An Efficient and Low-cost Secure System for Women Safety using GSM and GPS

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ABSTRACT

In today's world, women come across many situations that make them feel unsafe. Women from various walks of life face situations that make them feel threatened in different environments. Sixty-six per cent of women has reported sexual harassment in the year 2010 in New Delhi. It has also been proven that in urban environments, women are more prone to experience harassment especially in developing countries. In such situations, the aid of a safety device that will inform the victim's family members or the authorities (in severe situations) may help women feel safer, confident and reduce the chances of harassment. Though there are a few Smartphone based solutions for the same, it might not be possible for the victim to reach for her phone in some situations without the knowledge of the perpetrator. In this approach, the focuses on a security system that is designed merely to serve the purpose of providing security to women so that they never feel helpless while facing such social challenges.

Keywords: women security, Arduino controller, GPS, GSM, vibration sensor, voice module, switch, buzzer, and LCD.

1. INTRODUCTION

In recent years, acts of a violence and assault against women are rising. With the escalation of female employees in industries and other sectors of the commercial market, it is now- coming to a necessity for females to travel at late hours and visit distant and isolated locations as a part of their work. However, the exponential increase in assault and violence against women in the past few years is posing a threat to the growth and development of women. Protection is not the only measure that can suffice against this increasing abuse. A security solution that creates a sense of safety among women needs to be developed. In instances of attack, it is largely reported that women are immobilized. Therefore, there is a need of a simpler safety solution that can be activated as simply as by pressing a switch and can instantly send alerts to the near ones of the victim. This project focuses on a security system that is designed uniquely to serve the purpose of providing security and safety to women. The objective of research work is to create a portable safety device for women, which provides following facilities.

- ❖ Alerts family and friends by sending emergency message.
- ❖ Sends the current location of women to rescue at the earliest.
- ❖ Alerts the neighbourhood immediately for seeking help.

2. RELATED WORK

In [1] such device is designed which is a portable one which can be activated as per the requirement of the individual which will locate the victim using GPS and with the help of GSM emergency messages can be sent to the respective locations as per the design. The gadget provides an alarm system, call for help, and electric shock to get rid of the attacker. Author in [2] suggests a new perspective to use

technology to protect women. The system contains a normal belt which when gets activated, tracks the location of the victim using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication), to the three emergency contacts and the police control room. In [3] author described a GPS and GSM based vehicle tracking and women employee security system that provides the combination of GPS device and specialized software to track the location of the vehicle as well as provide messages and alerts with an emergency button trigger. The information of vehicle position provided by the device can be viewed on Google maps app. In [4] author proposed the system with the push of one button, people can alert selected contacts that the person is in danger and share the location. With this personal safety app, you will never walk alone. The personal safety application needs the name and number of the person who is to be contacted in times of emergency. Users can add multiple people's mobile numbers in the emergency contacts list. These are the people who will receive notifications in case of an emergency. All it needs is the user's action to trigger an SOS button provided and it shoots messages as fast as the device can manage. This app also provides necessary first-aid measures that should be taken at the time of emergency situations. In this [5] literature focus is on creating a safety system that brings about a solution that ensures both defence and creation of a seamless pathway to initiating legal procedures, if any; have to be taken by the victim. We expect to create a partial wearable that can provide a complete security solution and become a utility that softens the restlessness among women and their family members. The objective of this literary work is to create a safety system in the form of a portable safety device for women.

3. PROPOSED METHODOLOGY

This Project presents an automotive localization system using GPS and GSM services for women security. The system permits localization of the women and transmitting the position to the rescue team as a short message service (SMS). This system can also be interconnected with the car alarm system and alert the surrounding people to help women. This security tracking system is composed of a GPS receiver, microcontroller, and a GSM modem. When woman need help that time, she will press security alert switch then GPS receiver gets the location information in the form of latitude and longitude. The microcontroller processes this information and this processed information is sent to the certain person/guardian or nearby police station using GSM modem. The presented application is a low-cost solution for women security system. The proposed solution can be used in other types of application like child security etc. where the information needed is requested rarely and at irregular time (when requested).
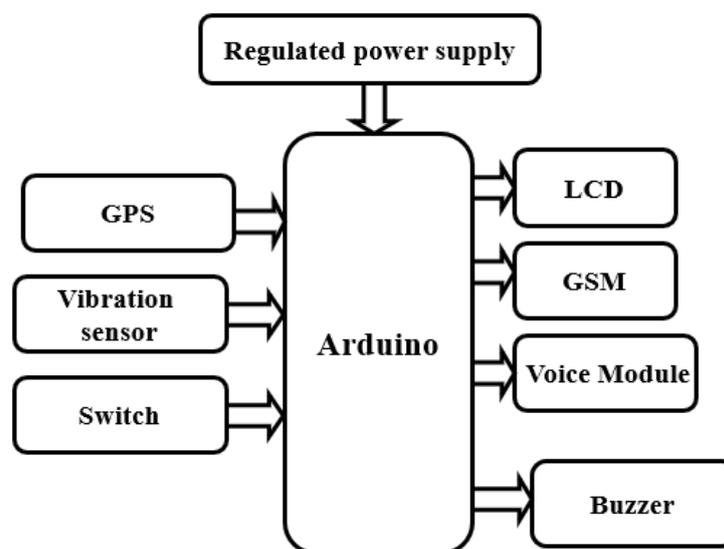

Figure 1. Proposed block diagram of women security system.

Features

- Remote communication using GSM modem.
- Sends location in the form of latitude and longitude.
- Reliable for remote tracking of woman when needed.

Software tools

- Arduino IDE for Embedded C programming.
- Arduino IDE for compiler, dumping code into micro controller.

Applications

- Women tracking.
- Child tracking.

3.1. LCD

LCD is liquid crystal display technology works by blocking light. Specifically, it is made of two pieces of polarized glass that contain a liquid crystal material between them. A backlight creates light that passes through the first substrate. It is used for display purpose.

3.2. Buzzer

A buzzer or beeper audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

3.3. GPS

The Global Positioning System (GPS) is a satellite-based route framework that sends and gets radio signs. A GPS collector gains these signs and furnishes the client with data. Utilizing GPS innovation, one can decide area, speed and time, 24 hours a day, in any climate conditions anyplace on the planet for nothing. GPS was formally known as the NAVSTAR (Navigation Satellite Timing and Ranging). Worldwide Positioning System was initially produced for military. Considering its famous route capacities and on the grounds that GPS innovation can be gotten to utilizing little, economical gear, the administration made the framework accessible for non-military personnel utilize. The USA claims GPS innovation and the Department of Défense looks after it. The compositional parts of GPS are ordinarily alluded to as the control section (ground stations), the space portion (satellites) and the client fragment (beneficiaries).

3.4. GSM

A GSM modem is a remote modem that works with a GSM remote system. A remote modem acts like a dial-up modem. The fundamental distinction between them is that a dial-up modem sends and gets information through a settled phone line while a remote modem sends and gets information through radio waves.

3.5. Tilt Sensor

This is a Mercury switch-based tilt sensor module that gives high at its output pin when tilted. It requires a 5V of DC input. It is a three-terminal device consist of input, ground, and output. It has a glass tube consist of two electrode and liquid mercury ball. The liquid mercury ball closes and opens the circuit when inclined in a direction. The working and internal structure of the module is given below:
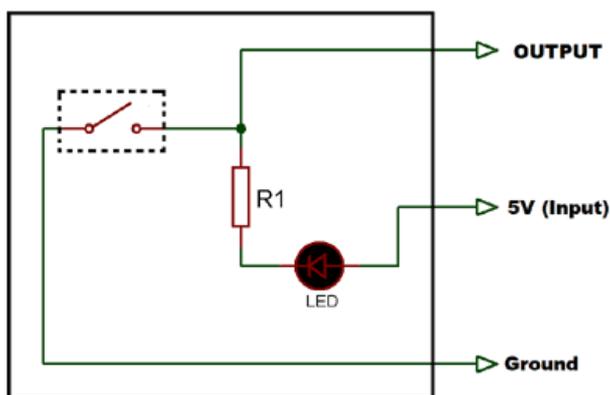
Figure 2. Internal structure of tilt sensor.

Working of Tilt Sensor

CASE 1: NOT TILTED

Initially, when it is in NOT tilted position as shown in the image below, it gives LOW output because of the liquid mercury complete the circuit by connecting the two electrodes. When the output is LOW on-board LED remain ON.
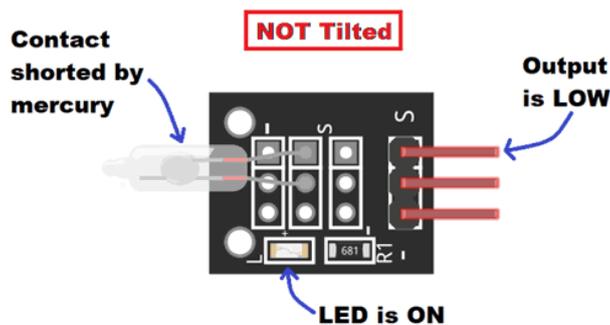

Figure 3. Example of not tilted.

CASE 2: TILTED

When it is inclined in a direction or angle, the liquid mercury breaks the contact between the metal electrodes and the circuit gets open. Hence, we get HIGH output in this condition and the onboard LED turns off.
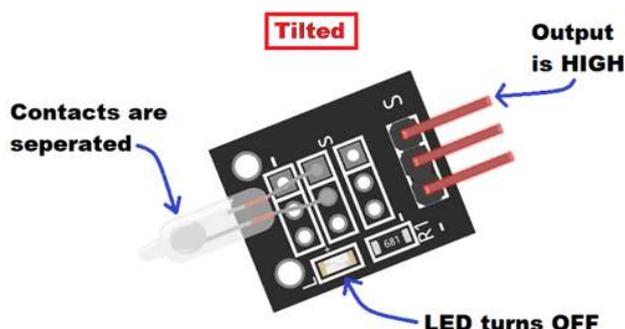

Figure 3. Example for tilted.

Initially, the Tilt sensor switch is in closed state which means the output is LOW. Now as per the circuit, the output of the tilt sensor is feed to the base terminal of transistor BC547. Whenever the sensor inclined to an angle or tilted the output gets HIGH and triggers the NPN transistor into ON state. As the transistor

turns ON, current through collector to emitter starts flowing and the LED and Buzzer, which are connected to the collector terminal, turns ON.

4. EXPERIMENTAL RESULTS
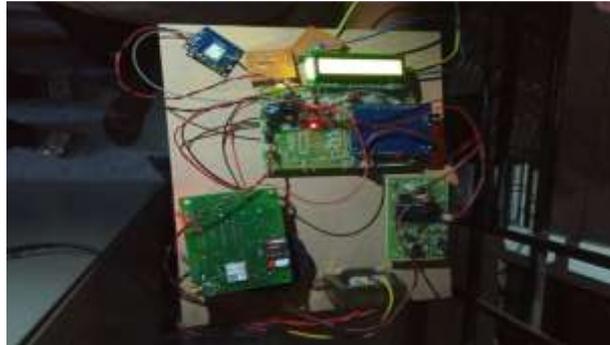

Figure 5. Complete setup of proposed system hardware.

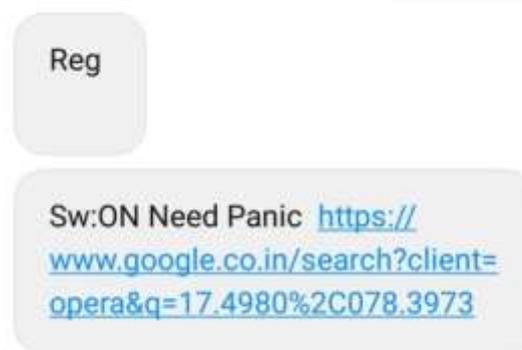Figure 6. SMS alert with location map link.

5. CONCLUSION

This type of idea plays an important role towards providing the fastest way of safety for women. The proposed design will deal with critical issues faced by women in the recent past and will help to solve them through using safety devices. This work was focused on developing a smart low-cost device to help women, feel them safer and prevent the occurrence of rape, harassment, and other dangerous situations. The project would aid in enhancing the safety and security of all despondent and badgered women and children. It can be concluded that the system helps to support gender equality by providing a safe environment to women in the society and allows them to work till late nights. Anyone before doing any crime against the women will be deterred and it helps to reduce the crime rate against the women.

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