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Women's Safety Static System

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***Abstract*—Women's safety has become a significant concern in modern times, despite rapid technological advancements. Increasing incidents of physical abuse, harassment, violence, and sexual assault have instilled fear among women, often making them hesitant to walk alone, especially in isolated areas. To address this issue, we propose the development of an IoT-based women's safety static system designed for installation in public locations such as bus stops, parks, and other secluded areas. This system comprises a push button, pepper spray mechanism, GPS, and GSM modules. The push button can be activated in distress situations, triggering a loud siren to alert nearby individuals. The GPS module provides real-time location tracking, while the GSM module facilitates the transmission of alerts via SMS and calls to the pre-fed phone number. Additionally, a pepper spray mechanism is integrated for immediate self-defense against an attacker. This system aims to provide timely assistance and enhance the sense of security for women in public spaces.**

Keywords—component, Women-Safety, IoT, Push Button, Pepper spray, GPS Tracker, Emergency Alerts

Introduction

In our society, both men and women are not in conflict. Women are responsible for 50% of the growth of a nation. As many of the crimes or any other forms of misconduct occur, women often find it difficult to address these issues. In order to safeguard a woman, safety needs to be implemented, but the major problem [6] arises when a woman is in danger, she first needs to pick up her phone, unlock the phone, and then ask for help. Rather than this long process, we have implemented an IoT-based static system that majorly focuses on, if any distress signal is made, then an in-built function automatically contacts the pre-saved phone number. Oracle's network includes device partners [7]. An independent, easy-to-carry device intended to ensure women's safety, allowing them to send emergency alerts when facing any threat [8].

I. Literature Survey

Rachana B et al. aimed to develop a smart device for assisting women in any emergency. Many different modules are found in the device, including a Buzzer, a GPS (Global Positioning System), and a GSM (Global System for Mobile Communication) module. In this work, the author provides women with a security system who are alone with a security system [9].

Ramya George et al. discussed the physical harassment of women. This initiative is to resolve this problem. An essential part of this system is a monitoring device, whose output is to identify dangerous situations. The device will set off alarms placed around the building and send a message to the nearby control center [10].

The Vehicle Tracker using SMS alerts with Google map link by Azeez Abdullah Ganiyu, published in June 2023, uses a GPS and GSM module to detect and send the vehicle's location via SMS to the pre-saved phone number, which contains a link to locate it on Google maps [11].

II. Methodology

A. Problem Statement

Violence against women has increased worldwide in recent years. Women face various obstacles, particularly when they travel alone. Without proper precautions like, timely emergency services, women are prone to risk, as help-lines do not always offer immediate assistance.

The gadget must be user-friendly, lightweight, and durable. Additionally, it must have an alarm feature so that any strange thing happening around can warn and alert the neighbours. Must support communication over the GPS network. The Main purpose of our device is to provide women a safer environment, so they can walk without any worry.

Therefore, the problem statement for a women's safety device using IoT and GPS tracker is to provide an innovative solution that can enhance women's travel safety, protect them from any kind of threats, provide timely help, and alert their neighbours.

B. Proposed Method

This work uses a 'Sound buzzer', 'GSM', and 'GPS' to create a friendly and secure electronic system for women. In the initial stage, the device can be turned on using a panic button. The GPS and GSM module have been incorporated into the gadget that gets switched on immediately when the push button is pressed. The system then sends a message to the pre-saved phone number, including latitude and longitude measurements. However, a buzzer keeps buzzing simultaneously to alert the nearby residents. The GPS module in the system helps locate the exact location of the victim, whereas the GSM module sends the victim's live location to the pre-saved phone number.

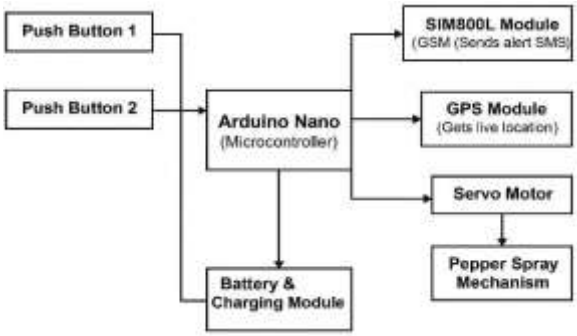

Fig. 1. Block diagram

The Women's Safety Static System, pressing the Push Button sends an emergency signal. Basically, when a woman feels unsafe then she can press this Button. Upon pressing the button, a beep sound occurs in order to alert nearby people. Pushbuttons are straightforward switches that get activated with a single button press shown in Figure 2.

Fig. 2. Push button.

An electrical device known as a GSM module is used to facilitate communication over the Global System for Mobile Communication(GSM) network, as shown in Figure 3. GSM modules are utilized in various kinds of applications, including tracking, security, and controlling the system. When a woman feels unsafe, she will press the push button, then the microcontroller sends a signal to the GSM module to send the message. The message that will be arriving includes the location accompanied with the latitude and longitude. The next step will be making a call to the pre-fed phone number.

Fig. 3. GSM module

A GPS module is a technology that points to the exact location of a person. The GPS module will be communicating with the satellites in the sky to find the current location. When the push button is been pressed, the GPS gets the location like map coordinates along with the current latitude and longitude. This location is been sent through the GSM module via the preferred phone number. Thereby, it helps them to find the person quickly and save them from dangerous situations.

Fig. 4. GPS module.

A Pepper spray is used to protect women from an attacker. A small bottle of pepper spray is been fixed to the device. Then the push button is been pressed, the system will activate a servo motor, then the servo motor will open the box cap in which the pepper spray is been placed.

Fig. 5. Servo Motor.

Fig. 6. Pepper Spray.

C. Experimental Setup

The Main components that are included in our project are:

1) Push Button: Used to activate the system. When it is been pressed, then there will be a beep sound in order to alert the nearby people.
2) Microcontroller: This is the brain of the system. It reads signals from the buttons and then controls the GSM, GPS, and servo motor.
3) GSM Module: Sends SMS and calls to the pre-fed phone number when the push button is pressed.
4) GPS Module: It detects the live location of the victim.
5) Servo Motor: Upon pressing the push, the servo motor rotates from its opening of the lid of the pepper spray box.
6) Power supply and Voltage regulators: This provides an amount of power to each part of the circuit.

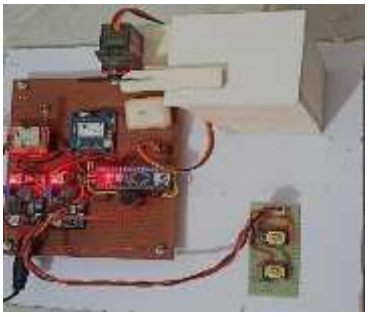

Fig. 7. Layout of Experimental Setup.

Results and Discussion

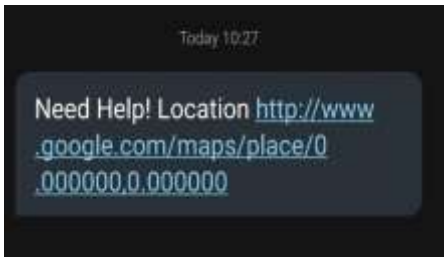

Fig. 8. Alert Message with Google Map Link.

Fig. 9. Google Map Location Display.

Fig. 10. Activating Pepper Spray.

Fig. 11. Emergency Call Triggered by Women's Safety System.

The proposed 'Women's Safety Static System' was successfully designed and implemented. Pressing the emergency button triggers the system to perform the following actions:

- It captures the user's location by using the GPS module.
- It sends an emergency SMS containing a Google map link of the live location and automates a call to the pre-saved number.
- Activates buzzer to notify people in the vicinity.
- Releases the pepper spray employing a servo motor for immediate self-defense to protect from the attacker.

The system worked reliably during testing and showed a quite good response in sending alerts and activating the spray and the buzzer. It is mainly designed to be fixed at places like bus stops, parks, railway stations, workplaces, schools, etc, where women need quick emergency support.

Images and recordings of individuals triggering or abusing the system

Future scope

In the future, the women's safety static system can be further improved with :

- Camera Integration: A camera can be added to capture the images and recordings of the individual triggering or misusing the system, which helps to identify the offender and prevents false alerts.
- Battery Backup: to make the system work even during power-cuts, so that the system remains functional at all times.
- Wi-Fi connectivity: If the system is upgraded to use wi-fi, it is possible to send emergency messages and make calls directly to the nearest police station for quicker response.

Conclusion

Our safety device offers a quick and effective solution for women in emergencies. With a press of a single button, it immediately sends the user's location using GPS, sends a help message through the GSM module, and activates a pepper spray mechanism using a servo motor to deter the attackers. This system has been successfully tested and provides a rapid, automatic response, offering crucial assistance in dangerous situations. It is ideally suited for locations like bus stops, workplaces, railway stations, etc, to ensure safety.

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