LOCATION BASED ALARM FOR WOMEN SAFETY

Sayantani Dey[1], Lucky Goswami[1]

[1]Student of B.Tech in Computer Science and Engineering, Royal Global University, Guwahati, India

---

Abstract: An Android Application that will allow user to set destination, and then notify user with an alarm when his destination is reached. The Android alarm can be associated with a reminder message. As the user reaches the destined location, the alarm rings and even the associated message flashes on their Mobile Screen. The user may set, reset, disable, edit and set duration of the alarms as he/she wishes. User may view the destination locations on a map to check how far he/she is from the desired location. To use this system, user must register by filling up details required by the system. User must enter the user id and password in order to login to the system. User must enter the destination by specifying the location name and work at particular place. When his destination is reached, the android alarm will notify him/her along with a reminder message. The system will also have a safety feature, which will immediately share the current location with the users trusted contact via SMS and also a call will be made to our emergency contact saved.

Keywords: Target Location, Alarm, Global Positioning System, Android, Safety system, Security.

1. INTRODUCTION

The Location based Alarm System depending on latitude and longitude, enables the user to initiate alarm whenever and where it's required therefore up the standard of life. The alarm is viewed, deleted and altered by the mobile user with none contradiction in information change. Google Play services employed in the project so the application will make the most of the newest, Google-powered features like Maps, Google+ alongside automatic platform updates distributed as an APK through the Google Play store. This makes it quicker for the users to receive updates and easier for the user to integrate the most recent that Google has to offer. This application can be useful for the frequent long distance travelers within the country like traveler, strangers, especially selling executives, sales executives, and representatives etc.

This Android Application that will allow user to set destination, and then notify user with an alarm when his destination is reached. As the user reaches the destined location, the alarm rings. The user may set, reset, disable, edit and set duration of the alarms as he/she wishes.. User must enter the destination by specifying the location name and work at particular place. When his destination is reached, the android alarm will notify him/her along with a reminder message. The system will also have a safety feature, which will immediately share the current location along with an audio recording of the surrounding user is currently in with the users trusted contact via SMS and a call is made immediately to the emergency contact. The system will have two SOS button:

- One before the login page, the SOS button will only inform two contacts added as emergency contact about our current location along with the audio recorded..
- SOS button in the Home page will notify the entire user added as contact in the application about our current location along with the audio recorded.

It also has a reminder System that will remind the user about their task which was created in the reminder section.

2. LITERATURE REVIEW

There exist variety of location based systems that may automatically generate alarm with the use of mobile.

Location Based Alarm[1]: The system is developed as five modules to handle the subsequent elements.

Display module: In this module the, the Google map is displayed the locations using the GPS and GPRS/3G networks available in Smart phones. In this module the user will set their destination and current location supported their wants of travel.

GPS interaction module: In this module the GPS interaction(i.e. the location update is modified supported their user's time limit. And check whether or not the GPS and also the Internet connection is enabled or disabled. Based on that, the alert can shows to the android notification bar in our mobile phones.

Place management module: During this module the location details are hold on in SQLite knowledge storage among the mobile phones. i.e. The visited location details location updates and stored in SQLite data storage for the user future use.

Alarm module: this is often main module of this project; during this the alarm service and places updates are done using the android background services. The location updates is done with the help of the GPS and Internet providers and the alarm is set by using the android device alarm services.

Abhaya-An Android Application For Women Safety[2]: This paper presents Abhaya, an Android Application for the Security of Women and this app is activated this app by one click, whenever want arises. one click on this app identifies the location of place through GPS and sends a message comprising this location address to the registered contacts and additionally appeal the primary registered contact to assist the one in dangerous things. The unique feature of this application is to send the message to the registered contacts unendingly for each 5 minutes till the "stop" button within the application is clicked. Continuous location tracking data via SMS helps to seek out the situation of the victim quickly and may be saved safely.

Advance Woman Security System Based On Android[3]: This paper suggests an android smart phone with integrated feature in it. Whenever women's are in danger or trouble they need to hold the volume key button in their mobile, it sends an alert message to the registered contacts and also a voice call.

Location based alarm using mobile device[4]: The main objective is to develop a GPS (Global Positioning System) based mostly application to handle the subsequent requirements: To alert the users with an alarm once the user reaches close to a predetermined location, To retrieve the users current location coordinates (Latitudes and Longitudes), To allows users to line their target location and save that focus on to the list, permits user to delete and edit the alarms, To allow user to the place the reminder text together with the alarm. The final system enable user to simply activate alarm within the mobile device. supported the saved location on the mobile device, alarm can ring automatically and show remainder message once the user reaches the target location. This mobile alarm service can act as help for the frequent travelers to go to new places.

Comparison:

1.Wake App[5]	Once the user choose stop on the map, the map closes and therefore the application goes into the background sporadically user location using the device's GPS sensor. once the user enters among a pre-configured radius from the stop the user is supposed to get off (default is one thousand meters), the alarm plays a ringtone of user alternative.
2.Raksha-Women Safety App[6]	The Raksha app is intended to make sure that ladies keep safe continually. The app comes equipped with a button, which is able to send alerts to your precious ones along with your location during a scenario of distress. The app conjointly has SOS functionality and can also send SMS if stuck in a place without internet.
3.VANITHA APP[7]	By clicking on '' HELP" button on our mobile's home screen in associate emergency state of affairs will deliver a distress text message to the registered mobile number ,E-mail-id, face book id seeking facilitate and indicating the user's location.
4.Circle Of 6[8]	Circle of 6 lets the user has to add six faithful friend to add to their 'circle'. After if they realize themselves in a very risky scenario, they'll use Circle of 6 to automatically send their circle a pre-programmed SMS alert message, with their precise location.
5.FIGHTBACK[9]	The FightBack application tracks a user's location associated sends SOS messages to chosen contacts just in case of an emergency. The FightBack app permits the user to click a button whenever he/she feels unsafe. It tracks the user's location using GPS and alerts chosen contacts about the concerning the situation.

Vulnerability:

1.Wake app[5]	It Can't save location for later use. Also their current location can't be shared with their contacts if they want. In our Proposed Application there is a SOS and Reminder facility which the WAKE APP lacks.
2.Raksha-Women Safety App[6]	Messages not getting delivered to emergency numbers. Performance issues, not working as it was intended to. It do not record any audio recording which can be sent to our contacts. Also there is no call feature in this application.
3.VANITHA APP[7]	This app enables the user to send emergency message to their contact via FB,E-mail. But in some places the internet facility might not be available. It also send message via SMS but the user's contact might not see the message. In our Proposed Application there is a facility to make a call to the user's emergency contact, also there is a facility to send our current location along with an audio recording to numerous contact that we have added in the application. The VANITHA App lacks this features.
4.Circle Of 6[8]	In this application the distress message along with current location can only be sent to six people only.Also there is no audio recording and call feature which is available in our proposed model.
5.FIGHTBACK[9]	Battery insensitive,Troublesome to install; Takes a long time to send out SMS alerts; Buggy interface.It also doesnot have any audio recording feature that is available in our proposed model,also there is no call feauture included in FIGHTBACK.

3. METHODOLOGY

The methodology adopted for the planning and implementation of the project includes: styling the project needs, Selection of applicable technology and Implementation of modules (set alarm, generate alarm, delete and edit alarm) and also an SOS module which will help the user when they are in danger(sharing current location, audio recording with their contacts and by making call to the emergency contact saved).

3.1Design the project requirement

3.1.1 Hardware Requirements

System : Intel® Core(TM) 13-3110 CPU @ 2.4 GHz.

RAM : 4GB

3.1.2 Software Requirements

Coding Language : Java, Kotlin

Ide :Android Stuudio

Database: Firebase Firestore

3.1.3 System Diagram

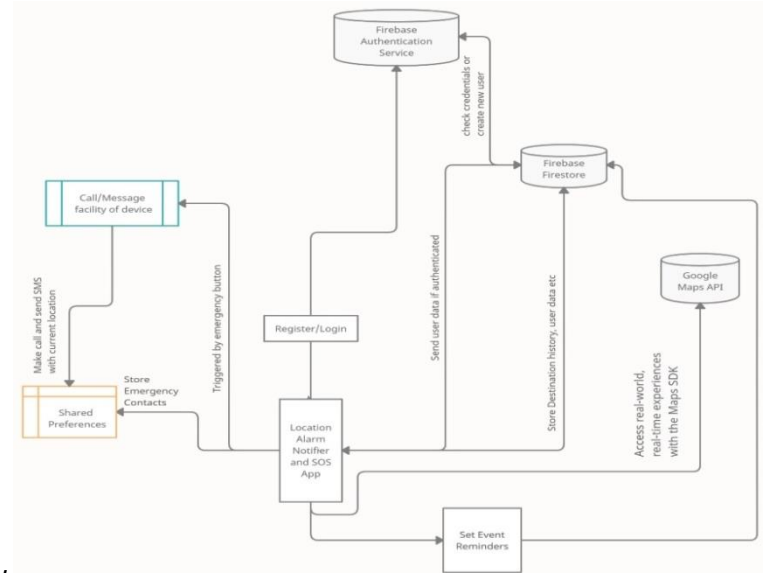

Fig1: System Diagram

Our Application "BuddAlert" is basically a location based notification, reminder and SOS feature. The application uses various features: Android, Firebase, Shared Preferences and other stuff. Here, in the figure above the login details are maintained by Firebase Authentication Service and the user details are stored in Firebase Firestore. The SOS uses Shared Preferences where the emergency contact is stored to make a call and send a message with their current location before login. After login, the Contacts module in the application where we can add infinite contacts their contact details are stored in Firebase Firestore. The location Alarm module uses Google Places API for setting the location of our destination. The date and time that we set for events are all stored in the Firebase Firestore and the audio files are stored in Firebase cloud storage.

3.2 Selection of applicable Technology

The system has used Android Google API, Android Development Tool plugin, Google Firebase Firestore to develop the application. Android platforms provides a foremost platform for creating applications for Android users It conjointly provides tools for creating applications that look nice and profit to the hardware capabilities offered on every device.

3.2.1 Android

Android is a mobile OS supported a modified version of Linux kernel and other open source software, designed primarily for touch screen mobile devices like smart phones and tablets. This application platform is very much of like Java SE. Android uses Apache Harmony's class library wherever solely some of the original Java SE packages have been removed. These are replaced by GUI packages that hat are more suited to reduced screen sizes used by mobile devices. The Android SDK is out there for Windows, UNIX operating system and Mac OS X, freed from charge. Existing Java SE based code may be ported to Android with relative ease, as long because it doesn't interface with any of the packages that have been removed. With the Android platform recently changing into very talked-about, this application can reach heaps of users who are using vehicle for transportation. The user interactive style is easy and intuitive in order that most users will simply use it for the primary time. The combination of GSM mobile and satellite-based GPS in one innovative unit provides users the power to initiate associate alarm calls whenever and where they have or need to try to to so.

Advantage of using Android are:

- Multitasking: Android phones will run several applications, i.e., the user will browse facebook whereas paying attention to the song.
- Access to the most effective Android Widgets: Widgets, or self-contained programs, add functionality and flexibility to Android devices. This feature is one in every of the largest reasons why Android is better than Apple. Some of the

most effective Android widgets, like Battery Widget Reborn and Circle Launcher, are popular options for enhancing an Android user's expertise.

- easy Notification: Any SMS, email, or incomprehensible decision there will continuously be a notification on the home screen android phone, that the user won't miss one SMS, Email or even Misscall.
- Can install a modified ROM: There are several custom ROM that may be utilized in mobile phones.
- Google Maniac: Android phone has integrated with Google services, that the user will quickly check e-mail from Gmail.

3.2.2 XML

Language (XML) is a markup language that defines a collection of rules for encoding documents in a very format that is both human-readable and machine-readable. XML is used for the creation of UI layouts in Android. Android provides a simple XML vocabulary that corresponds to the View classes and subclasses, such as those for widgets and layouts. The advantage to declaring UI in XML is that it permits the user to separate the presentation of the applying from the code that controls its behavior. UI descriptions area unit external to the application code, which suggests that the user will modify or adapt it while not having to change the source code and recompile. as an example, XML layouts will be created for different screen orientations, completely different device screen sizes, and different languages. to boot, declaring the layout in XML makes it easier to check the structure of the UI, therefore it's easier to rectify issues [10] [11].

3.2.3 GPS

Global Positioning System (GPS) [12] is a satellite primarily based, medium earth orbit (MEO), navigation technology. GPS relies on a constellation of a minimum of twenty four satellites to produce location, speed and direction data to its users. It works by using a technique known as trilateration combined with atomic clocks in the satellites so as to accurately confirm the proper location.GPS finds the user position by shrewd variations in the times the signals, from completely different satellites, desire reach the receiver. The accuracy of GPS is comparatively high compared to most different techniques, however it needs line of sight to satellites that severely limits its use inside.

3.3 Implementation

My prototype creates location based alarm and emergency service that enable the frequent travelers to initiate an alarm whenever and where it's required up the standard of life. The alarm are often viewed, deleted and edited by the mobile user with none contradiction in information change. The system will also have a safety feature, which will immediately share the current location along with an audio recording with the users trusted contact via SMS.The Google Play services [10] employed in the project so the application can take advantage of the newest, Google-powered features like Maps, Google+, and more, with automatic platform updates distributed as an APK through the Google Play store. This makes it quicker for the users to receive updates and easier for the user to integrate the latest that Google has to offer.

3.3.1 Modules Developed

The module is developed as three module which is described as follows:

3.3.1.1 SOS :

The letter sequence SOS (pronounced S-O-S)is employed in international more code as a distress signal-a path to call for help throughout an emergency such as our day to day life . However the phone can capture audio and send a text messages to up to individuals whom you designate. But, you've got to line this entire up before the emergency happens.

Fused Location client: It is used to get the current location of the user(Fused Location Provider), united Location is truly a location service which mixes GPS location and network location to attain balance between battery consumption and accuracy. Simple, battery-efficient location API for automation .The united location supplier could be a location API in Google Play services that showing intelligence combines completely different signals to supply the placement data that our app desires.

Android media Recorder will record the user voice clip whenever SOS button is clicked

Media Recorder will record audio and video files. once recorded the media, we are able to produce a sound file that may be contend later

Firebase Cloud storage :We use it to store the recordings recorded by the user

Cloud Storage firebase helps us to transfer and share user generated content, like pictures and video, that permits us to make multimedia content into our apps. our information is keep in Google Cloud Storage bucket — an exabyte scale object storage resolution with high accessibility and international redundancy.

Android SMS Manager is used to send SMS to emergency contacts . SMS operations like causation information, text, and pdu SMS messages .

Shared preferences: It is used to fetch save contacts which is previously saved by the user, we have a tendency to used shared preferences to send SMS to emergency contacts .Shared Preferences means during a time one will store and retrieve little amounts of primitive information as key pairs to a file on the device storage.

3.3.1.2 Location alarm:

User must enter the specified location, where he needs to urge associate alert. The alarm can monitor the mobile screen. The alarm can raise once the user is among the radius of 500meters. By default, the radius are going to be 500meters, user may modification the radius consistent with his desire. alongside the alarm, alarm description.

The user can set a time interval so that their current location is sent to their saved contacts in the application based on the time interval set. When we type our destination in the search bar of the alarm section, then our application provide the latitude and longitude of the place along with the address of that particular place.

To fetch location we are using Google Places API and the location details are stored in firebase. The Places API is a service that returns data concerning places using hypertext transfer protocol requests. Places are outlined inside this API as establishments, geographic locations, or outstanding points of interest. The Place Autocomplete service is part of the Places API and shares an API key and quotas with the Places API. The Place Autocomplete service is a web service that returns place predictions in response to an HTTP request. The request specifies a textual search string and an HTTP request. The request specifies a textual search string and functionality for text-based geographic searches, by returning places like businesses, addresses and points of interest as a user sorts[13]. The Place Autocomplete service will match on full words and substrings, breakdown place names, addresses, and plus codes. Applications will so send queries because the user sorts, to produce on-the-fly place predictions.

The returned predictions are designed to be bestowed to the user to assist them in choosing the specified place. We can send a Place Details request for additional data concerning any of the places that are came back. To fetch live location we are using android service to run in the background to fetch the location unendingly among the given interval.

The IntentService class provides an easy structure for running an operation on one background thread. this permits it to handle long-running operations while not affecting our user interface's responsiveness. To make an IntentService component for your application define a class that extends IntentService, and within it defines a way that overrides onHandleIntent(). The Activity that sends work requests to the service uses an explicit Intent, therefore no filter is required. This additionally means solely parts within the same app or alternative applications with identical user ID will access the service. Android apps will send or receive broadcast messages from the Android system.

To make changes in the UI we obtain the changes from the service class using Broadcast Receiver in the TrackUserActivity.

The fused location provider is a location API in Google Play services that showing intelligence combines completely different signals to produce the location information that your app desires. The fused location provider manages the underlying location technologies, like GPS and Wi-Fi, and provides an easy API that you just will use to specify the specified quality of service.

Using the fused location provider API, our app will request the last well-known location of the user's device.When requesting location info many alternative location sources, like GPS and WiFi, are used. Deciding that sources to use are often difficult,

however fused location provider API removes the guesswork by automatically changing suitable system settings. all of your app should do is specify the specified level of service.

Location are saved to Firebase Firestore under History. Firestore is a NoSQL document info engineered for automatic scaling, high performance, and simple application development. Like Realtime information, Cloud Firestore uses knowledge synchronization to update data on any connected device. It caches that your app is actively using , that the app will write, read, listen to, and query data although the device is offline. once the device comes back on-line, Cloud Firestore synchronizes any native changes back to Cloud Firestore.[14]

It helps us to keep data in our apps current, while not retrieving your entire information every time an update happens. In the contact section of our application we can add our contacts form our device contact list. All the contact details are stored in database (Firebase Firestore).When we set interval in the location alarm section of our app It will notify the contacts that we have saved in the contact list of the application after some interval ie:the interval we have set in the application via SMS.

Shared Preferences is that the method during which one will store and retrieve tiny amounts of primitive data as key/value pairs to a file on the device storage like String, int, float, Boolean that structure your preferences in an XML file within the app on the device storage[15].Shared Preferences ar appropriate in several things. as an example, once the user's settings ought to be saved or to store data which will be employed in totally different activities at intervals the app.

3.3.1.3 Reminder:

Here we can set the date and time of our event as well as the event name and the location where it will occur.The reminder will notify us about the event based on the time and date set.It will check in database i.e:Firebase Firestorethatis there any event set on that date and time.If there is any event on that date and time then it will notify us about the event,but if the time and date is set is passed eg:we have set thedate as 11th June and time as 7:00AM but we open the application at time 8:00AM on 11th June then the reminder will notify, this data are stored in Firebase Firestore.

Android provides controls for the user to choose a date or a time by using date and time picker. Each picker provides controls for choosing every part of the time (hour, minute, AM/PM) or date (month, day, year).By using these choosers helps make sure that your users will pick a time or date that's valid, formatted properly, and adjusted to the user's venue.

Firestore provides real-time updates by letting clients hear a document and use queries to urge real-time updates. We provide a callback that instantly creates a document snapshot with the present contents of one document. When the document contents modified, another call updates the document snapshot. We have used new Date() for making our date record. Firestore can automatically acknowledge this as a timestamp and we also use date.toString() to convert an object to string.

4. Result:

The following figures are the screen shot of BuddAlert application from the starting of it.

Below Fig 4.1 represents screen shot of the application immediately after apening BuddAlert app on the device on which it is installed. It contains two option for user: "sign in" and "Help Me". If the user feels to only use the emergency sevice then they can use "Help Me". It will send SMS to the user set emergency Contact and also make a call to that emergency number. But if the user sign in, they can use location alarm, reminder and also the Emergency service. At that time the SMS can be sent to numerous number of contacts. To send the "I am in danger" message to numerous contact, they need to save the contact in contact section.

Fig 4.1: Screenshot of BuddAlert after opening the application.

Below Fig 4.2 depicts the screen shot of an audio recording when "Help Me" is pressed. Here an audio will be recorded of the surrounding of the user and sent to their trusted contact in the form of an URL also the current location of the user via SMS.

Fig 4.2: Screen shot of audio recording when "Help Me" is pressed.

Below Fig 4.3 depicts the screenshot of our application when a call is made and also it shows that the message is sent to the emergency contacts. The message will contain the user current location, an audio recording in the form of URL.

Fig 4.3: Screen shot of making a Call and sending SMS to the emergency Contact.

Below Fig 4.4 represents the scenario after tapping on sign in. There it shows 4 section: Location Alarm, History, Reminder and Contacts.

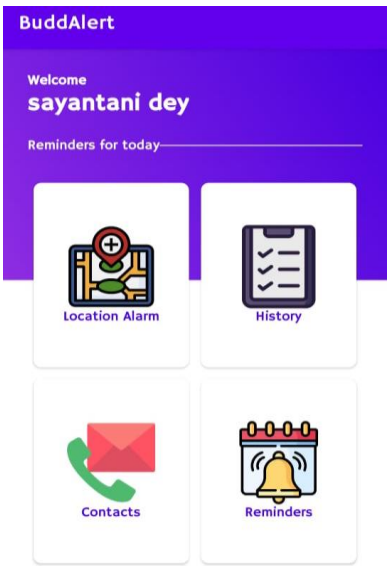

Fig 4.4: Screenshot of the application after clicking on sign in.

Below Fig 4.5 represents the screenshot of the application after alarm is set. Here when the user reaches the destination the alarm starts ringing and also there is an option of setting time interval through which we can inform our contacts about our current location hich is sent via SMS after the set interval.

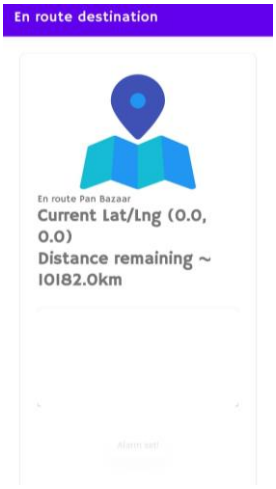

Fig 4.5: screenshot of the application after alarm is set.

Below Fig 4.6 depicts the screenshot of history and contacts section of our application. History contains the places that we have visited while using location alarm of "BuddAlert" application and in contact we can add any number of contacts as per user wish, there is no limitation of adding number of contacts.

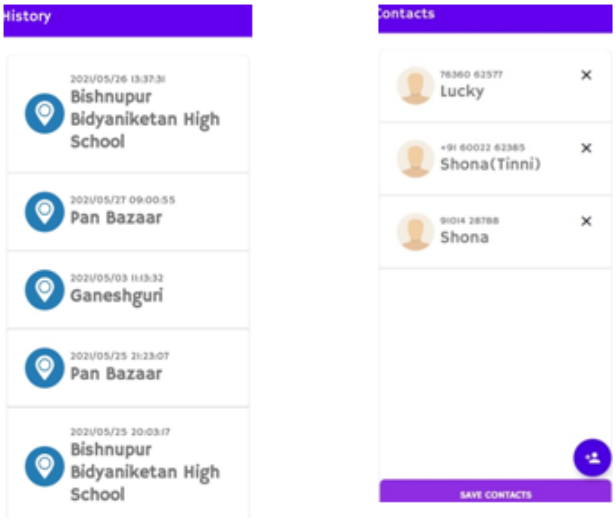

Fig 4.6: Screenshot of app of History and contact.

Below Fig 4.7 depicts the screenshot of our application of reminder which shows notification based on the event date and time we have set. If the date or time lapses then the reminder notification is removed from the application. Here, we can set the event name, date, time and also location of the event.

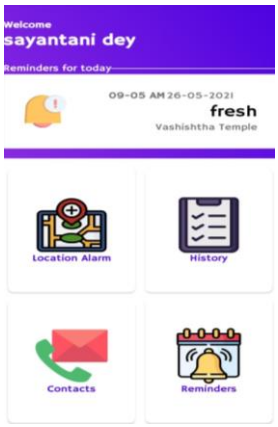

Fig 4.7: Screenshot of the application that shows reminder notification.

Uniqueness of our Prototype:

The location based alarm and women application has following unique feature:

- The alarm rings when the user's destination is reached and also with the help of the interval slide bar, when we set the time. Our current location is sent to our trusted contacts after some intervals.
- The reminder is used to remind us about our works when the app is running.
- The SOS is used to sent the user's current location along with an audio sample. Also A call is made to the emergency contact saved in the app. As sometime the SMS might be left unnoticed.

5. CONCLUSION AND FUTURE SCOPE:

The final system permit user to simply activate alarm within the mobile device. Based on the saved location on the mobile device, alarm will ring automatically once the user reaches the target location Also there is an Emergency service that send the current location of the user when the SOS button is pressed along with an audio recording to the user's trusted contact via SMS. Also a call is made to the emergency contact saved when "Help ME" button is pressed.

The possibility of improvising the system includes:

The audio recording can be done if there is any movement is detected. Currently, system ringtone is employed because the default ringtone within the application. However, selection of ring tones could be provided from the audio gallery, since it's volume control and vibrates mode control settings.

REFERENCES

[1]Sateesh Kumar.M and Prasanth.R, "Location Based Alarm", "https://www.scribd.com/doc/124734588/Location-Based-Alarm",2014.

[2]Ravi Shekhar Yaraboyhu and Bramarambika Thota,"Abhaya-An Android app for Women Safety"," Institute of Electrical and Electronics Engineers India Conference(INDICON)",2015.

[3]Kavita Sharma Anand, "Advance Woman Security System Based On Android"," International Journal for Research in Emerging Science and Technology",May 2016.

[4]Sheeba Justin,"Location based Alarm using Mobile Device","International Journal of Computer Application",2018.

[5] http://www.instantfundas.com/2011/11/3-location-basedalarms-that-wake-you.html, visited May 2021.

[6] BharathSewa.com, 14 March 2014,"RAKSHA –WOMEN SAFETY ALERT".

[7] ABC Mobile Learning Communication, 23 January 2014,"VANITHAALERT". "https://play.google.com/store/app"

[8] CIRCLE OF 6", an IOS app developed in April 1,2015," https://www.circleof6app.com/"

[9]Android App developed by Canvas M Technologies, 26 June, 2013, "FIGHTBACK".

" https://www.techno360.in/fightback-app-women-safety/"

[10] http://en.wikipedia.org/wiki/XML.

[11]http://developer.android.com/guide/topics/ui/declaringlayout.html , visited 20 May 2021.

[12] https://www.geotab.com/blog/what-is-gps/

[13]https://developers.google.com/maps/documentation/places/android-sdk/overview, visited 23 May 2021.

[14]https://firebase.google.com/docs/firestore/manage-data/add-data , visited 27 May 2021.

[15]https://developer.android.com/training/data-storage/shared-preferences, visited 23 May 2021.

BIBLOGRAPHIES:

Sayantani Dey completed her B.Tech from Royal Global University in September, 2021 in Computer Science and Engineering. She is interested in Android App development, Web Development and Theoretical Computer Science.

Lucky Goswami completed her B.Tech from Royal Global University in September, 2021 in Computer Science and Engineering. She is interested in Android App Development and Theoretical Computer Science