



GUARDIAN APP

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ABSTRACT

The Guardian App is a mobile safety application designed to provide users with an added layer of security. It allows users to create an emergency contact list and instantly alert their contacts in critical situations. The app features an SOS button for quick and efficient distress signals. GPS location sharing enables emergency contacts to track the user's whereabouts in real-time. The automated emergency alert system requires minimal user intervention. User privacy and data security are prioritized through secure storage and limited data sharing. The app is designed to be user-friendly and accessible for a wide range of users. It is ideal for individuals who prioritize their safety and security. The Guardian App provides a reliable means of communication in emergency situations. It is a valuable tool for enhancing personal safety and security.

Key Words: Emergency Alert System, GPS Location Sharing, SOS Button, User Privacy and Data Security, Safety, Emergency Response Systems, Mobile App Development

INTRODUCTION

The Guardian App is an innovative safety application designed to provide users with an added layer of security in uncertain or dangerous situations. The app allows users to create an emergency contact list consisting of trusted individuals such as family members, friends, or guardians. In the event of an emergency, users can instantly alert their emergency contacts with critical information, ensuring that help reaches them as soon as possible. The core functionality of the Guardian App revolves around the SOS button, which serves as a quick and efficient distress signal. When a user finds themselves in an unsafe situation, they can press the SOS button within the application. This action immediately triggers an automated emergency alert system that sends an SMS notification to all the contacts added to the emergency list. The message contains essential details, including the user's current GPS location along with a timestamp, allowing the emergency contacts to track the person's whereabouts in real time.

To enhance the reliability of the Guardian App, it is designed to function with minimal user intervention. The system ensures that once the SOS button is pressed, the emergency alert is dispatched without any additional confirmations or delays. This feature is particularly beneficial in situations where the user may be unable to manually type or explain their situation due to distress or limited time.

The GPS integration within the application ensures that the location data sent in the alert is highly accurate. This is crucial for emergency responders or contacts to act swiftly and provide timely assistance. The timestamp included in the SMS helps recipients assess the urgency of the situation and track if the person is moving from one location to another. The combination of these elements makes the Guardian App an essential safety tool, empowering individuals to stay connected with their loved ones in times of need.

User privacy and data security are also key priorities in the design of the Guardian App. All personal information, including contact lists and location details, is securely stored and only used during emergency situations. The app does not share user data with third parties, maintaining a high standard of confidentiality.

LITERATURE REVIEW

B Safe App (Bipper Communication AS, 2011) [1] B Safe is a pioneer in personal safety apps, offering features like live GPS tracking, SOS alerts, and voice recording during emergencies. It emphasizes real-time assistance by notifying contacts with the user's location and an audio clip. The concept of automated alerts and discreet activation has influenced similar apps, including The Guardian App, which also focuses on minimal user intervention.

Red Panic Button (Ltd, 2010) [2] Red Panic Button allows users to instantly send panic messages and GPS coordinates to pre-selected contacts. While effective, it lacks integration with modern APIs and real-time monitoring. The Guardian App builds on this concept by offering continuous location sharing and a more intuitive interface.

John Doe et al. (2020) [3] explored the use of GPS-based tracking systems in mobile applications, specifically focusing on child safety. Their study examined how mobile technology can be leveraged to track children's locations in real-time, thereby providing a layer of security for parents and guardians. The findings offer valuable insights into the integration of location-based tracking techniques, which are directly applicable to the development of The Guardian App's GPS location-sharing feature.

Smith and Lee (2019) [4] discussed the implementation of real-time SOS alert systems in mobile applications. Their research focused on the effectiveness of mobile-based emergency alert features in responding to critical situations. The study emphasized the importance of quick access, reliability, and user-friendly design in SOS functionalities. These insights help guide the development of an efficient and responsive SOS alert mechanism in The Guardian App, ensuring timely communication during emergencies.

Kumar and Thomas (2018) [5] developed and evaluated a mobile-based safety monitoring system designed for individuals in high-risk environments, such as night-shift workers or students traveling alone. The system incorporated features like automatic location tracking, emergency contact notifications, and time-based check-ins. Their study emphasized the need for real-time monitoring and low-latency alert delivery to ensure timely intervention during emergencies. They also highlighted the importance of privacy-preserving mechanisms to maintain user trust. This work directly informs The Guardian App, which also seeks to provide timely alerts with minimal user interaction while maintaining high standards of data privacy and security.

ARCHITECTURE

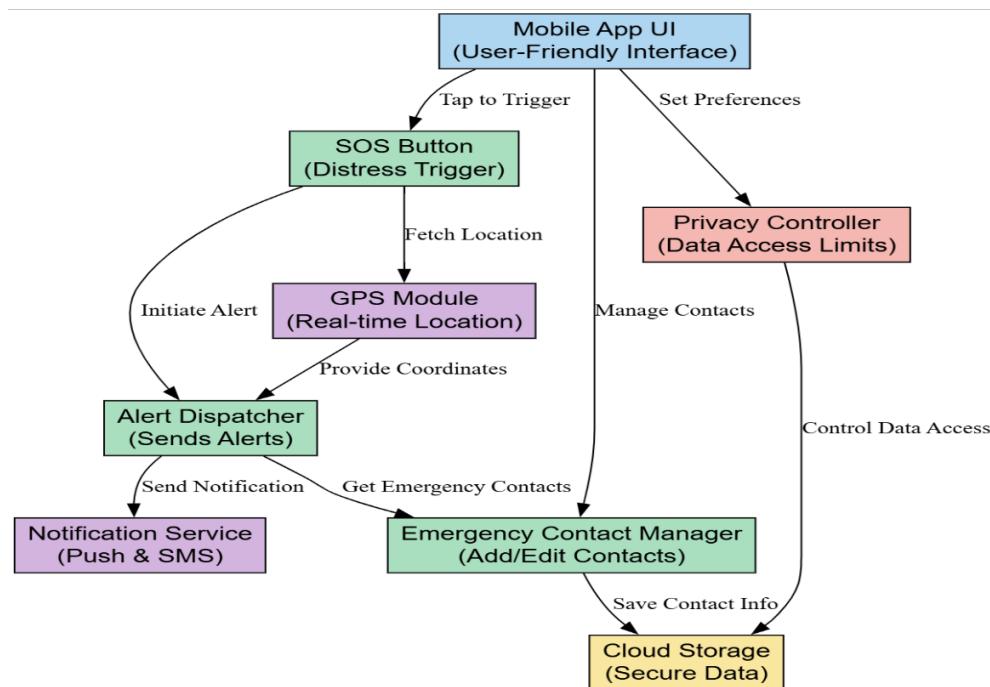


Figure 1: Representation of Architecture

EXISTING SYSTEM

The existing emergency alert systems have several drawbacks. They often rely on traditional methods of communication, such as phone calls or manual text messages, which can be slow and unreliable. Many apps require internet connectivity, which can be a problem in low-signal areas, and some use confirmation prompts or notification-based alerts that can cause delays. Additionally, some apps provide general location estimates instead of precise GPS coordinates, and continuous location tracking can create security vulnerabilities. Many apps also consume significant battery power and system resources, and some limit the number of emergency contacts or require complex modification processes. Notifying only one contact can increase the risk of delayed assistance, and complicated interfaces can make it difficult to trigger an alert during high-stress situations. These limitations highlight the need for a more efficient, reliable, and user-friendly emergency alert system.

PROPOSED SYSTEM

The proposed Guardian App addresses the shortcomings of existing emergency alert systems by providing a fast, reliable, and user-friendly solution for personal safety. It enables users to send an immediate distress signal to multiple emergency contacts with real-time location and timestamp information. The system features a one-tap SOS button, eliminating unnecessary delays, and relies on SMS-based communication to ensure functionality in low-network areas. The multi-contact emergency alert feature sends notifications to all emergency contacts simultaneously, increasing the chances of immediate assistance. The app integrates precise GPS tracking, providing accurate location details, and includes a timestamp to ensure timely responses. The system prioritizes user privacy and data security, only accessing location data when the SOS button is activated. It is optimized for low power consumption, remaining idle until the SOS button is pressed, and allows users to customize their emergency contact list. The Guardian App is designed to be compatible with various mobile devices, ensuring smooth performance, and empowers users with a sense of security, providing a direct and efficient method of seeking help in critical situations. This approach ensures a more reliable and efficient way to alert emergency contacts. The system is built to function effectively in different scenarios, including low-connectivity environments. The app's simplicity and intuitive interface make it easy to use, even in high-stress situations. The Guardian App provides a comprehensive solution for personal safety, addressing the limitations of existing systems.

METHODOLOGY

The research methodology for the Guardian App involves a structured approach to designing, developing, and implementing an emergency alert system. This approach ensures a smooth and effective implementation.

Technology and Tools Used: The system is designed to function seamlessly across different devices while maintaining minimal resource consumption. Key technologies include Android-based programming, Firebase Realtime Database, and Google Maps API.

Programming Languages and Development Frameworks: The development of the Guardian App involves Android-based programming using Java or Kotlin, with Android Studio as the primary IDE. XML is used for designing the user interface, and Firebase Cloud Messaging is integrated for push notifications.

Location Tracking and GPS Integration: The system uses Google Maps API and GPS Location Services to retrieve and transmit real-time location data

Communication Protocols and SMS Integration: The system integrates SMS Gateway APIs to ensure reliable message delivery. MQTT is used for real-time messaging within the application, facilitating quick message transmission between devices.

Hardware Requirements: The Guardian App primarily operates on smartphones with built-in GPS and SMS functionality. Mobile network connectivity is required for sending SMS alerts, and users must have an active SIM card with sufficient balance. AES encryption is implemented to protect user data.

System Development Life Cycle: The system retrieves GPS coordinates, generates an emergency SMS, and sends it to predefined contacts.

Testing and Validation: The system undergoes rigorous testing to validate its effectiveness in different emergency scenarios. The app is tested for ease of use, accessibility, and efficiency, with feedback collected to improve user experience. Performance is monitored to ensure minimal resource usage and secure data storage.

Security Measures: The Guardian App prioritizes user privacy and data security, implementing AES encryption to protect emergency contacts and location data. The system ensures that sensitive information is protected from unauthorized access, providing a secure and reliable emergency communication solution.

RESULTS & ANALYSIS

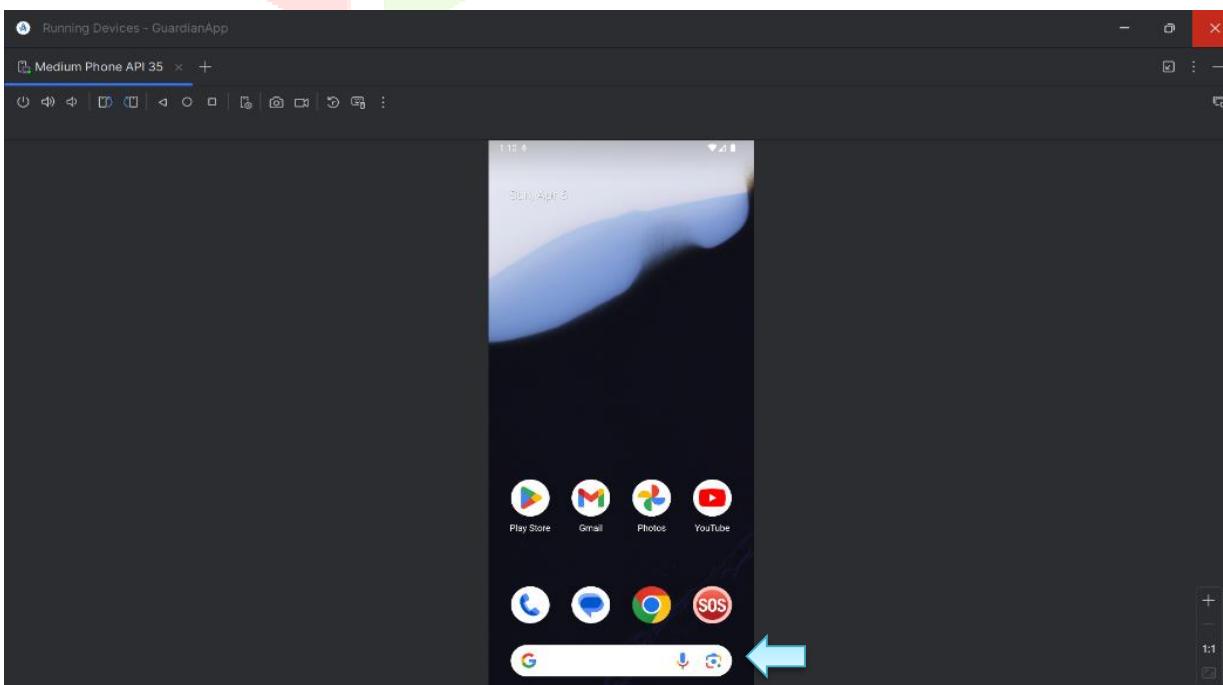


Figure 2: Mobile home screen

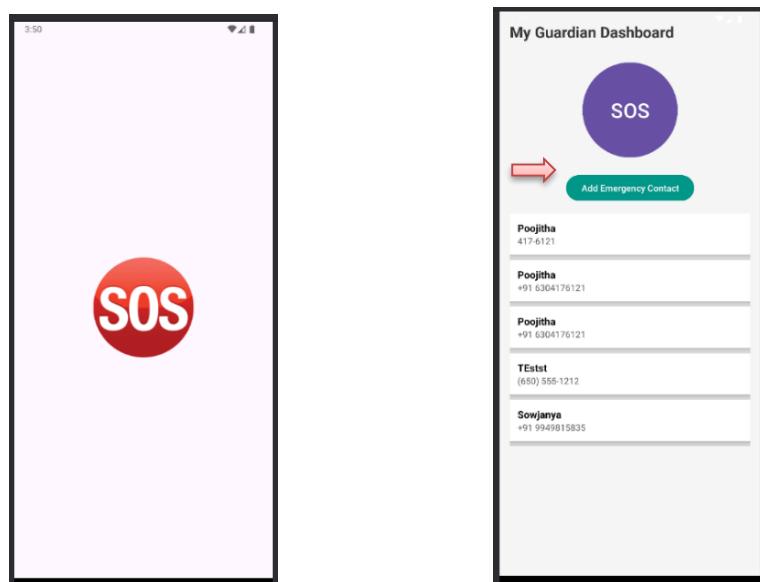


Figure 3: Application logo and Home Page

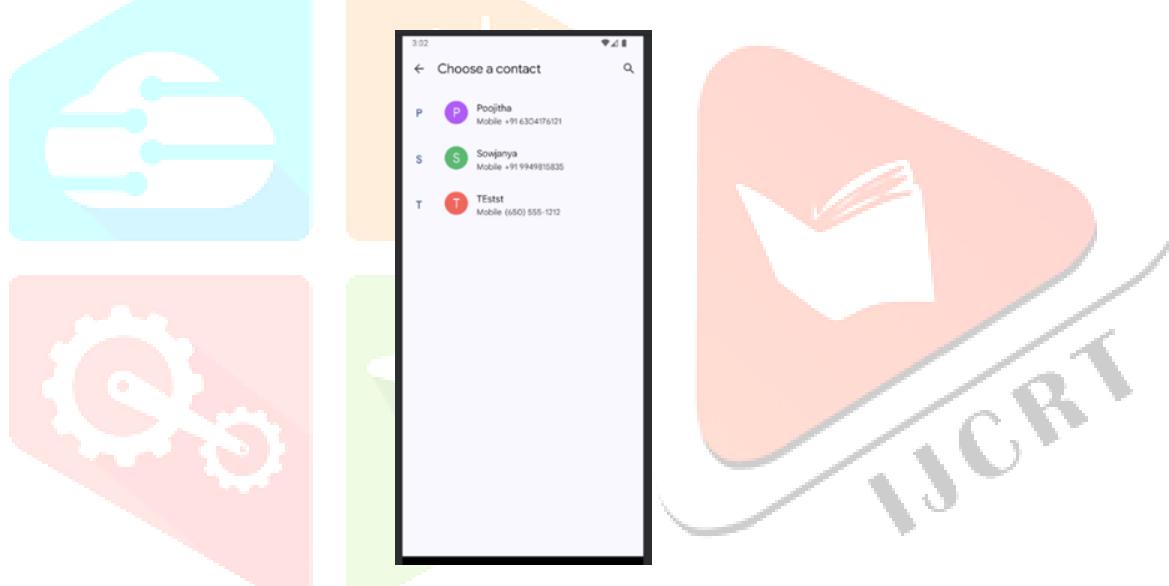


Figure 4: List of contacts to add

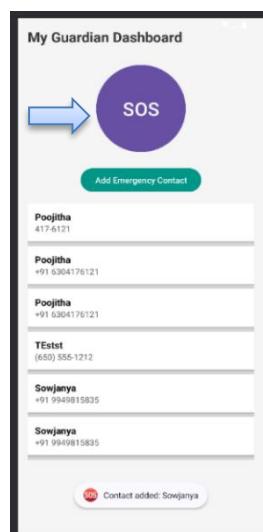


Figure 5: Trigger SOS Button

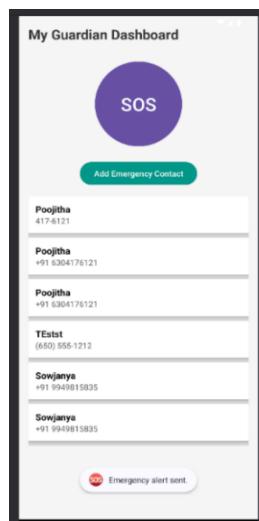


Figure 6: Alert sent Notification

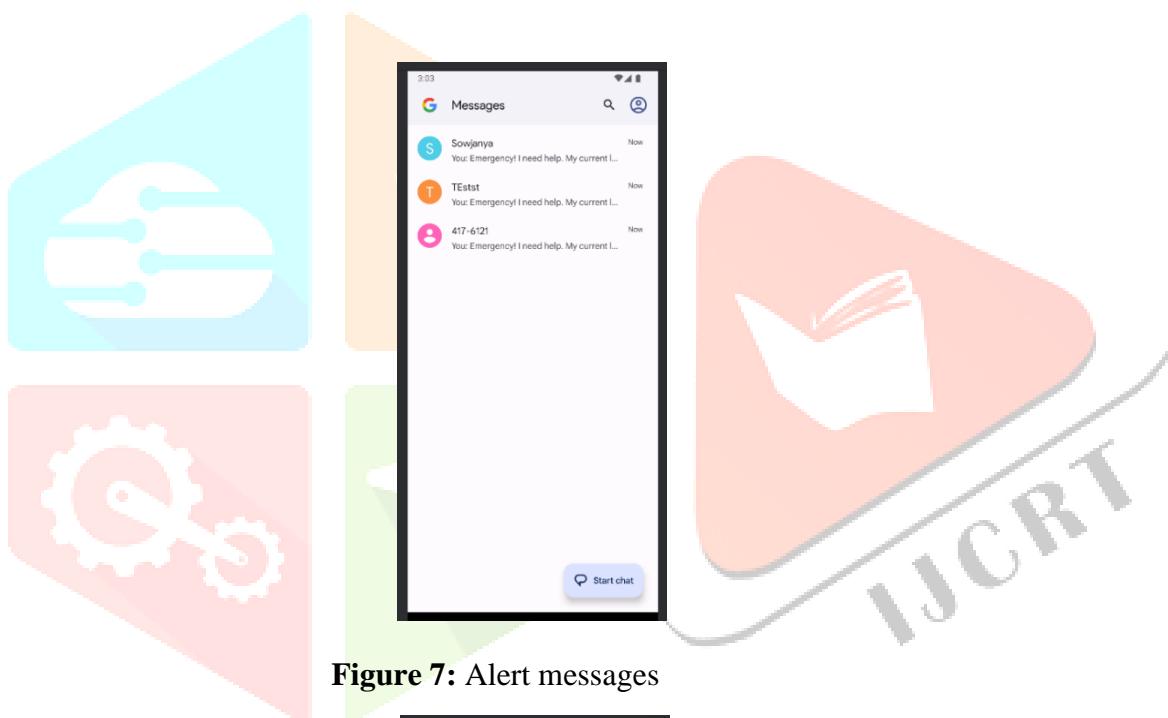


Figure 7: Alert messages

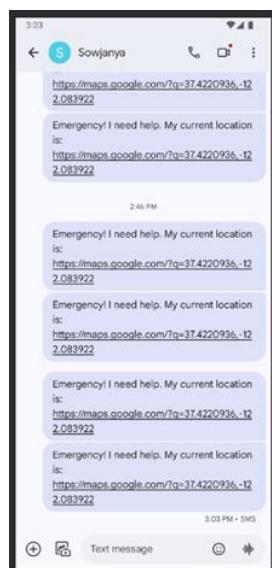


Figure 8: Alert msg with location link

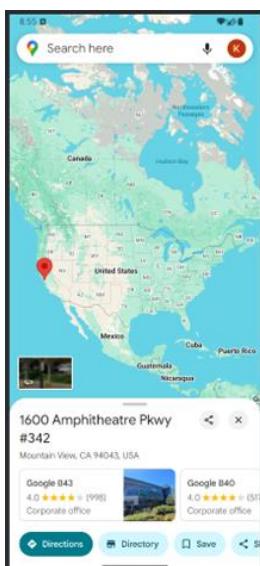


Figure 9: Real time Geo location

CONCLUSION

The Guardian App serves as a dependable and intuitive solution for personal safety, empowering users with real-time support and swift communication during emergencies. By combining ease of use, robust security measures, and essential features like instant alerts and location sharing, the app ensures that users can confidently navigate their daily lives with an added sense of protection and peace of mind.

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