

Human Safety Device Using IOT Technology

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ABSTRACT

Despite technological advancements, human safety remains a significant concern, particularly for those traveling alone in remote or deserted areas. Existing handheld safety devices for humans require manual intervention, such as pressing a button or shaking the device, after sensing danger. To address these limitations and provide reliable safety, we propose an AIOT-based safety device that uses AI technology to alert nearby people and law enforcement when the user is in danger. The proposed solution leverages IOT technology to provide security to humans, and when an unsafe situation is detected, the device can be triggered using voice commands, automatically alerting nearby individuals. All features of the IOT device can be activated via voice commands. Additionally, for immediate safety, the shoes are equipped with a shockwave generator for self-defense against attackers. The proposed design includes additional features such as sending group messages and taking photographs of attackers. Furthermore, a mobile app is designed to display safe locations from the user's current location and to alert people including friends, allowing them to reach a safe place quickly.

Keyword: - AI-OT, Safety device, Mobile App, Shockwave generator, Buzzer.

1. INTRODUCTION

Human safety has always been a concerning issue, even in modern times with the advancement of technology. Humans are vulnerable and face danger when traveling alone on lonely roads and deserted places. Existing handheld safety devices require human intervention to activate them, such as pressing a button or shaking the device, after sensing danger. However, if a human does not have enough time to activate it, then the purpose of the safety device is not fulfilled. In India, where crime rates are growing, including burglary, murders, rapes, and more, Human safety is considered one of the most significant issues. According to a report by Thomson Reuters Foundation, India is ranked as one of the most dangerous places for human worldwide, with the highest number of child brides. In 2016, almost 39,000 rapes were reported. Experts interviewed for the report blamed India's government for not doing enough to provide safety to human since the rape and murder of a student in 2012, which led to changes in the rape laws of the country [1].

Most attacks on humans occur when they are traveling alone or in remote areas where they cannot find any help or assistance. To address this problem, this paper proposes an IOT-based solution that overcomes the shortcomings of existing devices. The proposed design includes features that notify family members and the nearby police station for immediate assistance when humans are not safe. Additionally, the proposed design includes a shock wave generator that humans can use to attack the perpetrator [2]. Other proposed features include the ability to send group messages from the device and the victim's phone, recording audio of the victim, which may be used as evidence against the perpetrator, and locating a safe place from the victim's current location on the map. The proposed design addresses the issues with existing devices by automating the activation process and including multiple features that provide immediate assistance to humans in danger. It is crucial to address this issue in India and around the world to ensure the safety and security of human [1].

2. RELATED WORK

In the area of designing safety devices for women's, several works have been proposed. Poonam et al. [1] have developed a stand-alone safety device that uses an AT mega 328 microcontroller without any android application. It incorporates GPS and GSM modules to track the location of the woman and sends the information to her family members and friends to alert them about her current location. Another proposed safety system [1] is activated by a switch, which sends the victim's location to her concerned ones and plays a prerecorded message using speech circuit to alert the surroundings.

There has been a growing interest in developing IOT-based solutions for women safety devices, especially for women safety. One such example is the "Smart Stiletto," a wearable IOT device designed to help women in distress. The device is integrated with various features such as GPS, GSM, and Wi-Fi, which allow the user to send their location

to family or friends, call for help, or contact emergency services. The device is also equipped with a high-pitched alarm that can deter attackers and alert nearby people [3].

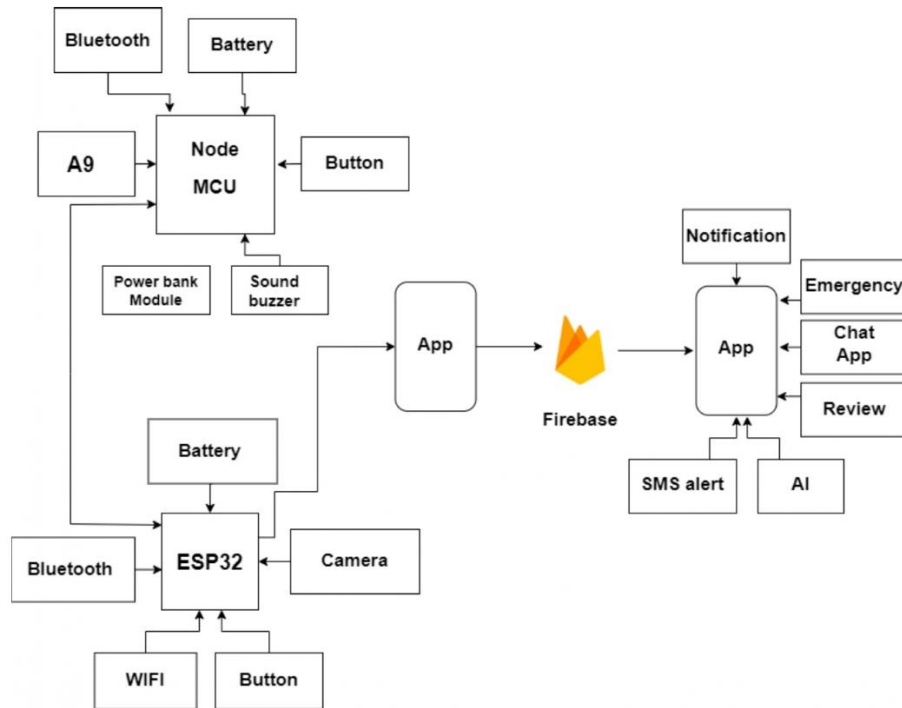


Fig -1: System Architecture

Another example is the "Guardian" device, which is a small IOT-enabled device that can be attached to a keychain or purse. It has a panic button that, when pressed, sends an emergency message to predefined contacts and tracks the user's location in real-time. Additionally, the device has a "Walk with Me" feature, which sends an alert to the user's emergency contacts if they don't arrive at their destination within a specified time frame.

The "Nirbhaya" mobile application is another IOT-based solution for women's safety, which was developed in India. The app is designed to help women during emergencies by sending an SOS alert to the nearest police station, along with the user's location. It also includes a panic button that can be activated by shaking the phone or pressing the power button multiple times [4].

SMARISA is a portable device for women safety. It comprises of hardware components such as Raspberry Pi Zero, Raspberry Pi camera, buzzer and button to activate the services. It is activated by the victim by clicking the button. Upon clicking, the current location of the victim is fetched, and the camera captures the image of the attacker which is then sent to police or predefined emergency contact numbers via the victim's smart phone [5].

3. PROPOSED WORK

The proposed human safety device helps a woman who might be in an unsafe situation. The device is essentially ready for all the situations that might go against the will of the woman. Fig.1 shows the hardware design of the safety device. It uses Node MCU as a core component. The design comprises of AI module to automatic activate the device, GSM (Global System for Mobile Communications) module for sending alert messages, buzzer for alerting the environment and shock wave generator for self-defense.

The proposed human safety device now includes an AI module for voice commands using Google Alexa. This would allow for a more intuitive and easier-to-use device for the user, as they can simply use their voice to activate the device and trigger the necessary actions. Integrating the AI module with the other IOT devices, such as the GSM module and shock wave generator, would allow for a more seamless and efficient response to an unsafe situation. For example, the user can activate the device with a voice command and immediately send an alert message to predefined contacts through the GSM module, while also activating the shock wave generator for self-defense. In addition, integrating a camera module with the AI module would allow for the user to capture and record evidence of unsafe situations by Help of camera module, which can be useful for legal purposes. Overall, the inclusion of an AI module in the human safety device can significantly improve its functionality and usability for the user, providing them with a more comprehensive and effective safety solution.

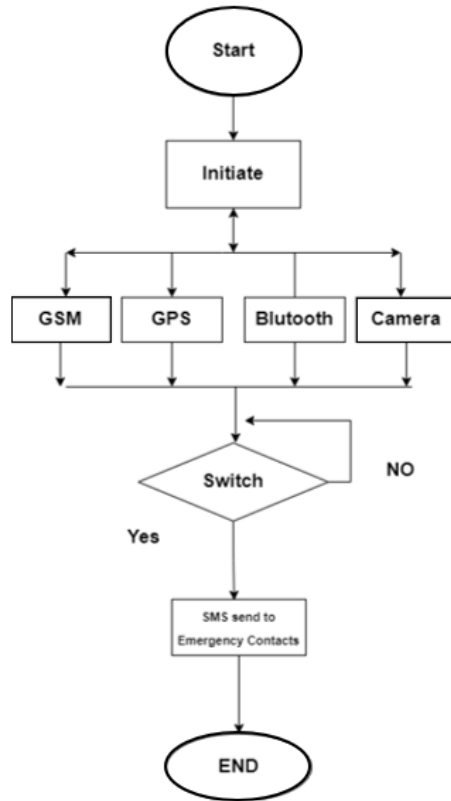


Fig -2: Data Flow Diagram

4. METHODOLOGY

On this paper the described device is designed to assist humans in emergency situations. It can be activated either manually or by a voice command with the help of an AI module. Once activated, the device sends the woman's location every minute using GPS data, which is displayed on an LCD and forwarded to the woman's family/friends using a GSM modem. The AI module can automatically trigger the device and send an emergency message to all contacts listed as ICE contacts, providing the woman's current location [3]. The device also includes a shock wave generator in the woman's shoes, which can be used for self-defense which includes a switch, transformer, and wires. One end of the wires is a high voltage source, while the other end acts as a ground for a return path. As the loose ends are not in direct contact with each other, the high voltage cannot arc-off unless it comes into contact with the attacker's body, which completes the conducting path between the two ends [3].

Android interface is also used for human safety. The design also encompasses an android application that provides an additional safety feature as listed [1]. Group messages will be sent from the device as well as from the victims' phone using this application [2]. An audio recording will be done so that the victim can use it as proof against the perpetrator [3]. Safe locations from victim's current location will be shown on the map using mobile app so that women can reach to safe place from her current location.4. the switch can be triggered with the help of android application also [5]. the human can see the safe location with the help of AI model.6.the buzzer, camera, shock wave generator shoes can all be triggered with the help of AI voice commands.

5. RESULT

This section presents the results of the experiments conducted with the proposed hardware design and android application. The procedure and working of all IOT devices are shown below.

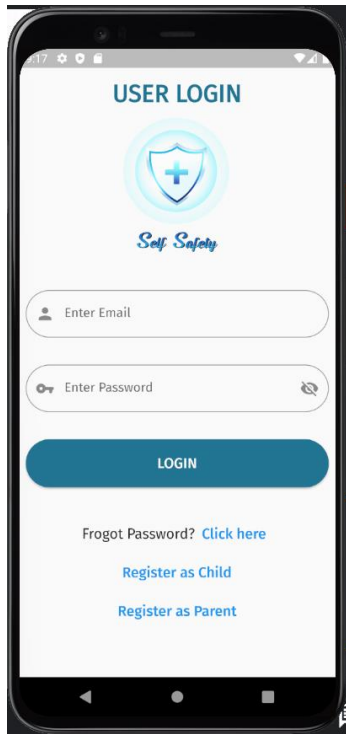


Fig -3: User Login Page for Child and Parent Registration.

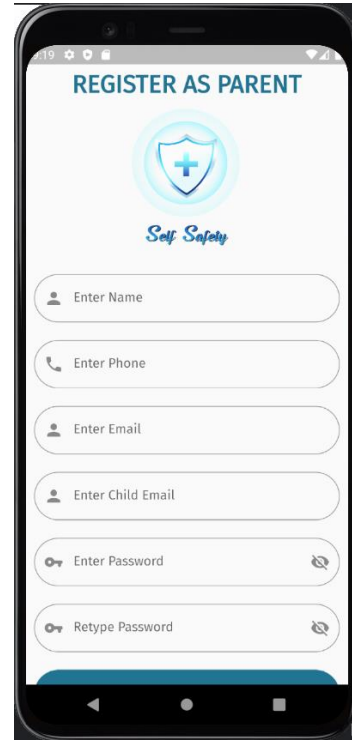


Fig -4: Registration Page Interface for Parent

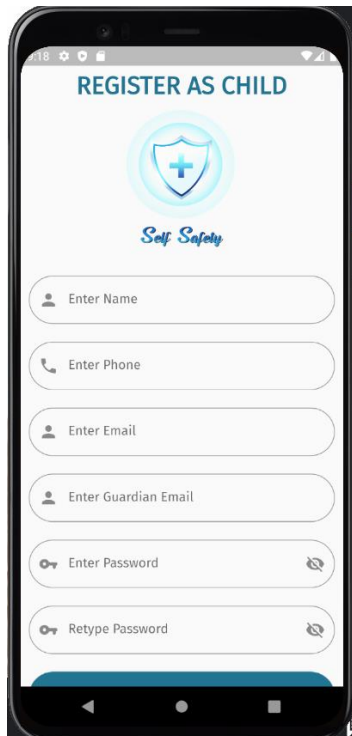


Fig -5: Registration Page Interface for Child Registration.

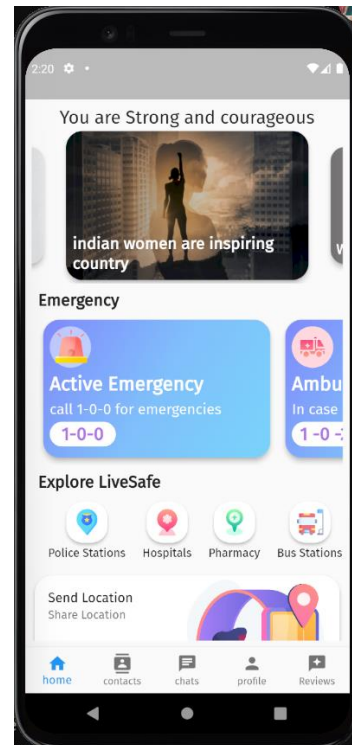


Fig -6: App UI Interface for user.



Fig -7: Shoe (Node MCU, Shock Generator, buzzer, Battery)



Fig -8: Pendant (ESP32, Battery)

6. CONCLUSIONS

In the proposed human safety device incorporating both hardware and software solutions to provide comprehensive security to humans. The use of AI integration with IT devices can increase the functionality and usability of the device, while also ensuring unique user identification. The inclusion of a buzzer in the design can alert nearby individuals about any unsafe situation, while the sending of text messages can alert close relatives and the police with the victim's location for quick response. The shockwave generator in shoes can provide a temporary self-defense solution for the victim in case of emergency. The development of an Android application with additional safety features, such as group messaging and identifying nearby safe locations through AI-assisted map tracking, can provide even more safety options for the user. Overall, the proposed human safety device with AI integration and software solutions has the potential to significantly improve human safety and provide a comprehensive security solution for the user.

7. REFERENCES

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