

## LOCATION BASED SMART ALARM SYSTEM FOR WOMEN SAFETY

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### ABSTRACT

An Android application that lets users define destinations and then receive alarm notifications when they arrive at those destinations. A reminder message may be linked to the Android alarm. The alert sounds as soon as the user arrives at the specified place, and the corresponding message even flashes on their mobile device. The user has complete control over how the alarms are set, reset, disabled, edited, and how long they last. To determine how far away from the intended location the user is, they can view the destination on a map. Users must register with the system by providing the necessary information. In order to log into the system, the user must provide their user ID and password. The user must give the location's name and the work location when entering the destination. The Android alarm will alert him/her and send a reminder message when they arrive at their location. The system will also have a safety feature that will immediately SMS the user's trusted contact with the user's current position and also make a call to our emergency contact saved in the system.

### Keywords

**Android Alarm, GPS, Firestore Database, Real-time systems, Receivers, Smart phones, Hardware, Safety, Sensors.**

### Introduction

By allowing the user to activate an alert whenever and wherever it is necessary, the location-based alarm system raises the level of living. The mobile user can see, delete, and make changes to the alarm without any conflicting information changing. The project utilizes Google Play services so that the application may take advantage of the most recent Google-powered features, including Maps and Google+, as well as automatic platform updates made accessible as an APK through the Google Play store. Because of this, users get updates more rapidly and find it easier to use the newest Google features.

This application may be helpful for those who frequently travel large distances within the nation, including tourists, strangers, and especially sales reps and selling executives. This Android app enables users to pick a destination and then receive alarm notifications when they arrive at their chosen location. A reminder message may be linked to the Android alarm. The alert sounds as soon as the user arrives at the specified place, and the corresponding message even flashes on their mobile device. The user has complete control over how the alarms are set, reset, disabled, edited, and how long they last. To determine how far away from the intended location the user is, they can view the destination destinations on a map. The user must enter the destination by indicating the location's name and the work location. The Android alert will let him or her know when they arrive at their destination and will also send a reminder message. Additionally, the system will have a safety feature that would instantly send the user's current position to a trusted contact through SMS. The system will have two SOS button:

- The SOS button, which appears just before the login screen, will only notify the two people we've added as emergency contacts of our position and any audio that has been recorded.
- The SOS button on the application's home page will alert every user who has been listed as a contact about our present position and any audio that has been captured.

Additionally, if it notices any unusual movement, an audio recording will be made and forwarded to their trusted connections. Additionally, a call can be placed to the emergency contact specified in our application. Additionally, it offers a system for reminding users of tasks they've made in the reminder area. Our application's history area stores the locations of the places we visit.

Use the Google Maps Places API to get location information. The user will enter the location they want to be informed they have reached. The location's history is likewise preserved to our database. After a predetermined amount of time, the Android GPS service will track the user's current location. When the user reaches the destination,

the system alert sounds and warns them. contacts kept in the database of our Fire shop. After the predetermined interval, the user will send these contacts an SMS and a WhatsApp message with their current position. Additionally, users can use a button to send an SOS message to saved contacts, including their current position and an audio sample. Gyroscope and Accelerometer on the smartphone are used to identify orientation and speed; if movement starts out of nowhere, the system will record an audio and transmit it to the user's contacts. When the application is operating, a reminder system will also alert the user to the previously saved event. The time and date of the event are saved in Firestore, and it only notifies you if the time and date of the event are identical to the time and date now in effect.

### **Literature Review**

Numerous location-based solutions are available that can employ mobile devices to automatically produce alarms.

Place-Based Alarm[1]: Five modules were designed for the system to manage the aforementioned components.

Display component: This module uses the GPS, GPRS, and 3G networks used in smart phones to display locations on a Google map. The user will enter their present location and desired journey destination in this section.

GPS interaction module: This module modifies the location update according to the user's time restriction via GPS. Additionally, make if the Internet connection and GPS are active or inactive. Based on it, the alert may display on our phones' Android notification bars.

Place management module: In this module, the mobile phones' SQLite knowledge storage is used to store location information. For the user's future use, the visited place's details and location updates are recorded in SQLite data storage.

Alarm Module: The project's main module is the alarm module, in which the android background services are used to update the locations and provide the alarm service. With the aid of GPS and Internet service providers, location updates are made, and alarms are set using Android device alarm services.

An Android App for Women's Safety, Abhaya: This essay introduces Abhaya, an Android application for women's security that can be launched at any time with a single click. With just one click, this app uses GPS to pinpoint a location, sends a message to all of the contacts you've added asking them to help you in an emergency, and also notifies your primary contact.

Android-based advance woman security system: This paper recommends an android smart phone with built-in features. When ladies are in danger or distress, they must hold down the volume key button on their phone; this makes a voice call and sends an alert message to the contacts who have been added.

Mobile device location-based alarm[4]: The main goal is to create a GPS (Global Positioning System)-based application to address the following requirements: When a user approaches a predefined spot, an alarm will sound to warn the users. In order to obtain the user's current coordinates (Latitudes and Longitudes), Users can add their target area to the list and preserve it there. They can also delete and modify the alarm. to give the user the option of placing the reminder text alongside the alarm. With the final system, users may easily

turn on alarms on their mobile devices. Once the user arrives at the desired place, the alarm can immediately ring and display the remaining message if the mobile device supports the remembered location. The use of this mobile alarm service can make it easier for frequent travellers to visit new locations.

wake[5] App: A geo-located alert from the Wake App sounds when the user is about to arrive at the specified location. The programme closes when the user selects a stop on the map and intermittently uses the device's GPS sensor to track the user's location.

The alert plays a user-selected ringtone once the user bus enters a pre-configured radius from the stop where the user is intended to get down (the default is one thousand metres). For passengers travelling by train or coach, this application is used. The alarm can be configured to go off within a present radius surrounding the destination. If the alarm volume is set too low, it will automatically rise. Cons: Locations cannot be saved for future use.

#### HUMAN SAFETY ALERT - RAKSHA[6]:

The BJP released this app on May 15, 2014, perhaps. By tapping on this app, the user can broadcast their location to any saved contacts and even view the specifics of their connections' situations. A sign that buzzes loudly to our dearest and most expensive by pushing just one key. The current software allows us to add many contacts, and when there is no knowledge association, this app notifies the contacts by sending them an SMS.

VANITHA ALERT[7]: ABC Mobile Learning Communication created this application. In an emergency, pressing the "HELP" button on the home screen of our phone will send a distress text message to the registered mobile number, email address, and Facebook ID, asking for assistance and providing the user's location.

Circle of 6[8]: On April 1, 2015, Test For Good created this application. This application only functions on iPhones and is designed exclusively for the iOS platform. Females of any age can use this application, including schoolgirls, working women, etc. When a user is in distress, this will let their friends know, and messages are sent to six contacts of our choosing. It also has a help button, maps the user's exact location, and transmits this address.

#### FIGHTBACK[9]:

Mahindra faction created this application. In the past, the consumer had to make a payment in order to use this software. however, this software is available for free after the city gang rape event. Through email or SMS, this programme notifies our friends or contacts that the "user is in difficulty." Mobile devices that support Android Java Programming can use this app.

**Comparison:**

<p><b>1.Wake App[5]</b></p>	<p>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 preconfigured radius from the stop the user is supposed to get off (default is one thousand meters), the alarm plays a ringtone of user</p>
	<p>alternative.</p>
<p><b>2.Raksha-Women Safety App[6]</b></p>	<p>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.</p>
<p><b>3.VANITHA APP[7]</b></p>	<p>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.</p>
<p><b>4.Circle Of 6[8]</b></p>	<p>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 preprogrammed SMS alert message, with their precise location.</p>
<p><b>5.FIGHTBACK[9]</b></p>	<p>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.</p>

**Table 1:Comparison of different Applications**

**Vulnerability:**

<b>1.Wake app[5]</b>	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.
<b>2.Raksha-Women Safety App[6]</b>	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.
<b>3.VANITHA APP[7]</b>	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.
<b>4.Circle Of 6[8]</b>	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.
<b>5.FIGHTBACK[9]</b>	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 feature included in FIGHTBACK.

**Table 2: Vulnerability of different Applications.**

**Methodology**

The project's planning and execution methodology includes: defining the project's requirements; choosing the appropriate technology; and implementing modules (such as set alarm, generate alarm, delete alarm, and edit alarm) as well as an SOS module that will assist the user when they are in danger (sharing current location, audio recording with their contacts and by making call to the emergency contact saved). Following are some system prerequisites that must be met in order to construct this application:

### Hardware Requirements:

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

RAM : 4GB

### Software Requirements:

Coding Language : Java, Kotlin

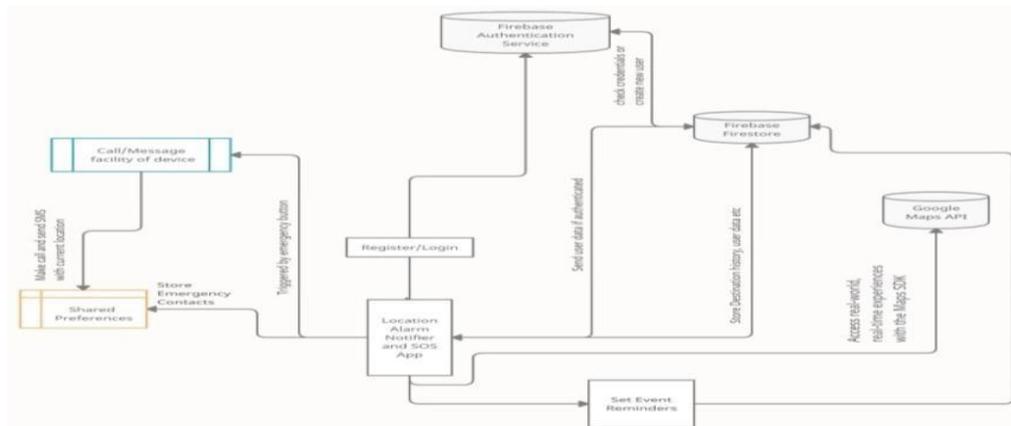
Ide :Android Studio

Database: Firebase Firestore

### Operating System:

Windows 10 Pro(64-bit)

### System Diagram



Our app, BuddAlert, essentially functions as a location-based SOS, reminder, and notification service. The app makes use of a number of capabilities, including Android, Firebase, Shared Preferences, and others. In the example above, the Firebase Authentication Service manages the login information, and the Firebase Firestore stores the user information. Before logging in, the SOS uses Shared Preferences to call and send a message with their present location. This is where the emergency contact is maintained. After logging in, the application's Contacts module allows us to add an unlimited number of contacts, and Firebase Firestore is where their contact information is kept. The location Alarm module sets our destination's location using the Google Places API. The Firebase database stores all of the dates and times that we provide for events.

### Selection of applicable Technology

The application was created by the system using Google's Android API, an add-on for the Android Development Tool, and Google Firebase Firestore. A leading platform for developing applications for Android users is provided by Android platforms. Additionally, it offers resources for designing applications that look good and take advantage of each device's hardware capabilities.

### Android

Android is a mobile operating system that is primarily intended for touchscreen mobile devices like smartphones and tablets. It is supported by a modified version of the Linux kernel and other open source

applications. It is an OHA (Open Handset Alliance) mobile operating system. This application platform is quite similar to Java SE. Only in cases where parts of the original Java SE packages have been deleted does Android use the Apache Harmony class library. These have been swapped out for GUI packages that are better suited to the condensed screen sizes found on mobile devices. Free versions of the Android SDK are available for Mac OS X, Windows, and UNIX.

### **Extensible Markup Language (XML):**

A markup language called Extensible Markup Language (XML) offers a set of guidelines for encoding documents in a way that is both machine- and human-readable. In Android, UI layouts are created using XML. The View classes and subclasses, such as those for widgets and layouts, are mapped to a straightforward XML vocabulary by Android. The benefit of expressing UI in XML is that it enables the user to distinguish between the code that governs an application's behaviour and how it is presented to the user. External to the application code, UI descriptions imply that they can be altered or customised by the user without requiring them to modify the source code and recompile the application.

### **Global Positioning System( GPS):**

A medium earth orbit (MEO)-based, satellite-based navigation system, the Global Positioning System (GPS) [12] is used predominantly today. In order to provide its users with location, speed, and direction data, GPS depends on a constellation of at least twenty-four satellites. Trilateration is a method for precisely confirming the correct location, and it combines atomic clocks in the satellites with it. Through clever adjustments to the times that signals from various satellites seek to reach the receiver, GPS locates the user's location. Compared to most other approaches, GPS has a higher precision, but because it requires a clear line of sight to the satellites, its application inside is severely constrained. Due to the limited number of satellites that GPS can view in large cities with several tall buildings and narrow streets, it frequently has incredibly poor accuracy. The robot mortal allows a file with previously recorded track points to be added so it may mimic a real GPS and trick apps into thinking it is actually moving. This method allowed a real GPS track to be recorded and uploaded to the mortal. One must first realise a suitable method to delineate this space before being able to determine if a user is inside or outside the world. The globe is defined as a circle with a radius  $r$  and centre coordinate once a GPS is used  $(x_c; y_c)$

### **Results**

The screen shot of the BuddAlert programme when it launches is shown in the following figures. After opening the BuddAlert app on the device where it is installed, a screen shot of the application is shown in Figure.

"Sign in" and "Help Me" are the two user options that are present.

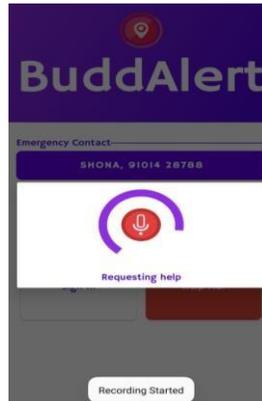
The "Help Me" button can be used if the user feels they should only use the emergency service.

It will both call and send an SMS to the emergency contact number that the user has set up. However, the user can access the location alarm, reminder, and emergency service if they sign in. The SMS can then be sent to a large number of people. They must keep the contact in contact in order to deliver the "I am in danger" message to multiple contacts.



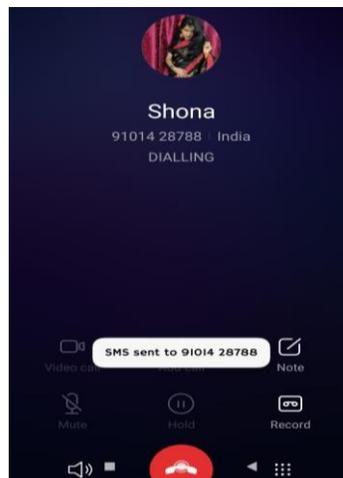
**Fig : Screenshot of BuddAlert after opening the application.**

When "Help Me" is pressed, a screen shot of an audio recording is shown in the following Fig. Here, the user's surroundings will be audio-recorded, and both the user's current position and the audio file will be sent by SMS to a trusted contact.



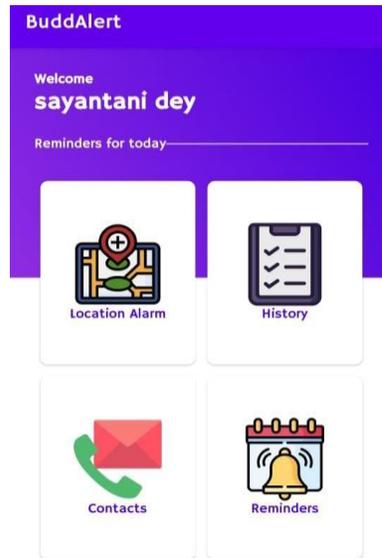
**Fig : Screen shot of audio recording when "Help Me" is pressed.**

When a call is placed, our application's snapshot in Figure illustrates that a message is sent to the emergency contacts. The message will include the user's current location and a URL for an audio file.



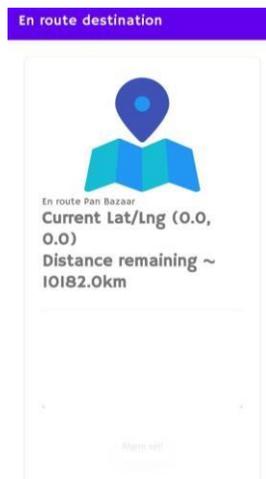
**Fig : Screen shot of making a Call and sending SMS to the emergency Contact.**

The situation after tapping "sign in" is seen in Fig. Four sections are displayed there: Location Alarm, History, Reminder, and Contacts.



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

The screenshot of the programme after the alarm is set is shown in Fig. There is an option to establish a time interval through which we can notify our contacts of our present location, which is transmitted via SMS after the chosen period, and the alarm begins to ring here when the user reaches the destination.



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

Fig shows a screenshot of our application's contacts and history sections. The "BuddAlert" application's history lists the locations we've been while using the location alarm feature, and in contacts, we may add as many contacts as the user chooses—there is no cap on the total number of contacts that can be added.

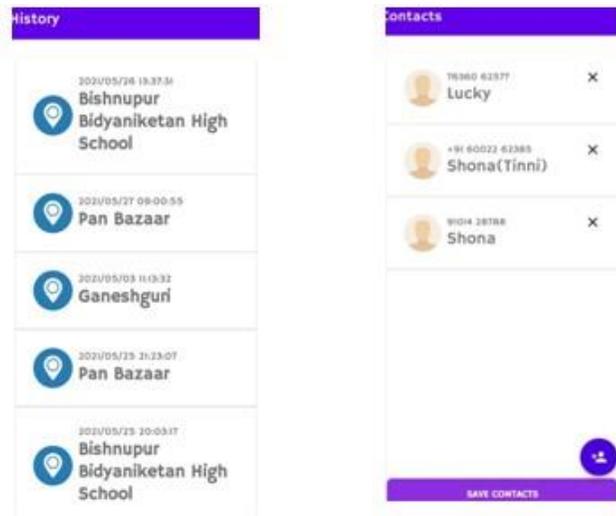


Fig : Screenshot of app of History and contact.

Fig. depicts the reminder application's snapshot, which shows notifications based on the event date and time we've selected. If the date or time has gone, the reminder message is removed from the programme. The event's name, date, time, and venue can all be found here.

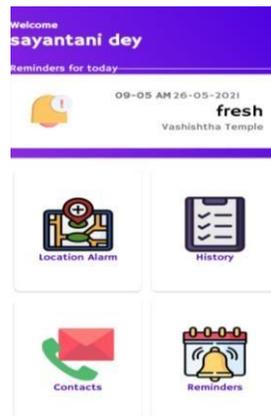


Fig :Screenshot of the application that shows reminder notification.

### Discussions

The location-based alarm and women's application in our prototype includes the following distinctive feature:

- The alarm sounds when the user arrives at their location as well as when the time is set using the interval slide bar.

After some intervals, we send our present position to our verified contacts.

- When the software is operating, the reminder is utilised to remind us about our tasks.
- The user's current position and an audio sample are communicated over the SOS.

Additionally, a call is placed to the app's emergency contact. The SMS could occasionally go unnoticed.

## Conclusion

The final system enables users to quickly set an alarm on a mobile device. Once the user arrives at the desired area, an alarm will immediately sound based on the saved position on the mobile device. Additionally, there is an emergency service that, when the SOS button is pushed, sends the user's current position and an audio recording to a trusted contact via SMS. Additionally, when the "Help ME" button is clicked, a call is placed to the pre-saved emergency contact.

## Future Studies

The system may be modified so that if any movement is detected, audio recording may be performed. As of right now, the application's default ringtone is the system ringtone. However, since the audio gallery has controls for volume control and vibrate mode, a selection of ringtones might be offered.

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