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Suraksha Sakhi: IoT Device For Women Safety

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ABSTRACT: The safety and security of women in today's society are paramount concerns, with incidents of harassment, violence, and discrimination still prevalent. In response to these challenges, there is a growing need to leverage innovative technologies to create safer environments for women. The Internet of Things (IoT) offers a promising solution to address this issue by enabling the development of smart and connected systems that can enhance women's safety in various aspects of their lives. This abstract provides an overview of a comprehensive approach to improving women's safety using IoT technology. It explores the key components and strategies involved in the implementation of IoT solutions, including wearable devices, smart infrastructure, and data analytics. These components can be integrated to create a network that enhances women's safety in both public and private spaces. The wearable devices, often in the form of smart jewellery or clothing, are equipped with sensors and connectivity features that allow users to send distress signals, record audio/video evidence, and share their location with trusted contacts or authorities in case of an emergency. These devices can also incorporate biometric authentication to ensure only the authorized user can trigger an alert. Innovative solutions are constantly sought to provide a safer environment for everyone. This has led to the development of a Smart Safety Device tailored for women, which utilizes IoT technology to enhance security and provide real-time assistance. This device is poised to empower women, giving them confidence in their daily lives by offering a suite of features that cater to their specific safety needs. The Smart Safety Device for Women using IoT is a revolutionary step towards addressing the pressing issue of women's safety. As we live in an increasingly interconnected world, the potential of IoT in enhancing security and providing immediate aid in distress situations cannot be overstated. The purpose of this device is to offer women a sense of security, both in their daily routines and during emergencies, by using an array of sensors, communication technology, and data analysis. This device is designed with the objective of providing real-time safety monitoring and support, effectively creating a virtual safety net that can be relied upon in times of need.

KEYWORDS: wearable devices, women's safety, discrimination, leverage innovative.

I. INTRODUCTION

In recent years, the Internet of Things (IoT) has revolutionized the way we interact with our surroundings, enhancing our daily lives by connecting everyday objects to the internet and enabling them to communicate with each other. IoT has found applications in various fields, and one of the most crucial domains is personal safety, particularly for women. Safety remains a primary concern, and innovative solutions are constantly sought to provide a safer environment for everyone. This has led to the development of a Smart Safety Device tailored for women, which utilizes IoT technology to enhance security and provide real-time assistance. This device is poised to empower women, giving them confidence in their daily lives by offering a suite of features that cater to their specific safety needs. The Smart Safety Device for Women using IoT is a revolutionary step towards addressing the pressing issue of women's safety. As we live in an increasingly interconnected world, the potential of IoT in enhancing security and providing immediate aid in distress situations cannot be overstated. The purpose of this device is to offer women a sense of security, both in their daily routines and during emergencies, by using an array of sensors, communication technology, and data analysis. This device is designed with the objective of providing real-time safety monitoring and support, effectively creating a virtual safety net that can be relied upon in times of need.

II. SYSTEM MODEL AND ASSUMPTIONS

The IoT device for women's safety combines several hardware components to provide a comprehensive safety solution. At its core is the A9G module, a versatile GSM/GPRS/GNSS module known for its communication capabilities and precise location tracking through the integrated GPS functionality. This module serves as the backbone for the device, enabling real-time communication with the cloud server and emergency contacts. Accompanying the A9G is the Xiao C3 microcontroller, a compact yet powerful unit responsible for processing sensor data and managing the device's operations. The Xiao C3 ensures efficient handling of the accelerometer for detecting sudden movements or falls, the microphone for capturing distress sounds, and optional sensors like a heart rate sensor for monitoring stress levels. To power these functionalities, the device is equipped with a reliable battery, ensuring uninterrupted operation when worn by the user. The system model assumes a user profile of females aged 18 and above with a basic understanding of technology and smartphones. In terms of interaction, the wearable device, allowing users to manually trigger alerts scenarios. This comprehensive system model aims to empower women with a reliable, user-friendly IoT device that prioritizes safety and peace of mind in various every day and emergency situations.

III. EFFICIENT COMMUNICATION

Efficient communication within the smart safety device for women is facilitated through a combination of real-time monitoring, immediate alerts, and two-way communication capabilities. By integrating sensors to detect various safety parameters such as location, movement, sound, and distress signals, the device ensures prompt detection of potential threats or emergencies. In case of an incident, the A9G module is configured to send immediate alerts, leveraging GSM/GPRS connectivity to notify predefined contacts or emergency services via SMS, calls, or app notifications. The inclusion of GPS capabilities allows for accurate location tracking, which accompanies the alerts to ensure swift response and assistance. Moreover, the device enables two-way communication, empowering users to convey their situation or needs directly to responders or contacts, thereby facilitating quick and effective assistance. Through optimization for low power consumption and a user-friendly interface, the device ensures prolonged battery life and easy triggering of alerts, even in stressful situations. Robust security measures safeguard user data and privacy, while integration with companion mobile apps enhances remote monitoring, configuration, and historical data analysis. By prioritizing these aspects, the smart safety device not only provides efficient communication but also significantly enhances the overall safety and security of women in diverse scenarios

IV. WORKING PRINCIPLE

The working principle of a Smart Safety Device for Women using IoT involves the integration of various sensors, communication modules, and intelligent algorithms to ensure real-time monitoring, accurate location tracking .

- **Sensors Integration:** The device incorporates various sensors such as GPS for location tracking, accelerometer for detecting sudden movements or falls, and possibly additional sensors for environmental monitoring. Cameras and microphones may be included for audio-visual surveillance.
- **Data Collection:** Sensors continuously collect data related to the user's location, movements, and environmental conditions. The collected data is processed within the device to extract relevant information.
- **Connectivity:** The device is equipped with IoT connectivity modules (e.g., Wi-Fi, Bluetooth, or cellular networks) to establish a connection with other devices and central servers. The device uses these connectivity options to transmit data in real-time to a centralized server or a designated cloud platform.
- **Real-time Monitoring:** The server continuously monitors the user's location, activities, and surroundings in real-time. Risk assessment algorithms may analyze the data to identify potential threats or emergencies.
- **Emergency Trigger:** The device features a panic button or gesture-based trigger that, when activated by the user, sends an immediate alert to the server.
- The emergency trigger may also activate additional features such as audio-visual recording.
- **Communication protocols:** The server communicates with the user's mobile application and predefined emergency contacts using secure communication protocols. Emergency alerts are sent through SMS, push notifications, or other communication channels to notify relevant parties.

V. RESULT AND DISCUSSION

- The project provides a way for women to send out distress signals quickly, through manual activation (panic button) of unsafe situations.
- With the GPS module, the system can track the user's location. This information can be crucial for locating and assisting the user in emergencies.
- Designated contacts and authorities will receive alerts in real-time, allowing them to respond promptly to ensure the user's safety.
- Women will have an added layer of protection and security when they carry the device. The system can automatically detect emergencies, ensuring rapid response and assistance.

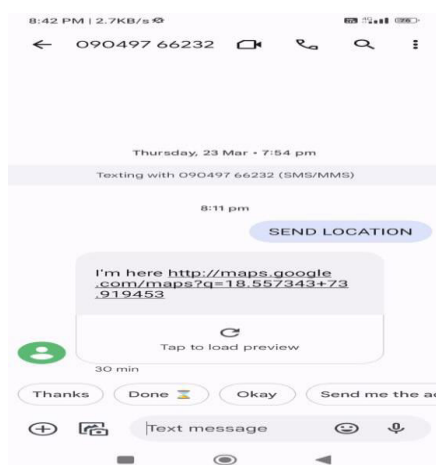


Fig. 1 Message response

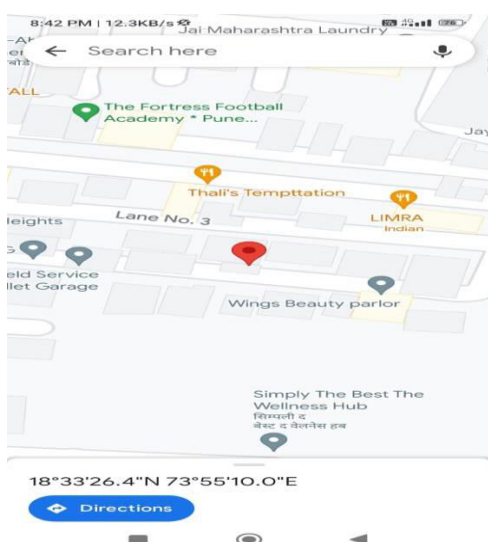


Fig. 2 Location Received from Message



Fig. 3 Call received by Father

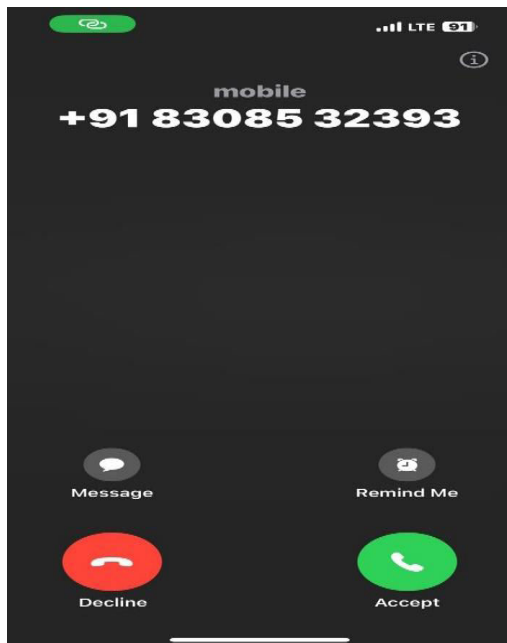


Fig .4 Call received by police

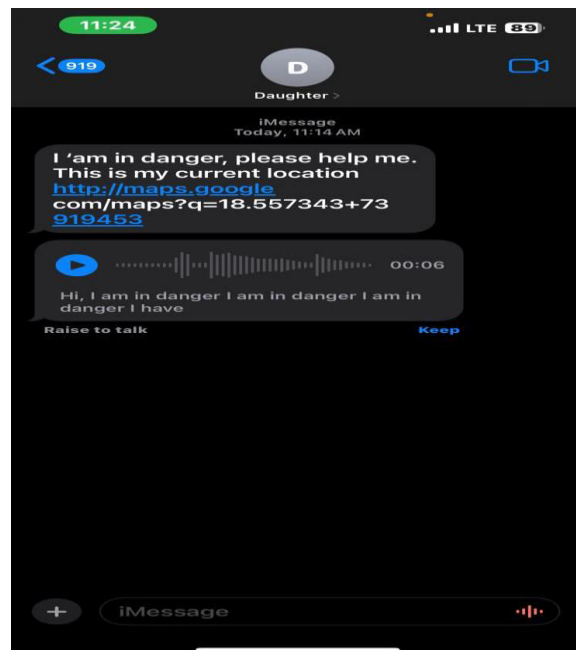


Fig .5 Audio Recording received by father

VI. CONCLUSION

In conclusion, the Smart Safety Device for Women using IoT stands as a valuable solution to address the critical issue of women's safety. Its multifaceted features empower women with heightened security, allowing them to navigate their lives with confidence and peace of mind. While challenges exist, the benefits of enhanced safety, privacy measures, and user-friendliness make this device a significant step toward a safer world for women, proving the potential of IoT technology in addressing pressing societal concerns.

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