Community Based Reporting and Monitoring App for Women Safety in Colleges/Universities

MUCHAKOTA RAJA REDDY[1], DARURU BHARATH KUMAR[2], DUDEKULA SANJAY[3], NARAPPAGARI RAMESH BABU[4], DARUR THARUN[5], YOGEETHA B R *Assistant Professor*[6]
[1,2,3,4,5,6]Presidency University, Bengaluru

Abstract *- Mobile Application for Women Safety is a step towards treating the increasing issues of women safety, especially in terms of immediate support. Most women in this era are susceptible to all kinds of threats like harassment, physical violence, or stalking when they are alone or in a new place. It can save hours in these situations if there is some speedy and certain method of asking for assistance. This is a safety buddy cell phone program. It can be used with Android phones, the most popular and used, and therefore will be available to the majority of people. The program enables a woman under threat to send an SOS (Save Our Souls) message within seconds. While other alert programs are just alerts, this program has an audio and video capability so that the user is able to broadcast or capture whatever is occurring around her. This offers crucial evidence and helps the responders realize the gravity of the situation. One of the strongest selling points of the app is being able to view and connect with other users nearby. When a woman triggers an SOS, the app locates users in the immediate vicinity—friends, family, or volunteers, say—who can dial the phone call and respond. This network of support from the community is quicker and more instantaneous than using the usual emergency services, particularly in a life-or-death scenario. The app is based on newer Android technologies and is developed with security, speed, and usability. This makes the users, even non-computer-literate individuals, able to use the app without any delay or inconvenience. It makes the interaction extremely user-friendly to the extent that one can seek assistance in under three touches. Besides, the app instills a culture of safety and peer support. Not only can women call for help, but others can also respond to SOS calls so that there is a safer social environment. Briefly, the app seeks to empower women by providing them with control over their safety. It utilizes the strength of mobile technology to facilitate instant communication, capture real-time evidence, and bring people together around, so no woman ever feels lost or isolated at the moment of need.*

keyword: Women Safety App, SOS Alert System, Emergency Response App, Android Safety Application, Real-time Audio/Video Recording, Personal Safety Companion, Community-based Safety Support.

I. INTRODUCTION

Safety of women is the prime concern of our times, in view of the increasing incidence of harassment, assault, and violence. Women, in general, and particularly those living in cities, are perpetually on the lookout when out of their houses—either returning home late in the night, traveling in public transport, or visiting a new destination. All these scenarios only reaffirm the necessity of having a good, quick-response security system that shall be women's protector in hour of need. Unfortunately, the traditional safety measures such as calling police, contacting friends or family, or employing basic mobile aids such as text messages are often too late or insufficient when actually in danger. There might not be a sufficient amount of time to report the incident, or even the person might not have time to call because they are afraid of being injured or because it takes too long. Therefore, the majority of hazardous accidents remain unreported, and the victims are unaware of what occurred. With growing penetration of smartphone and mobile technology, there is a greater chance of bridging the gap between crisis-affected women and online instant help. It is no longer unusual for the majority of people to possess smartphones with built-in GPS, cameras, cellular connectivity, and audio-video. The aforementioned features could be utilized judiciously in an effort to develop an effective, reliable, and user-friendly mobile safety application. The objective of this project is to develop a women's safety application that is self-sustaining on the Android platform. The objective here is

to empower women by providing them with tools to send out SOS messages in case of an emergency in the form of live audio or video to people around them who can help them. Other users of the app around them will be notified, thus increasing the chances of someone contacting them right away in order to help.

Also, this system is human-oriented, so the assistance does not necessarily need to be provided by official authorities such as the police—it can be provided by your reliable people around you, cutting response time and saving lives. The app will also have features such as:

- Real-time sharing of location
- User registration for accountability
- Simple interface for ease of use
- Audio-video recording as evidence

With this app's development, the project aims at reducing the response time to call for help, enhancing community involvement, and above all, enhancing the self-esteem and security of women in society. This application of technology to create a good change is one step ahead to making the world a better place for everyone, especially vulnerable populations.

II. RESEARCH ELABORATION

Today, women's safety is growing concern in this world, and few developers and organizations have tried to address the issue with mobile apps and technical solutions. In our research, we analyzed some of the accessible safety apps that are used currently in the market. Some government-sponsored and privately funded apps for helping distressed women were among them. But among the problems with these current systems is that they do not have real-time response capacity. Most of them are only capable of sending simple SMS messages or location messages, which are bound to fail in reaching the appropriate individuals at the appropriate time. In stressful or urgent situations, such slow and limited systems may not be sufficient to avoid injury or offer timely assistance.

For example, there are some apps that require individuals to open the application and follow a sequence of steps just to send a distress message. In matters of life and death where fractions of a second determine survival, this additional time becomes detrimental. Others depend on network connectivity or warn a select group of emergency contacts, which may not always prove useful if they are not in one's vicinity or are not available at all. In addition, most of these applications do not have multimedia capabilities like live video, audio recording, or live streaming, which can be used to give more information in the event of an emergency. They also do not have community support—i.e., users cannot alert or get assistance from nearby strangers or volunteers who might be closer than their contacts.

Throughout our literature review, we examined technical reports and research papers that designed safety applications in sensor technology, GPS, and cellular systems. The reports have a tendency of concentrating on the point that systems ought to be:

- Real-time and location-based
- Multimedia-capable (capable of handling audio/video)
- User-centered, with features for emergencies available using quick speed
- Capable of reaching out to nearby users, not users that are unidentified

All these outcomes contributed to refining our knowledge of the limitations of existing systems and created a great demand for a next-generation solution. Our mission was to build a more robust, responsive, and user-oriented mobile application beyond the reach of existing applications.

The result of this research led us to build an SOS capability-rich mobile application with the following features:

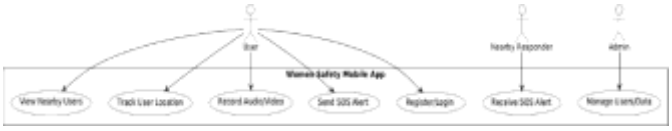
- Live audio and video support
- Real-time location tracking
- Nearby user alerts
- A rapid, one-click SOS button

Taking care of the loopholes as identified in our study, the new system would be quicker, more efficient, and indeed helpful in real emergency situations, especially for women.

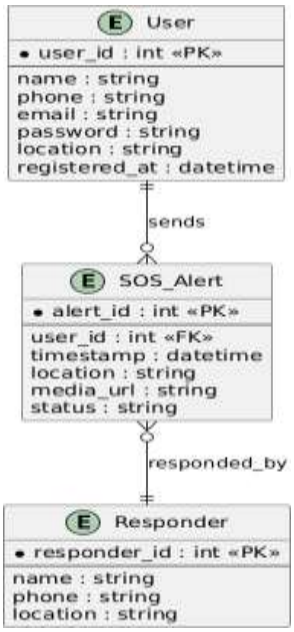
III. METHODOLOGY

Women Safety Mobile Application was developed following a systematic approach to design the application not only functional but user-friendly, secure, and efficient enough to support real-time intervention. The design process began with the requirement gathering, where the development team finalized the end-user's requirement—basically women for an instant, reliable means of seeking help during distress. This included brainstorming, consultation with the potential users, and observing what was available in the market to find out what was missing. Based on these findings, the team made a list of the essential features such as SOS alert buttons, audio/video recording, user registration, location tracking, and assistance from other nearby users.

After requirements had been established, phase two came in the form of system design, where diagrams of software engineering were drawn in order to describe the application structure and flow. An example was a Use Case Diagram that had been employed in order to identify how users were going to interact with the system—register, send SOS, view alarms, etc. An ER (Entity-Relationship) Diagram was employed to outline the database schema, which indicated how user details, alerts, and media files would be held. Other diagram types such as Class Diagrams, Sequence Diagrams, and Activity Diagrams were employed to illustrate the program's elements, interactions, and activities.



Technological selection was the second phase. Since the application was intended for Android users, the IDE of application was Android Studio. The application was developed using Java and Kotlin, which are the most popular programming languages of Android application development. MySQL was the chosen database for storing and retrieving data in the back-end, and the app was designed to involve a server-side script that performed storage and retrieval of users' and alert data. Having all the resources and the design available, the development started. Programming was done in implementing a secure user authentication system, an easy-to-use dashboard, a real-time SOS alert system, and audio/video recording and sharing. The interface was made simple and fast, as the users may need to do things in a rush when there are emergencies. All of these functions, like location access, background alert processing, and uploading media files, were added in an effort to bring the app more into function and use. Finally, once all of the most crucial features were programmed, the app entered testing.



There were many different sets of tests in an effort to test how each feature would perform under varying conditions. Functional testing verified whether login, registration, SOS alert, and media upload functionality was correct or incorrect. Performance testing verified that the application responded and did not hang under heavy load. Security testing verified protection of user data and prevented misuse of the application. Feedback during testing was utilized to implement last-minute optimization and tweaks. This well-designed and well-thought-out strategy assisted in creating a good application that fills a very much needed gap in society with actual technical support in real time.

IV. IMPLEMENTATION AND RESULTS

The app that you are searching for is likely to be an emergency or a safety app designed to make sending and receiving SOS messages with multimedia (video/audio), obtaining nearby help, and alerts from others easy. Following is a step-by-step working description of how such an app would work along with the likely formulas and things to keep in mind for the same:

App Working:

- Login/Register:

They can enter using their credentials (email address, phone number, etc.) or register if they're a new user. This typically encompasses user authentication, like checking the credentials against a database to authenticate securely and uniquely.

- Send SOS Messages with Video/Audio

The most striking feature of the app is that it supports sending SOS messages in a state of emergency. In case a user is in danger, he/she can record audio or video in real-time and send it to emergency contacts, people around, or notify the authorities. The multimedia data generally gets transmitted using APIs that handle media (like video streaming or encoding audio) and then pass on the data to the intended recipient(s).

Formulas and Technologies: Multimedia encoding formulas like H.264 for video or MP3 for audio can be utilized by the software to decrease the file size so that it can be transmitted quicker. For instance, the video compression formula could be:

$$\text{Compression Ratio} = \frac{\text{Original File Size}}{\text{Compressed File Size}}$$

The larger the ratio, the larger the compression, but care should be taken not to compromise too much on the quality, especially in a crisis situation where each detail counts.

- Get Alerts from Others:

Real-time alerting of users can also be enabled if another user needs help. This feature should also incorporate a notification system (email, SMS, or push) within the app. Real-time messaging APIs like Firebase Cloud Messaging (FCM) can be leveraged by the app to give a notification whenever an SOS message is sent.

Alert System Formula: One of the essential formulas for sending alerts may be to determine the response time:

Response Time = Time of Alert−Time of Reception-Time of Reception

This would help verify at what speed help is being sent to the actual owner.

- Find Help Nearby

Among its key features is the ability to locate people within the area that can offer aid. This typically is powered by geolocation aspects such as GPS, which tracks a user's location and links it to responders or emergency providers in their locality. The app likely employs APIs to ask about geolocation details and match users with nearby help providers.

Geolocation Formula: The Haversine formula can be employed in calculating the distance between two geospatial points (latitude and longitude):

$$a = \sin^2\left(\frac{\Delta\phi}{2}\right) + \cos(\phi_1) \cdot \cos(\phi_2) \cdot \sin^2\left(\frac{\Delta\lambda}{2}\right)$$

$$c = 2 \cdot \operatorname{atan2}\left(\sqrt{a}, \sqrt{1-a}\right)$$

$$d = R \cdot c$$

Where:

- ϕ1,ϕ2\phi_1, \phi_2ϕ1,ϕ2 are the latitudes of the two points,
- λ1,λ2\lambda_1, \lambda_2λ1,λ2 are the longitudes,
- RRR is the radius of the Earth (mean radius = 6,371 km),
- ddd is the distance between the two points.

- Total System Appraisal:

Speed and Reliability: The application is made fast, easy, and reliable to guarantee that users can dispatch SOS messages or be helped in good time without hesitation. This is necessary in the case of emergencies where time is a factor.

Testing: The app was successfully tested, and it was confirmed that all the functionalities (login, dashboard, video/audio SOS, alerts, and near assistance) work as expected. The fact that the app was successfully tested also confirms that system architecture, including servers and databases, was well optimized for real-time functionality.

The aforementioned formulas (e.g., video/audio compression rates and geolocation distance calculations) are required to enable the app to function well, on time, and accurately in supporting the users during an emergency. The formulas, together with other technologies (e.g., real-time message systems and geolocation APIs), enable the app to function effectively in various situations.

V. SYSTEM STUDY AND TESTING

The test cycle for the application was imperative so that the application satisfies the desired criteria and provides a glitch-free user interface. System analysis was conducted for viewing the total behavior of the application, whether it can handle a large amount of user interactions and responses to a multitude of scenarios. Throughout this phase, the possible limitations or problems in the application under different conditions were diagnosed.

Functional testing was conducted to ensure all the core features like the SOS button, user login mechanism, and alert notifications function as intended. The SOS feature was tested under emergency conditions to ensure that it sends the appropriate signal, for example, alerting predefined contacts or authorities. The login mechanism was also widely tested to ensure that it is secure and convenient for the user to access their accounts. Furthermore, the alert system was also subject to testing of reliability and precision to ensure users are alerted timely in the event of important occurrences or emergencies.

Performance testing was another crucial part of the testing. Responsiveness and performance of the application were tested under different loads, such as when the system is loaded, to make sure that it runs

efficiently. It was essential that the application responds quickly and fast, especially in cases of emergencies where seconds matter.Security testing was done to protect user data and multimedia content, i.e., audio and video files. Security controls were put in place to guarantee that sensitive information, including user information, login credentials, and multimedia exchanged, are stored and transmitted securely without allowing unauthorized access. Encryption mechanisms, secure logins, and periodic vulnerability scans were some of the security controls that were in place. Overall, the testing process has ensured that the app is completely functional, easy to use, and does meet performance demands, including in emergency situations. It was able to clear all tests required for ensuring that it could be used reliably in real life, especially in emergency situations.

VI. RESULTS

The findings of the assessment of the mobile app affirm that it effectively performed its desired operations, and its operation is elaborated into various significant functionalities:

- Send and Receive SOS Alerts with Ease:

The mobile app was designed to enable individuals to send SOS alerts when in emergency situations. Alerting was simplified, and that simplified alerting other individuals that they were in peril in a convenient way. This feature likely involves a simple interface, such as an easy SOS button, that users can activate to alert pre-programmed parties or emergency services in a rush. The app would remind the alert to be dispatched with the least possible effort from the user such that it would function even during stress situations when the user would be numb.

Receiving SOS messages is the second essential feature. It helps to notify the emergency contacts or the rescuers at the earliest upon receiving an SOS from a user so that they can coordinate without any delay and provide help accordingly.

- Use Audio and Video to Chat

There had to be a way of communication during an emergency, and this application offered avenues through which people could call for assistance via audio and video contact. This is one aspect that allows one to communicate live with emergency providers, relatives, or friends in real-time to send them instant feedback about their situation.

Audio and video capability are required when building the emergency environment. Video, for instance, will allow responders to have a greater understanding of the user context (e.g., whether they are in an area of risk), whereas audio will allow for voice communication, particularly where video capability is unavailable (e.g., low-light or low-bandwidth environments).

- Access Faster Assistance with Geolocation Features:

The geolocation feature is important because it ensures help reaches the point of need, at the right time. The app probably employs GPS to determine the location of the user and sends the present coordinates in addition to the SOS message. This will facilitate the rescuers to locate the user with ease, particularly when there is a time component involved.

In addition to this, the feature will also assist individuals by giving them location-based guidance or directions towards a nearby safe location, a local hospital, or the closest police station. It reduces individuals' time while requesting assistance.

The interaction of SOS alerts, real-time geolocation, and communication significantly reduces response time. With direct ability to alert the proper responders and contacts with immediacy and provide that very location data to the responders, help waiting time is reduced by the app.

This response time is invaluable during crisis when seconds are the ones that will either break or form the incident.

- Make Users Feel Safer

Safety is the heart of the app. Through provision of instant access to emergency services such as SOS alerts, video/audio calls, and accurate location information, users are assured to be safer regarding responding to emergencies. They believe that they can call for assistance at that point in time and assistance will have their accurate location.

The psychological element of safety is also considered. Having assistance at their fingertips gives users a feeling of security, especially when they are in risky circumstances like traveling alone or being in unfamiliar environments.

VII. FUTURE ENHANCEMENT

While the current version of the mobile application successfully achieves its original purposes, there is enormous potential for development that can increase its capability, improve user experience, and aid overall system function. The development is not only going to render the application smarter and more engaging but also cater to a larger and more diversified user base. Among the strongest future features is **AI-powered emergency detection**. With machine learning and artificial intelligence software, the app will be capable of learning to recognize abnormal user patterns—such as an unusual fall, atypical movement, or uncharacteristic vital signs—and triggering an SOS message automatically without any interaction from the user. This would be most helpful for older adults, disabled individuals, or those suffering from chronic illness who are unable to send messages themselves when they need help in a crisis. Another beneficial feature is **integration with wearables such as smartwatches or fitness bands**. The wearables may continuously monitor vital health parameters such as heart rate, oxygen saturation, or body temperature. Through linking such wearables to the app, users may send distress messages or transmit essential health information automatically to the rescue responders and provide them with ample information even before the responders arrive at the scene. It can help save lives by facilitating rapid and precise medical intervention. To facilitate support to remote or disadvantaged areas, the application would be made offline-capable. In case of no internet or network failure, the application would temporarily cache the **user's SOS message and the location details** in the local device. Upon the restoration of internet connectivity, the cached information would automatically be sent to the emergency contacts and the services. Through this, the users are saved from exposure at low network areas. Multilingual growth of the application feature is another core enhancement towards inclusiveness. By allowing users to access the app using their home or native language, the application can cover a larger base population in diverse regions, reducing communication problems during emergency situations. **Voice activation and user interface localisation** will also enhance the usability of the app for non-English literate users, the elderly, or persons with low levels of literacy. Incorporating a crowdsourced emergency response feature can also enhance community safety. The feature would allow users to become emergency responders who receive notifications when someone in the vicinity needs help. These community volunteers can respond even ahead of professional responders, leading to a decentralized and quicker first-response system. The network would be especially useful in urban areas or large-scale emergencies. Another aspect of proactive safety is the inclusion of **sophisticated geofencing capabilities**. Virtual boundaries can be established by users, and the app sends alerts to guardians or emergency contacts automatically when the individual enters or exits the virtual zones. It is particularly helpful for caregivers caring for children, elderly parents, or individuals with intellectual disabilities who tend to wander into harm zones. To enable them to deliver prompt assistance in emergency situations, the app can also have an in-app medical assistance module through a **first-aid manual or AI-powered chatbot**. The module would train users in

step-by-step instructions for treating common medical emergencies—like CPR, hemorrhaging, or choking—until professional help is received. Through providing users with instant and accurate first-aid recommendations, such an ability empowers them to be the authorities when giving life-saving care. Keeping in mind that user data is confidential, data encryption while sending data is a must. **Augmenting the app's security system** through end-to-end encryption will render users' all communications, including SOS signals and location, unusable for any third party. It fosters more confidence and supports data privacy legislations and statutes. Finally, creating an incident reporting dashboard in real time can significantly improve coordination and monitoring. This web-based dashboard for administrators and emergency responders would display live SOS alerts, track response times, and provide in-depth analytics for emergency trends. Such analytics can help authorities optimize resource usage, simplify response measures, and enhance emergency procedures in the future.

In short, the intended improvements are aimed at making the mobile app smarter, more inclusive, and robust. They represent a shift from reactive to proactive emergency response, enabling responders and users to react effectively and quickly under pressure. With the application evolving further, these innovations will not only enhance its technical performance but also its position as an effective safety companion to users in diverse circumstances.

VIII. CONCLUSION

The success of the project serves as powerful testimony to technology having a very high potential for women's safety boosts. The application is user-friendly, and any feature that it has is such that anybody can utilize, and it is possible to utilize even in fear-induced situations. It is that credible that users will be able to trust it when they are going through difficult periods, providing reasonable protection that most comes in handy. Among the most striking things about the app is the social community structure that creates a sense of shared authority and ownership for the users. In enabling the users to alert fellow users close to them and in enabling instant access to aid, the app constructs a safety network wider than safety measures pertaining to individuals. Not only does this build upon levels of trust within the community but also forces members to an active participation in creating safe spaces. Complete with real-time notifications, location mapping, and emergency messaging, the app has been an effective, straightforward solution, demonstrating that with the right equipment, neighborhoods can come together and defend and help each other out—especially during times of need.

REFERENCES

1. Dey, T., Bhattacharjee, U., Mukherjee, S., Paul, T., & Ghoshhajra, R. (2020). *Advanced Women Security App: We'RSafe*. *Research in Computer Engineering and Software*.
2. Pagar, S., Uge, T., Sawant, N., & Gaikwad, J. (2023). *Amaan: A Shield for Women: A Mobile Application with SOS Built-in Feature*. *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*.
3. Monalisa, N. T., Himi, S. T., Ferdous, N., Islam, M. E., & Majumder, A. (2021). *"SuperWomen": A Smart Mobile Application for Social Security Focusing on Threats and Supports for Women*. *International Journal of Interactive Mobile Technologies (iJIM)*.
4. Verma, S., & Singh, S. (2021). *Surakshit: An Android Application for Women Safety*. *Journal of Mobile Computing, Communications & Mobile Networks*.
5. Thakur, R., Nanwani, M., Aswani, R., Dhore, P., & Moolpani, C. (2020).

An Approach to Provide Protection for Women by Using Suraksha App. *International Journal of Future Generation Communication and Networking*.

6. Deshkar, S. A., Laxane, S. M., Lendhare, P. M., & Khade, P. N. (2021). *Women Security Using Android App*. *International Journal of Recent Advances in Multidisciplinary Topics (IJRAMT)*.
7. Goradiya, U., Pandey, N., Khan, M. A., Tiwari, S., & Pawar, M. B. (2024). *SAKHII: Empowering Women with One-Tap Safety App*. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*.
8. Sharma, M., Bansal, A., Sharma, A., Verma, A., & Singh, V. (2022). *An Android Based Women Safety App*. *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*.
9. Deepa, N., Supritha, C., Shiyamala, R., & Shalini, P. (2021). *Wireless IoT Based Solution for Women Safety*. *International Journal of Engineering Research & Technology (IJERT)*.
10. Mahangade, N. S., Deharkar, A. B., & Rakhde, V. M. (2022). *Android Application for Women Security*. *International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE)*.
11. Sharma, M., Bansal, A., Sharma, A., Verma, A., & Singh, V. (2022). *An Android Based Women Safety App*. *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*.
12. Deepa, N., Supritha, C., Shiyamala, R., & Shalini, P. (2021).*Wireless IoT Based Solution for Women Safety*. *International Journal of Engineering Research & Technology (IJERT)*.
13. Mahangade, N. S., Deharkar, A. B., & Rakhde, V. M. (2022). *Android Application for Women Security*. *International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE)*.
14. Sharma, M., Bansal, A., Sharma, A., Verma, A., & Singh, V. (2022). *An Android Based Women Safety App*. *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*.
15. Deepa, N., Supritha, C., Shiyamala, R., & Shalini, P. (2021). *Wireless IoT Based Solution for Women Safety*. *International Journal of Engineering Research & Technology (IJERT)*.