iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** V **Month of publication:** May 2025

DOI: https://doi.org/10.22214/ijraset.2025.71736

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue V May 2025- Available at www.ijraset.com

RakshaDeep: A Beacon of Safety for Women in Distress

Aditi Uike[1], Arfat Shaikh[2]
Bachelor's of Science in Data Science and Data Analytics, Vivekanand Education Society's College of Arts, Science and Commerce (Autonomous), Mumbai

Abstract: ***RakshaDeep is a safe, real time digital platform that supports the protection of women in distress through efficient access to a local center of support. The platform has three functional interfaces; the Victim, Intermediary and Admin. The two-way and secure communication of emergency needs is implemented so that a victim and intermediary can communicate efficiently without the risk of being compromised. Using geolocation services and an NGO dataset, we can ensure proper matching to service providers, whether legal aid, emergency responders or shelters, to ensure the best response possible. Some of the features include; live map based alerts, passphrase controlled intermediary access, admin dashboard for previous alerts with real time updates and smart filters allowing for compliant rapid response and good oversight for admins. The backend is implemented using Firebase Firestore as a realtime database for all records stored in structured documents, utility scripts for geocoding, parsing the json data, and filtering by distance. RakshaDeep focuses on privacy, dependability and user-centred design and was created as a technology enabled safety net for women in crisis.***

Keywords: Women's Safety, Firebase Firestore, NGO (Non-government Organization), Emergency Response, Real-Time Alert System, Location-Based Services, Privacy-Preserving Reporting, Digital Safety Tools, Social Impact Technology

I. INTRODUCTION

The safety and security of women have become critical social issues, especially in urban areas, over the past several years. Crimes such as harassment, abuse, and violence frequently go unreported due to fear, limited access to help, and societal stigma [1][2]. Bridging this gap requires not only community awareness but also robust technological interventions that can provide timely, location-based support to women in need.

RakshaDeep – A Beacon of Safety for Women in Distress – is a real-time digital platform developed to empower women by enabling them to send instant alerts to verified support centers in their vicinity. Similar to existing systems that connect users within a geographical radius to offer or seek emergency assistance [1], RakshaDeep offers role-based access through victim, intermediary, and admin interfaces for secure and streamlined reporting.

The platform uses geolocation, a well-structured NGO database, and Firebase cloud services to send the right kind of help based on what the user selects—whether it is Emergency, Legal, or Emotional/Shelter support. Users can view nearby NGOs within a five-kilometer radius that provide the needed services. The alert system, combined with an interactive map, ensures that each alert is stored safely and shown to admins in real time. The platform aligns with modern efforts in women's safety applications, combining multi-feature integration and real-time emergency communication to create an effective and socially impactful solution [2].

II. SYSTEM ARCHITECTURE AND FUNCTIONAL MODULES

A. System Overview

RakshaDeep is an easy-to-use safety platform meant to provide women in distress with timely, secure, and reliable access to aid. The system operates via three interlinked interfaces to simplify the process of assistance. The Victim Interface provides women a discreet method to call for assistance during emergencies, along with requesting aid related to legal, emotional, or shelter issues. This is supplemented by the Intermediary Interface, intended for trusted third person, including family members, friends, or social workers, to raise warning signals on the victims' behalf through a secure passphrase to avoid misuse. On the administrative side, the Admin Dashboard enables authorized persons to observe incoming warning signals in real time, see victims' current positions through interactive maps, and manage the cases by updating the status and the alert log.After an alert has been raised—by the victim or an intermediary—geolocation or manual input in the system automatically locates the sender. It then checks for NGOs in the immediate vicinity of 5 kilometers providing the support sought.

©IJRASET: All Rights are Reserved

The alert and supporting information are stored safely in the system, enabling swift and effective response by the admin group. RakshaDeep focuses heavily on speed, confidentiality, and operational effectiveness, bringing the right assistance at the right moment.

B. *Three - Interface Model*

RakshaDeep is a three-interface design with Victim, Intermediary, and Admin roles, each configured with specific functionalities and access levels to ensure secure communication and coordinated response. The system starts with a main page(Refer Fig. 1) that offers users three options-Victim, Intermediary, and Admin-depending on their role.

1) Victim Interface: A simple and swift interface allows women to ask for assistance discreetly. Users can specify the type of aid—Emergency, Legal, or Emotional/Shelter—and input the location through auto-tracking IP location or enter pincode and address. Depending on the choice of assistance and location, NGO lists of the closest 5 km appear on an interactive map. The user can see descriptions and post alerts with voluntary comments. Alerts are stored safely to be accessed by admins.(Refer Fig. 2 and Fig. 3).
2) Intermediary Interface: This interface would be used by responsible persons such as witnesses, social workers, or the victim's friends to raise an alert on behalf of the victims. It would be secured with a secure passphrase (e.g., “RakshaAccess@2025”) to avoid misuse. Similar to the Victim Interface, intermediaries choose the assistance to be provided and the location, and are given a filtered list of NGOs. Intermediaries can even give a short note—e.g., “Subject is unreachable” or “Locked indoors”—for further context to the admin staff.(Refer Fig. 4 and Fig. 5).
3) Admin Dashboard: The administrator interface is the control dashboard. On secure login by the admin, all the alerts are made available to be viewed in real time, categorized by the nature of aid requested and source (Victim or Intermediary). Each alert has the timestamp, location, and notes in both narrative and table modes. Color icon interactive map displays the nature of distress and the location. If geolocation facility is not available automatically, the system defaults to pincode entered location. Admins may mark the status of all the alerts as "Pending," "Acknowledged," and "Resolved" in order to maintain efficient monitoring and tracking.(Refer Fig. 6 and Fig. 7).

C. *Technologies Used*

RakshaDeep uses a mix of modern technologies to design a secure and responsive emergency alert system. The technologies work together to manage location-based alerts, information visualization on the map, and the system's real-time behavior.

1) Firebase Firestore: Firebase Firestore acts as the real-time cloud database for holding all the alert information. Alerts submitted by victims and intermediaries are safely pushed to Firestore collections to enable administrators to immediately monitor and act. It has a cloud-based design to guarantee the availability, scalability, and seamless synchronization across the interfaces.
2) Folium Maps: In visualizing alert information, the platform employs Folium, a Python library developed based on Leaflet.js. The interactive maps on the admin dashboard feature victim locations color-coded with icons based on the category of assistance required. The map interface enables admins to comprehend spatial relationships between victims and the surrounding NGOs, facilitating coordination.
3) Python Scripts: Customized Python scripts are used to process tasks related to the loading of NGO datasets, the calculation of geodesic distances based on longitude and latitude, and filtering NGOs by proximity and the nature of aid. Integrated error handling makes the system robust and responsive during operations.
4) Geolocation APIs: RakshaDeep utilizes ipinfo.io to geolocate users from their IPs. If auto-detection proves to be incorrect, users can manually enter their address and pincode. The system further employs Nominatim (OpenStreetMap) for reverse geocoding to transform coordinates into human-readable address forms, which ensures better mapping and alert placement.

D. *Backend Utilities*

RakshaDeep's backend is powered by modular utility scripts to ensure smooth integration between the user interfaces, geolocation services, and NGO data systems. These utilities are meant to process information fast, to make the whole system more reliable, and to allow a secure channel of communication with the database.

1) Firebase Utility: The Firebase module supervises all interactions with Firestore. It uses encrypted credentials to ensure secure data transfer. It manages alert submission and retrieval.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

The key operations are: sending alerts from users and displaying alerts on the admin dashboard. There is error handling as well as logging for every incident that builds reliability and traceability into the system.

2) Geolocation Utility: Location detection in RakshaDeep is achieved through two methods: IP-based geolocation by means of ipinfo.io, and manual entry as a fallback. Reverse geocoding with Nominatim is then used for precision in converting coordinates into recognizable addresses. This hybrid approach guarantees location accuracy even under conditions such as low connectivity or faulty IP detection.

3) NGO Utility: The system relies on a pre-fed dataset of NGOs inclusive of coordinates, categories of services, and contact details. Filtering of NGOs is done by calculating geodesic distances and matching requested help types with their service offerings. Only those NGOs falling under a 5 km radius that can serve the category of help requested are shown so that the victims get the assistance that is quite feasible and nearby.

III. METHODOLOGY AND DATA FLOW LOGIC

A. *Alert Processing Workflow*

Victims and their trusted intermediaries- friends, family, social workers- would raise an alert through interfaces designed specifically for the purpose. Once the alert is generated, Firebase securely stores the alert, noting that it immediately pushes it on the Admin Dashboard for intervention first. Such details would include the type of help required (Emergency, Legal, Emotional/Shelter), location (auto-detected or manual), and optional notes so the correct help can be dispatched as soon as possible.

B. *NGO Filtering Logic*

The system calculates the distance between the user and nearby NGOs, filtering those within 5 km. Then it applies keyword-based parsing to match the type of need with the NGO services. The filtered NGOs are shown to the user as their map markers, which are clickable for further details and intervention.

C. *Geolocation and Fallback Conditions*

The preferred method for initial location detection at RakshaDeep is geo-based IP detection through ipinfo.io. Failing this will prompt the user to enter the address and pincode, which Nominatim converts to coordinates. Then, if none of these can be done, it would trust the pincode as a good approximation and forward the alert for further processing.

D. *Alert Storage and Retrieval Logic*

Alerts are stored in Firebase Firestore as structured documents, carrying types, location, reporter role, timestamp, and notes. With real-time sync, admins can see alerts at once and keep them under their thumb by managing their status updates of Pending/Acknowledged/Resolved to ensure smooth emergency handling.

E. *Admin Decision Flow*

The Admin Dashboard provides real-time monitoring with filter options based on urgency and type of assistance. The alerts are color coded and geotagged. The Admins update status tags while handling the alert, thereby ensuring the handling of the alert is transparent and traceable, supporting timely follow-up and case resolution.

IV. IMPLEMENTATION AND RESULTS

A. *Platform Setup and Tools*

The RakshaDeep system was implemented in Python within the VS Code environment. Streamlit was adopted to build the GUI for all three interfaces. Firebase Firestore was integrated into the project for real-time database synchronizing between the sender and the receiver. The Geopy library was applied for distance calculations, Pandas for data handling, and Folium for the interactive map built for the admin. IPinfo.io and Nominatim APIs were used for geolocation and reverse address decoding respectively.

B. *GUI Demonstration*

The graphical user interfaces in RakshaDeep are designed for intuitive use and functional clarity. Each interface — Victim, Intermediary, and Admin — provides a streamlined layout tailored to the user's role and responsibilities.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

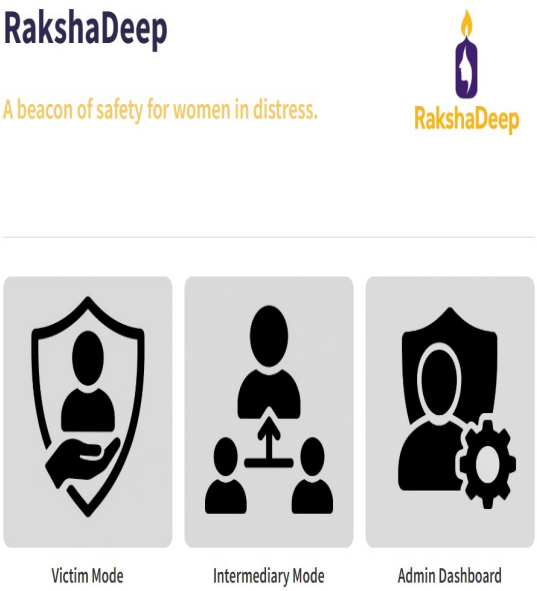


Fig. 1: Main Interface – Role Selection Page

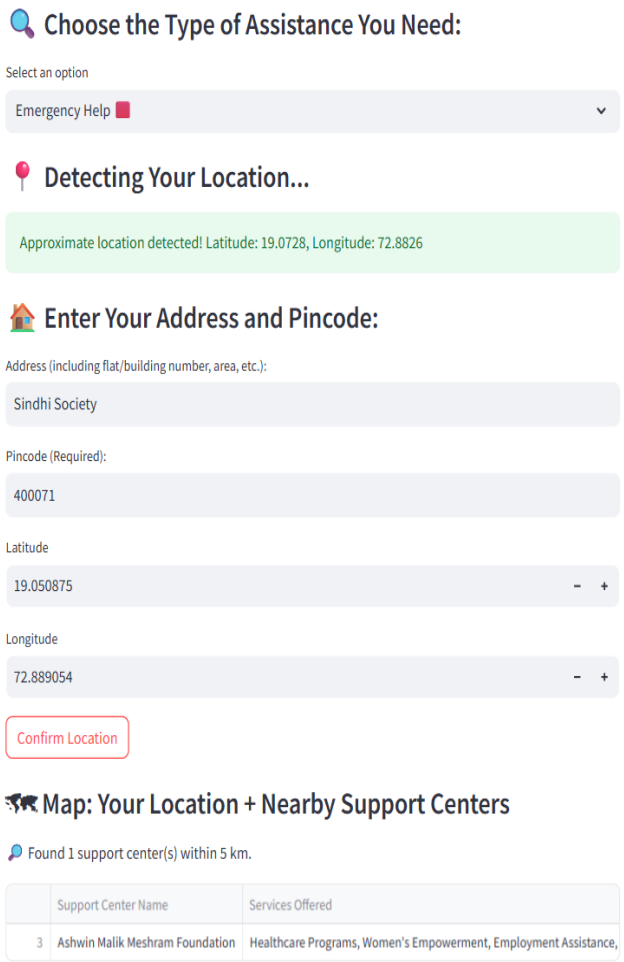


Fig. 2: Victim Interface – Selecting Help Type, Entering Address, and Viewing Nearby NGOs

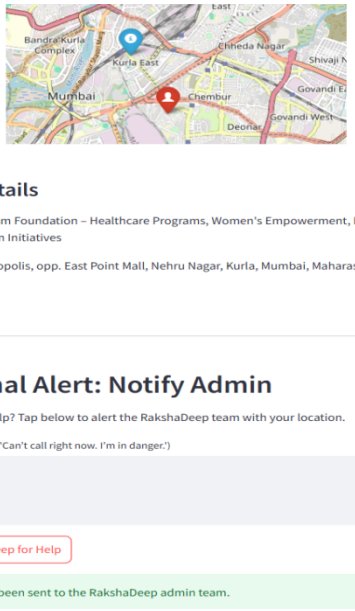


Fig. 3: Victim Interface –Map View of User Location and Nearby NGOs with Alert Submission Option

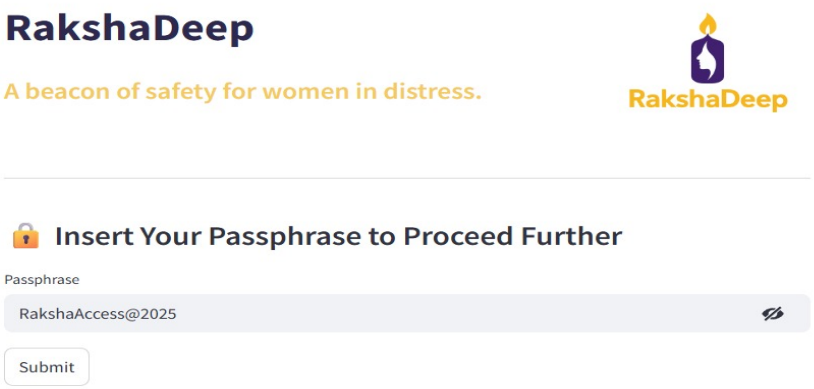
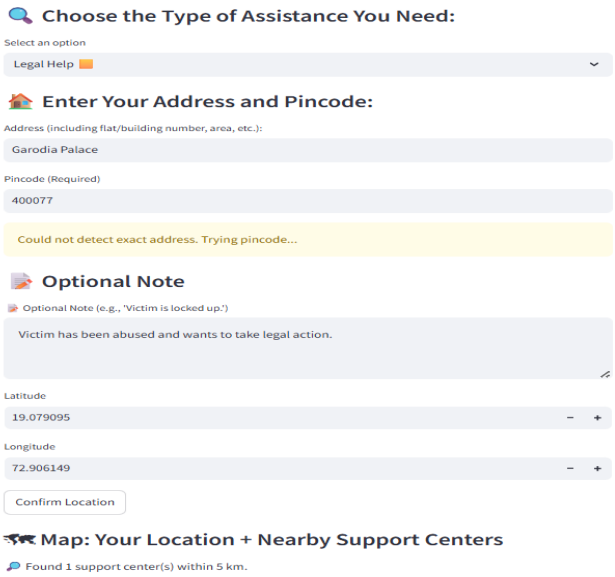


Fig. 4: Intermediary Interface – Secure Access via Passphrase Entry



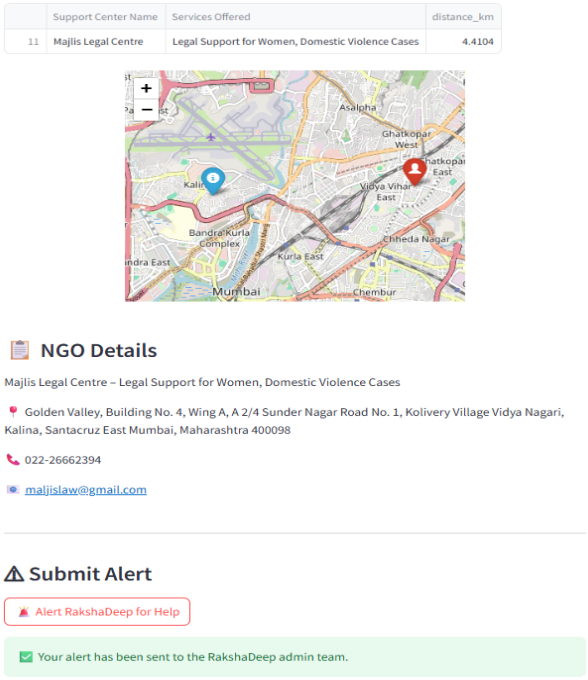


Fig. 5: Intermediary Interface – Help Type Selection, Address Input, Optional Note, NGO List, Map View, and Alert Submission

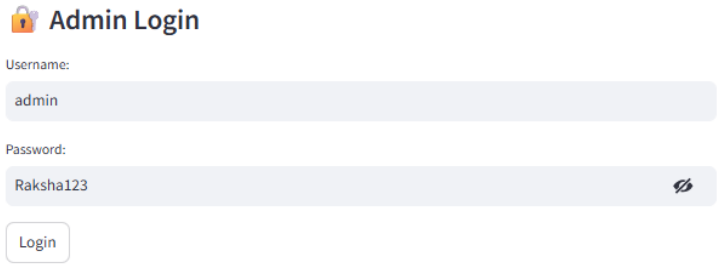
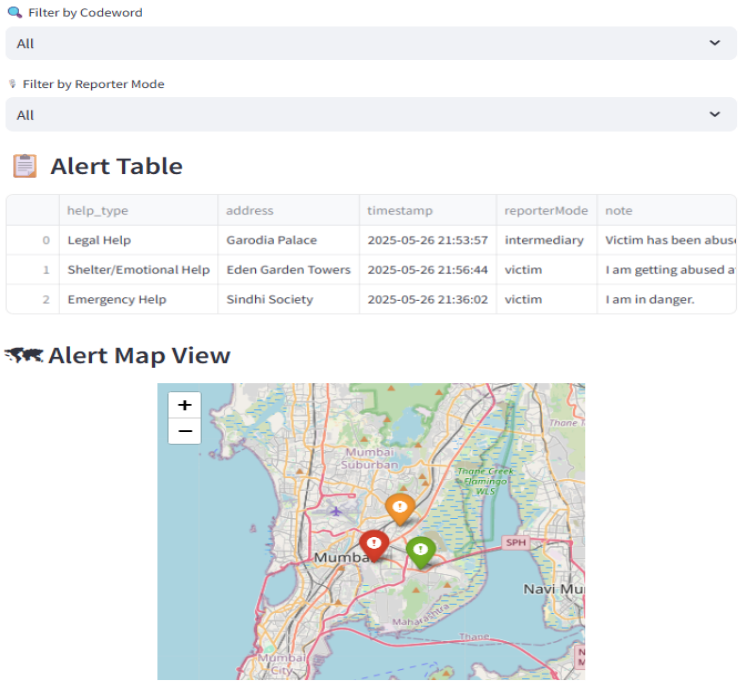


Fig. 6: Admin Interface – Secure Login with Admin Credentials



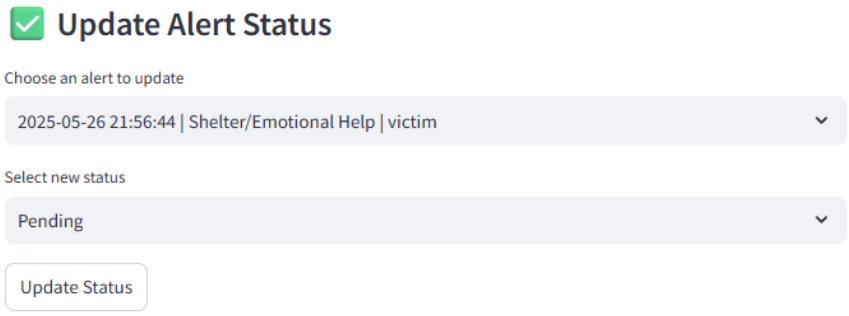


Fig. 7: Admin Interface – Filter Options, Alert Table, Map View with Color Markers, and Status Update Controls

C. System Execution Output

A test scenario was conducted where a victim selected 'Emergency' and allowed the system to auto-detect her location via IPinfo. The system reverse-geocoded her location, matched her with 3 NGOs within a 5 km radius offering emergency support, and sent the alert to Firebase. This alert was instantly visible to the admin on both the tabular view and map, with all associated metadata including timestamp, coordinates, and request type. The admin then marked the case as 'Acknowledged,' and this status was updated system-wide.

V. FUTURE ENHANCEMENTS

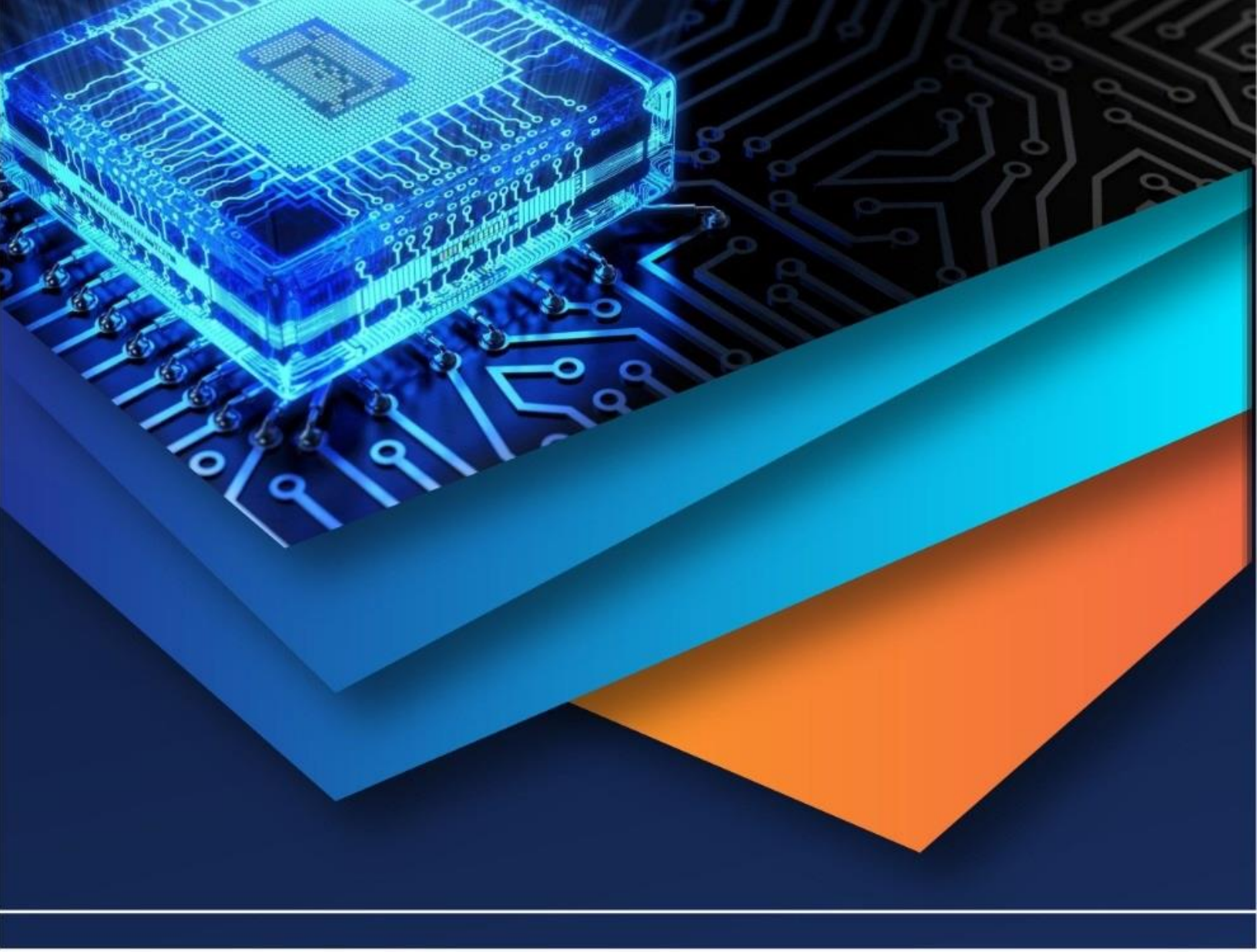
Though RakshaDeep performs well, several improvements would help enlarge its scope and purpose. An SMS-based alert option would cater to users in low-connectivity areas. Furthermore, alerts may be given a priority ranking on their own with an AI-based system that will assess urgency depending on what the alert states; thus, the faster the admins will respond to the critical cases. An NGO database with real-time auto-updated features will ensure more service coverage on a larger scale more accurately. The separate app facilitates offline usage with more secure user authentication using OTP or biometrics. Multi-language support would provide accessibility to users who can't interact in English. Eventually, enhancement of the platform beyond Mumbai to a pan-India level will help any victim across India to benefit from the RakshaDeep safety net.

VI. CONCLUSION

RakshaDeep makes a practical, safe, and reactive solution for women in distress, integrating real-time alerting, geolocation, and NGO coordination via a triple-interface scheme. This efficient architecture allows the victims or intermediaries to send alerts faster, whereas the administrators are secured with commands that assure a suitable response accordingly. This platform is another instance where technology can genuinely be innovated for social good, having been developed considering Firebase, Folium maps, and geolocation APIs. Currently, RakshaDeep is confined to a certain location, and there is great scope for expansion wherein the platform can begin to incorporate offline access, multi-native, AI prioritization, and national reach and hence would become this fully scalable model for security and empowerment across India.

REFERENCES

[1] A. R. Arundhati and G. Sinha, "Women Safety System with Emergency Alert, Analysis and Prediction," [Online]. Available: https://ieeexplore.ieee.org/document/10742698
[2] D. V. K. Reddy, A. Lakkshmanan, and S. G. Sohan, "Integrated Women's Security System with Safe Route Navigation and Instant Law Enforcement Reporting," [Online]. Available: https://ieeexplore.ieee.org/document/10527644
[3] D. Chand, S. Nayak, K. S. Bhat, S. Parikh, Y. Singh, and A. A. Kamath, "A mobile application for Women's Safety: WoSApp," [Online]. Available: https://ieeexplore.ieee.org/document/7373171
[4] D. S. Prashanth, G. Patel, and B. Bharathi, "Research and Development of a Mobile Based Women Safety Application with Real-Time Database and Data-Stream Network," [Online]. Available: https://ieeexplore.ieee.org/document/8074261
[5] National Crime Records Bureau, "Official Website," [Online]. Available: https://www.ncrb.gov.in/



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)