

# Nirbhaya – The Women Safety App

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**Abstract**—Women’s safety remains a critical concern, as existing emergency response applications often lack essential features such as real-time tracking, instant communication, and holistic support for both physical security and mental well-being. These shortcomings create significant gaps in providing immediate assistance and ensuring long-term security. This research presents an integrated approach to addressing these issues through the development of an advanced women’s safety application. The proposed solution introduces a comprehensive safety framework incorporating hands-free emergency activation, real-time location tracking, and quick access to safe zones such as police stations, hospitals, and fire stations. Live location sharing and an optimized alert system ensure immediate notifications to trusted contacts and authorities during emergencies. To further enhance security, an AI-powered chatbot provides personalized safety guidance, stress management support, and menstrual health tracking, making the application a complete safety companion. Unlike traditional safety models that rely on single-source tracking, the application integrates the Fused Location Provider API to ensure high-accuracy real-time monitoring, reducing errors and improving response efficiency. Additionally, by addressing key concerns such as data privacy, emergency response effectiveness, and accessibility, this solution bridges gaps in current women’s safety technologies. This research highlights the importance of combining security, health, and well-being features to create a more reliable and accessible safety solution. Future advancements may focus on expanding AI capabilities, incorporating predictive safety analytics, and integrating community-based response systems for enhanced protection. By offering a user-friendly and technologically advanced approach, this application represents a significant step forward in women’s safety technology, ensuring better security and support for women in diverse environments.

**Index Terms**—AI Chatbot, Emergency Response, Location-Based Assistance, Mental Health Support, Real-Time Tracking, Security Technology, Women’s Safety.

## I. INTRODUCTION

Women’s safety remains an essential worldwide concern, requiring progressive solutions that provide both instant security and long-term well-being support. Despite advancements in technology, many existing safety applications primarily focus on emergency response, often lacking vital features such as real-time tracking, mental health support, and seamless communication during crises [1][2]. These limitations create significant gaps in ensuring women’s safety, emphasizing the need for a more comprehensive approach. Various types of women’s safety applications exist, including panic alert systems, location tracking tools, and self-defense training apps. While these solutions address specific concerns, they often operate in isolation, failing to provide an integrated platform that covers all aspects of security and well-being. Among these categories, real-time security and emergency response systems play a crucial role in providing immediate assistance during distress situations. To bridge these gaps, the Nirbhaya Women’s Safety App is designed as an advanced, all-in-one security solution. Developed using Flutter, this application integrates SOS alerts, panic button activation, emergency contact messaging, and live location sharing to ensure instant support in emergencies. The app leverages the API for high-accuracy tracking, even in low-connectivity environments [3]. Additionally, an AI-powered chatbot offers safety guidance, mental health support,

and menstrual health tracking, making the app a holistic safety companion. By addressing challenges such as emergency response delays, privacy concerns, and accessibility limitations identified in previous research [2][4], the Nirbhaya Women's Safety App marks a significant advancement in women's safety technology. Its multi-faceted approach ensures enhanced security, improved accessibility, and personalized support, making it a reliable and innovative solution for women worldwide.

## II. LITERATURE SURVEY

In the paper [1] presented by Crawford, Salisbury, and McGrath, the authors explore the development of an mHealth app aimed at managing women's health and safety while on probation, as published in the Journal of Medical Systems. This app is designed to provide personalized health and safety support with culturally coordinated assistance. While the study demonstrates the effectiveness of individualized care, it lacks hands-free emergency activation and real-time tracking for instant access to police stations and hospitals, highlighting the need for improved emergency response mechanisms.

In the paper [2] by Shenoy, the authors propose a framework integrating technology with community participation to enhance women's safety. The study emphasizes leveraging criminal databases and social involvement to strengthen security measures. However, it lacks real-time emergency response, integrated personal security features, mental health support, and adequate privacy protection, which are critical factors in ensuring comprehensive safety solutions.

In the paper [3] by Yoo and Dourish, the authors investigate how women perceive safety data and the usability of safety applications. Through interviews and workshops, the research provides insights into effective application design. However, concerns are raised regarding privacy risks, the long-term effectiveness of safety applications, and the absence of dedicated safety apps for widespread use, which limits their practical implementation and accessibility.

In the paper [4] by Fernandez, the authors focus on the role of smartphone safety applications in smart cities. The study highlights the Circle Armored app, which offers real-time security features and global safety analytics. Despite its advantages, the research identifies limitations, such as the lack of integration

with emergency contacts and the absence of mental health support, restricting the app's ability to provide a holistic safety solution.

## III. PROPOSED SYSTEM

The Nirbhaya - The Women Safety App is designed with a structured flow to ensure user safety and accessibility during emergencies. The system follows a block-based modular architecture, allowing seamless user interactions with various safety features. The architecture begins with the Start & Permission Check module, where the app verifies necessary permissions such as location access. If permissions are granted, the user proceeds to the Login or Signup page for authentication before accessing the safety features. If permissions are denied, the app prompts the user to enable them; otherwise, access to location-based services remains restricted. The technology stack includes Flutter for UI design and permission handling, along with Google Maps API & Location Services for real-time location tracking.

Once authenticated using Firebase Authentication, the user is redirected to the Home Page, which acts as a dashboard for various safety functionalities. These include Emergency Contacts, Explore LiveSafe, Be Nirbhaya With, Panic Button, Track Me, Chatbot Assistance, and the Record Feature. The Emergency Contacts & SOS Alert System allows users to store trusted contacts who receive distress messages in emergencies. The system is triggered either by a Shake Feature, where shaking the phone sends an alert, or by a Panic Button, which manually triggers an SOS message. When activated, the app automatically sends an SMS with the user's real-time location to emergency contacts using the Flutter Sensors Package for shake detection and Firebase Cloud Messaging (FCM) for notifications.

The Explore LiveSafe feature enables users to locate the nearest police stations, hospitals, fire stations, and medical stores. This is achieved through integration with Google Places API & Google Maps API, allowing users to navigate safely to emergency services. The Be Nirbhaya With section enhances security with features such as SOS Alert with Shake Feature, Periodic Location Sharing, and Self-Defense Techniques. Users can access self-defense videos via Firebase Storage & YouTube API, while periodic location updates are managed using Firebase Realtime Database.

The Panic Button is another crucial safety mechanism that allows users to send emergency alerts and directly call emergency helplines, including police, ambulance, and fire brigade. The Flutter Call package facilitates emergency calls, while SMS services ensure distress messages are delivered promptly. The Track Me feature enhances personal safety by enabling real-time location sharing with trusted contacts. Users can manually activate tracking or configure auto-updates, leveraging the Google Maps API for location tracking and Firebase Firestore for real-time updates. To provide additional assistance, the Chatbot Assistance feature offers quick responses to safety-related queries, mental health support, and menstrual health guidance. Built using llama3-8b-8192 llm model with groq API, it ensures an interactive and informative user experience. Finally, the Record Feature allows users to capture audio in emergencies, storing them locally or in Firebase Cloud Storage for future reference.

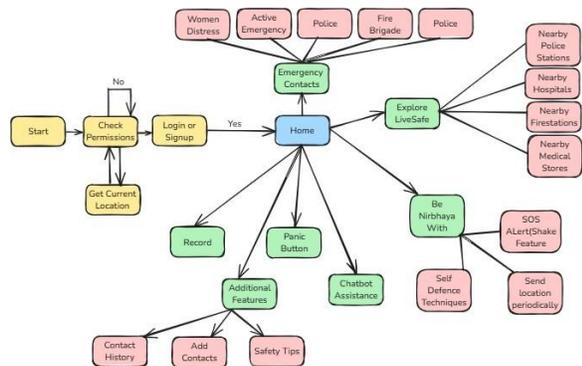


Fig III.1 - System Architecture

IV. RESULTS AND DISCUSSION

Initial evaluations of the Nirbhaya - The Women Safety App indicate that its modular structure drastically enhances response performance and user accessibility during emergencies. The integration of real-time tracking, emergency alerts, chatbot assistance ensures seamless user interaction with safety features. Various modules work collaboratively to process live location data, trigger alerts instantly, and provide quick access to emergency services with minimal user input. Screenshots from the dashboard illustrate clear visualizations of live location sharing, emergency contact setup, and SOS alert activation. While further testing and real-world deployment are necessary to refine the system, the preliminary results

highlight the potential of leveraging a multi-functional approach to enhance women's safety and security.

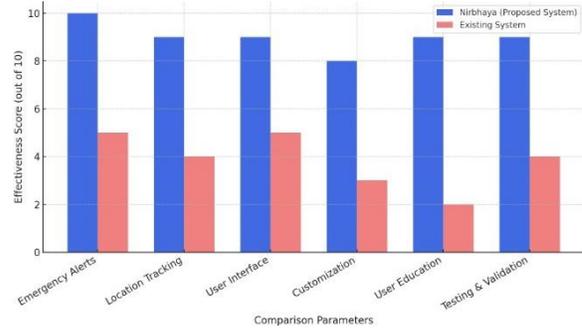


Fig IV.1 – Comparison Chart of Proposed System vs. Existing System

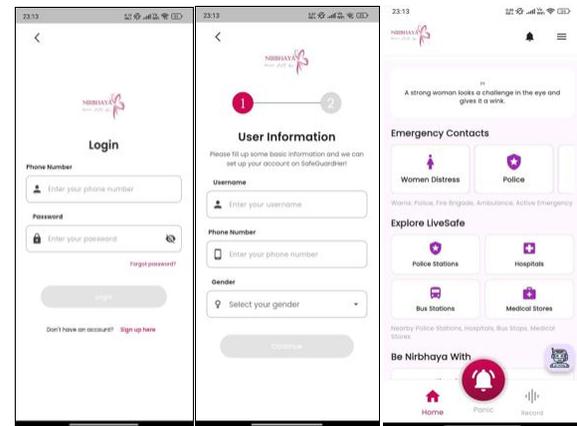


Fig IV.2 – Login/Signup and Home Page

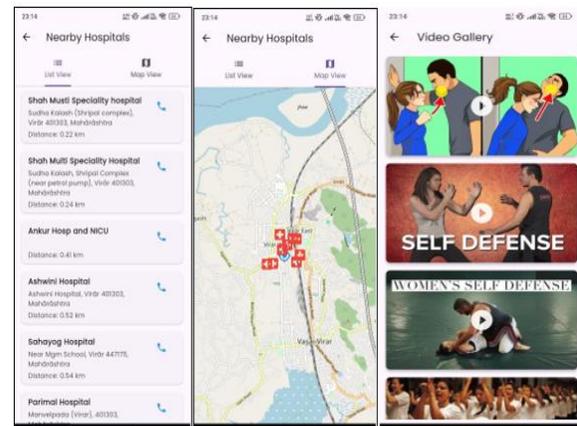


Fig IV.3 – Explore LiveSafe (Nearby Hospitals) and Be Nirbhaya With (Self Defense Techniques)

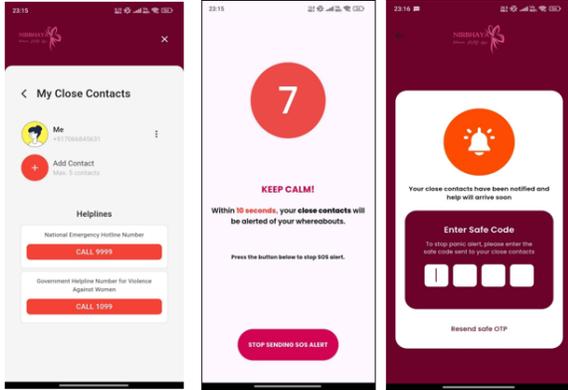


Fig IV.5 – Emergency Contacts and SOS Alerts (Panic Button and Shake)

## V. CONCLUSION

This paper delivered the Nirbhaya Women’s Safety App as a comprehensive solution addressing vital gaps in existing safety applications. By integrating real-time monitoring, hands-free emergency activation, and AI-driven support, the application enhances both physical security and mental well-being. The use of the API ensures precise real-time tracking, while features like SOS alerts, panic button activation, and emergency contact messaging provide instant assistance in distress situations. Moreover, the inclusion of an AI-powered chatbot for safety guidance, mental health support, and menstrual health monitoring makes the app a holistic safety companion. By overcoming limitations in emergency response, privacy concerns, and user accessibility, this application significantly improves women’s safety technology. Future enhancements may focus on expanding AI capabilities, incorporating predictive safety analytics, and integrating broader community support features. The Nirbhaya Women’s Safety App serves as a reliable and innovative step toward empowering women with enhanced security, accessibility, and well-being in diverse environments.

## VII. FUTURE SCOPE

Future work will focus on AR navigation for more secure course guidance, permitting users to identify secure paths in real time. Moreover, AI-powered risk detection will be integrated to recognize unusual activities and generate instant alerts. The application will also support smartwatch and fitness band SOS integration, allowing users to trigger emergency responses directly from wearable devices. To enhance

accessibility, an NLP-powered chatbot with multilingual support will be implemented, ensuring effective communication across diverse user groups. The system will also establish a direct connection to police and community responders, improving emergency response efficiency. Furthermore, offline SOS and emergency features will be added, ensuring safety assistance even in areas with limited connectivity. Ultimately, voice command activation will be included to enable hands-free alerts, making the system more user-friendly and responsive in critical situations.

## APPENDIX

i) <https://plantuml.com/>

PlantUML tremendously helped in making the UML diagrams in the project. The various UML diagrams created using PlantUML include Component Diagrams, Deployment Diagrams, Data Flow Diagrams, Use Case Diagrams, and Entity Relationship Diagrams. PlantUML allowed for efficient and dynamic diagram creation using a text-based approach, making it easier to modify and update UML diagrams throughout the project development.

ii) Android Studio

Android Studio was used for setting up the entire project.

iii) Flutter

The Flutter framework is used for developing the mobile application, with Dart as the programming language. Flutter provides a cross-platform development environment, enabling the app to run seamlessly on both Android and iOS devices. This change ensures that the Nirbhaya Women Safety App is built with a modern UI toolkit, offering a fast, smooth, and interactive user experience while maintaining high performance and flexibility.

## ACKNOWLEDGMENT

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#### REFERENCES

[1] "An Intervention Development Study of an mHealth App to Manage Women's Health and Safety While on Probation" by Allison D. Crawford, Emily J. Salisbury, and Jacqueline M. McGrath. Published in Health & Justice, 2024.

Link:

<https://link.springer.com/content/pdf/10.1186/s40352-024-00277-6.pdf>

Summary: This study explores the development of a mobile health application tailored for women on probation, providing personalized health and safety support with culturally coordinated assistance. While the app demonstrates effectiveness in individualized care, it lacks hands-free emergency activation and real-time tracking for immediate access to police stations and hospitals.

[2] "A Holistic Framework for Crime Prevention, Response, and Analysis With Emphasis on Women Safety Using Technology and Societal Participation" by Meetha V. Shenoy, Smriti Sridhar, Girish Salaka, Anu Gupta, and Rajiv Gupta. Published in IEEE Access, 2021.

Link:

<https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&number=9416659>

Summary: This research emphasizes integrating technology with community participation to enhance women's safety. The framework leverages criminal databases and social involvement to improve security measures. However, it lacks real-time emergency response, integrated personal security features, mental health support, and adequate privacy protection.

[3] "Anshimi: Women's Perceptions of Safety Data and the Efficacy of a Safety Application in Seoul" by Chaeyon Yoo and Paul Dourish. Published in

Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, ACM, 2021.

Link:

<https://dl.acm.org/doi/pdf/10.1145/3449221>

Summary: This study investigates how women perceive safety data and the usability of safety applications. Through interviews and workshops, the research provides insights into effective application design. However, it raises concerns about privacy risks, long-term effectiveness, and the absence of dedicated safety applications for widespread use.

[4] "Challenges of Smart Cities: How Smartphone Apps Can Improve the Safety of Women" by Z.A.M. Fernandez, M.A.T. Cruz, C. Peñaloza, and J.H. Morgan. Published in IEEE Access, 2020.

Link:

<https://scihub.se/https://ieeexplore.ieee.org/abstract/document/9248546>

Summary: This research focuses on the impact of smartphone safety applications in smart cities. The study highlights the Circle Armored app, which offers real-time safety features and global safety analytics. Despite its advantages, the research lacks integration with emergency contacts and does not address mental health support, limiting its holistic effectiveness.