help tune, these two are the main features of the application. In case of small children's, the app will keep sending the location of their devices to their parents' phone, the parent's phone can receive the message in the SMS format and will be able to track their child location. In case of women, when an emergency situation comes, they can simply shake the phone and this triggers the working of the application, the app will then search the location of the girl and send that location to girls' parents and in case the situation gets worse they can alert the police station. The app will send alert SMS to girl's parent asking for help. In case of any form of harassment the quick help feature will let you ask help from the nearby people by playing a help tune, the music tone is set by default and cannot be changed later.

II. SYSTEM OBJECTIVES

The Study Child and women security Application aims to deliver an android based mobile app which provides the features to facilitates users in desperate situation and ask for help from their parents, police and people from surroundings. The app can be used to track location and send it to different emergency contacts, ask for help when getting bullied and harassed by someone, and call police when there is emergency.

This App is developed carefully with simple and easy to understand user interface for users to easily access and use the app in emergency without any confusion. The App uses simple pink colour theme and doesn't store any of the user data for any marketing purposes or extra profit.

The app should be capable of installing in any android based devices with API level greater than 20. The app has the feature of recording audio and video for later recognizing the criminals. The app is fully dedicated to provide features for child and women security.

III. LITERATURE REVIEW

For developing the app, an in-depth and thorough research has been done. Many apps are developed throughout last 10 years to tackle this social issues.

A. FIGHTBACK, the application is developed by Mahindra faction. This app was not open for everyone before they had to pay for the service but after a gang rape incident at Delhi the app was hand on with no coast. The app sends a message to your friend or contacts that "user is in trouble" through E-mail, SMS and GPRS.

B. SECUREME BETA, the app is developed by Think MPI Consulting Private Limited. It helps us to raise alert and we can get help in case of desperate situations and life-threatening emergencies. After installation the app, user have to give a pin number for security purpose and then after enter their emergency contacts to whom to send help request. By clicking on secure button, it notifies the contacts with location co-ordinates.

C. VANITHA ALERT, the app is developed by ABC Mobile Learning Communication, by clicking on HELP button on mobile's home screen in an emergency situation can deliver a distress text message to the registered mobile number, E-mail id, face book id seeking help.

D. RAKSHA – WOMEN SAFETY ALERT, On May 15,2014, this app is launched by BJP. By clicking on this app, the registered contacts by user are sent location details of the user and user can get the location of the contacts. A distress signal to users near and dear ones. App allows to add multiple contacts to this app and alert messages are sent by SMS when no data connection available.

E. GLYMPSE – SHARE GPS LOCATION, the app is developed in January 2015.The app is a fast, free and its simple to share user's location using GPS tracking in real time with friends and family.

F. GUARDLY, the applications development intention was for women's safety, this app also provides the same location function and sending to contacts, it takes details from the users and available for many devices. This app is also used in I-Phone, I-Pad, BlackBerry, Windows Phone etc.

G. STREET SAFE, this application was developed on worldwide Women's day. It has four features for crisis and by clicking on the button it automatically updates on Face book account with user's recent location. Second, SMS will be sent. Third, an alarm is set with large voice. Fourth, call can be made to chosen number.

As a part of literature survey, we have researched and investigated some applications that offer the similar services for the android devices. Our main aim is to see how they work and how they can be improved. Since the cases of atrocities on women are growing, a smart phone plays an important role for their safety in these types of cases. Now android consist some application which can be used during crisis situations. There are still many applications which provide similar functionalities other than applications discussed in literature survey. The "Raksha" app is designed to ensure the person to stay safe always and is launched by BJP on 2014.The app comes with a button facility which sends a distress signal to the registered contacts and sends out a loud buzzer to their near and dear ones by a single tap. It alerts the contacts by SMS when there is no data connection.

Application like WithU app is also similar to the above Raksha app and it sends out the alert messages to the listed contacts along with their physical location and has one disadvantage i.e., the alert function activates while the power button is pressed twice consecutively which might not be possible at all situations. Nirbhaya app is also one among the application which feature on the safety of the user. It lets the user send the SMS alert or call on the selected contacts with the location which can be updated on every 300 meters movement. But it is physically dependent.

There is also SOS Stay Safe application which sends alert messages by clicking the power button or by shaking the device with the user's name and voice recording, their location and device battery level. But the application lacks when the user fails to activate the application or when they become unconscious which does not sure their safety. There are some applications for the devices like smart bands which also work for the same purpose. The Spot N Save Feel Secure app which works on the smart bands which by clicking the button twice the signal is sent to their guardian network and their location is updated every 2 minutes. But for some situations the user may be unable to activate the function without clicking the button.

Here is the list of problems, out of which one or more cases highlight the issues in some of the previously mentioned existing and related work. The set of research, apps and existing works only supports one problem. No other application has solution for all the problem mention in problem definition. None of the existing mobile apps provide solution for both children and women in same. None of the existing work have quick response-based feature after emergency. Most of the application demands information from the users and they also ask to login into app for usage and some of the apps are premium. Most of the apps does not let the use change the default functions of the application. Most of the apps or work doesn't talk about customer call and police call features. None of the mobile application or works have audio and video recording feature and this is the uniqueness of our application.

IV. METHODOLOGY

This guide proposes a step-by-step guide with a model case following which provides a solution for issues related to child and women security. Here is an overview of problems faced and how the app feature provides solution to those problems.

First feature of the developed app is location tracking, we have used location APIs to track the users after a set frequency which is set in the program and can be changed based on the requirement. As user will be travelling to different places, we need to have a system which is capable of tracking and sending their location to their emergency contacts continuously.

SMS APIs are used in the app to create a SMS loop which will continuously keep sending the location which is being tracked by android device and provides to the API, the SMS will be sent by the user number to the emergency contacts and it will keep sending the message until and unless the activity is killed by pressing the back button on the device.

Voice and video recording feature is also available to record the surrounding in desperate situations which can be used as proof to catch criminals later by police. Video recording APIs are used with an intent to open camera and record a video which can be saved into internal device after recording video and can be later viewed into the internal camera folder.

Music player APIs are used to create a music player which covers the whole activity page and can be used when users click anywhere on the screen and a music tone for asking help will be played from the system. The music tone will be set by default and cannot be changed by user. This feature can be used to ask for help when getting harassed or bullied.

Emergency call features, call APIs are used to call police in case of emergency. We have disabled the call feature for now.

The mobile app followed the appropriate rules of System Development Life Cycle (SDLC). This will serve as a guide to the proponents in their proposed system and its network infrastructure. Phases of the SDLC model includes System Planning, System Analysis, System Design, System Implementation, and System Support and has been laid out as shown in figure 1.

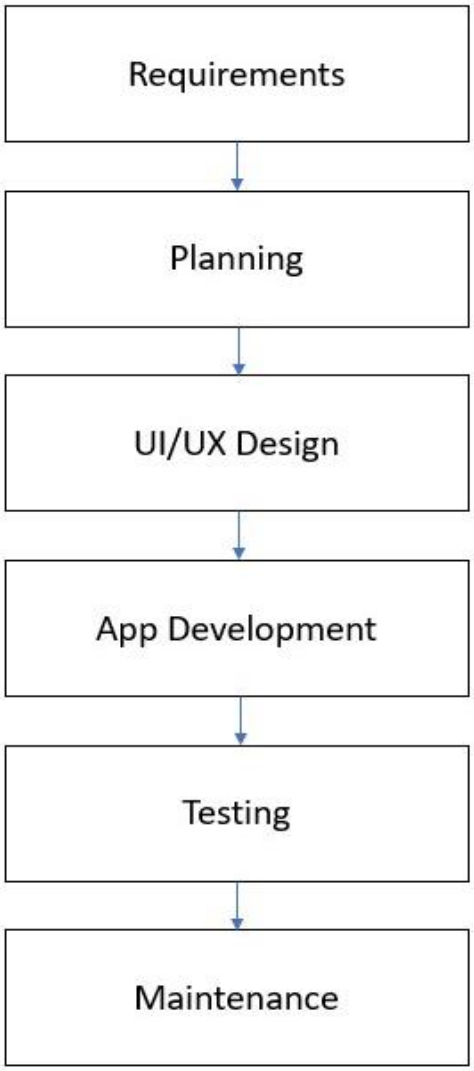

Figure-1 Software development life cycle

Software: This guide uses Android studio and Java as primary software's for the development of the app and we need high end PC to run this software for smooth working of application.

Since this guide focuses more on App development one should have in depth knowledge of android operating system, APIs, Android studio and JAVA. With that being said one should know how to integrate all the APIs together and have some hands-on experience on android studio as it can become very confusing going forward with only half knowledge. Android studio is the official integrated development environment for Googles Android operating system, built on JetBrains, IntelliJ IDEA software and designed especially for Android development. The Android studio uses kotlin and Java for writing the coding and backend of the app, users have options to choose between the languages and once a language is decided it cannot be changed. This guide uses Java with android studio version 4.1 and everything is written on the same version for the mobile app. Android studio uses Xml for designing the UI/UX of the app and gives the option of drag and drop for the beginners and provides a UI for setting the user interface of the app.

Hardware: Since this guide focuses more on development of mobile application, there is no hard focus on the hardware of the device on which mobile application will be used. Any new type of smartphone which have 4G internet connection, should be able to run the APK and the app should be able to work smoothly.

However, for using android studio we need a high configuration laptop or desktop with ram more than 4+Gb and should have enough free disk space. There is no compulsion on the operating system for the laptop or desktops and we have used according to our comfort for the app development process. Since the Android studio framework takes time building the apk and running the emulator on system and consumes more RAM we should prefer a desktop where a cooling fan is available, so that we can work without any lag and slowness of the system. For this guide we have used windows 10 configured laptop with 8 Gb RAM and 1TB disk space for development environment. The app was built on the same system after every update in the coding and testing of the mobile application is done on emulator above lollipop versions.

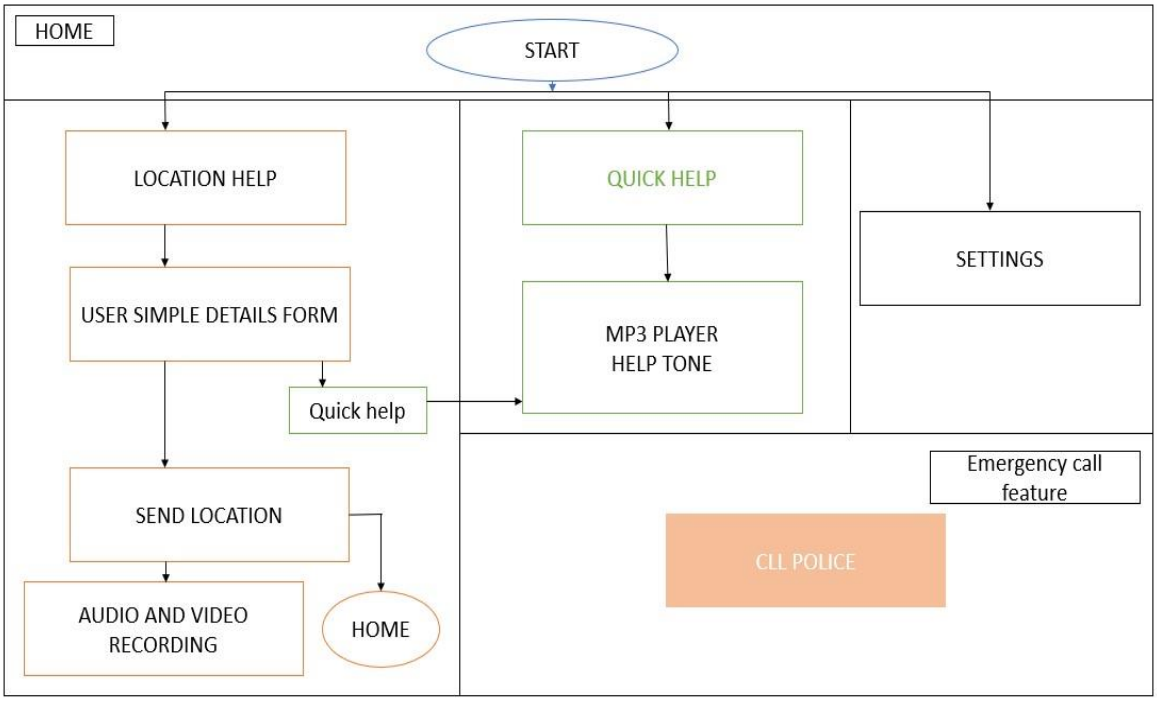

Fig-2 Model design used for implementation of the application

Figure 2 depicts the app creation process with the model design, which is followed throughout the software development process to design the UI/UX of the application and is used for the backend coding. This model design is made carefully to draw out best possibilities from the app.

The Model show the best possible design which can be made after getting and considering all the requirements. The app development process starts with requirement process where all the details are collected online and similar problem were collected from different social media sites. The Problems were sorted based on the app design, where we tried to come up with best solution for these problems.

In the initial stages we gathered information and talked with few girls and parents about these problems and we noted down some of the solution which they were thinking, which can be included in the app. Planning was done and model design was prepared, on which we designed our Mobile application.

Fig-3 Workflow of the mobile application

As per the figure 3, the Architecture and workflow of the application is followed to have a best working app which can solve all the problems defined in the problem definition.

The idea of developing mobile application for child and women security starts with the idea that many existing apps are not able to provide a full dedicated security for both children and women. Requirements for Application development are laid, which encompasses all types of requirements such as problem, objective, devices, audience, feature set, budget, etc. Main points which can be implemented into the app are sorted out from the requirements gathered by talking to people and from social media. Then a best suited model is designed, which can make use of all the best solution that can be put into mobile application for simple and better use. Once a model is designed, a UI/UX is also made for the application which can be implanted into the app through android studio. Xml is used to create the user interface which was designed. Child and women security application uses pink colour theme in all activity pages. This guide recommends to use agile and incremental software development cycles to develop the mobile application as we go further new things and ideas may come and we can add more to the application for it to have more features and work smoothly.

According to the architecture the app has three main features of location tracking and sending it to the users contact when they shake their phones, second one is asking help in harassment situations, where quick help feature can be used to alert people from surrounding and the third feature will be calling police when the situation get worse. The Frame work used for developing the app and in this guide is Android studio, the option of using flutter and React native was available, as the required APIs and said functions were easily implemented through android studio, this guide recommend to use android studio for developing this kind of app. entire document should be in Times New Roman or Times font. Type 3 fonts must not be used. Other font types may be used if needed for special purposes.

V. SPECIFICATION

As an end product deliverable, an industry standard Mobile application is created following the guide's procedures and thereby validating it. This mobile application is hard to build and one must learn many things to understand the development process but the usage of the app is very simple. This project builds a (proprietary and commercial) business android mobile application for the physical security of the end users and it can be used by anyone for their safety, the app is capable of tracking location, calling police, sending SMS and many more security related features. The app's target audience comprises of children and women of any age and it can also be used by anyone.

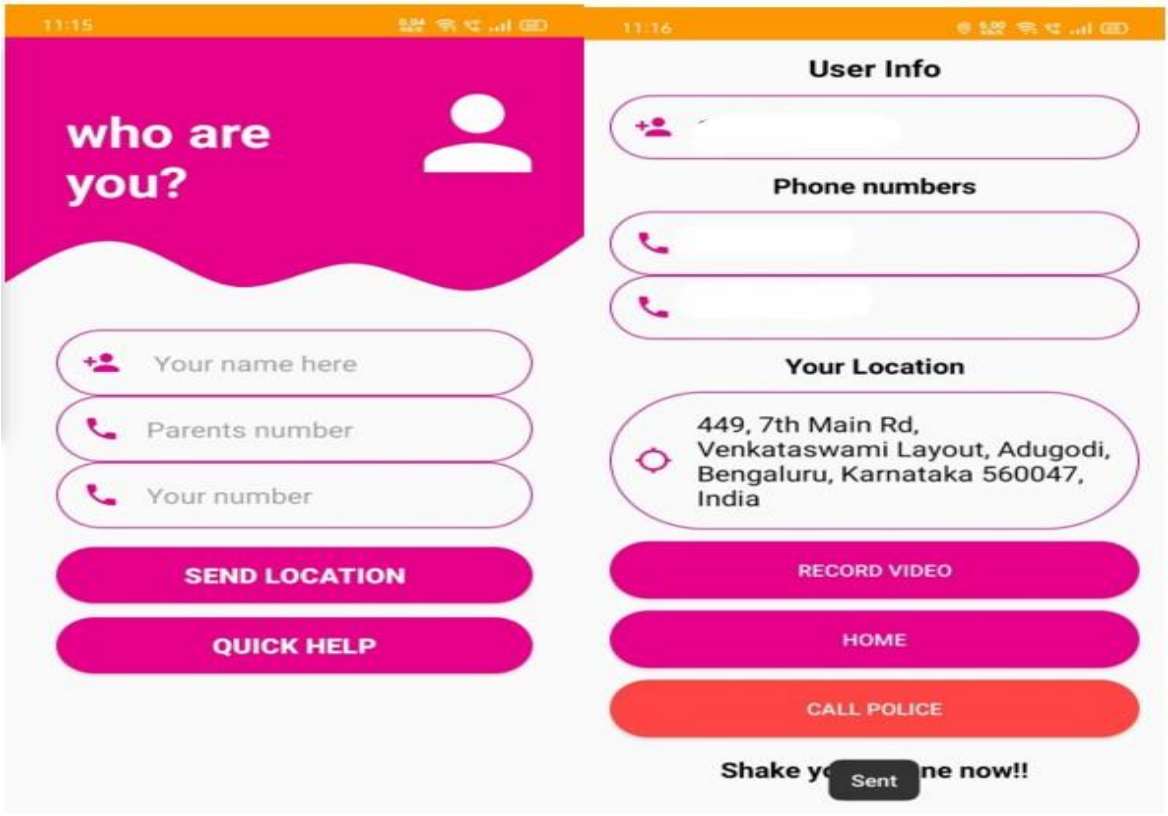

Figure-4: Login Menu and working of app

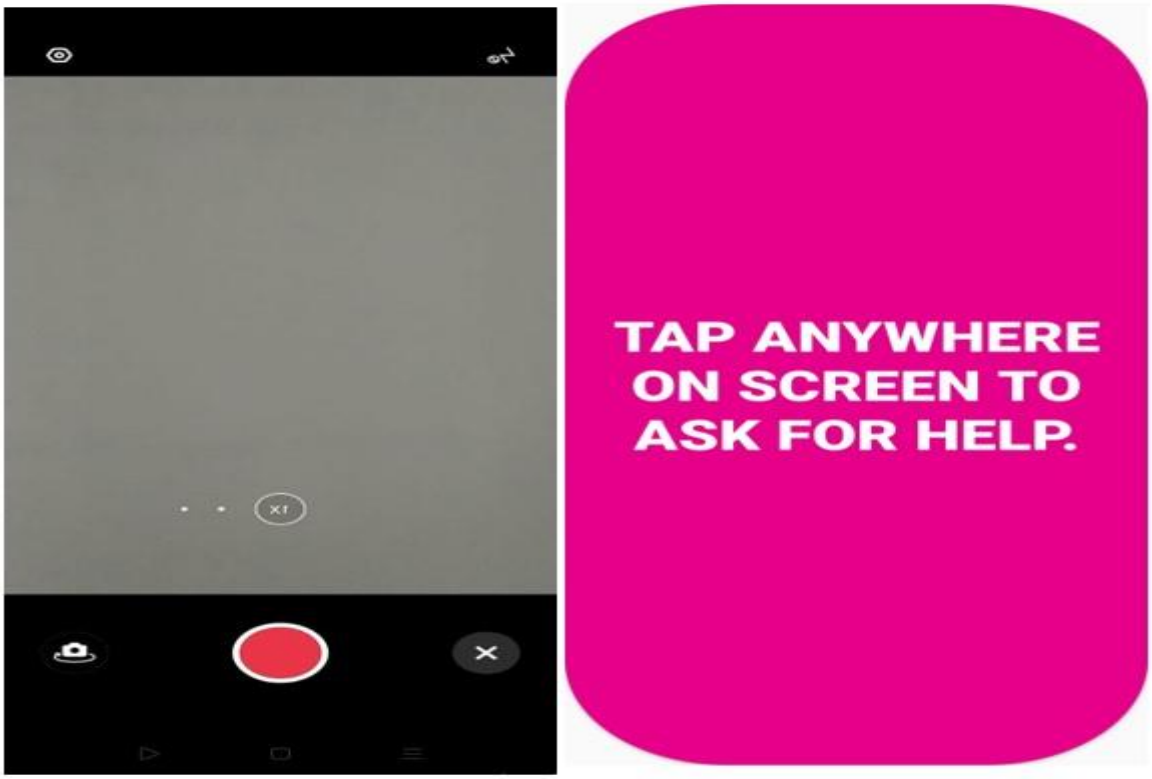

Figure-5: Video recorder and working of app

VI. CONCLUSIONS

Successful development of android mobile application and this guide is completed and all the said objectives are achieved. This guide can be used to successfully create similar app and provide many new ideas for further updates and following the guide other developers can come up with best ideas to tackle these social issues with the help of technology. The app follows the best practices involved in coding and designing UI/UX for a mobile application for android operating system. The said app can be installed in any android device whose version is greater than 20 and have internet connection, the app can be shared by any means like email, WhatsApp etc.

The app can be further updated to have multiple target tracking features, screen sharing, video call feature and google map integration to have more dedicated security services. The mobile application can be used by non-government and government agencies to promote child and women security and promote awareness in the students about social problems.

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