

Rakshita – the Girl's Shield

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Abstract

Rakshita: Girls' Shield is a smart safety application designed to enhance women's security by providing real-time emergency assistance. Inspired by the framework of Raksha, Rakshita integrates GPS tracking, SOS alerts, emergency contacts, and AI-based threat detection to offer a proactive approach to personal safety. The application ensures rapid response by notifying predefined contacts and nearby authorities in distress situations. Additionally, features like location sharing, and real-time alerts make it a reliable tool in critical scenarios. By leveraging technology for safety, Rakshita aims to empower women and create a secure environment.

Keywords: Secure payment, Taxi Service, Harassment prevention, emergency assistance, GPS tracking, location sharing, SOS alerts, women's safety

1. Introduction

In the contemporary landscape of advancing gender equality, the persistent issue of women's safety remains a focal concern. Despite strides in social progress and legislative measures, women across diverse socio-cultural contexts continue to grapple with safety challenges that compromise their freedom and well-being. Driven by a commitment to address these pressing concerns, we have developed "Rakshita: The Girls' Shield"—a pioneering endeavor at the nexus of technology and social empowerment. Inspired by the Raksha app, Rakshita aims to furnish women with a robust technological solution to augment their safety and self-determination. Through real-time location tracking, discreet emergency alert mechanisms, and innovative features informed by extensive research, our application empowers women with practical tools tailored to their unique safety requirements. Safety and security are the utmost important requirements of every individual in the present scenario. In a developing country like India, the rapidly increasing violence against women is a daunting task for policymakers and regulatory authorities. In the year 2019, a total of 405,861 cases were reported under the

category of crimes against women. An analysis of police records found that approximately one in five women reported having experienced physical and sexual violence from an intimate partner, and one-fourth of women have at least been sexually or physically assaulted by a spouse since the age of 15 years. In situations like these, women's safety and security are significantly affected. Persons with international exposure claimed that they felt safer when they were in some places abroad compared to their own country due to the weak legal points and countermeasures in protecting women. [1]

2. Problem Definitions

Women's safety remains a pressing issue in today's society, with increasing cases of harassment, threats, and unsafe situations in public places, transportation, and digital spaces. Many women struggle to seek immediate help due to fear, hesitation, or the unavailability of trusted contacts. Traditional safety measures often fail due to delayed emergency responses, lack of secure transportation options, and inefficient reporting mechanisms. Additionally, there is a lack of AI-driven assistance that can guide users during distressing situations. To address these

challenges, Rakshita – The Girl's Shield is designed as a smart security solution that provides real-time protection, SOS alerts, secure payment safety, AI-powered assistance, and a reliable reporting system. By integrating technology with safety, Rakshita ensures that women can navigate their daily lives with confidence and security. [2]

3. Methodology

Design and Architecture: The architecture of Rakshita comprises:

Frontend: Developed using React Native for a seamless user experience.

Backend: Built with Node.js to manage business logic and handle API requests.

Database: Utilizes MongoDB to store user data, reports, and evidence securely.

Cloud Services: Hosted on Azure for API deployment and server hosting. [3]

4. Key Features and Algorithms

Secure Pay: Uses a custom logic algorithm to simulate fake payments and send alerts.

Nearby Women Taxi/Auto: Implements a location-based search algorithm (e.g., Haversine formula) to calculate the distance between GPS points.

Suspicious List: Employs pattern-matching or filtering algorithms to analyze and store reported numbers.

AI Chatbot: Uses NLP algorithms like GPT for advanced conversational capabilities.

SOS System: Incorporates real-time location tracking using GPS and geo-fencing algorithms.

Report Filing: Utilizes CRUD operations with data validation and hashing algorithms for evidence storage.

5. Programming Languages/Tools

Frontend: React Native (using Expo for development)

Backend: Node.js

Database: MongoDB

AI/ML: Python

Cloud: Azure

Other Tools: JWT for authentication, Postman or Insomnia for testing APIs

6. Scope of Work

The scope of the Rakshita project encompasses the following key areas:

6.1. Application Development

Ensuring seamless operation across mobile devices with compatibility for platforms.

6.2. Real-time Assistance

Streamlined mechanisms for immediate assistance during emergencies, including integrated SOS features and efficient communication with predefined contacts.

6.3. Geolocation Services

Advanced geolocation features enabling users to share their real-time location effortlessly.

6.4. Emergency Workflow

In emergency situations, the app sends real-time location updates and notifications to predefined contacts and authorities, and securely stores evidence for later use.

6.5. Community Support

A platform for users to connect with nearby individuals who may offer assistance in times of need, fostering a sense of community and support.

6.6. Privacy and Security

Robust data encryption and stringent measures to protect user information and maintain data confidentiality.

6.7. User Interface

Designed with a user-centric approach to ensure ease of navigation, even in high-stress situations, and integrated accessibility features for inclusivity.

7. Working

7.1. Admin Portal

Admin manages the system, monitors reports, and receives alerts from users. Admin takes actions based on alerts from features like Secure Pay and SOS.

7.2. User App

Users log in or sign up to access features like Secure Pay, SOS, and Nearby Women Drivers. The AI chatbot assists with navigation and reporting. SOS alerts track location and send data to emergency contacts and admin. [4]

7.3. Emergency Workflow

In case of an emergency (via SOS or Secure Pay), the app sends real-time location updates and notifications to predefined contacts and authorities. Evidence security are significantly affected (e.g., reports, images, audio) is stored securely for later use.

8. Models Used

8.1. Process Model

Agile Development Model: Iterative and incremental development focusing on continuous feedback and quick iterations.

Mathematical Model

NLP Models: Utilizes TF-IDF for simpler bots or Deep Learning for advanced conversational models.

8.2. Architectural Model

Three-tier Architecture

Presentation Layer: React Native frontend

Application Layer: Node.js backend

Data Layer: MongoDB

AI Integration: Python-based AI/ML modules hosted on Azure

Real-time Features: Uses Socket.IO or similar technology for real-time location tracking and updates Through real-time location tracking, discreet emergency alert mechanisms, and innovative features informed by extensive research, our application empowers women with practical tools tailored to their unique safety requirements (Figure 1)

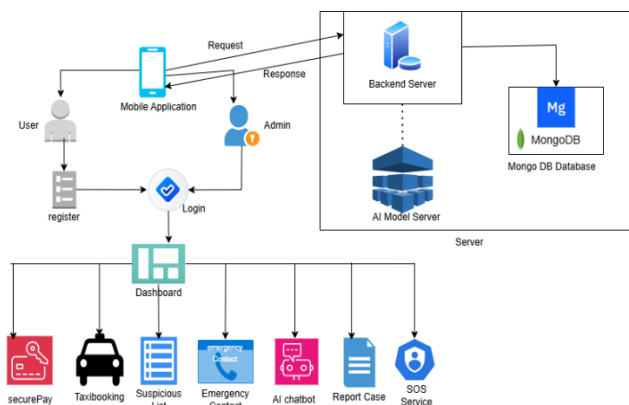


Figure 1 Architectural Model

9. Objective

- Develop an integrated system for women's safety on campuses.
- Utilize AI & emergency response for instant support.
- Implement secure deception-based payments to alert law enforcement.

- Provide a seamless mobile and web-based safety system. (Figure 2)

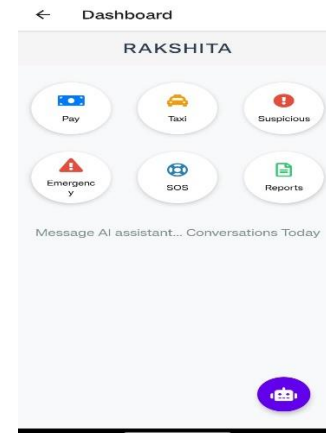


Figure 2 Integrated System for Women's Safety

Results

Our testing and evaluation demonstrated that Rakshita's features significantly enhance women's safety. The AI-based threat detection provided proactive alerts in simulated scenarios, and the SOS system successfully notified predefined contacts and authorities with accurate real-time location updates. Users praised the app's user-friendly interface, voice activation, and reliable offline mode, highlighting its effectiveness in critical situations. [5]

Future Scope

Rakshita aims to expand beyond campuses to create a city-wide safety network, ensuring women's security everywhere. By integrating with law enforcement, the app enables automated threat reporting for faster responses. Additionally, Machine Learning helps predict risks by analyzing patterns and identifying unsafe areas. This advanced approach enhances real-time protection, proactive safety, and rapid emergency response, making cities safer for women.

Conclusion

Rakshita: The Girls' Shield successfully integrates various advanced technologies to enhance women's safety, providing real-time emergency assistance and promoting a secure environment. Its unique features, such as AI-based threat detection, Secure pay, and Suspicious list, offer a proactive and reliable



approach to personal safety. With Rakshita, women are not alone in distressing situations—the app acts as a trusted companion, providing instant help and security whenever needed. By expanding to city-wide networks and continuously improving safety features, Rakshita aims to create a safer, more secure world for all women.

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