Using the Internet of Things to Create a Feminine Safety Device

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Abstract

Even in this day of unprecedented technological development, women's safety remains a paramount concern. No location is safe for women, but they are more vulnerable on lonely highways or in other isolated areas. The risk is sensed, however existing hand-held safety gadgets for women need human involvement to activate it (pushing a button, shaking the device, etc.). We suggest a method that seeks to both address the limitations of current systems and ensure that women may always feel secure even if they are being lied to. The proposed work intends to create an Internet of Things (IoT) based safety device that uses fingerprint-based connection to the device to provide security to women and inform local individuals and police when a woman is in danger. If fingerprint verification fails for 60 seconds, the gadget will send out an alarm to the local community and the authorities. To further ensure women's physical protection, a shockwave generator is also developed for them to utilise in self-defence. The suggested layout also includes extra functions like group chat and audio recording. A smartphone app is being developed to help ensure the protection of women by displaying nearby safe zones on a map and providing directions to such zones.

Introduction

Even in this day of unprecedented technological development, women's safety remains a paramount concern. No location is safe for women, but they are more vulnerable on lonely highways or in other isolated areas. The current crop of portable safety gadgets for women requires the user, in this case a woman, to take action upon perceiving danger (by pushing a button, shaking the device, etc.). However, the safety mechanism is rendered useless if the lady in danger is unable to activate it in time. In a nation like India, where crimes like burglary, murder, and rape are on the rise at a pace that may even exceed the rate of population increase, the protection of women is widely seen as a pressing concern. A study by the Thomson Reuters Foundation found that not only is India the country with the highest rate of child marriage, but it is also one of the most hazardous for women worldwide. Just around 39,000 rapes were recorded in 2016. According to experts questioned, India tops the list of countries unsafe for women since the government has done absolutely nothing to ensure women's safety after the rape and death of a student in her early 20's in 2012. It's common for women to be attacked while they're on their alone or in a distant location, where they won't be able to get any aid. This study suggests an IoT-based solution to the issue of women's safety, one that avoids the limitations of currently available technologies. The suggested design includes components to alert loved ones and the local police station so that help may be sent immediately if a woman feels she is in danger. Additionally, the suggested design includes

a shock wave generator for use by women in attacking their attacker.

Companion Papers

The literature on creating protective equipment for women is reviewed here. Suraksha[2] is a portable gadget that responds to verbal commands, switches, or shock/force. The victim's voice has been heard. The detector will pick it up and immediately start broadcasting an emergency signal. A simple on/off switch activates the gadget, and a force sensor activates it when thrown, alerting the victim's loved ones to her whereabouts. An AT mega 328 microcontroller-based safety device, built by Poonam et al. [5] and operating independently of any android app, has been created. It sends an alert to the woman's relatives and friends through GPS and GSM modules, letting them know where she is at all times. It is recommended that women have access to a self-defence safety system [7] that, when activated by a switch, immediately notifies those who are worried about their whereabouts. The gadget will also play a warning message recorded in voice circuit to the surrounding area. The authors' suggested gadget (FEMME) [4] is available as an Android app. Its primary purpose is to alert authorities to an emergency situation and to collect documentation, such as audio and video, of the event. It also includes a radio frequency receiver module that can pick up and analyse the electromagnetic waves sent off by a concealed camera. Kumar et al. [3] offer a watch-like gadget that uses the idea of GEOFENCE, a virtual barrier that activates the application when the user is inside a certain geographic region. The two-way communication capability allows the victim to potentially reach out to loved ones. Even if the recipient's device is set to mute,

the women may nonetheless activate a loud buzzer. You can protect ladies on the go with the help of SMARISA [6]. Raspberry Pi Zero, a Raspberry Pi camera, a buzzer, and a button are some of the hardware components. As soon as the victim presses the button, it goes off. By just tapping a button, the victim's location and a photo of the perpetrator may be forwarded to the police or other predetermined emergency contacts.

Conceptualization of a Feminine Security Tool

The suggested women's safety gadget aids ladies who are in potentially dangerous situations. Every possible scenario in which a woman's wishes are not respected is included into the gadget. The hardware layout of the protective device is shown in Fig. 1. In order to function, it employs an at mega 328 microprocessor. Features include a fingerprint scanner for activation, a Global System for Mobile Communications (GSM) module for transmitting alarm messages, a buzzer for notifying the surroundings, and a shock wave generator for self-defence. The message is shown on an LCD screen.
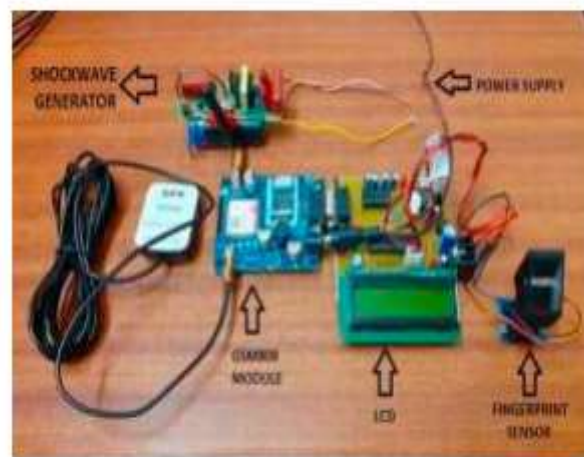

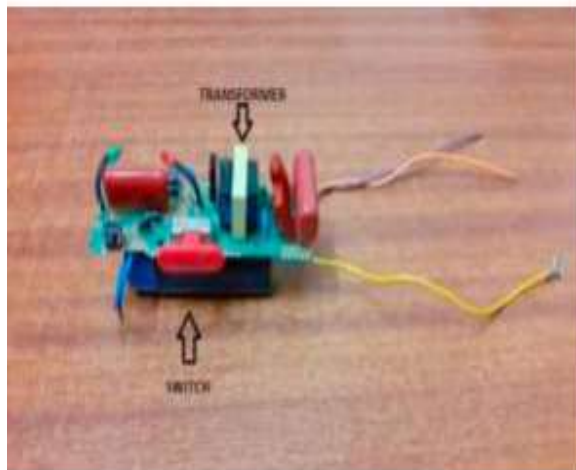*Fig. 1.Proposed Hardware Design for Women Safety*

Fig. 2.Design of Shock Wave Generator

What this tool does is as follows: The gadget is activated by the woman's fingerprint when she registers it. The gadget begins scanning the lady's fingerprints at 60-second intervals the moment the woman activates it. After a certain amount of time during which the fingerprint scanner does not detect any fingerprints, a buzzer will sound to notify anyone in the immediate vicinity. Only in an extreme situation, when the lady perceives danger, does the gadget begin scanning her fingerprint, so its accuracy is not compromised. In addition, the LCD and GSM modem receive the GPS coordinates to relay to the woman's loved ones her current location. Therefore, even if she is struck down from behind and unable to activate the alarm, the gadget will still send a message to the women she has designated as her "In Case of Emergency contact" (ICE contact) with her present position. Included in the design is a shock wave generator that may be used as a weapon, making the concept a viable option for self-defence. The shock wave generator hardware is seen in Fig. 2 and consists of a switch,

transformer, and cables. With just two wires connected, one is the high voltage source and the other is the ground for the return trip. Since these dangling wires aren't touching, the high voltage can't arc-off until it comes into contact with the attacker's skin, which serves as a conductive channel.

There are three primary sections to the circuit.

Fuel for generators

Consider:

• The Oscillator

Intensifier of Voltage

The voltage is supplied to the oscillator stage when the battery is completely charged. The oscillation frequency is increased by the transformer, which acts as a sort of inverter. The capacitors receive the electricity from the transformer and store it until it is needed to electrocute the attacker.

Fig. 3.Andriod Interface for Women Safety

Fig. 3 shows an android interface for women safety. The design also encompasses an android application that provides an additional safety features 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.
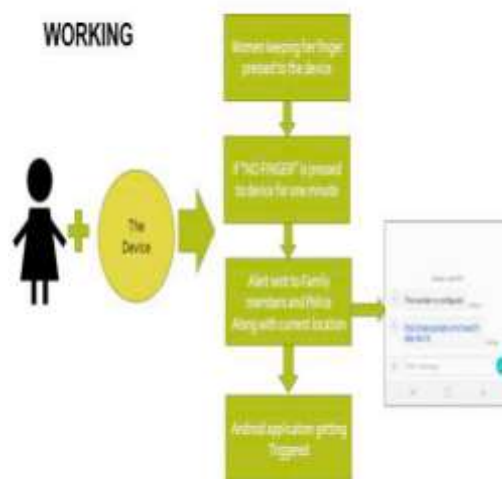
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Fig. 4. Workflow of the Proposed Design

Fig. 5. Additional Features Supported through Android Application.

As previous devices depend on Women to push some button or make some movement in the portable device, Fig. 4 and Fig. 5 demonstrate the uniqueness of the suggested design in addressing the delicate problem of women's safety. But it doesn't work if she has no time to respond. Our notion is that if there is no fingerprint verification on our IoT-based gadget for one minute, the device would immediately warn surrounding people and authorities, protecting women even if they are assaulted from behind. The android app does a lot more than just issue notifications; it also allows you to capture the victim's voice and recommends safe areas in the area.

Results

Results from trials using the suggested hardware design are presented in this section.

mobile phone software designed for androids. At first, we check to see whether the GSM module is correctly installed and set up, as seen in Fig. 6. Once the GSM module has been configured, the device will ask the user to register their fingerprint (as seen in Fig. 7) for future use in unlocking and authenticating the device.
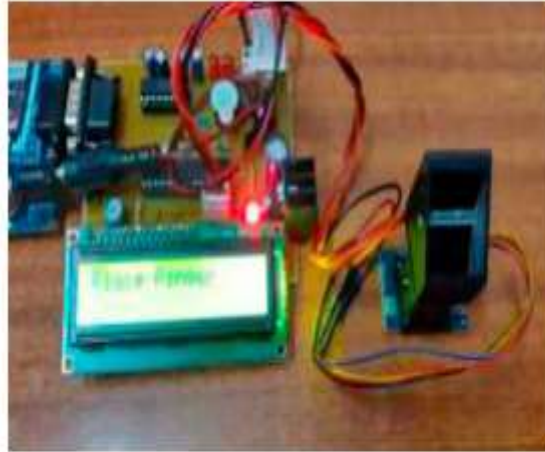

Fig.6.Connecting with GSM Module

Fig. 7.Prompting for Fingerprint

Once the user activated the device with her fingerprint, the continuous monitoring begins, which keeps on checking for fingerprint on the fingerprint module. In case, there is no finger impression for one-minute buzzer starts to beep as shown in Fig. 8. When the buzzer starts to beep, the GSM module sends message to all in case of emergency (ICE) numbers along with the latitude and longitude values which is taken from the GPS module as shown in Fig. 9. It also triggers the android application which suggests the victim for the possible safe locations as shown in Fig. 10.
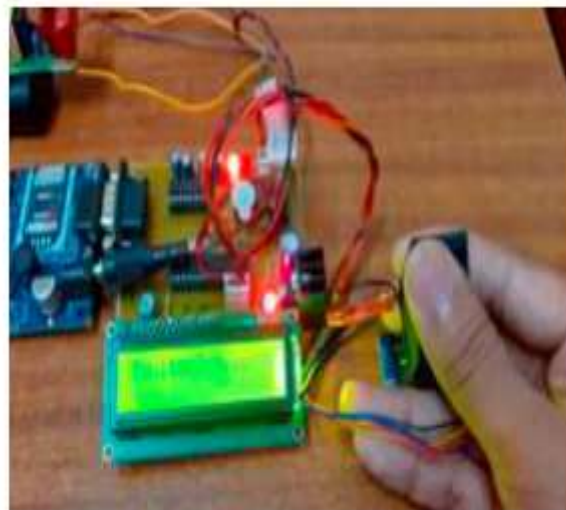

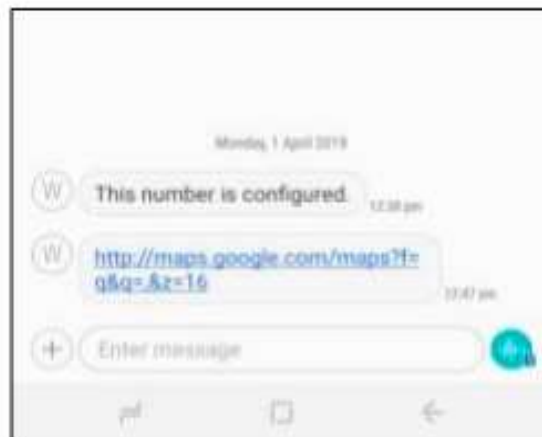*Fig. 8.Monitoring Fingerprint and Buzzer beeps*

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Fig. 9. Message Received by Family members/Police

Fig. 10.Android Application showing the Details and Map of Safe Location.

Conclusion

The suggested women's safety gadget is meant to provide ladies full protection in all conceivable situations. To prevent any accidental or malicious alarms and to limit alerts to genuine times of danger, the user's fingerprint is employed as a unique identification. A buzzer is included into the structure for extra safety, alerting anybody in the immediate area to the situation. By notifying loved ones and the authorities by text message, you can make sure that the victim is safe. A shockwave generator is available to women for use in self-defence situations to briefly incapacitate an attacker. The hardware-based design is supplemented with an android app that allows for the transmission of group texts, the recording of audio, and the determination of adjacent secure areas through map. While the study provides a prototype of an intelligent gadget meant to ensure the safety of women, it will be necessary to conduct more research using performance measures to demonstrate the device's efficacy.

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