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Women's Safety: Auto SOS Generative System Using Code Word

A MINI PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF TECHNOLOGY

IN

INFORMATION TECHNOLOGY

VELAMMAL ENGINEERING COLLEGE, CHENNAI - 66.

(An Autonomous Institution, Affiliated to Anna University, Chennai)

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BONAFIDE CERTIFICATE

Certified that this Mini Project report **"WOMEN'S SAFETY AUTO SOS GENERATIVE SYSTEM USING CODE WORD"** is the bonafide work of **KAVYA PRIYA R** and **GAYATHRI C** who carried out at the project work under my supervision.

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CERTIFICATE OF EVALUATION

COLLEGE NAME : VELAMMAL ENGINEERING COLLEGE

BRANCH : INFORMATION TECHNOLOGY

SEMSETER VI

Sl. No	Name of the students who has done the project	Title of the Project	Name of supervisor with designation
1	Kavya Priya R	Women's safety auto sos generative system using code word	Mrs.V.Sathya Assistant Professor
2	Gayathri C		

This report of project work submitted by the above students in partial fulfillment for the award of Bachelor of Technology Degree in Anna University was evaluated and confirmed to be reports of the work done by the above students and then assessed.

Submitted for Viva voce Evaluation held on.....

Internal Examiner

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ABSTRACT

Women's safety has become a major concern in today's society due to the increasing number of emergency situations, harassment cases, and unsafe travel conditions. In many critical situations, women may not be able to manually call for help or send messages because of fear, panic, or lack of time. To address this issue, this project proposes a Smart Women Safety Mobile Application with Auto SOS that provides immediate emergency assistance through a software based solution—The proposed system is developed as a mobile application using Flutter, enabling users to access safety features directly from their smartphones. The application includes core functionalities such as Auto SOS alert generation, live location sharing, voice-triggered emergency activation, one-touch emergency calling, and SMS alerting to pre-registered contacts. The app is designed to work quickly and efficiently in real-time emergency situations —The system allows users to register trusted emergency contacts during setup. In dangerous situations, the app can automatically or manually trigger an SOS alert, send the user's current location, and initiate emergency communication. The application also supports voice-based activation, allowing users to trigger help using a predefined safety phrase without opening the app manually—This project focuses on improving women's personal security through an easy-to-use and portable software solution. Since smartphones are widely available, the proposed app offers a practical and low-cost safety system for students, working women, and women traveling alone. The application improves emergency response time and ensures better safety support using smart mobile technology.

Keywords: Women Safety, Auto SOS, Flutter App, Emergency Alert, Live Location Sharing, Voice Activation, Mobile Application, Smart Security

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CHAPTER-1

INTRODUCTION

Women's safety has become one of the most serious concerns in modern society. Many women face unsafe situations while travelling alone, returning from work or college at night, staying in unfamiliar places, or using public transport. In such situations, immediate help becomes extremely important. However, during emergencies, victims may not always have the time or ability to unlock their phone, open an application, or manually contact someone for help. This limitation makes many existing safety solutions ineffective during real-time danger [1][2][3]. With the rapid growth of smartphone usage and mobile technologies, software-based safety solutions have become more practical and accessible. Mobile applications can provide a powerful platform for real-time emergency support because smartphones already include features such as GPS location access, calling, SMS, internet connectivity, and voice recognition [4][5][6][7]. By using these built-in capabilities, a smart women safety application can be developed to provide faster response and improved security without the need for additional devices or hardware modules [8][9]. The proposed project, Women Safety with Auto SOS Mobile Application, is designed to provide immediate assistance through a smartphone app developed using Flutter. The application allows users to register emergency contacts, trigger SOS alerts, share live location, and activate emergency functions using voice commands. This makes the system highly useful for students, working women, and women travelling alone. Unlike basic safety apps, the proposed application focuses on quick activation, simple interface, automatic alerting, and real-time communication [10][11][12]. Thus, this project aims to provide a practical and reliable digital safety companion for women [13][14][15]

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1.1 BLOCKCHAIN

Blockchain is a decentralized and secure digital record system used to store data safely.In this project, blockchain can be used to save SOS alert details such as time, location, and emergency contact information.This improves security, transparency, and reliability by preventing unauthorized modification of alert records.

1. **Structure Decentralized**

This improves security, transparency, and reliability because no single person can easily modify or control the data.In this project, it can be used to securely maintain SOS alert records and emergency logs.

2. **The Blockchain and Blocks**

In the Women Safety Auto SOS System, blockchain can be used to record each SOS event as a block.Each block may contain the trigger phrase, time, location, and emergency alert details.This creates a secure and trusted history of emergency records.

3. **Method of Consensus**

The consensus method used in this project is Proof of Authority (PoA).

In this method, only trusted nodes are allowed to validate and store SOS alert records.This ensures secure, fast, and reliable emergency data management.

4. **Protection and Unchangeability**

Blockchain provides high protection by storing data in a secure and distributed manner.Once the data is recorded in a block and added to the blockchain, it becomes unchangeable (immutable) and cannot be easily modified or deleted.

In this project, this helps protect SOS alert records, location details, and emergency logs from unauthorized changes.

5. **Openness and Lack of Trust**

In the Women Safety Auto SOS System, openness and lack of trust help

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maintain a reliable emergency alert record system.Authorized users can verify SOS alert details, while blockchain ensures that no single user can secretly modify the stored data.This increases trust, security, and transparency in the project.

1.2 METAMASK, GANACHE AND TRUFFLE

Blockchain technology can be integrated into the Women Safety Auto SOS System to provide secure, decentralized, and tamper-proof storage of emergency alert records. In this system, each SOS event can be stored as a block containing details such as the trigger phrase, alert time, current location, emergency contact number, and alert type. Since blockchain follows a decentralized structure, the data is not stored in a single location, which improves security, transparency, and reliability. The consensus method used for this project can be Proof of Authority (PoA), where only trusted and authorized nodes are allowed to validate and store SOS data. This ensures protection and unchangeability, meaning once the emergency alert data is recorded, it cannot be easily modified or deleted. Tools such as MetaMask, Ganache, and Truffle can be used to implement the blockchain module, where MetaMask is used to connect the application to the blockchain, Ganache is used for local blockchain testing, and Truffle is used for smart contract development and deployment. Thus, blockchain enhances the project by making emergency records more secure, trustworthy, and efficient.

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CHAPTER 2

2.1 RELATED WORK

Women safety has become an important area of research and many systems have been developed to provide quick emergency assistance using modern technology. Several existing applications use GPS tracking, SMS alerts, and emergency calling features to help users send distress signals during dangerous situations. Some systems are designed with panic buttons, while others use mobile sensors, voice commands, or wearable devices to activate alerts automatically.

Recent studies have also focused on smart women safety applications that integrate location tracking, voice recognition, and real-time communication to improve response speed. In addition, some advanced systems use IoT, machine learning, and blockchain technology to enhance security, data storage, and emergency monitoring. Blockchain-based approaches are especially useful for securely storing alert records and preventing unauthorized modification of emergency data.

Compared to existing systems, the proposed Women Safety Auto SOS System introduces a more user-friendly and efficient solution by combining voice-activated triggering, automatic SOS message delivery, location sharing, and optional blockchain-based secure alert storage. This makes the system more reliable, faster, and easier to use in real emergency situations.Several women safety applications and emergency alert systems have been proposed in previous works. These systems commonly use GPS, SMS, and emergency contact features to provide help during unsafe situations. The proposed system improves existing methods by using voice-triggered SOS activation and secure alert handling, making it more efficient and practical.

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CHAPTER 3

3.1 PROPOSED WORK METHODOLOGY

The proposed system is a mobile-based application designed to enhance women's safety using a code word activation mechanism. Initially, users register and add emergency contacts. The system continuously monitors user input (voice/text) for the predefined code word. When the code word is detected, the application automatically triggers an SOS alert. It fetches the user's real-time location and sends alert messages to emergency contacts. The system also initiates an emergency phone call. The methodology ensures quick, discreet, and reliable communication during critical situations.

3.1.1 INSTALLATION

Step 1: Install Development Tools
Install Node.js, a code editor (VS Code), and MongoDB to set up the development environment.

Step 2: Setup Project Folder
Create a project directory and organize files for frontend, backend, and database configuration.

Step 3: Install Dependencies
Use npm to install required packages such as express (if used), mongoose, and other libraries.

Step 4: Configure Database
Connect the application to MongoDB and create collections for users and emergency contacts.

Step 5: Develop Frontend Interface
Design user interfaces for registration, login, and SOS activation using HTML, CSS, and JavaScript or React.

Step 6: Run the Application
Start the backend server and open the frontend in a browser or mobile emulator to test the system.

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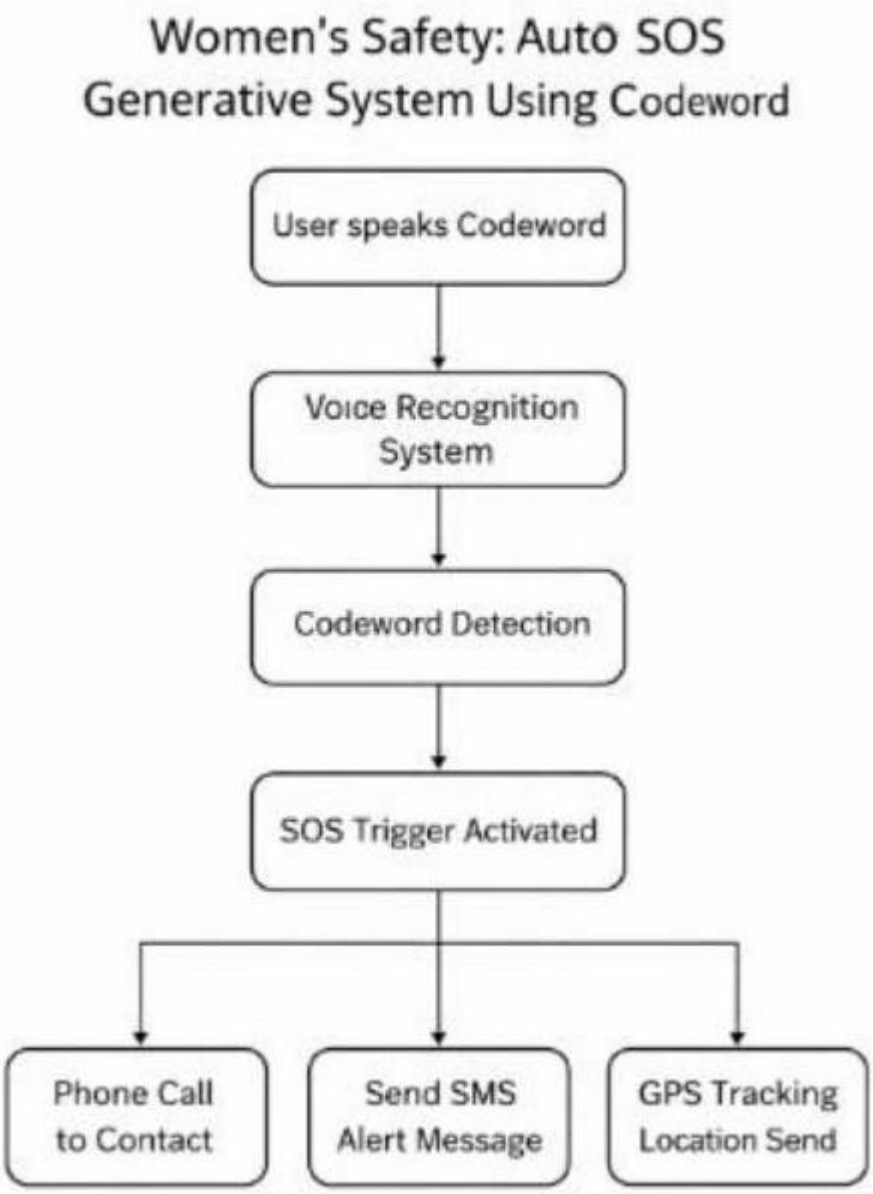

Figure 3.1: Flow Diagram

3.1.2 ALGORITHM STEPS:

Step 1: Start the Application

The system begins when the user opens the application. It checks whether the user is registered and logged in. If not, the user is prompted to register and provide emergency contact details.

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Step 2: Store User and Contact Details
The user enters personal information and adds emergency contacts. These details are stored securely in the MongoDB database for future use during emergencies.

Step 3: Monitor for Code Word Trigger
The application continuously listens for the predefined code word through voice recognition or checks for text input. This ensures the user can activate the system discreetly without drawing attention.

Step 4: Detect Emergency Situation
When the system identifies the correct code word, it interprets it as an emergency signal. This triggers the SOS process automatically without requiring further user interaction.

Step 5: Fetch Current Location
The system accesses the device's GPS to obtain the user's real-time location. This location is essential for helping others track and reach the user quickly.

Step 6: Generate and Send SOS Alert
An emergency message is generated containing the user's location and alert information. This message is sent to all registered emergency contacts via SMS or internet-based messaging.

Step 7: Initiate Emergency Call
The application automatically initiates a phone call to a predefined emergency contact or helpline number to ensure immediate assistance.

Step 8: Continue Monitoring and Updates
The system may continue sending updated location details at intervals until the emergency is resolved, ensuring continuous tracking.

Step 9: Stop the Process
Once the emergency is handled or manually stopped by the user, the system ends the SOS process and returns to normal monitoring mode.

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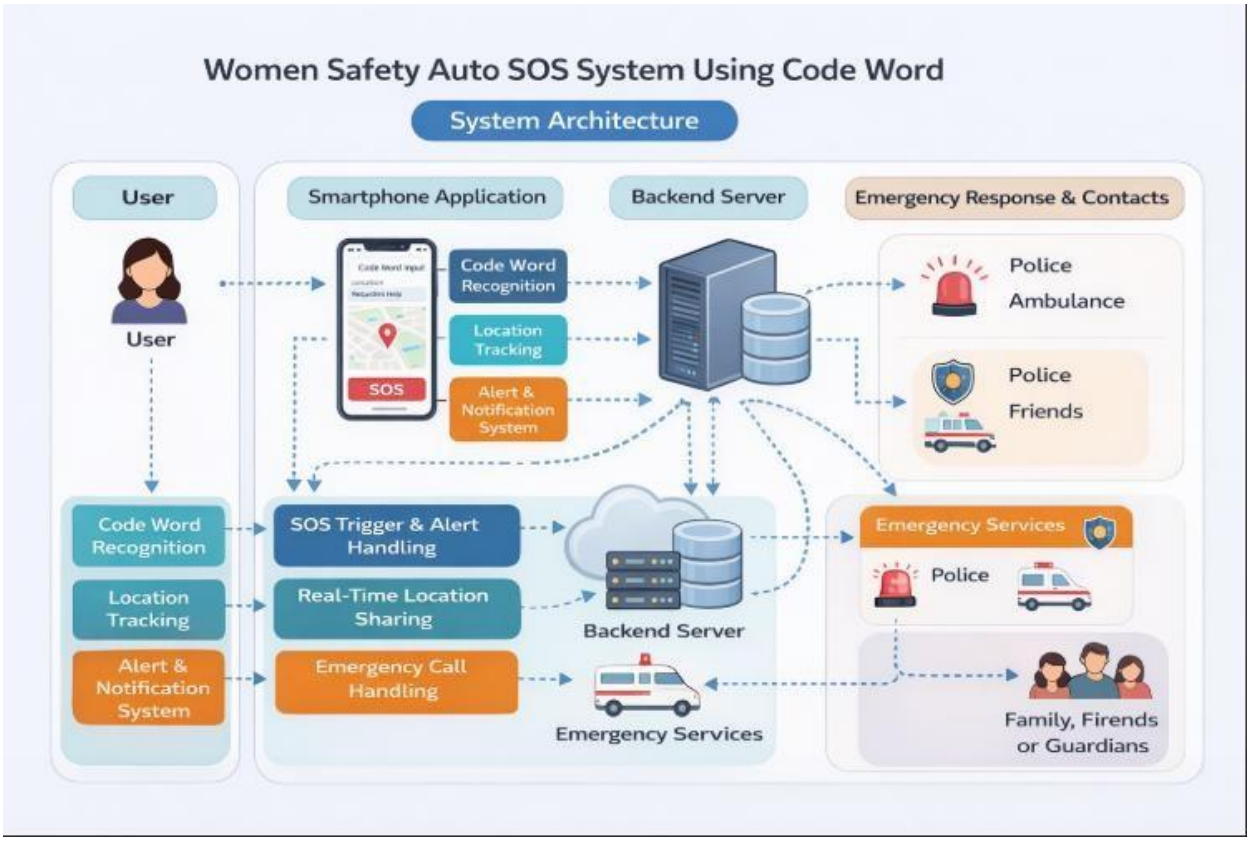

Figure 3.2: System Architecture

CHAPTER 4

4.RESULT AND DISCUSSION

4.1 SoftwareRequirements

- Frontend: HTML, JS, CSS
- Backend: Dart

4.1.1 FRONTEND

HTML: Requirement: Create semantically structured web pages. Description: HTML will be used to define the structure and content of web pages, ensuring accessibility and SEO-friendliness.

CSS: Requirement: Style web pages for visual appeal and consistency.

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Description: CSS will be utilized to apply visual styles, layouts, and responsive design to HTML elements, enhancing user experience.

JavaScript: Requirement: Implement dynamic and interactive features on the client-side. Description: JavaScript will enable client-side scripting for functionalities like form validation, dynamic content loading, and user interface enhancements.

4.1.2 BACKEND

Dart: Dart is a modern, object-oriented programming language developed by Google.It is mainly used with Flutter to build fast, responsive, and cross-platform mobile applications.In this project, Dart is used to implement the application logic and control SOS functionalities.

4.2 Result

The Women Safety Auto SOS System was successfully designed and developed to provide quick emergency support for women during unsafe situations. The application is capable of detecting a predefined voice trigger phrase and automatically initiating the SOS process.

When the trigger phrase is recognized, the system sends an emergency alert message along with the user's current location to the saved emergency contact. The application also supports additional features such as custom trigger phrase setting, alert mode selection, and emergency contact management.

The final output shows that the system works effectively as a smart personal safety solution, helping users send alerts quickly without requiring manual phone operation in emergency situations.

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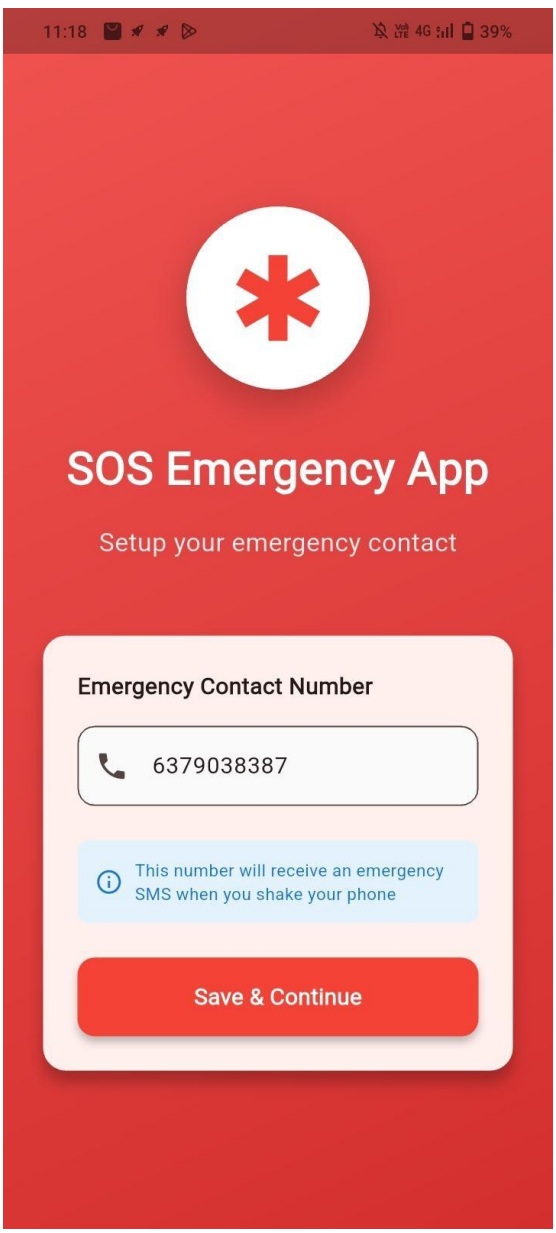

Fig 4.1.a

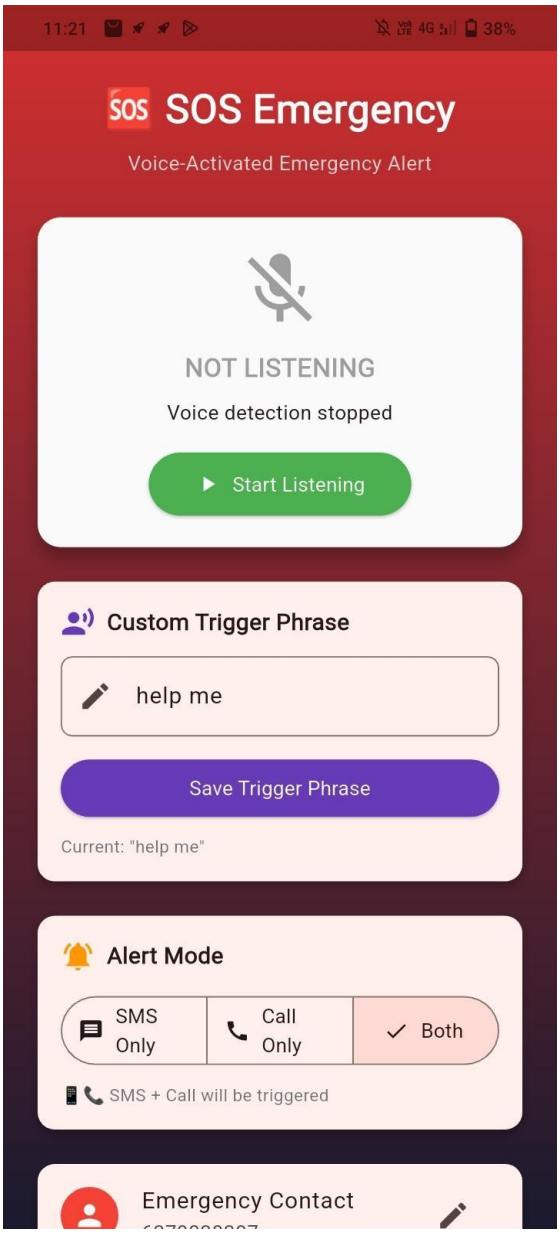

Fig 4.1.b

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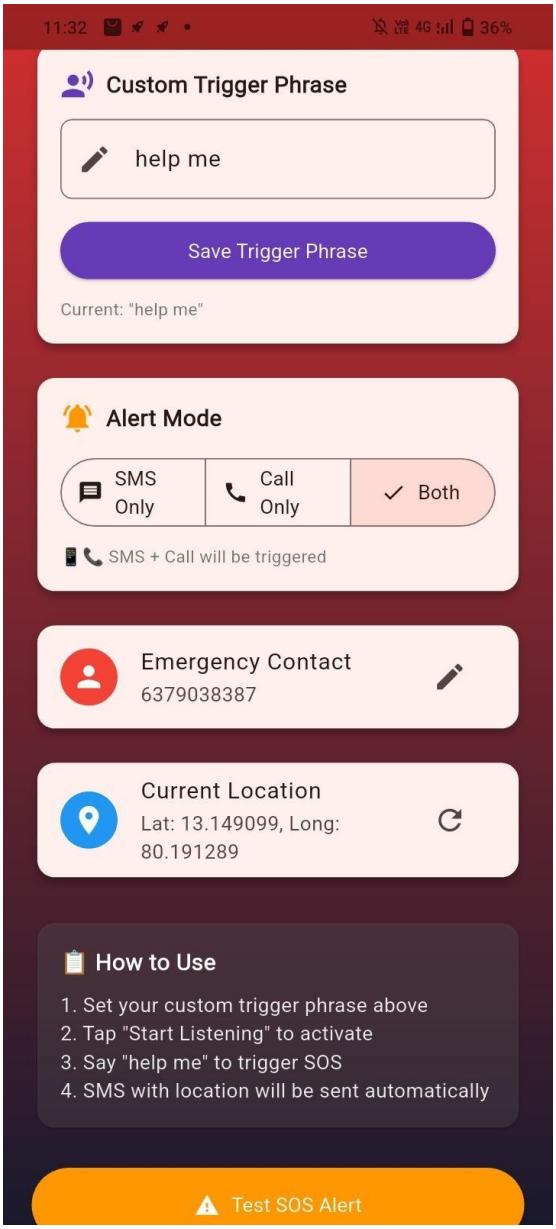

Fig 4.1.c

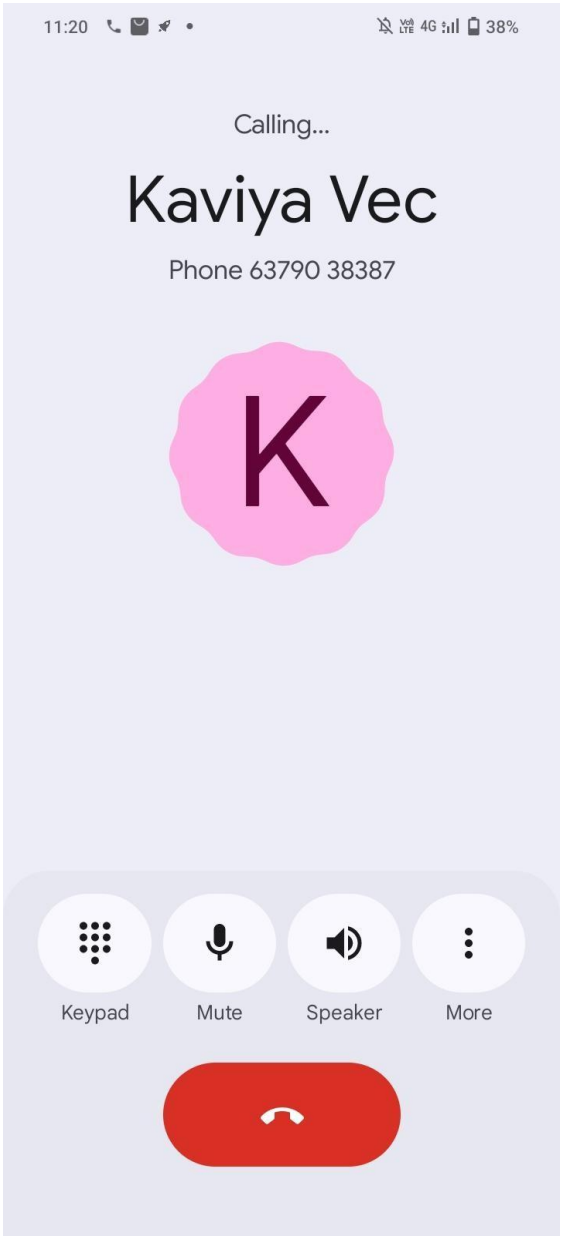

Fig 4.1.d

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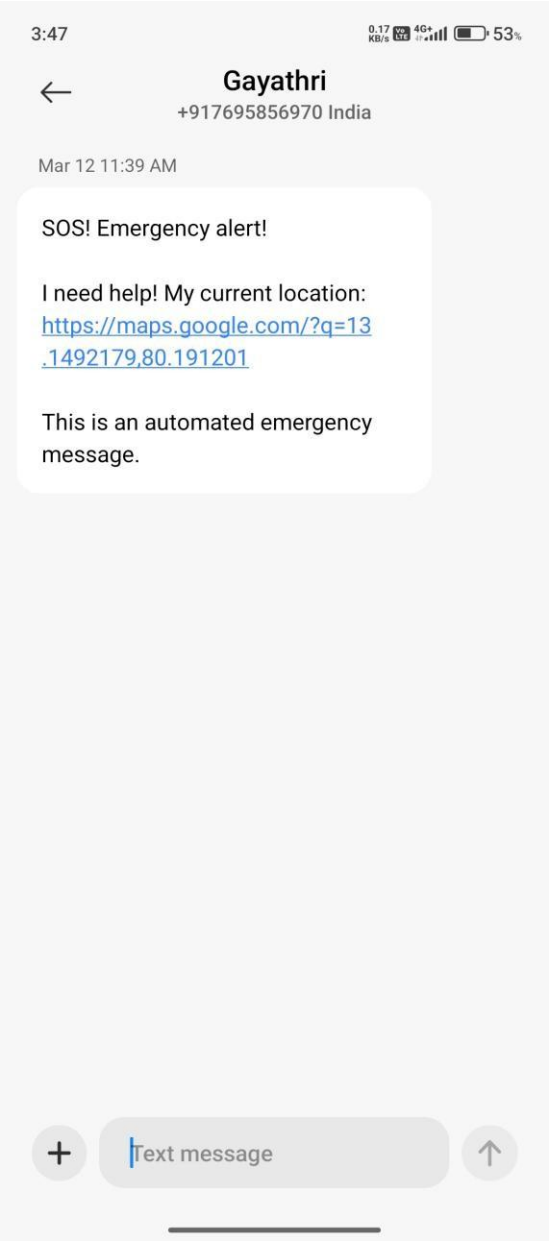

Fig 4.1.e

Fig 4.1.a,b,c,d,e: Application running

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CHAPTER 5

5.1 CONCLUSION AND FUTURE WORK

The proposed project, Women Safety with Auto SOS Mobile Application, provides an effective software-based solution for improving women's personal security. The application is designed to offer quick emergency support through features such as SOS alerting, live location sharing, emergency calling, and voice activation. Since the project is completely mobile app-based, it is practical, portable, and easy to use in daily life. The application successfully integrates essential emergency functionalities into a single platform using Flutter. It allows users to set up emergency contacts, trigger alerts quickly, and communicate location details during distress situations. The modular design of the application also makes it easier to maintain, extend, and improve in future versions. This project can be highly useful for students, working women, women travelling alone, and users requiring quick emergency assistance. It improves response time and provides a reliable safety mechanism using only smartphone software capabilities. The application can be enhanced in future by adding: Real-time background tracking Cloud database integration Emergency contact notifications via internet Fake call feature Nearby police station integration Map-based unsafe zone alerts AI-based danger prediction Multilingual voice activation Thus, the proposed system has strong future potential as a complete digital safety assistant for women

CHAPTER 6

6.1 CODING

1. FRONTEND

```
<?xml version="1.0" encoding="utf-8"?>
<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="#B71C1C">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
```

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```
android:padding="20dp">

<!-- Title -->
<TextView
    android:id="@+id/titleText"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="□ SOS Emergency"
    android:textColor="#FFFFFF"
    android:textSize="32sp"
    android:textStyle="bold"
    android:layout_gravity="center_horizontal" />

<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="Voice-Activated Emergency Alert"
    android:textColor="#F5F5F5"
    android:textSize="18sp"
    android:layout_marginTop="8dp"
    android:layout_gravity="center_horizontal" />

<!-- Listening Card -->
<androidx.cardview.widget.CardView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="24dp"
    app:cardCornerRadius="20dp"
    app:cardElevation="10dp"
    app:cardBackgroundColor="#E8F5E9">

    <LinearLayout
        android:layout_width="match_parent"
```

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```
android:layout_height="wrap_content"
android:orientation="vertical"
android:padding="24dp"
android:gravity="center_horizontal">

<ImageView
    android:layout_width="70dp"
    android:layout_height="70dp"
    android:src="@android:drawable/ic_btn_speak_now"
    android:tint="#43A047" />

<TextView
    android:id="@+id/statusText"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="LISTENING"
    android:textColor="#43A047"
    android:textStyle="bold"
    android:textSize="28sp"
    android:layout_marginTop="16dp" />

<TextView
    android:id="@+id/listeningText"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:text="□ Listening for &amp;quot;code red&amp;quot;..."
    android:textSize="20sp"
    android:textColor="#333333"
    android:layout_marginTop="14dp" />

<Button
    android:id="@+id/btnListen"
    android:layout_width="260dp"
```

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```
            android:layout_height="wrap_content"
            android:text="Start Listening"
            android:textColor="#FFFFFF"
            android:textSize="20sp"
            android:backgroundTint="#F44336"
            android:layout_marginTop="22dp"
            android:padding="14dp" />

    </LinearLayout>
</androidx.cardview.widget.CardView>

<!-- Custom Trigger Phrase -->
<androidx.cardview.widget.CardView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="22dp"
    app:cardCornerRadius="20dp"
    app:cardElevation="8dp"
    app:cardBackgroundColor="#FCE4EC">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:padding="20dp">

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="□ Custom Trigger Phrase"
            android:textStyle="bold"
            android:textSize="24sp"
            android:textColor="#212121" />
```

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```
        <EditText
            android:id="@+id/etTrigger"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter trigger phrase"
            android:text="code red"
            android:textSize="24sp"
            android:layout_marginTop="18dp"
            android:padding="16dp"
            android:background="@android:drawable/edit_text" />

        <Button
            android:id="@+id/btnSavePhrase"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="Save Trigger Phrase"
            android:textColor="#FFFFFF"
            android:textSize="20sp"
            android:backgroundTint="#673AB7"
            android:layout_marginTop="18dp" />

        <TextView
            android:id="@+id/tvCurrentPhrase"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Current: &amp;quot;code red&amp;quot;"
            android:textSize="18sp"
            android:textColor="#666666"
            android:layout_marginTop="16dp" />
    </LinearLayout>
</androidx.cardview.widget.CardView>
```

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```
<!-- Alert Mode -->
<androidx.cardview.widget.CardView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="22dp"
    app:cardCornerRadius="20dp"
    app:cardElevation="8dp"
    app:cardBackgroundColor="#FFF3E0">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:padding="20dp">

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="□ Alert Mode"
            android:textStyle="bold"
            android:textSize="24sp" />

        <RadioGroup
            android:id="@+id/radioGroupMode"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="horizontal"
            android:layout_marginTop="18dp">

            <RadioButton
                android:id="@+id/rbSms"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
```

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```
            android:text="SMS Only"
            android:textSize="20sp" />

        <RadioButton
            android:id="@+id/rbCall"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Call Only"
            android:textSize="20sp"
            android:layout_marginStart="20dp" />

        <RadioButton
            android:id="@+id/rbBoth"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Both"
            android:textSize="20sp"
            android:checked="true"
            android:layout_marginStart="20dp" />
    </RadioGroup>

    <TextView
        android:id="@+id/tvModeInfo"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="□ □ SMS + Call will be triggered"
        android:textSize="18sp"
        android:layout_marginTop="16dp" />
  </LinearLayout>
</androidx.cardview.widget.CardView>

<!-- Emergency Contact -->
<androidx.cardview.widget.CardView
```

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```
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="22dp"
    app:cardCornerRadius="18dp"
    app:cardElevation="6dp"
    app:cardBackgroundColor="#FFFFFF">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:padding="18dp">

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="□ Emergency Contact"
            android:textStyle="bold"
            android:textSize="24sp" />

        <EditText
            android:id="@+id/etContact"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:hint="Enter phone number"
            android:text="6379038387"
            android:inputType="phone"
            android:textSize="24sp"
            android:layout_marginTop="14dp" />
    </LinearLayout>
</androidx.cardview.widget.CardView>

<!-- Location -->
```

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```
<androidx.cardview.widget.CardView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="22dp"
    app:cardCornerRadius="18dp"
    app:cardElevation="6dp"
    app:cardBackgroundColor="#FFFFFF">

    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:padding="18dp">

        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="□ Current Location"
            android:textStyle="bold"
            android:textSize="24sp" />

        <TextView
            android:id="@+id/tvLocation"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Lat: 13.150117, Long: 80.195934"
            android:textSize="20sp"
            android:layout_marginTop="12dp" />
    </LinearLayout>
</androidx.cardview.widget.CardView>

<!-- How to Use -->
<androidx.cardview.widget.CardView
```

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```
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="22dp"
        app:cardCornerRadius="18dp"
        app:cardElevation="6dp"
        app:cardBackgroundColor="#4E342E">

        <LinearLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:orientation="vertical"
            android:padding="18dp">

            <TextView
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="□ How to Use"
                android:textColor="#FFFFFF"
                android:textStyle="bold"
                android:textSize="24sp" />

            <TextView
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="1. Set your custom trigger phrase above&#10;2. Tap &quot;Start Listening&quot; to activate&#10;3. Say your phrase to trigger SOS&#10;4. SMS with location will be sent automatically"
                android:textColor="#FFFFFF"
                android:textSize="18sp"
                android:layout_marginTop="14dp" />
        </LinearLayout>
    </androidx.cardview.widget.CardView>
```

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```
        <!-- Test SOS -->
        <Button
            android:id="@+id/btnTestSOS"
            android:layout_width="match_parent"
            android:layout_height="wrap_content"
            android:text="□  Test SOS Alert"
            android:textColor="#FFFFFF"
            android:textSize="22sp"
            android:backgroundTint="#FF9800"
            android:layout_marginTop="30dp"
            android:layout_marginBottom="30dp"
            android:padding="16dp" />

    </LinearLayout>
</ScrollView>
```

2. BACKEND

```
package com.example.sosemergency;

import android.Manifest;
import android.content.Intent;
import android.content.SharedPreferences;
import android.content.pm.PackageManager;
import android.location.Location;
import android.net.Uri;
import android.os.Bundle;
import android.speech.RecognizerIntent;
import android.telephony.SmsManager;
import android.widget.Button;
import android.widget.EditText;
import android.widget.RadioButton;
import android.widget.RadioGroup;
import android.widget.TextView;
```

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```
import android.widget.Toast;

import androidx.activity.EdgeToEdge;
import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;
import androidx.core.app.ActivityCompat;
import androidx.core.content.ContextCompat;
import com.google.android.gms.location.FusedLocationProviderClient;
import com.google.android.gms.location.LocationServices;

import java.util.ArrayList;
import java.util.Locale;

public class MainActivity extends AppCompatActivity {

    private TextView statusText, listeningText, tvCurrentPhrase, tvLocation, tvModeInfo;
    private EditText etTrigger, etContact;
    private Button btnListen, btnSavePhrase, btnTestSOS;
    private RadioGroup radioGroupMode;
    private RadioButton rbSms, rbCall, rbBoth;

    private boolean isListening = false;
    private String triggerPhrase = "code red";
    private String emergencyContact = "6379038387";
    private String currentLocationText = "Lat: Unknown, Long: Unknown";

    private FusedLocationProviderClient fusedLocationClient;

    private static final int REQUEST_CODE_SPEECH = 100;
    private static final int REQUEST_PERMISSIONS = 200;

    @Override
    protected void onCreate(Bundle savedInstanceState)
```

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```
    { super.onCreate(savedInstanceState);
    EdgeToEdge.enable(this);
    setContentView(R.layout.activity_main);

    initViews();
    loadSavedData();
    requestPermissions();
    setupListeners();

    fusedLocationClient = LocationServices.getFusedLocationProviderClient(this);
    getCurrentLocation();
    updateModeText();
}

private void initViews() {
    statusText = findViewById(R.id.statusText);
    listeningText = findViewById(R.id.listeningText);
    tvCurrentPhrase = findViewById(R.id.tvCurrentPhrase);
    tvLocation = findViewById(R.id.tvLocation);
    tvModeInfo = findViewById(R.id.tvModeInfo);

    etTrigger = findViewById(R.id.etTrigger);
    etContact = findViewById(R.id.etContact);

    btnListen = findViewById(R.id.btnListen);
    btnSavePhrase = findViewById(R.id.btnSavePhrase);
    btnTestSOS = findViewById(R.id.btnTestSOS);

    radioGroupMode = findViewById(R.id.radioGroupMode);
    rbSms = findViewById(R.id.rbSms);
    rbCall = findViewById(R.id.rbCall);
    rbBoth = findViewById(R.id.rbBoth);
}
```

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```
private void loadSavedData() {
    SharedPreferences prefs = getSharedPreferences("SOS_PREFS", MODE_PRIVATE);
    triggerPhrase = prefs.getString("triggerPhrase", "code red");
    emergencyContact = prefs.getString("emergencyContact", "6379038387");
    etTrigger.setText(triggerPhrase);
    etContact.setText(emergencyContact);
    tvCurrentPhrase.setText("Current: \"" + triggerPhrase + "\"");
    listeningText.setText("□ Listening for \"" + triggerPhrase + "\"...");
}

private void saveData() {
    SharedPreferences prefs = getSharedPreferences("SOS_PREFS", MODE_PRIVATE);
    SharedPreferences.Editor editor = prefs.edit();
    editor.putString("triggerPhrase", triggerPhrase);
    editor.putString("emergencyContact", emergencyContact);
    editor.apply();
}

private void setupListeners() {

    btnSavePhrase.setOnClickListener(v -> {
        triggerPhrase = etTrigger.getText().toString().trim().toLowerCase();
        emergencyContact = etContact.getText().toString().trim();

        if (triggerPhrase.isEmpty()) {
            Toast.makeText(this, "Enter trigger phrase", Toast.LENGTH_SHORT).show();
            return;
        }

        if (emergencyContact.isEmpty()) {
            Toast.makeText(this, "Enter emergency contact", Toast.LENGTH_SHORT).show();
            return;
```

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```
        }

        saveData();
        tvCurrentPhrase.setText("Current: \"" + triggerPhrase + "\"");
        listeningText.setText("□ Listening for \"" + triggerPhrase + "\"...");
        Toast.makeText(this, "Trigger phrase saved!", Toast.LENGTH_SHORT).show();
    });

    btnListen.setOnClickListener(v ->
        { if (!isListening) {
            startVoiceRecognition();
            isListening = true;
            btnListen.setText("Stop Listening");
            statusText.setText("LISTENING");
        } else {
            isListening = false;
            btnListen.setText("Start Listening");
            statusText.setText("STOPPED");
            Toast.makeText(this, "Listening stopped", Toast.LENGTH_SHORT).show();
        }
    });

    btnTestSOS.setOnClickListener(v -> {
        emergencyContact = etContact.getText().toString().trim();
        if (emergencyContact.isEmpty()) {
            Toast.makeText(this, "Enter emergency contact first",
Toast.LENGTH_SHORT).show();
            return;
        }
        sendSOSAlert();
    });

    radioGroupMode.setOnCheckedChangeListener((group, checkedId) -> updateModeText());
```

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```
    }
    private void updateModeText()
       { if (rbSms.isChecked()) {
          tvModeInfo.setText("□ SMS will be triggered");
       } else if (rbCall.isChecked())
          { tvModeInfo.setText("□ Call will be triggered");
       } else {
          tvModeInfo.setText("□ □ SMS + Call will be triggered");
       }
    }

    private void startVoiceRecognition() {
       Intent intent = new Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);
       intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL,
             RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);
       intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE, Locale.getDefault());
       intent.putExtra(RecognizerIntent.EXTRA_PROMPT, "Say your SOS trigger phrase");

       try {
          startActivityForResult(intent, REQUEST_CODE_SPEECH);
       } catch (Exception e) {
          Toast.makeText(this, "Speech recognition not supported",
Toast.LENGTH_SHORT).show();
       }
    }

    @Override
    protected void onActivityResult(int requestCode, int resultCode, Intent data)
       { super.onActivityResult(requestCode, resultCode, data);

       if (requestCode == REQUEST_CODE_SPEECH && resultCode == RESULT_OK &&
data != null) {
          ArrayList<String> result =
```

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```
data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);

        if (result != null && !result.isEmpty()) {
            String spokenText = result.get(0).toLowerCase();
            Toast.makeText(this, "You said: " + spokenText, Toast.LENGTH_LONG).show();

            if (spokenText.contains(triggerPhrase.toLowerCase()))
               { sendSOSAlert();
            } else {
               Toast.makeText(this, "Trigger phrase not matched",
Toast.LENGTH_SHORT).show();
            }
        }

        if (isListening)
            { startVoiceRecognition();
        }
    }
  }

   private void sendSOSAlert() {
      emergencyContact = etContact.getText().toString().trim();

      String message = "□ SOS ALERT!\nI am in danger. Please help me.\nMy Location: " +
currentLocationText;

      if (rbSms.isChecked())
         { sendSMS(emergencyContact,
         message);
      } else if (rbCall.isChecked())
         { makeCall(emergencyContact);
      } else {
         sendSMS(emergencyContact, message);
```

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```
            makeCall(emergencyContact);
        }

        Toast.makeText(this, "SOS Alert Triggered!", Toast.LENGTH_LONG).show();
    }

    private void sendSMS(String phoneNumber, String message)
        { try {
            SmsManager smsManager = SmsManager.getDefault();
            smsManager.sendTextMessage(phoneNumber, null, message, null, null);
            Toast.makeText(this, "SMS Sent Successfully", Toast.LENGTH_SHORT).show();
        } catch (Exception e) {
            Toast.makeText(this, "SMS Failed: " + e.getMessage(), Toast.LENGTH_LONG).show();
        }
    }

    private void makeCall(String phoneNumber)
        { try {
            Intent callIntent = new Intent(Intent.ACTION_CALL);
            callIntent.setData(Uri.parse("tel:" + phoneNumber));

            if (ActivityCompat.checkSelfPermission(this, Manifest.permission.CALL_PHONE)
                    != PackageManager.PERMISSION_GRANTED) {
                Toast.makeText(this, "Call permission not granted",
Toast.LENGTH_SHORT).show();
                return;
            }

            startActivity(callIntent);
        } catch (Exception e) {
            Toast.makeText(this, "Call Failed: " + e.getMessage(), Toast.LENGTH_LONG).show();
        }
    }
```

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```
    private void getCurrentLocation() {
        if (ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION)
                != PackageManager.PERMISSION_GRANTED &&
                ActivityCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_COARSE_LOCATION)
                        != PackageManager.PERMISSION_GRANTED) {
            return;
        }

        fusedLocationClient.getLastLocation().addOnSuccessListener(this, location ->
            { if (location != null) {
                updateLocationText(location);
            } else {
                tvLocation.setText("Unable to fetch location");
            }
        });
    }

    private void updateLocationText(Location location) {
        currentLocationText = "Lat: " + location.getLatitude() + ", Long: " +
location.getLongitude();
        tvLocation.setText(currentLocationText);
    }

    private void requestPermissions()
        { String[] permissions = {
                Manifest.permission.RECORD_AUDIO,
                Manifest.permission.SEND_SMS,
                Manifest.permission.CALL_PHONE,
                Manifest.permission.ACCESS_FINE_LOCATION,
```

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```
            Manifest.permission.ACCESS_COARSE_LOCATION
        };

        ArrayList<String> listPermissionsNeeded = new ArrayList<>();
        for (String permission : permissions) {
           if (ContextCompat.checkSelfPermission(this, permission)
                 != PackageManager.PERMISSION_GRANTED)
              { listPermissionsNeeded.add(permission);
           }
        }

        if (!listPermissionsNeeded.isEmpty())
           { ActivityCompat.requestPermissions(this,
                 listPermissionsNeeded.toArray(new String[0]),
                 REQUEST_PERMISSIONS);
        }
    }

    @Override
    public void onRequestPermissionsResult(int requestCode,
                                           @NonNull String[] permissions,
                                           @NonNull int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
        if (requestCode == REQUEST_PERMISSIONS) {
           Toast.makeText(this, "Permissions granted", Toast.LENGTH_SHORT).show();
           getCurrentLocation();
        }
    }
}
```

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CHAPTER 7

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SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. NITI Aayog (National Institution for Transforming India Commission) is the nodal institution for achieving SDGs in the country.

The 17 sustainable development goals are as follows:

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequality
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace and Justice Strong Institutions
17. Partnerships to achieve the Goal

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Title of the Project:	Enhancing Drug Supply Chain Transparency and Security Through Blockchain
List the SDG's covered by the project?	1. Good Health and Well-being (SDG 3). 2. Industry,Innovation and Infrastructure (SDG 5).
Justify, how your project supports SDG?	**1. Good Health and Well-being (SDG 3)** – Ensuring the authenticity and safety of medicines improves public health and reduces counterfeit drugs.

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	2. **Industry, Innovation, and Infrastructure (SDG 9)** – Implementing blockchain enhances transparency, efficiency, and security in pharmaceutical supply chains.
Signature of the Project Team Members	1. Kavya Priya R 2. Gayathri C