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Women Safety Application

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ABSTRACT: Technology has evolved into a priceless instrument for solving the issue of ensuring the protection and security of women in society. In-depth analysis and development of the women's safety application IamSafe, which has advanced features including SOS messages, location tracking, audio recording capabilities, and other key features, are presented in this research document. The proposed system offers a dependable and effective way to warn authorities and emergency contacts in stressful situations. A detailed assessment of the literature on current applications for women's safety and their shortcomings forms the basis of the research. It pinpoints the crucial areas where existing solutions fall short, which contributes to creating a solid and user-centred design for the proposed system.

KEYWORDS: Women safety, Handset, Coordinates, Tracking, Emergency situations, Microphone, SOS messages.

I. INTRODUCTION

In the present day, women's safety is still a crucial and challenging subject. The threats and harassment that women experience range from physical to online, including cyber-bullying and threats. Lack of proper security measures in many public areas exposes women to attacks and assaults. In addition, social expectations and victim-blaming mindsets frequently discourage women from reporting crimes and demanding justice. Implementing thorough solutions is crucial to addressing these issues. Smartphone applications designed especially for women's safety may prove very significant. Such applications can provide community support, real-time alerts, location tracking, and emergency assistance.

In the modern world, women's safety is a critical issue, and technology may play a significant part in finding solutions. A software programme known as a "women's safety application" makes use of the capabilities of cellphones to offer real-time protection and support to women who may be in danger. Women's safety applications have the potential to change the game in the fight against gender-based violence and harassment in this era of constant connectivity. A growing percentage of women have concerns about their safety when travelling alone or visiting unfamiliar areas, which has resulted in an increase in the popularity of women's safety applications. These smartphone applications offers a variety of functions that make women feel more comfortable and confident when they are in public.

II. LITERATURE SURVEY

The data from the surveys only includes cases and occurrences that have been legally reported;[8] there are numerous unreported and unattended incidents that are not included in these surveys.

- There has been an increase of 15.3 per cent in crime against women in 2021 as compared to 2020.[8]
- As per the data, a total of 4,28,278 cases of crime against women were registered in 2021, up from 3,71,503 cases in 2020.[8]
- It's a rise of 26.35% over six years - from 338,954 cases in 2016.[8]
- 107 women were attacked with acid, 1,580 women were trafficked, 15 girls were sold and 2,668 women were victims of cybercrimes in 2020.[8]
- India lodged average 86 rapes daily, 49 offences against women per hour in 2021.[8] India reported about 1.96 lakh rape cases, accounting for approximately 8.6 per cent of the total crimes against women in 2016-2021.[8]

III.EXISTING SYSTEM

There are other such systems active in the market with the goal of women's safety. Some of them are

- Safetipin: Safetipin enables the users with some key features such as, selecting a place to stay based on the safety score of the neighbourhood, driving or walking using the safest route, finding the nearest safe place and heading there, asking a friend to track them and get notifications if there is a problem, receiving notifications when in an unsafe place.[6]
- Raksha: The Raksha app has a button that, when pressed in an emergency, will notify your loved ones of your whereabouts. You can choose the people who will be able to see where you are. Additionally, you may still send notifications even if the app is not running or switched on by just holding down the volume key for three seconds.[9]
- Himmat: The Delhi Police recommends the free Himaat app for women as a means of safety. The user must register on the Delhi Police website in order to use the app. The user will receive an OTP after completing the registration process, which must be entered when finishing the app configuration. In an emergency, the police authority receives SOS alerts. [9]
- Smart 24x7: The police in several states support the Smart24x7 app solely to safeguard the safety of women and older citizens. In a difficult scenario, the app sends panic notifications to emergency contacts. During the panicky scenario, it also records voices and snaps pictures and transfers these to the police. Additionally, it features call centre assistance, which will track down the user's first steps.[9]
- Shake2Safety: The easiest to use is the Shake2Safety app. To send an SOS text or call to the registered numbers, the user only needs to shake their smartphone or push the power button four times. Even without an internet connection and with the locked screen enabled, it functions. Additionally, users will be able to turn on or off the option to shake the device to send an alarm.[9]
- bSafe: Women are safe and secure thanks to the bSafe app. It enables live GPS tracking so that contacts can follow you. It also lets you set a timed alarm that goes off if you haven't "checked in". Additionally, it will create a phony call on your phone and notify your emergency contacts of your location with a video and even a siren.[9]

Fig. 1 illustrates a comparison of the functionality of the system that we propose with other systems that are presently in use. IamSafe will have most of the essential features as well as a few new ones that set it apart from other products.

IV.PROPOSED SYSTEM

We propose the "IamSafe" application to provide women's safety. Three essential domains will be the focus of this application's efforts to ensure user safety. Location, microphone, and internet access are the three factors. Both of the most common mobile platforms, Android and iOS, can support the application. The user is obligated to provide some basic information, such as name, contact information, guardian information, and safepoints. Safepoints are places where a person can feel secure, such as their house, place of work, a relative's address, etc. Users must provide contact information for their guardians, which will be used in emergencies. The user's contact number will be used to verify the user's identity so that legitimate users can access their private information and make use of the system. The proposed system makes use of Firebase services for authentication and data storage. Multiple authentication mechanisms, including OTP verification, email verification, captcha verification, etc., are offered by Google Firebase. Additionally, it offers services for offline databases and real-time databases. IamSafe uses Firestore as a real-time database for data storage and OTP verification for authentication purposes. Fig. 4 diagrammatically depicts how the Firebase services and the application interact.

IamSafe's operations are laid out using a very straightforward and core procedure. When a user experiences an emergency, the previously provided data that already exists in the database is retrieved. The smartphone's GPS is used to access the user's current position. The application determines whether the acquired coordinates are close to any safepoints after receiving the user's coordinates. Current location fetching suspends if the user is close to or nearby any safepoint.[4] IamSafe also has a panic mode. As soon as panic mode is activated, microphone services start. If any frequency exceeding 90 dB is detected (such as women screaming or gunshots), microphone audio is captured and monitored. Guardians will receive an SMS with the user's current location and a recorded voice clip within seconds.[7]

When the user is close to any of the safezones, both location services and microphone services will be automatically terminated.[4] Fig. 3 depicts the actual use cases and actors of the system.

Emergency notifications are one of the most crucial components of women’s safety applications. Women can swiftly and simply send a signal to pre-selected contacts, that include family members, friends, or emergency services, in the event of an emergency. The location of the user as well as additional critical information may be included in these signals to make it easier for emergency responders to track down and help the user. The proposed system’s general workflow is illustrated in the Fig. 2. At any point a victim feels danger, an SOS signal is sent immediately. When an SOS signal is sent to the guardian, the system retrieves guardian information from the database and determines the user’s current location.[2] If the victim notices any further suspicious or risky activity. Panic mode can be activated with an already- set gesture or hardware button action.[5] This will activate the microphone and location services, making it possible to get the assistance required much more quickly.

Features/App	Safetipin	Raksha	Himmat	Smart24x7	Shake2Safety	bSafe	Proposed Solution
SOS	✓	✓	✓	✓	✓	✓	✓
Police Alert			✓	✓	✓		✓
Guardian Alert				✓		✓	✓
Audio/Video			✓	✓			✓
GPS	✓	✓	✓		✓	✓	✓
Realtime Database				✓		✓	✓
Timer On/Off						✓	✓
Live location tracking				✓		✓	✓
Gesture Support					✓		✓

Fig. 1. Comparison Table

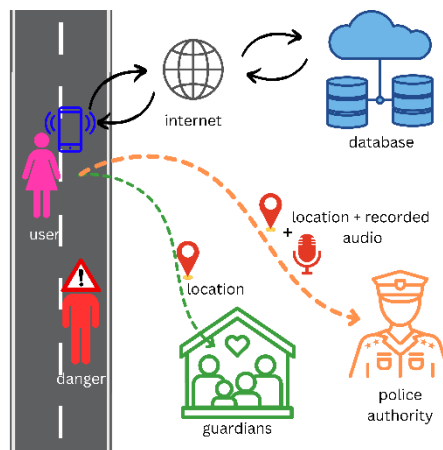


Fig. 2. Workflow of system

V. INTERNAL WORKING

– SOS Message

The victim’s last known location, contact information, and other relevant details will be contained in the SOS message alert sent by the victim. [1]

- SOS Mail

The SOS mail warning will include an audio file and will be sent to the police and guardians. The audio file contains the victim’s most recent microphone recording, recorded before receiving 100 dB of sound. This audio file may contain crucial data and can be used as proof/evidence by the law.

- Audio Recording

The handset’s microphone services will be active automatically on receiving gesture/hardware button activity predefined by the user. Additionally, audio recording will begin automatically. The recording is stopped and sent to the appropriate receivers when a sound frequency is detected that is greater than 100 dB. [7]

- Timer Service

While the phone is on, a timer is automatically established. The timer determines whether the user-provided time matches at each interval that has been set. The application waits for the user’s gesture while keeping track of their position; if there is a successful match, emergency mode is automatically initiated.



Fig. 3. Use Case Model

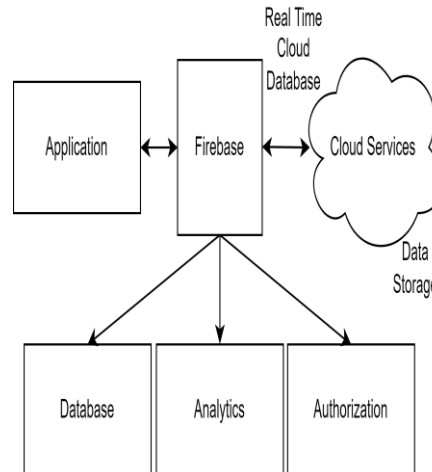


Fig. 4. Firebase Interaction with system [3]

VI. EXPERIMENTAL SETUP AND MINIMUM REQUIREMENTS

The experiments were performed using an AMD Ryzen 7 5800 HS@3.20GHz CPU with 8GB RAM, a 512GB SSD, an 8GB NVIDIA GTX Video Card, and an Android mobile with WiFi support. Every component and aspect of the proposed system was developed, tested, and integrated in accordance with a planned and systematic process. After every feature integration, the system underwent a number of test runs to guarantee software dependability. During the experimental tests, both fake and actual data were used to test the system. The application was kept in debug and release modes, while the database was kept in beta test mode. The minimum Android SDK level required for running the system on an Android smartphone is 24 (Android 7 Nougat). An active internet connection and a registered SIM card should be installed on the device to run the system accurately.

VII. RESULT AND DISCUSSION

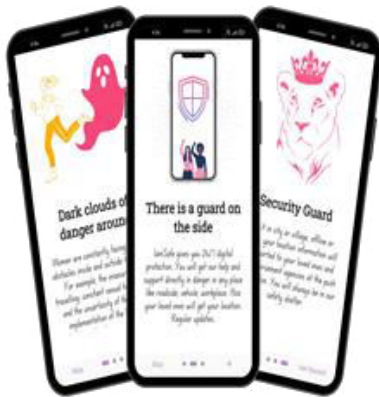
The development's culmination is a performance-oriented application that is highly reliable and responsive. The application's user interface is made as straightforward as possible to make it as easy as possible for every user to use the features. An introduction screen for the application appears when a user logs in for the first time. It aids in comprehending the key capabilities and features offered by the system. Following the introduction page, the user logs in using an SMS OTP that is sent to the provided number. The user's home screen appears after successful authentication. When adding safe points, the user must first provide guardian information (if they haven't already). It is advised that the user check the information by visiting the Profile page. By performing a circular gesture on the home screen, the user can activate emergency mode. As a result, features like GPS and microphones will start up automatically. The Introduction Screen is shown in Fig. 5., the Home Screen is depicted in Fig. 6., and the Guardian Details page and the Safe points page, respectively, are shown in Fig. 7. and 8. The Fig. 9. displays profile page.

VIII. FUTURE IMPROVEMENTS

The application will continue to benefit from a great number of minor upgrades in the future. Future improvements to the existing system could include the addition of features like self-defense tutorials and positive news notifications. It is also possible to add more gesture capabilities, such as the ability to recognise hand motion without touch and other comparable gestures. A self-defence course can boost a woman's chances of avoiding any dangerous circumstances. An inspiring statement or bold gesture by any woman anywhere in the world can have a significant impact on one's intellectual thinking and help build up self-confidence to lead a healthy life. There might be a lot more unattended features that can be added to the present system.

Summarising the features and improvements that can be made to the existing system:

- Identify danger prone areas.
- Improve gesture detection accuracy.
- Save local snapshot of database in case of no internet connection.
- Add facilities for fake call and self-defence tutorials. [2]



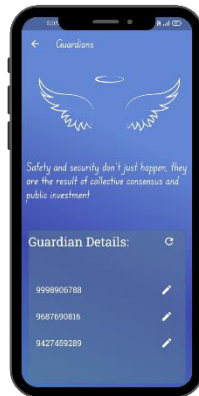
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Fig. 5. Introduction Screen



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Fig. 6. Home Screen



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Fig. 7. Guardian Details



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Fig. 9. Profile Page



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Fig. 8. Safe Points

IX. CONCLUSION

The fundamental reason for creating such a system for women's safety is to aid women in defending themselves against harassment, molestations, and sexual assaults. Society strongly needs to take action on such unreflective topics. Women who use IamSafe report feeling much safer and more secure. Their self-assurance and fortitude grow. Positive energy can be sensed, and a healthy mindset can be established. In the end, only when society and the communities around it pay attention to such crimes and educate the populace by promoting awareness will all women be assured of their protection.

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