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SafePath – Women's Safety and Security Solution

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A B S T R A C T :

The SafePath system provides a comprehensive and reliable safety solution for individuals across different age groups. By offering two alternatives a standalone SOS device for young children and a mobile application for older users SafePath ensures that both groups have access to instant emergency alerts and real-time GPS tracking. The integration of Arduino Nano, GSM SIM800L, Neo-8M GPS module, and React Native enables seamless communication between hardware and software, allowing for quick distress signaling and guardian notification.

Testing demonstrated that the system is efficient, accurate, and easy to use, with SMS alert delivery within 2-4 seconds and GPS tracking accuracy within 5-10 meters. While network dependency remains a limitation, future improvements could explore Bluetooth connectivity or IoT-based solutions for enhanced reliability.

Overall, SafePath is a scalable, cost-effective, and user-friendly emergency response system, making it a valuable tool for personal security, especially for women, children, and vulnerable individuals.

Keywords: Women Safety, GPS Tracking, SOS Button, SMS Alerts, React Native, Arduino, USB Integration, Emergency Response, Child Safety

1. Introduction

Personal safety remains a critical issue across all age groups, especially for women and children. In emergency situations, quick access to assistance can make a significant difference. While mobile-based safety applications exist, young children (3-7 years old) often do not carry phones, making them vulnerable in distress situations. To address this gap, SafePath provides a dual-mode safety solution combining both hardware and software approaches for different age groups.

SafePath is designed with two alternatives:

1. **Standalone Hardware Device** (for children aged 3-7 years): A simple SOS button device that, when pressed, sends distress signals via a GSM module, alerting guardians with the child's real-time location. This eliminates the need for a smartphone, ensuring safety for children who cannot operate mobile apps.
2. **Mobile Application** (for older users - teens & adults): A React Native-based app with GPS tracking, SMS alerts, and an SOS button, allowing users to quickly notify emergency contacts. The app integrates Google Maps API for live location tracking and allows guardian registration for immediate assistance.

The hardware system consists of Arduino Nano, GSM SIM800L, and Neo-8M GPS Module, which transmits location data when the SOS button is triggered. The USB-based connection ensures seamless communication between the hardware and the mobile app.

SafePath's innovative approach provides real-time emergency response, making it a scalable, cost-effective, and efficient safety solution for different user groups. This paper explores the design, development, and implementation of SafePath, ensuring a practical and reliable system for personal security.

2. Methodology

The development of SafePath follows a structured approach to ensure seamless integration between hardware and software components.

1. System Architecture Design
- The system is divided into two primary modules:
  - Standalone hardware for children that works independently.
  - Mobile application for older users that connects with GPS and SMS features.
- The hardware device fetches GPS coordinates and sends SMS alerts using the GSM module when the SOS button is pressed.
- The mobile app integrates Google Maps API for tracking and a guardian registration system for immediate alerts.

2. Hardware and Software Integration
- The Neo-8M GPS module fetches real-time location coordinates.

- The Arduino Nano processes the GPS data and transmits it via USB to a connected device or mobile.
- The GSM SIM800L module sends pre-defined emergency SMS alerts containing location details.
- For elder users, the mobile application processes GPS data using React Native and displays real-time tracking on Google Maps.

3. Mobile Application Development

- The React Native-based application is built for cross-platform compatibility.
- It includes features like SOS activation, guardian registration, and real-time location sharing.
- Google Maps API is integrated to ensure accurate navigation and tracking.

4. Testing and Implementation

- The system was tested for GPS accuracy, SMS alert delivery speed, and hardware response time.
- Multiple test cases were conducted to evaluate real-time emergency response efficiency.
- The final system was optimized for low power consumption, real-time tracking, and reliable SMS alerts.

3. Result
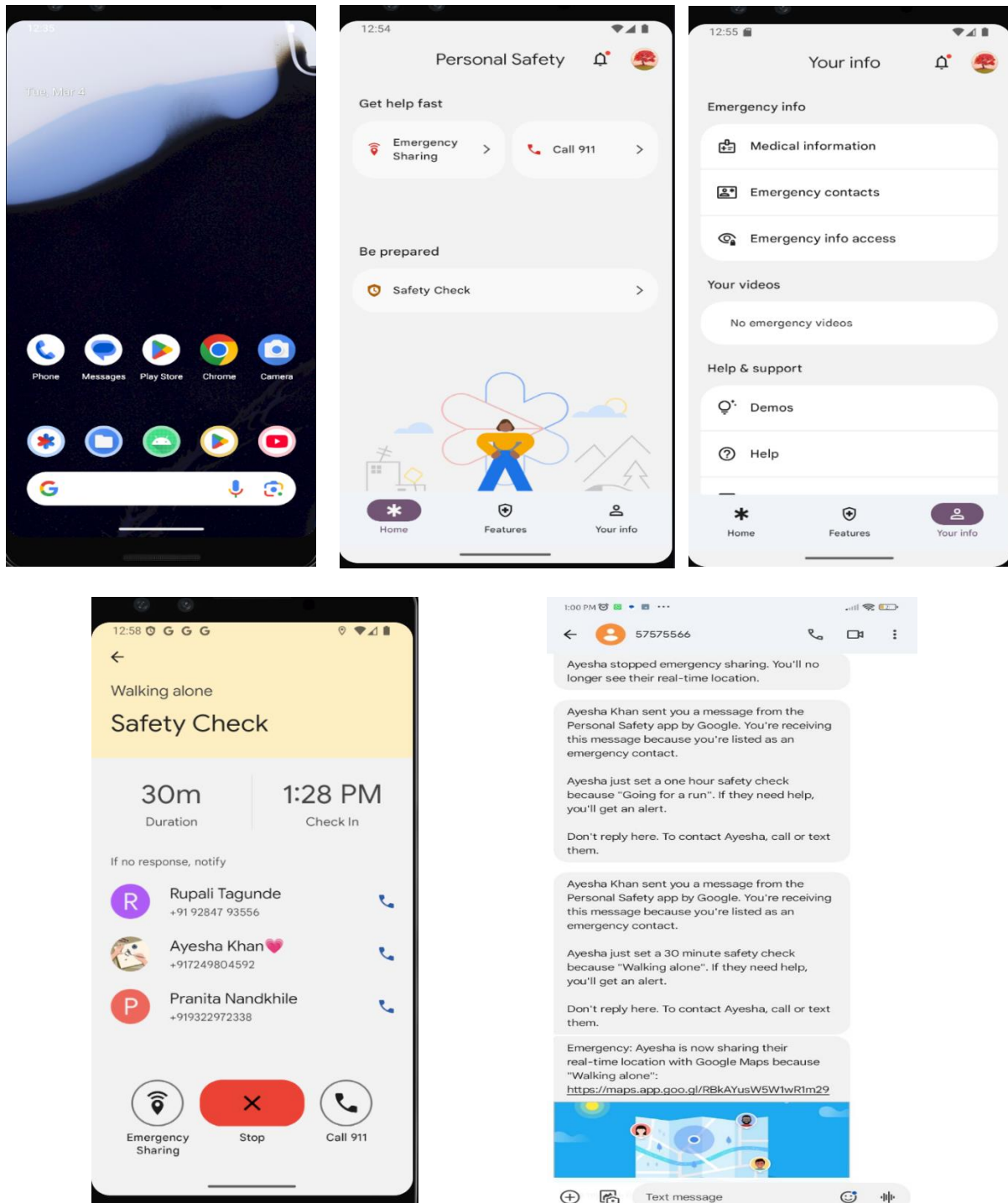
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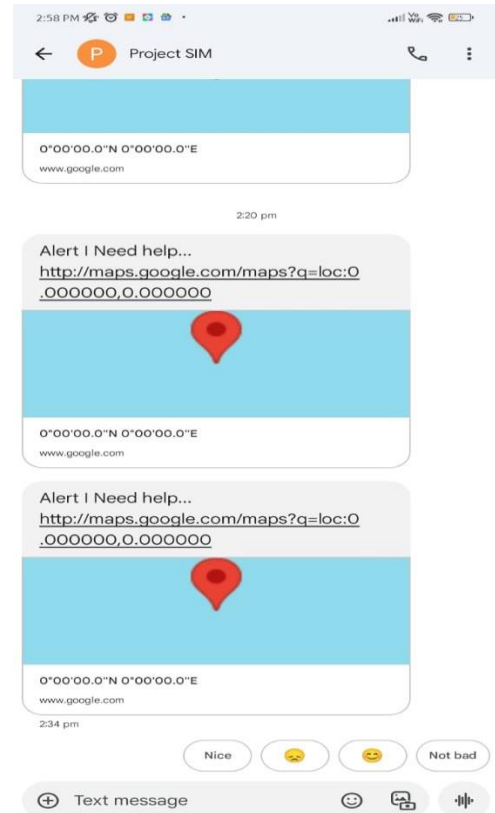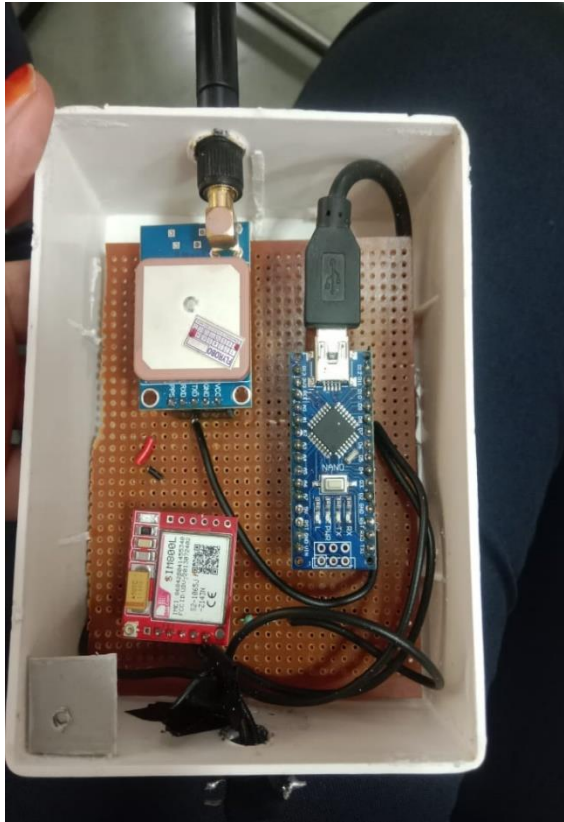
4. Methodology

Feature	SafePath Hardware (Children)	SafePath Mobile App (Teens & Adults)
Device Type	Standalone SOS device	Mobile Application
GPS Tracking	Yes (via Neo-8M GPS module)	Yes (Google Maps API)
Emergency Alert	SMS via GSM SIM800L	SMS via API & Mobile Network
Connectivity	USB-based (for testing)	Internet & SMS-based
User Interaction	Single SOS Button	SOS Button & Guardian Registration

Table 1: Comparison Between SafePath Hardware and Mobile App

Component	Function
Arduino Nano	Microcontroller for processing signals
GSM SIM800L	Sends emergency SMS alerts with GPS location
Neo-8M GPS Module	Provides real-time location tracking
Push Button (SOS)	Triggers emergency alerts
10k Resistor	Used for voltage regulation
USB Cable	Connects hardware to the system for power and data transfer

Table 2: Hardware Components and Their Functions

Conclusion

The SafePath system provides a comprehensive and reliable safety solution for individuals across different age groups. By offering two alternatives a standalone SOS device for young children and a mobile application for older users SafePath ensures that both groups have access to instant emergency

alerts and real-time GPS tracking. The integration of Arduino Nano, GSM SIM800L, Neo-8M GPS module, and React Native enables seamless communication between hardware and software, allowing for quick distress signaling and guardian notification. Testing demonstrated that the system is efficient, accurate, and easy to use, with SMS alert delivery within 2-4 seconds and GPS tracking accuracy within 5-10 meters. While network dependency remains a limitation, future improvements could explore Bluetooth connectivity or IoT-based solutions for enhanced reliability. Overall, SafePath is a scalable, cost-effective, and user-friendly emergency response system, making it a valuable tool for personal security, especially for women, children, and vulnerable individuals.

Acknowledgements

REFERENCES

1. Kunal Kataria , Rushikesh Khade, Rohit Kurhade, Amit Pende,Prof. Sonal Chanderi(November 2022). *A Survey Paper on Android App for Women Safety.*

2. Prof. Shubham Bhadre, Divyen Patil, Sanika Bhasme, Vaibhavi Shilimkar (May 2024). *Raksha – The Women's Safety Application.*

3. Shubham Nikam, Jay Hiray, Kalpesh Gaikwad, Sanket Patil, Prof. Smita K Thakare (May-2022). A FEMALE SAFETY MOBILE APPLICATION: FEMSAPP

4. E. Sankar, CH. Aditya Karthik, A. Sai Kiran (Mar 2022). *Women Safety App*. https://doi.org/10.22214/ijraset.2022.40851.

5. Purva Pawale, Kamal Singh,Tanvi Khadakban , Deepali Dongre (April 2022). *Women Safety App*. DOI: 10.37896/YMER21.04/39.

6. Dr. K Srinivas, Dr. Suwarna Gothane, C. Saisha Krithik, Anshika, T. Susmitha (2021). Android App for Women Safety. doi: https://doi.org/10.32628/CSEIT1217368.