Application to Ensure Women's Safety Involving Government Community Support System

Kumari Shreesty
Master of Computer Applications,
Lovely Professional University,
Phagwara India.
shreestykri14200@gmail.com

Abhishek Kumar
Master of Computer Applications,
Lovely Professional University,
Phagwara India.
abhipurnea3@gmail.com

Muskan Goyal
Master of Computer Applications,
Lovely Professional University,
Phagwara India.
muskangoyal033@gmail.com

Anchal Kumar Mahato
Master of Computer Applications,
Lovely Professional University,
Phagwara India.
anchalkumarmahato@gmail.com

Rajnish Kumar Singh
Master of Computer Applications,
Lovely Professional University,
Phagwara India.
kumar.rajnish6587@gmail.com

Abstract

Women's safety is a major concern today, as many continue to face issues like harassment and violence in their daily lives. This highlights the need for quick, easy, and reliable ways to seek help during emergencies. Some safety apps and devices already exist, but they often lack community support and effective real-time support. To address this, we have developed a cross-platform mobile application using React Native, which supports both Android and iOS devices to ensure wider accessibility and consistent performance. The application features a simple interface with an SOS button that, when pressed, instantly sends a voice message and live location to pre-selected emergency contacts and nearby trusted community members. This enables quicker understanding and faster response in dangerous situations. Additionally, the application includes a blog section where users can share personal experiences, safety tips, and useful information to support one another. Our main aim is to provide a practical, easy-to-use solution that empowers women to feel safer and more confident, especially when alone. Initial testing has shown that the app performs well, with fast alert response, accurate location sharing, smooth voice message delivery, and effective blog functionality. These promising results indicate that the application has real potential to enhance women's safety in everyday life.

Keywords: Women's Safety, SOS Button, Fake Call, Security, Community Support.

Introduction

Women's safety is a crucial issue in today's world. Women have achieved remarkable success across various fields, excelling in sports, education, and careers just like men. However, when it comes to their safety, they face numerous safety concerns in their daily lives, whether walking home from the office, visiting a supermarket, or traveling alone for various reasons. We have come to a nation where slogans are written "Beti Bachao Beti Padhao," but do they enjoy the same secure environment when it comes to safety? The research says the answer is NO. Not only women but young girls also continue to face numerous threats, rape, kidnapping, acid attacks and harassment in public. However, our nation has come too far in terms of education, technology, science, and many other areas. But when it comes to the safety of women, it remains a pressing issue. According to the annual report of the National Crime Records Bureau (NCRB), crimes against women rose 4% in 2022 compared to 2021[1]. There are 29 states and 8 Union Territories in India. If we see state-wise analysis in absolute numbers, Uttar Pradesh (65,743) registered the maximum FIRs in cases of crimes against women in 2022, followed by Maharashtra (45,331), Rajasthan (45,058), West Bengal (34,738), and Madhya Pradesh (32,765). These five states together contributed to 2,23,635 (or 50.2 percent) of the total cases lodged in India, according to the National Crime Records Bureau (NCRB) [2]. As shown in Figure 1, the graph of crime rate against women in the top 5 states in India [3].

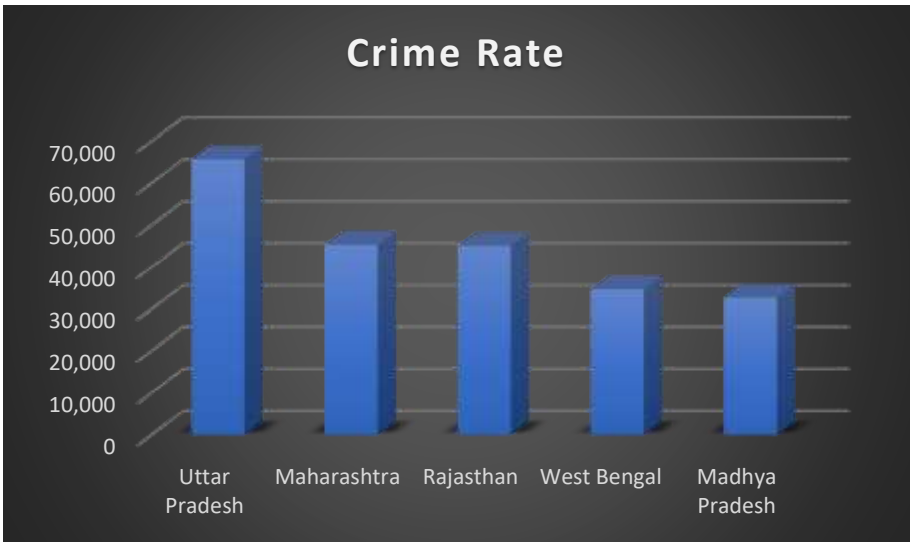

Figure 1 State-wise crime rate analysis

This year's tragic and horrific case of rape and murder of a young doctor in Kolkata has inflamed a significant public outcry. This incident, which took place at the RG Kar Medical College and Hospital, has highlighted persistent issues in women's safety in India, even in professional environments. Even though Kolkata is a big and well-known city often called the "City of Joy," this case shows that women can still feel unsafe, even in places meant for education. If such an incident can happen in a respected institution in a major city, it raises serious concerns about how safe women really are in other parts of the country.

The de facto spokesperson of the United Nations, Ban Ki-Moon, stated that "There is one universal truth applicable to all countries, cultures and communities: violence against women is never acceptable, never excusable, and never tolerable" [4]. "A violent act against the female gender disturbed the public health of society, and also violates the human rights of women" [5].

The research paper proposes an Android application, easily downloadable and installed on mobile devices such as smartphones. The app features an SOS button that, when activated, shares the user's live location with pre-selected contacts and nearby community support networks. A voice message is automatically sent along with the location, helping emergency contacts quickly understand the situation. Additionally, a fake call feature is included to help users discreetly handle uncomfortable or unsafe situations. The app also offers a blog section where users can share experiences, safety tips, and reviews regarding the application's usefulness. This paper discusses the design, development, and effectiveness of the application in reducing safety risks for women.

Literature Review

Nicole Westmarland et al [6] bandied guarding women's safety. Their research objective examines how smartphones play a role in domestic and sexual violence cases. In the report [7], violence against women is a global public health problem; 35% of women worldwide have endured either physical and/ or sexual intimate partner violence or non-partner sexual violence. The report also details the effects of violence on women's reproductive and internal health. In [8], the authors seek to place questions of surveillance technologies into a theoretical frame that foregrounds the challenges that new surveillance technologies pose to anti-violence movements. Specifically, they address the impact of surveillance technologies in the practice of violence and some proposed results, and consider the ways that surveillance technologies are used disproportionately in the criminalization of marginalized groups. By placing violence against women at the centre of analysis to complicate enterprises related to surveillance technologies. In [9], the author bandied that the technology is used in circumstances of intimate terrorism. It'll examine how technology is used as a batterer's tool in playing coercive control over a victim. It'll also look at the changes in the laws as the legal system strives to keep pace with the rapid-fire advancement of technology. The paper examines how GPS tracking is being used to monitor

intimate terrorists in recent times. The ongoing legal changes produce various problems according to this analysis, although these developments enable offenders to become more adapted and escalate their harmful patterns [10]. The researchers at Dimond et al [11] discovered in their US domestic violence information technology study that mobile phone and social network users made decisions between hidden harms from abuse continuing and found benefits in getting support services. The worldwide market forecasts 700 million new smartphone deals for 2015[12]. Statistics indicate that 92% of British adults use mobile phones regularly for communication, as 39% access the internet through their mobile devices [13]. The smartphone ownership rate in the UK stands ~~at 40%, while the number of tablet owners increased from 2% to 11% in the past 12 months.~~ The smartphone has changed into an everyday communication tool because of its advanced mobile features and software capabilities, which provide vital computational programs that support multiple operational systems and physical sensors [14]. A research study [15] unpacked the advantages, together with difficulties, that smartphone apps present in distributing health-related behavioural interventions. The research disclosed multiple beneficial aspects that app developers should incorporate into their design of health gesture applications. Various major obstacles demanded additional exploration and analysis before developing acceptable and effective gesture change applications. Vodafone detailed in its report [16] how mobile technology supports women in their economic growth and social progress. Mobile technology enables women to access services such as knowledge acquisition, as well as banking, health care, educational resources, and business opportunities.

Proposed Solution

This research proposes a mobile-based women's safety system designed to provide quick and reliable help during emergencies. The system includes an easy-to-access SOS button that can be used when the user feels threatened or unsafe. When the SOS button is pressed, the system immediately sends a distress signal, which will be an alert message to the user's pre-selected emergency contacts. The user's live location is also shared, helping them respond quickly and accurately. In addition, the system shares the same information with a trusted community group or nearby responders, increasing the chances of getting help on time. The system continues to track and update the user's location in real-time, allowing emergency contacts and community helpers to follow the user's movements until they are safe. The application also includes a fake call feature, which helps the user escape uncomfortable or suspicious situations by triggering a realistic fake phone call. Another helpful addition is the forum feature, where users can share their experiences, safety tips, and feedback on the app's effectiveness. This helps spread awareness and build a supportive user community. By combining real-time

alerts, live tracking, community support, and user interaction through forums, the system offers a simple yet powerful tool to improve women's safety and respond quickly and effectively during emergencies.

The proposed women's safety system is designed with a modular architecture that ensures real-time responsiveness, user privacy, and reliability. The system consists of the following major components:

- **Frontend Development:**
  We used React Native to build the mobile application. It allowed us to create a cross-platform app for both Android and iOS using a single codebase, saving time and effort.
- **Backend Development:**
  For server-side logic and managing APIs, we used Node.js along with Express.js to keep the backend lightweight, fast, and scalable.
- **Database:**
  We used MongoDB to store user details, emergency contacts, forum posts, and fake call information securely and reliably.
- **Location Services:**
  To fetch and share live user locations, we integrated the Google Maps API and we also used the Haversine Formula to calculate the distance between the user and the nearby community supporters during emergencies.
- **Messaging and Notifications:**
  For sending real-time SOS messages and call alerts to emergency contacts and nearby community members, we used the Twilio API.
- **Authentication:**
  We implemented JWT (JSON Web Tokens) for secure and efficient user authentication, ensuring data protection and privacy.
- **Detect the user's position through Geofencing**:
  We have built a system where the nearby people and the emergency contacts can see where the user is, so that it is easy to communicate and reach on time.
- **Battery Information Sharing:**
  Along with the SOS alerts and live location sharing, the user's current battery percentage is also shared with the emergency contact and community, giving them better context during emergencies.
- **Version Control:**
  We managed all code and project changes using **Git** and hosted the repository on GitHub for better collaboration and version management.

- **IDE Used:**

  The main coding work was done using Visual Studio Code, a powerful and lightweight editor.

Experimental Setup

The developers conducted the experimental phase by using actual classroom settings to test the functionality and reliability of the Women's Safety Application. The application first required users to register and log in to their accounts. The users accessed the application's home screen after proper authentication, which led to the emergency contact menu to add their required phone numbers. The application securely stored the registered emergency contacts within its database. The emergency contacts needed to be set before conducting a test of the SOS function. Clicking the SOS button should trigger the following sequence of events according to the requirements specifications. The application provides an immediate notice to the previously registered

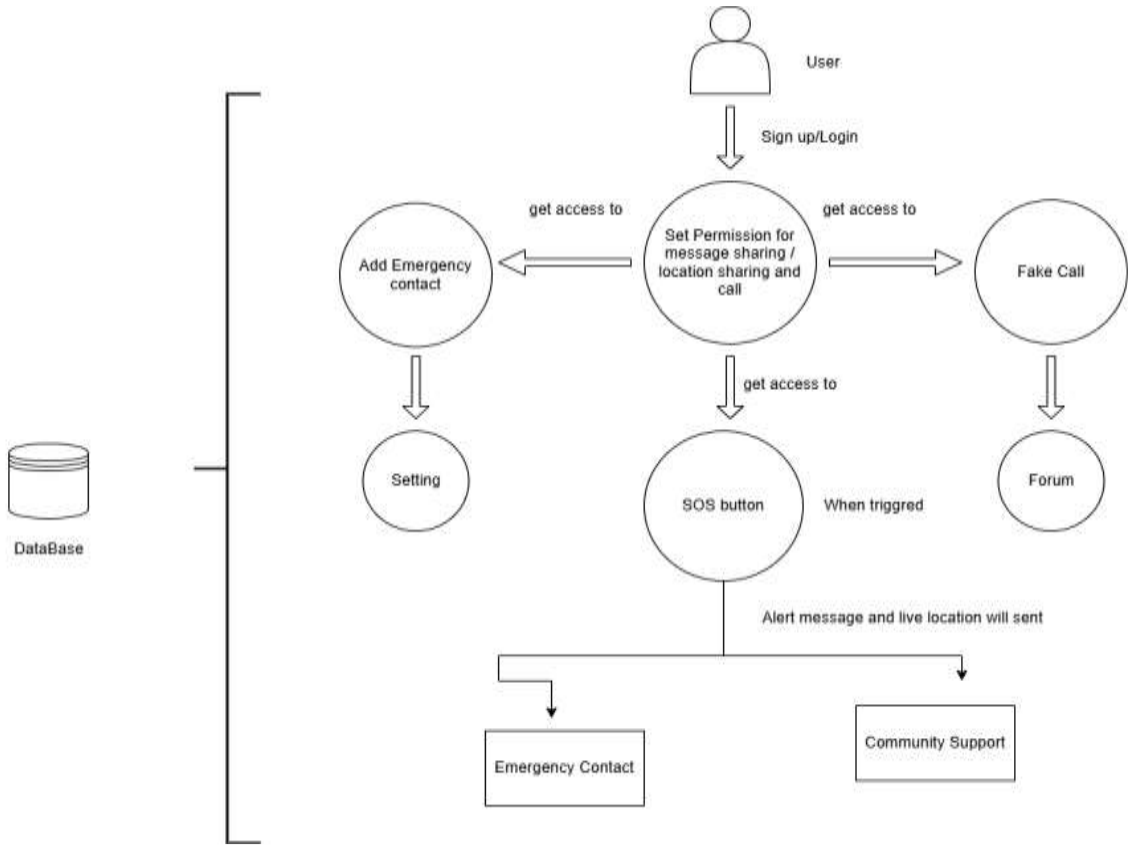

Figure 2 Data flow diagram

emergency contact. The application would automatically call the registered emergency contact so users can establish immediate communication. This system allows the user to transmit their real-time location to the emergency message as the application uses global positioning system (GPS) services. Emergency contacts

receive both your device battery status and geolocation from the application, which allows them to act swiftly even when your battery has low power. The experiment successfully demonstrated that the emergency contact received the alert message instantly after it was sent. The user immediately contacted the emergency number by making a phone call. The application precisely transmitted current positions through the Google Maps API. Emergency contact services received the battery percentage that alerted them to critical device power levels directly from the location message. A classroom test of the system confirmed its dependent performance features in a controlled real-world testing environment thus validating the platform's readiness for actual emergency scenarios.

Result And Discussion

In today's world, personal safety, especially for women, has become a growing concern due to an increase in unpredictable and unsafe situations. Often, individuals may not have the time or ability to make the call or send a detailed message when they are in danger. The delay in reaching out for help can result in serious consequences. To overcome this issue, our system presents a mobile-based safety application developed using React Native, a powerful framework that allows us to create cross-platform apps with a smooth and consistent user experience. Our main focus is to provide a quick, smart, and accessible solution that allows users to reach out for help instantly during emergencies through real-time alerts and location sharing to pre-selected emergency contacts and nearby community supporters.

Some of the key advantages of our system include:

- Instant sharing of alert messages and location for better understanding of the emergency.
- Trusted community support, not just relying on personal contacts.
- Awareness-building through forums, and stealth features like fake calls to handle situations smartly.
- Cross-platform compatibility and smooth performance using React Native.

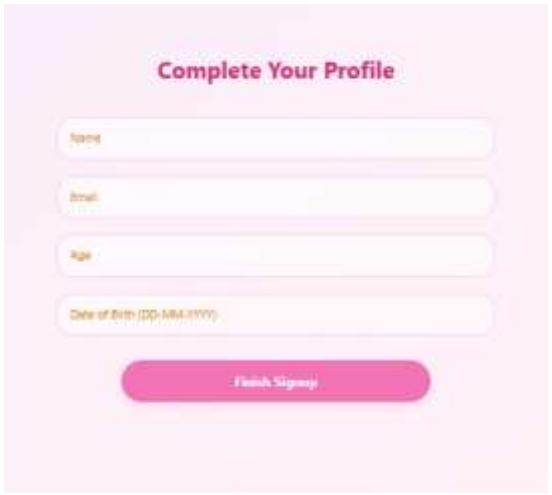

Figure 3: Sign-up page

After downloading the app, the user needs to sign up by filling in the details

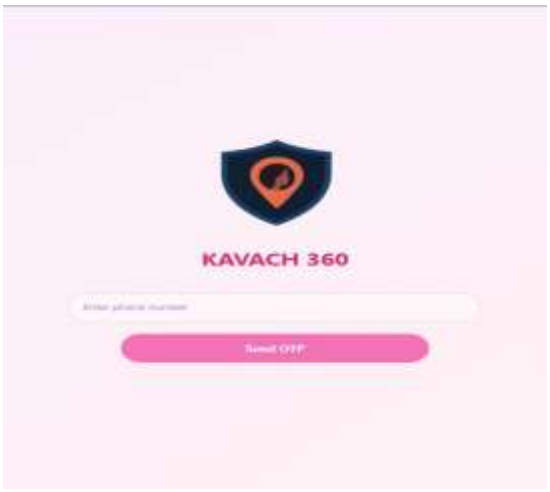

Figure 4: Sign-in page

After signing up user needs to verify the phone number by giving the otp.

Figure 5: Home page

After successfully logging in to the app, you will be redirected to the home page

Figure 6: Browse page

After clicking on the browse button, you will be redirected to the forum page. Click on the plus button to share your

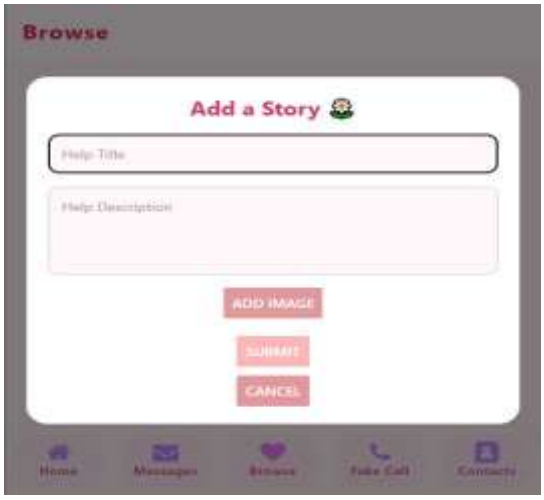

Figure 7: Browse page

After clicking on the plus button, you can share your experience here by adding an image and a message.

Figure 8: Message page

Click on the message button, and this page will appear where you can add your message.

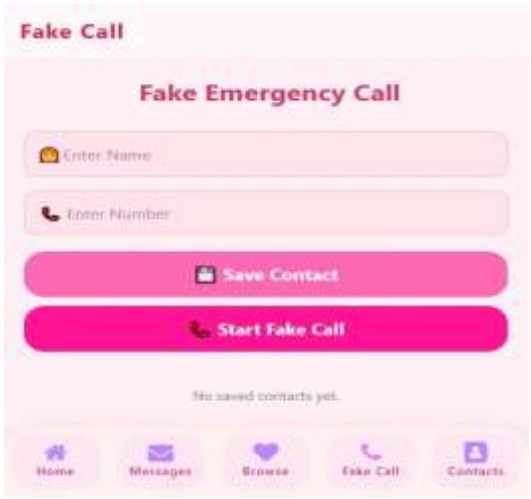

Figure 9: Fake call page

Click on the fake call button. here you can add the fake emergency call.

Figure 10: Contact page

To add the contacts, click on the contact button. In the Nearby Helpers, you can see the location of people near you who have joined the app

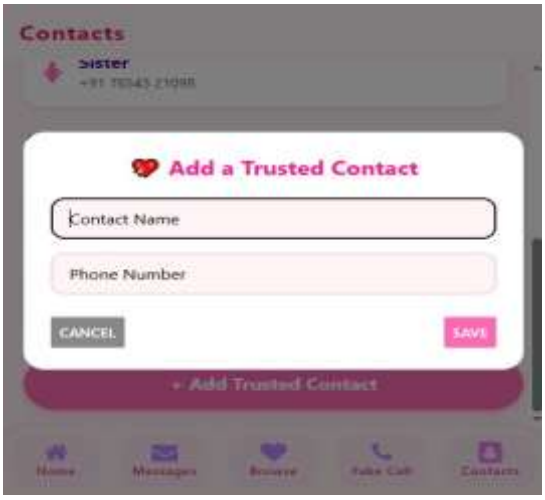

Figure 11: Contact page

Click on Add trusted contact, here you add the emergency contact details.

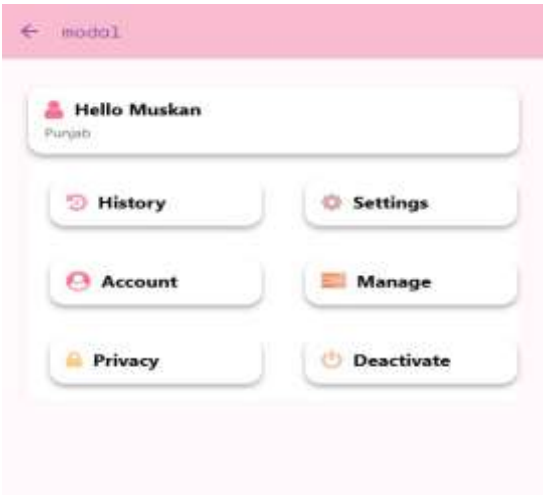

Figure 12: Setting page

Click on the menu button, here you make the necessary changes for your account

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Conclusion

The Women's Safety App functions as a platform that gives rapid assistance to women dealing with emergency situations. Users now have simple access to a platform that combines SOS alerts with live location sharing and emergency contact notifications and fake calls and community support, and user forum capabilities. Testing revealed that the app delivered speed in its responses, together with precise location features and faultless contact interactions and community communications. Users could activate the SOS alerts to send immediate messages and location sharing, along with using the fake call feature to control dangerous situations unknowingly to others. Through this forum, users built relationships that allowed them to exchange stories as well as guidance, making an advisory network. The solution contained straightforward features that allowed users to rapidly reach crucial functions despite experiencing stressful circumstances. The safety application achieved both its goal to protect users along to give individuals the ability to feel secure, together with control over their personal safety. The Women's Safety App establishes itself as a useful tool that provides prompt assistance during emergency situations when users require it most. The application creates confidence among users because it protects them and facilitates safety, particularly for women who worry about their security in their daily routines.

Future Enhancements:

- Unlike regular safety apps, this one not only sends alerts but also records evidence and involves a larger support network. By including NGOs and law enforcement, the app increases the chances of getting timely help.
- AI-based threat detection, smart wearable integration, and better privacy settings. This app aims to make women feel safer and more independent by using the power of technology.

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