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AI-Powered Women Safety System with Predictive Crime Alerting

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Abstract: In the contemporary world, ensuring women's safety remains a significant challenge due to the rising number of crimes. Despite technological advancements, women often feel insecure about stepping out alone, particularly during odd hours. Another critical issue is the tampering of evidence during criminal investigations, which delays justice. Existing safety solutions mostly provide reactive measures, sending alerts only after an incident occurs. This paper proposes an AI-powered, proactive software system that utilizes machine learning, computer vision, and IoT technologies. This system includes real-time video surveillance, weapon detection, and GPS tracking. Emergency alerts and live evidence were stored in the cloud for quick action and investigation. The proposed system aimed to offer a holistic, preventive safety mechanism for women. This system aims to enhance situational awareness and reduce response time, thereby creating a robust, proactive safety framework for women.

Keywords: Women's safety, AI, Predictive crime alerting, Real-time monitoring.

I. INTRODUCTION

In recent years, concerns about women's safety have prompted increased focus on leveraging technology to create comprehensive security systems. The safety of women is a growing global concern due to the frequency and severity of crimes against them. Although various mobile apps and smart wearables exist, they are reactive and rely heavily on user initiation. Furthermore, tampering with or without evidence frequently leads to a delay in justice.

This study offers a multi-layered AI-based system that proactively analyses the environment, anticipates dangers, and guarantees prompt emergency response in order to solve these drawbacks. Women are frequently threatened in both public and private settings, even with the widespread use of safety applications and surveillance systems. Many current solutions only offer an alert after a threat has been encountered, limiting their effectiveness. Additionally, tampering with evidence and delays in justice further complicate this issue. Creating a comprehensive system that does more than just respond to threats is the aim of this research.

II. BACKGROUND AND RELATED WORK

A. ABHAYA: A Python App for the Safety of Women

This study introduces the "ABHAYA" Python application for women's safety, which aims to stop incidents like the Delhi Abhaya case from occurring again. This program tracks the location of the troubled individual via a 3G or 2G data connection and sends a message from the device with the URL of their location. This message is sent every five minutes to the registered contacts until the "stop" button is clicked. It can follow the woman's location continuously because it sends a location message every five minutes.

B. S-ZONE: A System for Women Safety & Security System

In paper "S-ZONE: A SYSTEM FOR WOMEN SAFETY& SECURITY SYSTEM", the authors states that the purpose of identifying (assault, rape, and domestic violence) is to assist you in leaving dangerous situations. In this document, the Android platform's S-site program for women's safety is described.

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C. SHIELD: Personal Safety Application

As the name implies, SHIELD: Application for Personal Security is an application that shields, defends, and saves a person from harm. It sends an instant message with the device's location to all registered contacts, which helps in live tracking of the location of the woman and provides the required assistance. The main function of the system is to track its location. It is totally dependent on real-time on-site updates and GPS location monitoring. Depending on the Internet connection, the update takes 0.5 seconds to appear on the webpage.

III. EXISTING SYSTEM

Women's safety solutions that have recently been developed come in a variety of forms, including security systems, smartphone apps, and stylish everyday wearables. One solution suggests sending a notification to the police or selecting contacts when the victim presses the power button. The system then sends the victim's live location after 1 min. As a result, it offers a better location when the victim or user walks around, and certain systems allow a woman who has been verified by the device to carry out. The lady should then scan her fingerprints once every minute.

IV. PROPOSED SYSTEM

Using Python Gui for Python programs, Node.js for backend functionality, and React.js for web development, the suggested solution seeks to create a comprehensive platform for women's protection. The main elements, characteristics, and capabilities of our suggested system are described in this section.

A. Real-time Location Tracking

The solution uses GPS technology so that the Python program can track the user's location in real time. This feature provides accurate location information during emergencies.

B. Emergency Alert System

A robust emergency alert system is implemented, allowing users to trigger immediate alerts through the Python app. The system notifies predefined contacts and relevant authorities based on the user location details.

C. Privacy and Security Measures

Stringent privacy and security measures are implemented to safeguard user data and ensure secure communication channels. This covers data protection laws, safe authentication methods like SMTP, and encryption technologies.

The purpose of this project is to develop a portable safety software tool for women that perform the following functions:

1) Voice Recording:

We have also provided a recording function that records the surrounding sounds that can be used by the victim in the case of a police investigation as evidence.

2) Weapon Detection:

Employs AI algorithms to evaluate environmental activities and take real-time pictures with the camera in order to identify potential risks and find weapons like guns and knives.

V. METHODOLOGY

A. Development Requirement

The system requirements for our program are quite low because it is web-based. A slow network speed will also function because the geolocation API is mostly used for data exchange. Because it may be utilized with low-end devices and shaky Internet connections practically anywhere in the world, the system requirements are kept minimal.

B. Web Application

Web applications are websites with most of the code running on the server. We will ensure that the website is lightweight so that it can be easily loaded on any browser even over low internet connections. The websites will be designed with the help of html, CSS, and JavaScript, the Python code will be running on the server, and we will use the MongoDB database to store all the information. MongoDB will be used to store all of this data, and the website's Google login API will verify her identity when she logs in.

C. Python Application

For the first stage, we just use the Python Gui code framework to make our program quick and easy, and we construct a particular kind of lightweight browser that opens only our site in it. The lightweight versions of Facebook and LinkedIn serve as an illustration of this kind of application.



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D. Internal Working

The user first registers all of their information; they can sign up for a Google account or log in with their existing one. After they login with their Google account, we received a Json package from Google with all the basic information of the user as provided to Google at the time of registration. As a result, we save all of this data in our MongoDB database. When the user logs in for the first time, we then ask them to complete such as emergency contact details and their names, ask the user to choose a security question or create one with a custom security question creation option.

VI. SYSTEM ARCHITECTURE



Fig. 1 Architecture of women safety APP

The diagram above illustrates the architecture of the proposed system. The three main components needed to work with this application are the Internet on the client's phone, or GPS to identify the location of the police and GSM, which enables data to be sent through the messaging system.



Fig. 2 Architecture of the proposed model

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The architecture of the suggested model is shown in Fig. 2. The user does not need to register himself to use the application so that there will be no delay time while using the application during an emergency situation. The user is given a set of options that they can be obtained depending on their current situation.

VII. IMPLEMENTATION

7.1 Modules in the Project

7.1.1 GPS Module:

This module is developed to provides two options such as Not Safe and Track for the user to provide security. The "Not Safe "Button is designed to protect the user who feels unsafe of her surrounding environment. The GPS system is used to notify the nearby hospital when the user chooses this option.

7.1.2 User Interface and Python shaking:

The user interface design is to be designed for providing the user-friendly interfaceFor the first time, the user must enter their friends' names, email addresses, and Python numbers in the user interface module. In the settings of the app, the user has to specify the threshold values.

7.1.3 Identifying the location:

Anywhere on or close to the Earth where there is satellite navigation, the Global Positioning System (GPS) gives location and timing data in all-weather circumstances an unobstructed line of sight to four or more GPS satellites. The GPS in our smartphones always in ON position only.

VIII. RESULT & ANALYSIS

Initial testing scenarios included:

- Weapon detection with over 85% accuracy.
- Gesture and voice command recognition with >90% reliability under moderate noise.
- Captures audio and video to aid in additional research.

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Fig 8.1

Fig 8.2

IX. CONCLUSION

The project's planned AI-Powered Women Safety System is a major step forward in proactively addressing women's safety issues. Unlike conventional reactive safety solutions that operate post- incident, this system leverages artificial intelligence, machine learning, computer vision, and IoT technologies to anticipate and detect potential threats in real-time. By incorporating features such as real-time video surveillance, speech recognition, GPS tracking, predictive crime analytics, and cloud-based alert systems, the project creates a multilayered and intelligent safety net for users.

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