

SAKHII- Empowering Women with One-Tap Safety App

Prof. Ms. Uma Goradiya, Satyam Rakesh Tiwari, Mantasha Arif Khan, Mandar Bhagwan Pawar, Naman Pandey

Department of Computer Engineering, Shree L. R. Tiwari College of Engineering, Mumbai, India

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ABSTRACT

In India, numerous crimes targeting women occur daily. We are far from knowing the actual figures due to hundreds of cases that go unnoticed. Recognizing this pressing issue, the objective of this project is to develop a mobile application that can provide features of self-defense training techniques and emergency services access, such as locating the nearest police station, hospitals, bus stops, and pharmacies. It will include a list of emergency calling options to dial emergency numbers and real-time location sharing. When activated, the app will send the user's location every 3 minutes and enable them to share their location with the nearest police station and government bodies with just one tap in case of an emergency. This application is integrated with numerous features in one app, playing a pivotal role in women's safety while providing a user-friendly experience.

Keywords : Women Safety, Security App, Self-Defense, Police Response, GPS, SOS, Emergency Helpline, Location Tracking.

I. INTRODUCTION

"A nation's treatment of its women serves as the best gauge of its progress," as Swami Vivekananda once said so beautifully. This important statement emphasizes the indispensability of placing women's safety and security first as a key indicator of a country's moral and social growth. It also highlights the intrinsic connection between women's safety and societal advancement. In fact, violence against women is a serious public health issue that also violates their fundamental human rights. As such, it requires immediate attention and coordinated measures to address. In light of this, programs aimed at preserving women's safety and dignity have become essential parts of our larger effort to build more inclusive and egalitarian society. Among these programs, "Sakhii" is

a trailblazing approach dedicated to empowering women and creating surroundings that support their security, independence, and empowerment. "Sakhii" represents a resolute dedication to provide women with the means and instruments required to confidently and assuredly negotiate the intricacies of modern life. With a host of cutting-edge features, such as live location tracking, emergency contact notifications, and in-depth self-defense tutorials, the app provides useful support to women who may face threats or hazards in their everyday lives[1].

"Sakhii" stands out because to its unwavering emphasis on usability and accessibility. With minimal training or help, women of different backgrounds and technological skill levels may effortlessly utilize the

application's features thanks to its user-friendly layout. "Sakhii" enables women to take proactive steps for their safety and well-being with ease and confidence, whether that means sending SOS messages with a single click or sharing one's whereabouts with trusted contacts. Additionally, "Sakhii" encourages a culture of cooperation and mutual support among its users by building a sense of community and solidarity among them. The application fosters a sense of shared responsibility and empowerment by promoting direct communication and collaboration between women and their networks of support. This strengthens social links and contributes to the building of safer and more resilient communities. "Sakhii" essentially represents a vision of transformation and empowerment, one in which women are given the freedom to stand up for what's right, take up their proper place in society, and make significant contributions to its advancement. "Sakhii" has the potential to be a game-changer, a catalyst for progress that will help bring about a day when women may live without fear or persecution and realize their full potential as change agents[2].

II. RELATED WORK

In [3] to avoid preventing incidents like the Abhaya case in Delhi from occurring once again, this paper introduces the Android application [3]. This program utilizes 3G and 2G. The device uses a data connection to track the location of the troubled person and sends messages to registered contacts with the URL of their location. Until the "stop" button is pressed, this message is sent every five minutes to the registered contacts. When a woman presses the "start" button, the application starts running and calls the first contact on the list while sending messages to every contact on the list with the device's location URL. The woman's location can be tracked continuously because a location message is sent every five minutes. The ABHAYA app is a step in the right direction towards improving women's safety, it is important to consider its limitations and potential improvements to make it

more accessible and effective for all women, especially those who may be more vulnerable.

In [4] The authors of the paper [4] suggest that identifying potential dangers and taking appropriate action is the most effective way to reduce the risk of becoming a victim of violent crimes such as robbery, sexual assault, rape, and domestic violence. The paper describes the S-ZONE program, which is specifically designed for the Android platform to enhance women's safety by utilizing the latest advancements in mobile technology. The program includes a GPS tracking feature that enables emergency services to quickly locate and rescue a vulnerable person from harmful situations. The paper presents a good overview of the problem of women's safety and the need for safety measures, but lacks in-depth analysis and empirical evidence to support the effectiveness of the S-ZONE system in reducing crime against women.

In [5] as the title recommends is an application that shields, secures, spares, and keeping an eye out for danger. It makes a difference in the live following of the lady's whereabouts and provides the necessary assistance by sending a moment message with the device's location to all the listed contacts. The framework that is built on following the area is the most helpful. It is entirely dependent on GPS position tracking and real-time location updating. In SHIELD, decisions are made and updates are made online in real-time for the client location. Depending on the web association, the update appears on the site in less than 0.5 seconds. Although SHIELD has the potential to improve personal safety, there are also some restrictions that need to be taken into account. It is crucial to assess these limitations and assess the effectiveness of the application in various scenarios before relying on it for personal safety.

SafetiPin is a women's safety app[6] that provides safety scores for different areas based on factors such as lighting, visibility, and crowd density. The app uses GPS tracking to determine the user's location and

provides safety scores for areas within a certain radius. The app also allows users to conduct safety audits of different areas, which are then used to calculate the safety score for that area. Safetipin is only effective in areas where there are enough users providing data. In areas with few users, the app may not be able to provide accurate safety scores or emergency assistance.

bSafe is a personal safety app[7] designed to provide users with a sense of security and peace of mind in potentially dangerous situations. The app includes a range of features designed to help users feel safer when walking alone, meeting new people, or traveling to unfamiliar places. While bSafe can be a useful tool for personal safety in some situations, it may not be effective in high-risk situations, such as violent attacks or kidnappings.

The VithU app [8] sends an SOS message to the user's designated contacts, along with the user's current location, through SMS or email. The app also initiates a loud alarm to alert people nearby that the user needs help. The app can be activated by pressing the power button of the user's smartphone twice. The app's features, such as the 'Fake Call' feature, may be triggered accidentally, leading to false alarms and unnecessary alerts to designated contacts. learning. Based on their approaches, datasets, assessment metrics, and outcomes, the publications are compared in this paper. Future directions and problems for monocular depth estimation are also covered in this work. The paper does not consider the recent advances and developments in monocular depth estimation, such as self-attention, multi-task learning, or geometric constraints.

The survey evaluates various women's safety applications designed for Android platforms, including ABHAYA, S-ZONE, SHIELD, Safetipin, bSafe, and VithU. These apps utilize features like GPS tracking, real-time location updates, safety scores based on environmental factors, and emergency SOS messages to enhance women's safety. While these applications

offer valuable safety features and functionalities, they also exhibit limitations and potential issues, such as accuracy concerns, high-risk situation effectiveness, false alarms, and dependency on user participation and data availability. The survey emphasizes the need for continuous improvement, assessment, and consideration of these limitations to ensure effective and reliable women's safety solutions.

| APP | RATING | FEATURES |
|-----------------|--------|---|
| Bsafe[7] | 4.4 | ·Live GPS tracking and location sharing ·Follow Me feature ·Group alarm feature |
| Circle of 6[11] | 4.1 | ·GPS location sharing with 6 friends Shake-to-leave feature |
| Hollaback[12] | 3.8 | ·Location sharing ·Report harassment and document incidents |
| HimmatApp[13] | 4.3 | ·Press-and-hold button to alert emergency services ·Real-time location tracking |
| NirbhayaApp[14] | 4.0 | ·Family tracking and location sharing ·Geofencing and location alerts |

Table 1. Comparative analysis of Existing System

Table 1. compares women's safety apps, highlighting ratings and drawbacks. Bsafe faces occasional bugs, limited customization. Circle of 6 has shake-to-leave sensitivity issues, GPS inaccuracies. Hollaback lacks real-time assistance, confusing interface. HimmatApp has limited availability, outdated design. NirbhayaApp encounters family tracking glitches, inaccurate geofencing alerts. Drawbacks impact app usability and effectiveness.

III.METHODOLOGY

Fig 1 illustrates, In order to expedite the processing of food, clothes, and stationery product contributions, the donation management project's system architecture is composed of four main parts. First, contributors of any kind may register their goods in the system by using the Donation Registration component. This applies to both people and organisations. Next, a Firebase database is created and used to store these registered products, acting as a single location for all donated goods. NGOs may request things from the database as receivers in order to engage with the system and ensure that resources are distributed and allocated efficiently. Last but not least, the system's User Management feature helps contributors to easily oversee their contributions, promoting accountability and openness throughout the giving procedure. This architecture, taken as a whole, offers a strong foundation for effectively monitoring and managing contributions, all the while encouraging accountability and openness throughout the donation process.

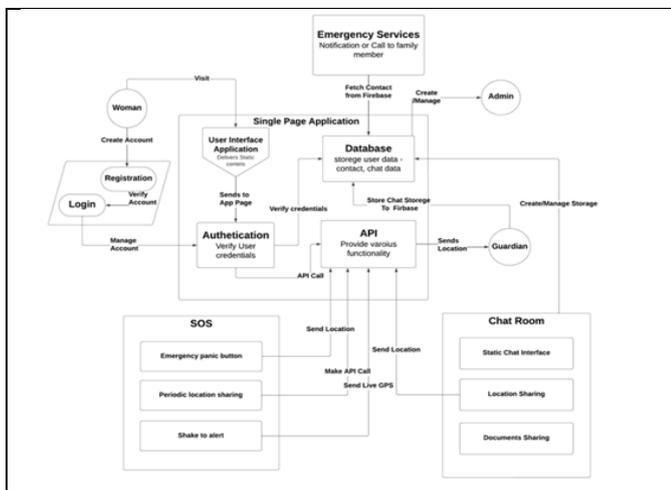


Fig 1. System Architecture

With an emphasis on user safety, privacy, and usefulness, the SAKHII app was developed using a methodical approach to design, development, and deployment. The main stages and processes required in creating the suggested system are outlined in the methodology that follows:

1. Analysis of Requirements:
 - To determine the requirements, preferences, and expectations of users, conduct in-depth user research and surveys.
 - Establish what the app's functional and non-functional needs are, such as user privacy, emergency services, self-defense training methods, dashboard, login, and registration.
2. Design and Architecture:
 - Create an intuitive user interface (UI) and user experience (UX) for the application, making sure that user interactions are simple to understand.
 - Create the system architecture utilizing Firebase and the Google Maps API, including the database design, API integration, and cloud service configuration.
3. Authentication and User Registration:
 - Provide safe user registration and login features, including the ability to verify an account using one-time passwords (OTPs) delivered to email addresses or phone numbers.
 - Make sure there are strong permission and authentication procedures in place to safeguard user information and guarantee the security and legitimacy of user accounts.
4. User Profile and Dashboard:
 - Create a dynamic dashboard that shows the user's personal information, emergency services information, self-defense training methods, and past location data.
 - Provide users with the ability to adjust their privacy settings, update personal information, and customize their profile.
5. Emergency Services and Location Sharing:
 - Include information on emergency services, such as the address, phone number, and business hours of the closest hospital or police station.
 - Provide emergency contact choices and frequency-customizable real-time location sharing features.

- Provide a feature that allows users to instantly share their location with government agencies and the closest police station in order to obtain police help in an emergency.

6. Self-defense Training and Review System:

- Create and put into practice a variety of self-defense training methods that accommodate varying degrees of physical prowess and aptitude.
- Create a review mechanism for existing sites that enables users to amend the location's safety status.

7. Privacy and Data Management:

- Provide a privacy statement explaining how user data is gathered, stored, and used.
- Put in place data protection mechanisms and provide consumers the option to export or delete their data whenever they choose.

8. Notifications and Customization:

- Provide features for app notifications that let users alter their preferences and settings.
- Provide users with timely and pertinent notifications regarding features, emergency services, and safety updates.

9. Testing and Quality Assurance:

- Carefully test the application to find and address defects, guarantee functioning, and enhance performance.
- To guarantee the security and safety of user data and transactions, conduct thorough security testing and vulnerability assessments.

Fig2. Depicts a user's activity flow, showcasing login/registration and access to safety features within the dashboard. The Sakhii-driven interface includes self-defense options, an offline siren, and quick access to nearby emergency locations. Users can also share live locations with guardians and the nearest police station for added security.

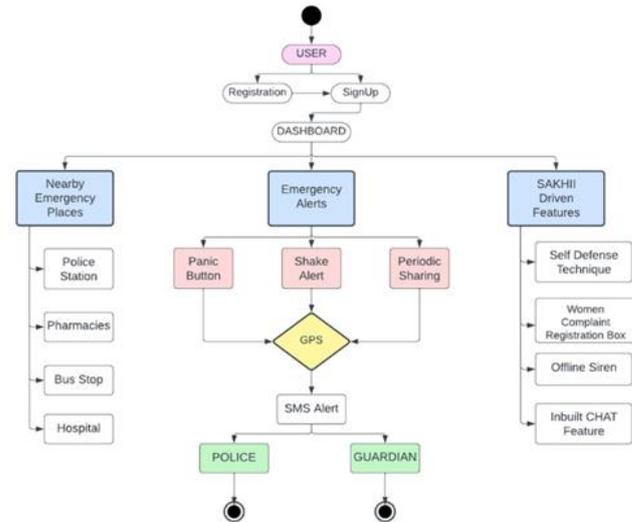


Fig 2. Activity Diagram

IV. IMPLEMENTATION

Our implementation is based on an Android application that acts as the interface between the user and the app to provide security to the user. Our app is integrated with security features that we implement by flutter frameworks[9] [10]. The interface of our project is divided into two parts: SAKHII interface and SAKHII STATION interface. The main interface is SAKHII i



Fig 3. Home Page & Dashboard

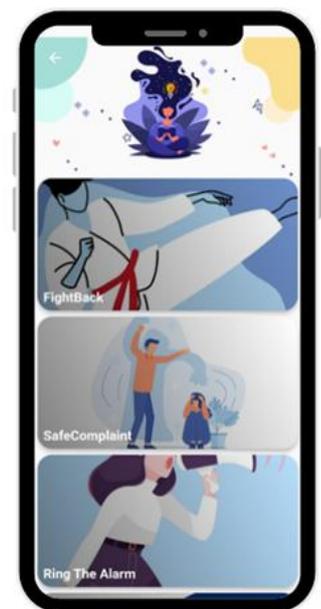


Fig 4. List Of Carousel Features

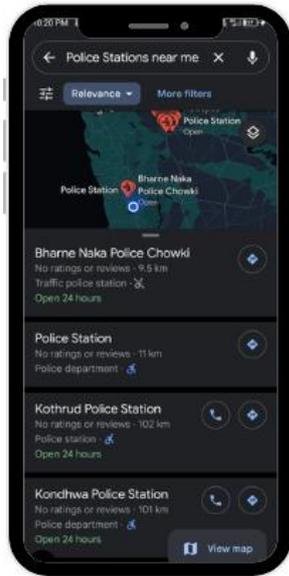
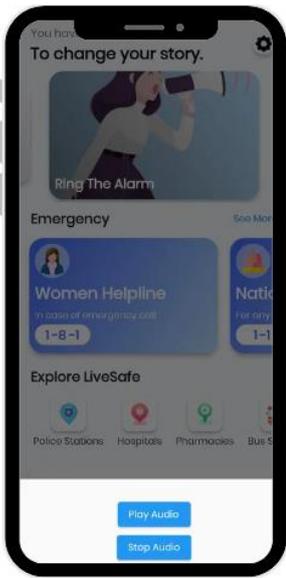


Fig5.Ring the Alarm

Fig6.LifeSafe Button Feature

Fig. 3 shows a dashboard, or homepage, with an attractive user experience that highlights the several aspects of the Sakhii app. There are four main sections to the dashboard. First, there is a carousel with the National Women Complaint Web incorporated in it, as seen in Fig. 4. In an emergency, users can utilize the "Ring the Alarm" feature, depicted in Fig. 5, to alert those around. It also offers self-defense tactics. One-tap calling is possible with the second portion, which includes a list of all emergency contact numbers that customers may quickly access for immediate assistance. When buttons in the third section are pressed, as shown in Fig. 6, detailed information about the closest police stations, bus stops, hospitals, and pharmacies is displayed. The final portion introduces periodic location sharing, which ensures ongoing safety and vigilance by automatically sharing the user's location with authorized guardians every fifteen minutes..

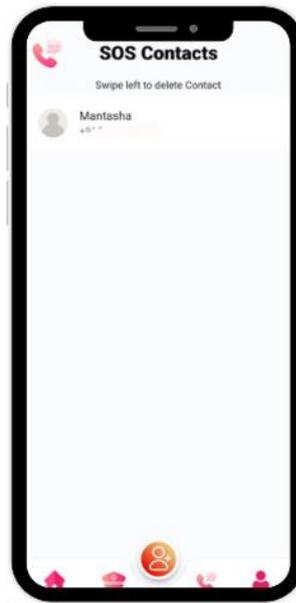


Fig 5. Add Contacts Page

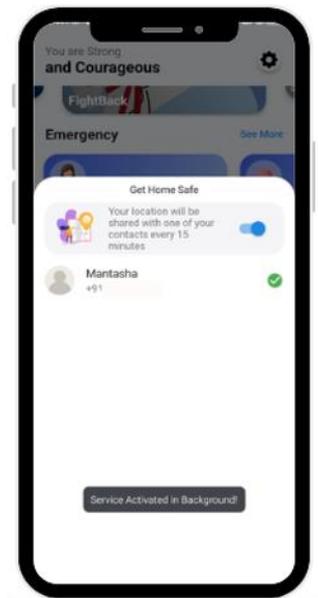


Fig 6. Periodic Location Sharing

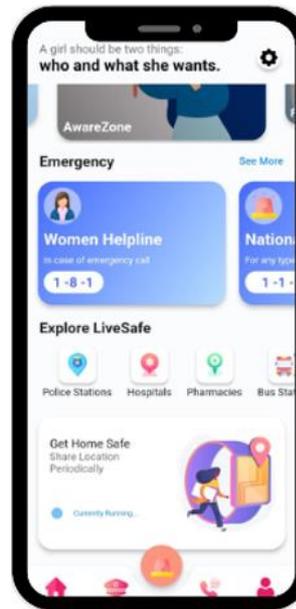


Fig 7. PLS Running

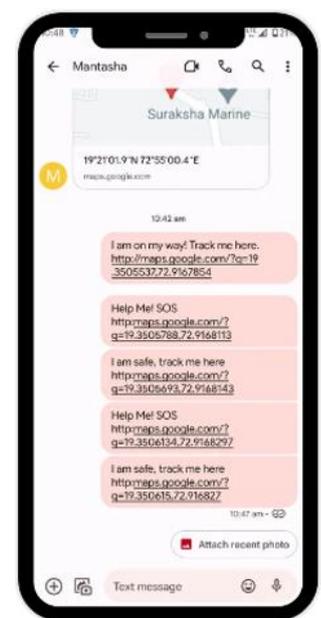


Fig 8. All Emergency SMS

The "Add Contact" panel, shown in Fig. 5, allows users to enter the emergency contact numbers of their guardians and loved ones. The user can instantly share their current position with these people by using the floating panic button. These additional contacts are essential for the user's periodic live location sharing, which keeps guardians or loved ones updated and comforted. Toggling the designated button allows the user to broadcast their location at regular intervals of every fifteen minutes, as seen in Fig. 6. The periodic

location sharing feature is demonstrated in Fig. 7, where it works in the background without any issues and tells the guardians of the user's current location on a regular basis. This makes sure that the current location is relayed every 15 minutes, giving a constant flow of security and comfort.

An archive of all emergency SMS notifications to the user's guardians or loved ones is shown in Fig. 8. These messages include location updates on a regular basis, alarms generated by the panic button, and emergency location sharing. Every message helps to ensure that the user's reliable contacts are aware and ready to act quickly in case of an emergency.

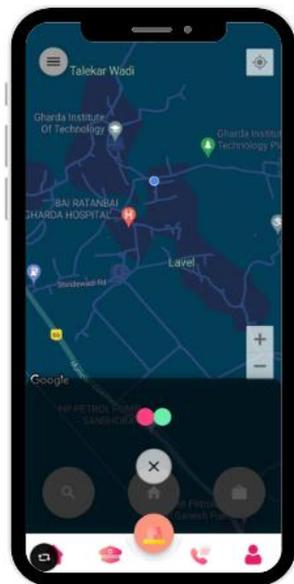
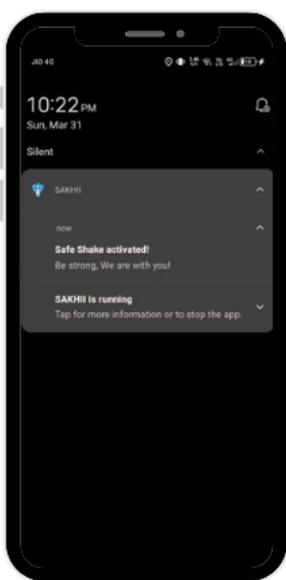


Fig 9.Shake To Alert Fig 10.Location To Nearest Police

A feature that allows the user to share their location with guardians without opening the app is shown in Fig. 9. Users activate this feature by giving the phone a hard shake; this can be quite helpful in situations where a woman would not be able to access her phone or the app. Severe shaking initiates the automatic sharing of the user's current position with assigned guardians, offering a rapid and covert way to request help.

The police emergency button is shown in Fig. 10. This feature retrieves information about the closest police station or pertinent government agencies when it is engaged. The designated authorities are then informed of the user's current location. The case is assigned to the police or other government agency for appropriate action if they accept it. The user's live location is shared with the next closest police station or government agency if the first authority is unwilling to take the case; this process continues until help is successfully secured for the woman who is in danger.

The Sakhii-Station app is another example of an implementation; it is intended to be installed on government or law enforcement personnel's smartphones. This software is an essential resource for identifying and reacting to distress signals sent by women who are in danger. A notification is immediately sent to the closest police station via the Sakhii-Station app when a lady in distress presses the "Police Station" button on the Sakhii app, enabling quick response times. The police or appropriate government agency receives information of the crisis situation and is furnished with all pertinent details, including the exact location of the woman who is in danger. Furthermore, the app provides guidance to help the authorities locate the woman quickly, guaranteeing a prompt and efficient reaction. The Sakhii and Sakhii-Station apps are integrated, which improves coordination and communication and makes it possible for government and law enforcement to quickly aid women who are in danger.

For SAKHII-Station App:-

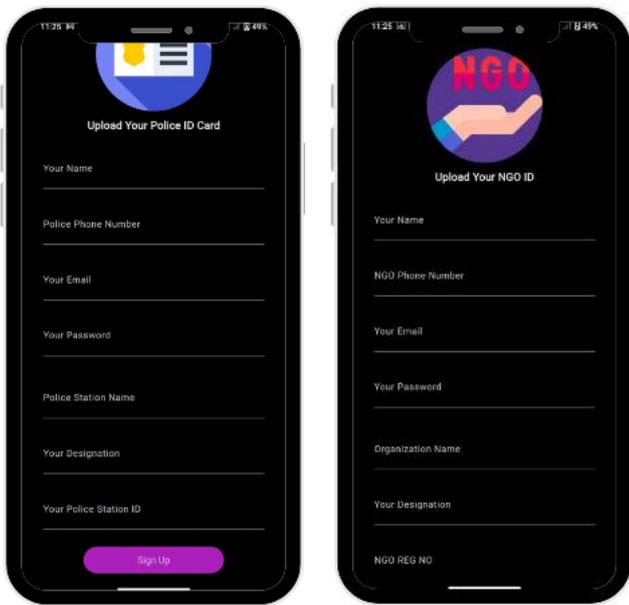


Fig11. Registration For Governmental Entities



Fig12. Notification To Nearest Police Station or Entity and Live Location Of Women In Entities Phone

The Sakhii-Station app's police and NGO servicemen registration function is shown in Fig. 11. Using their ID cards and private contact information, police stations and non-governmental organizations can register. This enables women in grave situations to communicate directly with these registered entities. In order to

validate their profiles and ensure their legitimacy, users must upload their ID cards upon registration.

Figure 12 shows the notifications that the closest law enforcement station or government agency receives when a woman provides her location in the event of an emergency. When the police accept the case, the woman's current location is shown on the map. This feature helps the woman in trouble be reached by law enforcement more quickly, protecting her during emergencies.

V. EXPERIMENT AND RESULT

During the experimental phase of the "Sakhi" women safety app, robust software utilizing Flutter and Firebase was employed. Hardware comprised modern smartphones. Experiments tested self-defense tutorials embedding, emergency siren activation, one-tap emergency calling, and periodic location sharing. Results showed smooth execution of features, with loaded websites, prompt emergency calls, and accurate location sharing. These experiments affirm the app's efficacy in empowering women with self-defense tools, immediate distress signaling, and reliable assistance during emergencies.

Series of experiments conducted on the Sakhi app, each focusing on testing specific features aimed at enhancing women's safety. The experiments included testing the embedding of a self-defense techniques website, activation of the emergency siren feature, initiation of one-tap emergency calls, and enabling periodic location sharing with a selected guardian and nearest police station. Results indicate that all tested features functioned as intended, with the embedded website loading seamlessly, the emergency siren emitting a loud sound upon activation, emergency calls initiating promptly, and live location sharing occurring at set intervals with the chosen guardian. These successful experiments highlight the effectiveness of the Sakhi app in providing women with practical tools

for self-defense, immediate distress signaling, and reliable assistance during emergencies.

VI.CONCLUSION

Conclusively, in an increasingly digital world, the women safety app "Sakhi" serves as a light of empowerment and safety. Sakhi not only provides useful tools for self-defense and emergency aid but also instills a sense of confidence and security in its users through its revolutionary features and user-centric design. The app's successful trial demonstrates how well-integrated key features like one-tap emergency phoning, self-defense courses, and sporadic location sharing are, guaranteeing that women always have access to essential assistance. Furthermore, Sakhi's adherence to security and privacy highlights its commitment to offering a reliable and secure platform for women in need of support, thereby fostering a sense of empowerment and independence.

Sakhi has the ability to bring about significant changes in society in the future by increasing awareness of women's safety concerns and promoting cooperation between government agencies, community resources, and technology. Sakhi has the potential to improve user safety and well-being while also supporting broader initiatives to build a more just and inclusive society as it develops and broadens its influence. Sakhi sets the path for a future in which women may navigate the world with agency and confidence, free from the limitations of fear and insecurity, by leveraging technology for social good.

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