

Innovative Women Safety Application

Kabir Patel*

Lecturer, Department of Computer Science, Vinayaka Mission's Kirupananda Variyar Engineering College, Salem, India

Abstract: Staying connected with people worldwide has become easier than ever in today's continuously growing internet technology. This vast internet network may also address pressing concerns like violence against women. Violence against women is a broad word that embraces any activities directed solely or predominantly at inflicting harm to women. Women's safety and security are essential concerns, and individuals must take action to safeguard them. Smartphones can help avoid domestic abuse against women. In addition, because cell phones are so standard, security apps that trigger alerts and send messages in times of emergency may be developed. Other people's threats, health emergencies, accidents, and so forth are examples of emergencies. This suggested Android-based security application intends to keep groups of people linked and deliver aid in an emergency as quickly as feasible. The application provides capabilities that allow users to alert authorities in an emergency swiftly. This is accomplished by a simple touch or shake of the phone, making it simple to operate even in tense situations. The program then notifies pre-defined contact groups, such as friends, family, and authorities, of the user's situation and position. This allows your connections to respond quickly to assist users in need. Additionally, the program can include GPS tracking. This allows continuous monitoring of a user's whereabouts from their contacts in an emergency. It can also include a database of emergency numbers, providing easy access to services such as police, ambulance, domestic violence, sexual assault, and other emergency numbers. A security tool that prevents violence against women by using the power of cell phones and the Internet. It can empower women to seek emergency assistance and give a supportive network of connections to assist them. With the capacity to rapidly trigger alarms and send messages, this Android-based safety app keeps women safe by providing them with essential tools to defend themselves when help is needed.

Keywords: efficient network, women safety, GPS tracking.

1. Introduction

The main objective is to develop a well-structured and user-friendly app that utilizes GPS technology to monitor and track the real-time location of an individual through an Android-enabled mobile device. The app retrieves the latitude and longitude of the person, offering an effective and precise method for location tracking.

One of the key objectives of the system is to raise awareness and contribute to the reduction of crime rates and mishaps in society. By utilizing the application, users can stay informed about emergency notifications concerning their area through app notifications, providing them with the quickest way to receive important alerts.

The application's user interface is designed to be

straightforward and easy to use, minimizing complexity at the front end. In addition, the application ensures that alert messages are sent to trusted individuals, allowing users to activate the alert feature when needed discreetly.

The system aims to provide a swift and efficient means of communication in emergency situations. By utilizing GPS technology, the application can quickly and accurately pinpoint the target person's location, allowing for timely assistance. This can be especially crucial in situations where time is of the essence, such as during medical emergencies or instances of danger.

In addition to its practical functionality, the system also aims to contribute to the overall safety of society. By raising awareness and providing a means for users to stay informed about emergency notifications, the application can help prevent crimes and mishaps from occurring. This proactive approach to safety can positively impact the community and contribute to a safer environment for everyone.

The application's user interface is designed to be user-friendly and straightforward, ensuring that users can quickly and easily navigate through the various features and functionalities. Additionally, the section is designed to be intuitive and easy to use, minimizing the learning curve and making it accessible to a wide range of users.

One of the key benefits of the system is its discreet alert feature. Users can activate the alert without drawing attention to themselves, allowing them to seek help in a discreet manner. This can be particularly useful in situations where users may feel threatened or unsafe and need to seek assistance without alerting others.

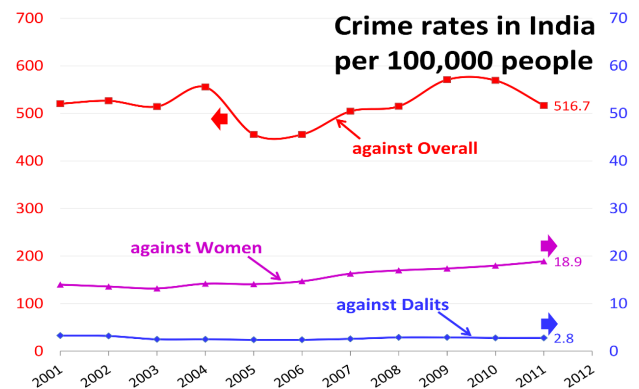


Fig. 1. Crime statistics

*Corresponding author: generalgao2022@protonmail.com

Street crimes can manifest in different ways, including snatch thefts, physical and sexual assaults, bump-and-rob cases, vehicles, and public robberies. The nature of these crimes can vary from minor offenses to more severe acts like kidnapping or serious assaults as perpetrators become bolder and more creative. Often, these crimes are committed while under the influence of alcohol or drugs. While committing crimes in public areas can be risky due to the potential presence of witnesses, it may also be advantageous for offenders to escape by blending into the crowd.

Women are often skilled at mobilizing diverse groups for various causes, transcending racial, religious, political, and intellectual differences to promote peace. While women's safety is recognized, it is crucial to acknowledge that women deserve to be well protected. Whether facing an immediate threat or being separated from friends at night with no safe means of getting home, having safety apps on one's phone can significantly reduce the risk and assist when needed.

According to the annual National Crime Record Bureau's "Crime in India" 2019 report, crimes against women increased by 7.3% from 2018 to 2019, and crimes against Scheduled Castes also increased by 7.3% during the same period. The report further states that a total of 405,861 cases of crimes against women were registered in 2019, showing an increase of 7.3% compared to 2018 (378,236 cases). The majority of cases under crimes against women under the Indian Penal Code (IPC) were registered under 'cruelty by husband or his relatives' (30.9%), followed by 'assault on women with intent to outrage her modesty' (21.8%), 'kidnapping & abduction of women' (17.9%), and 'rape' (7.9%). The crime rate registered per lakh women population was 62.4 in 2019, compared to 58.8 in 2018, per the NCRB report.

The safety of individuals has become a matter of concern in today's world. The adoption of smartphones with GPS navigation capabilities has significantly risen from 3% to over 80% in the past eight years. Therefore, smartphones can be utilized effectively for personal safety and other protective purposes, particularly for women. As smartphones with GPS technology continue to grow, a system has been developed that enables individuals to seek assistance in dire situations with a simple tap or shake of their mobile phone or even by screaming, potentially saving their life.

The primary goal of this system is to utilize the GPS capabilities of an Android mobile phone to track an individual's precise location by extracting their longitude and latitude coordinates. Using technology, the system aims to raise awareness and contribute to reducing crime rates and incidents in society. In addition, it provides a rapid means of receiving emergency notifications related to one's vicinity through app notifications, ensuring that users are promptly alerted to any potential threats. The system's user interface is designed to be simple and user-friendly, allowing for easy access to the discreet activation of the alert message feature.

2. System Designs

A. Modules

The system is composed of five major modules, each with its own sub-modules, as outlined below:

1) Admin Module

Emergency Alerts Management: The administrator can send emergency notifications through their Android application to inform users about emergencies in their local area or city. These notifications can be in various formats, such as text, photos, location, or links, and can be directly sent from the admin app.

2) User Module

Contact Management: Users have the option to add their friends, family, and acquaintances to their contact list in the Safety app. When a user sends a threat alert through the app, their added contacts will also receive notifications about the same.

Contacts: Added contacts can be viewed under this section, along with their contact details and real-time location. Users can also view their sent threat logs.

Admin Emergency Alerts: Users can view all the emergency alerts for their city or area under this section to stay updated with real-time information.

Threat Alerts: When a user is in a threatening situation, they can alert the Safety body (admin) for help and notify their contacts with just one click.

Home: Users can view the sensor readings, such as sound meter and accelerometer readings, on their home screen. They can also start/stop the detection system as needed.

App Notifications: The Safety app provides real-time notifications to users for emergency alerts in their city or area. Additionally, user-generated threat alerts are sent to their contacts through app notifications, ensuring that contacts are promptly alerted and the admin can swiftly address the situation. In summary, the system consists of an admin module that allows for emergency alert management and a user module that enables contact management, threat alerting, and monitoring of sensor readings for potential accidents. The background monitoring feature ensures quick response in case of accidents, and app notifications keep users and their contacts updated with real-time emergency alerts. Overall, this system aims to enhance user safety by providing timely information and assistance in emergency situations.

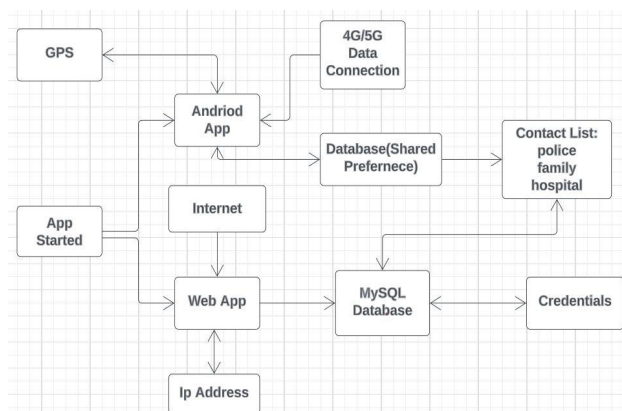


Fig. 2. Software architecture

B. Software Architecture

The following software architecture describes the detailed process for running an Android application. The database serves as the storage medium between the two mobile devices in this case. The database information, i.e., the database URL to which the database information will be passed, is encoded in the application. Location coordinates from the database are regularly provided to the registered contacts of the user.

C. Database Design

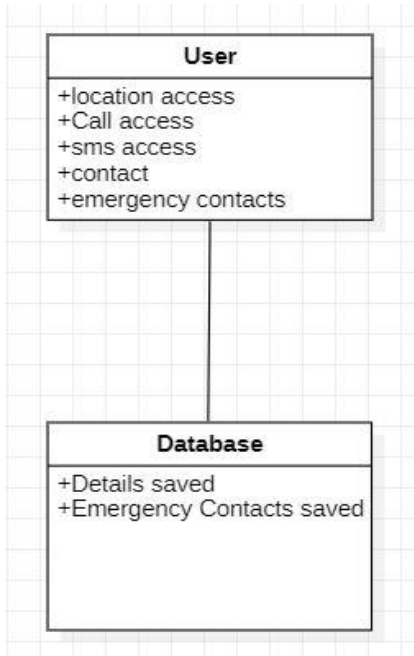


Fig. 3. Database schema diagram

A database schema diagram is a graphical depiction of a database schema that illustrates a database's blueprint or structure. A schema describes the data pieces or objects stored in the database as well as their relationships. A schema diagram depicts the structure of your database, including tables, columns, primary keys, foreign keys, and constraints. It aids in seeing the relationships between tables as well as the properties that comprise each table. Because they give a clear and simple perspective of the database structure and may be used to convey the design to other development team members and stakeholders, schema diagrams are frequently employed in the early phases of database design and development.

D. ER Diagram

An entity-relationship (ER) diagram is a graphical representation used in database design to show the relationships between entities (that is, objects, concepts, or things) in a system. ER diagrams use different kinds of symbols to represent the components of a system and the relationships between them. The basic components of an ER diagram are entities, attributes, and relationships. Entities are objects or concepts in the system. B. Customer, Product, or Order. Attributes describe properties or characteristics of an entity, such as: For example, the customer's name, address, phone number, etc. Relationships describe how entities are related to

each other. B. How customers order your products. ER diagrams are often used to visually represent database structures during the database design stage of software development. It helps identify and clarify relationships between entities, identify key data elements, and ensure data model accuracy before database implementation.

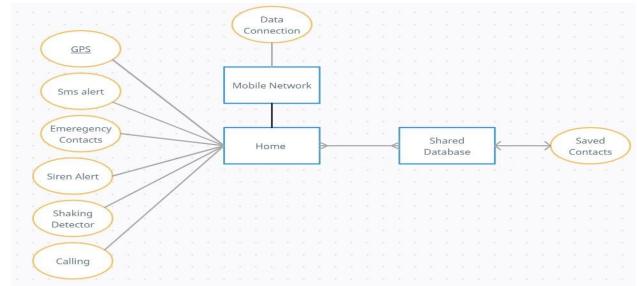


Fig. 4. ER diagram – Android application

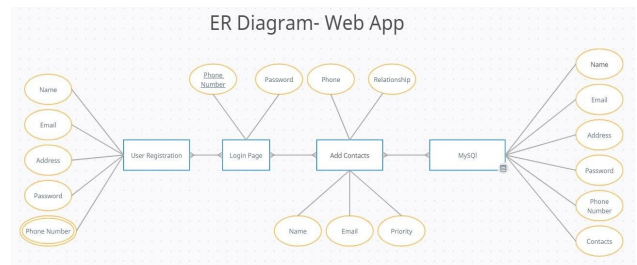


Fig. 5. ER diagram – Web application

E. Connection Diagram

The Women's Safety Android app uses Shared Preferences for local storage of user data, while the Women's Safety website uses MySQL for remote data storage. The two apps are not directly connected. When a user logs into the app, user data is retrieved from shared settings. When the user updates the data, the changes are saved in shared settings. When a user visits the Women's Safety website, user data is retrieved from the MySQL database. When a user updates data on your website, the changes are saved in the MySQL database. It is important to note that the data stored in Shared Preferences and MySQL are separate and not synchronized in real time. If a user updates data on one platform, they must manually update the data on the other platform.

F. Dataflow Diagram

A data flow diagram (DFD) is a graphical depiction of a system's data flow. Describes how a system or process receives, processes, and outputs information. A DFD is made up of a succession of bubbles or circles that represent the system's operations or functions and arrows that depict the data flow between them. DFDs are often used to describe the flow of data inside a system or process in software development and business process modeling. They aid with the comprehension of complex systems and the communication of their structure and processes to stakeholders.

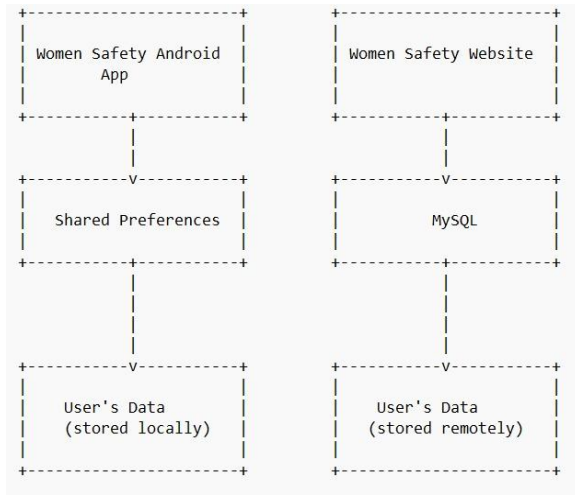


Fig. 6. Connection diagram

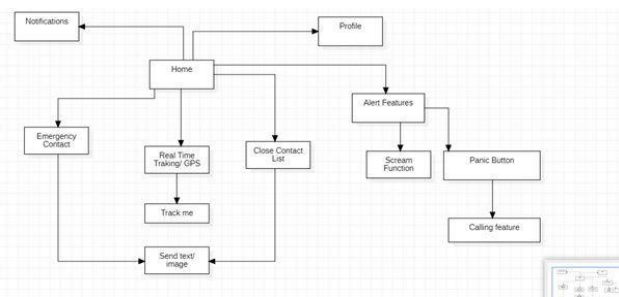


Fig. 7. DFD diagram

3. Resulting Product

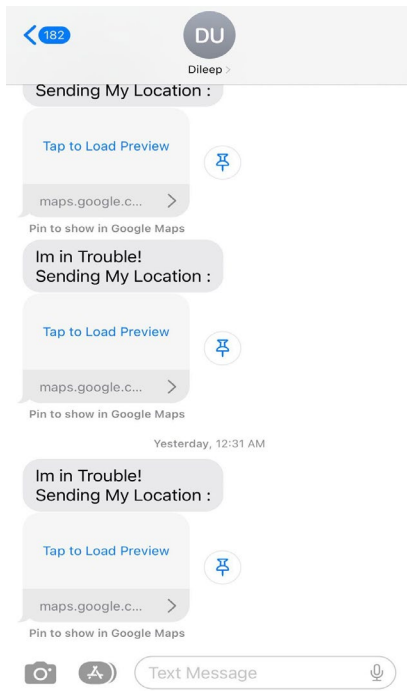


Fig. 8. Final product

Once the contacts have been saved, click the Save button to quit the program and the Panic button to quickly launch it. You are not needed to input your message and contact information every time you launch the app. It will be recorded with the

application once entered and saved until altered. Message received by the contact device shortly after the program was launched. When the user clicks the panic button in the application, GPS starts operating on the smartphone and immediately broadcasts the user's location (see Figure 8).

After getting started, this is the home page of the application. It mainly consists of four features which are contacts, SMS alert, basic laws, and self-defense, and it does contain a PANIC button too, which helps to send alerts to emergency contacts and friends, family, etc.



Fig. 9. Home screen

4. Conclusion

Safety is a major concern in today's world, with headlines often highlighting incidents such as rapes, molestation, sexual assault, murders, kidnappings, and accidents. These issues have caused many people, especially women, and children, to lose confidence and feel afraid for their freedom. To contribute to the safety of people, we have developed the WomenSafety (App), which can quickly notify users of any mishap. This mobile application is designed to be helpful for anyone who needs immediate assistance.

In Women Safety, users can add trusted contacts, referred to as "mediators." When a person finds themselves in a dangerous situation, they can press the power button three times or shake their mobile device three times in an up-and-down motion, which sends alert notifications to the mediator along with the location. The application not only allows live tracking of the victim's location through GPS but also alerts the trusted contacts listed in the app. In case of accidents, the app can also send alerts to hospitals and police authorities and calls to the number they add.

References

- [1] Mandapati Sridhar, Sravya Pamidi, and Sriharitha Ambati. "A mobile based women safety application (I Safe Apps)." *IOSR Journal of Computer Engineering (IOSR-JCE)* 17, no. 1 (2015): 29-34.
- [2] Gadhave, S. N., Kale, S. D., Shinde, S. N., & Bhosale, A. C. (2017). Electronic jacket for women safety. *International Research Journal of Engineering and Technology (IRJET)*, 4(05), 858-861.
- [3] Chaware, M., Itankar, D., Dharale, D., Borkar, D., Kumar Pendyala, S., & Nimbarte, M. (2020). Smart safety gadgets for women: a survey. *Journal of University of Shanghai for Science and Technology*, 22(12).
- [4] Lonbale, P., Mane, P., Kharade, S., & Mohite, B. J., Role of IT in Women Safety.
- [5] Bala, B. S., Swetha, M., Tamarasi, M., & Vinodha, D. (2018). Survey On Women Safety Using IoT. *International Journal of Computer Engineering in Research Trends*, 5(2), 16-24.
- [6] Petermeijer, S. M., Abbink, D. A., & De Winter, J. C. (2015). Should drivers be operating within an automation-free bandwidth? Evaluating haptic steering support systems with different levels of authority. *Human factors*, 57(1), 5-20.
- [7] Manakkadu, S., & Dutta, S. (2014, July). Bandwidth based performance optimization of multi-threaded applications. In *2014 Sixth International Symposium on Parallel Architectures, Algorithms and Programming* (pp. 118-122).
- [8] Petermeijer, S. M., De Winter, J. C., & Bengler, K. J. (2015). Vibrotactile displays: A survey with a view on highly automated driving. *IEEE transactions on intelligent transportation systems*, 17(4), 897-907.
- [9] Dutta, S., Manakkadu, S., & Kagaris, D. (2014, September). Classifying performance bottlenecks in multi-threaded applications. In *2014 IEEE 8th International Symposium on Embedded Multicore/Manycore SoCs* (pp. 341-345).
- [10] Bazilinskyy, P., Petermeijer, S. M., Petrovych, V., Dodou, D., & de Winter, J. C. (2018). Take-over requests in highly automated driving: A crowdsourcing survey on auditory, vibrotactile, and visual displays. *Transportation research part F: traffic psychology and behavior*, 56, 82-98.
- [11] Manakkadu, S., & Dutta, S. (2018, October). On efficient resource allocation in the Internet of Things environment. In *Proceedings of the 8th International Conference on the Internet of Things*, pp. 1-5.
- [12] Khandelwal, T., Khandelwal, M., & Pandey, P. S. (2018, October). Women safety device designed using IoT and machine learning. In *2018 IEEE SmartWorld, Ubiquitous Intelligence & Computing, Advanced & Trusted Computing, Scalable Computing & Communications, Cloud & Big Data Computing, Internet of People and Smart City Innovation (SmartWorld/SCALCOM/UIC/ATC/CBDCOM/IOP/SCI)*, pp. 1204-1210.
- [13] Manakkadu, S., Joshi, S. P., Halverson, T., & Dutta, S. (2021, December). Top-k User-Based Collaborative Recommendation System Using MapReduce. In *2021 IEEE International Conference on Big Data (Big Data)* (pp. 4021-4025).
- [14] Kumar, D., & Aggarwal, S. (2019, February). Analysis of women safety in Indian cities using machine learning on tweets. In *2019 Amity International Conference on Artificial Intelligence (AICAI)*, pp. 159-162.
- [15] Manakkadu, S., & Dutta, S. (2024). Ant Colony Optimization based Support Vector Machine for Improved Classification of Unbalanced Datasets. *Procedia Computer Science*, 237, 586-593.
- [16] Rani, K. P., Rajeswari, T. R., Chitra, N. T., & Rao, B. D. (2023, May). Analysis of women safety in Indian cities using machine learning. In *AIP Conference Proceedings*, Vol. 2492, No. 1, AIP Publishing.