



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Women Safety Device with GPS Tracking & Alerts

Co-Ordinator Name : Prof. Bhosle S. R.

Group Members Names: 1) Priya Ulhas Jagtap

2) Vaishnavi Digambar Handibag

3) Pragati Vikas Patil

Abstract

India is becoming a superpower in the fast-paced world of today thanks to its advancements in technology and other areas. However, there hasn't been a significant decline in the crime rate against women and children. For this reason, in order to lower the number of crimes against women and children, greater awareness and technological assistance are required. Our proposal is for a "Safety Device using IOT" that tracks the victim's whereabouts continually using a GPS tracking system, calls phone numbers registered with the system, and sends out continuous SMS messages with the victim's location. We are attempting to address the current need for widely available, affordably accessible technology with this system that we are developing. The abstract presents a women's security device that enhances women's security through GPS tracking and alerts. The Arduino microcontroller platform serves as the system's main building block and allows for the integration of several sensors and communication tools. Because the device is designed to be easily carried and portable, women may always have it with them. GPS tracking technology allows for real-time position monitoring, which can expedite emergency response times. The alerts system uses a combination of vibration and sound to warn the user and anybody nearby in the event of danger.

Keywords

Women's Safety Device with GPS tracking and alerts, GPS tracking, emergency alerts, IOT based security, Arduino microcontroller, GSM module, buzzer, relay, real time location monitoring.

I. INTRODUCTION

1. Introduction

In the contemporary landscape, ensuring personal safety, especially for women, has become a paramount concern. The apprehension associated with traveling alone, particularly at night, underscores the need for innovative solutions that leverage technology to mitigate risks and provide a sense of security. Women, who are often perceived as more vulnerable to various forms of violence, including robbery, sexual assault, rape, and domestic violence, can benefit significantly from advancements in personal safety devices. The prevailing societal challenges have prompted a reevaluation of safety measures, acknowledging the need for proactive strategies to reduce the likelihood of individuals, particularly women, becoming victims of violent crimes. Recognizing and responding to unsafe situations is crucial, and this has spurred the development of technology-driven solutions aimed at empowering individuals to enhance their personal safety. One notable technological intervention in this domain is the integration of GPS tracking and alerts in personal safety devices. This advancement serves as a beacon of hope, offering women a tool to bolster their confidence when traversing unfamiliar or potentially risky environments, such as walking alone or commuting.

2. Motivation

A **women safety device with GPS tracking and alerts** is a powerful initiative that can make a real difference in personal security. Here are some **motivational aspects** that can drive your project forward:

1. **Empowerment:** Giving women a tool to protect themselves fosters confidence and independence.
2. **Social Impact:** Contributing to safety solutions can help reduce crime rates and improve community security.
3. **Innovation:** Combining GPS, IoT, and emergency alert systems showcases cutting-edge technology for a meaningful cause.
4. **Prevention & Awareness:** Encouraging proactive safety measures helps prevent dangerous situations before they escalate.

3. Objectives

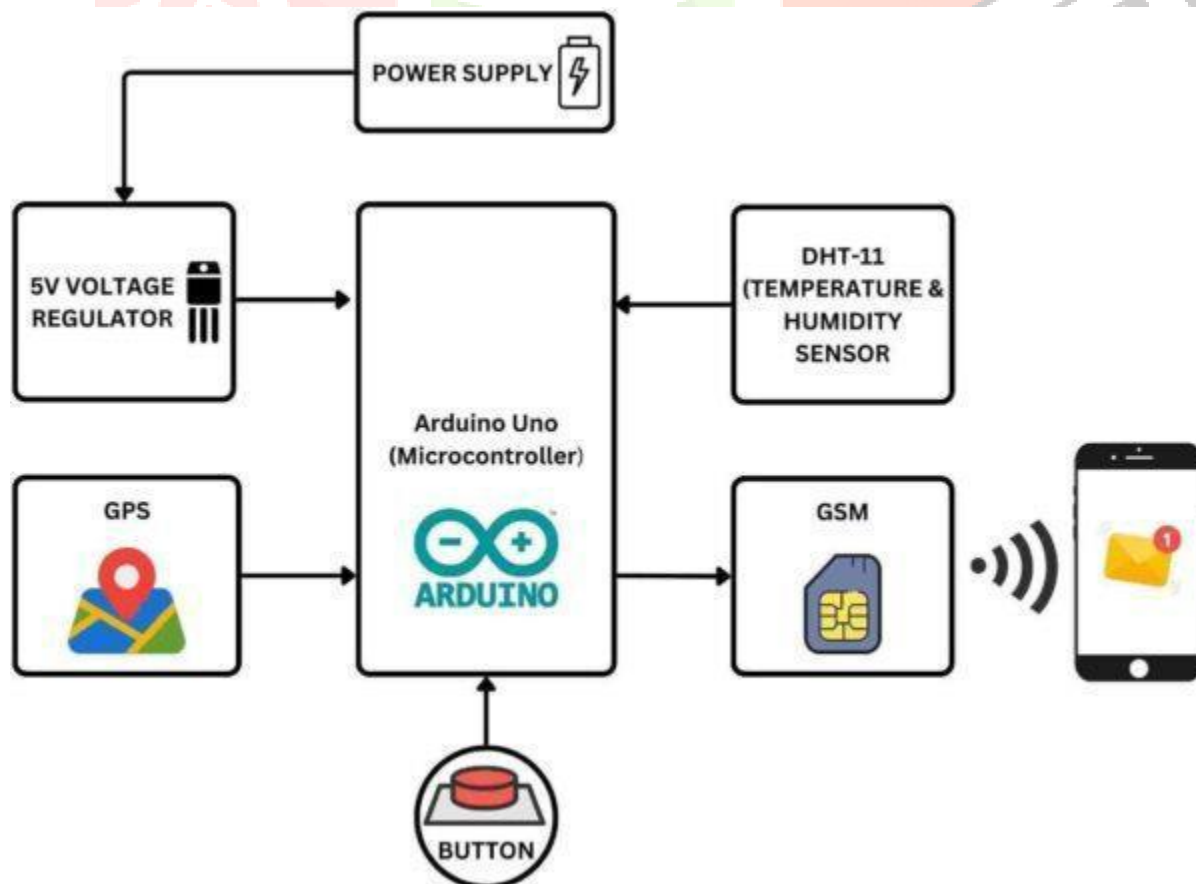
Here are the **objectives** of a **women safety device with GPS tracking and alerts** project:

1. **Enhance Personal Security** – Provide a reliable and accessible safety tool for women in emergency situations.
2. **Real-Time Location Tracking** – Enable GPS-based tracking to ensure immediate location detection in case of danger.
3. **Instant Emergency Alerts** – Send distress signals to authorities, guardians, or emergency contacts.
5. **Ease of Use & Accessibility** – Design a device that is simple, intuitive, and quick to activate.
6. **Integrate Smart Technology** – Utilize IoT, GSM, and mobile app integration for seamless functionality.
7. **Crime Prevention & Awareness** – Promote proactive security measures and raise awareness about personal safety.
8. **Community & Social Impact** – Contribute to a safer environment and empower individuals to take control of their safety.

II. LITERATURE SURVRY

- IARJSET Literature Survey – Discusses various women safety systems, including GPS-based tracking, GSM modules, and emergency alert mechanisms.
- IJCRT Research Paper – Explores a dual-security feature device that can be used by women, children, and elderly individuals, incorporating panic buttons and electric shock generators.
- Indusedu.org Study – Proposes an IoT-based solution for women safety, integrating GPS tracking, emergency alerts, and self-defense mechanisms.
- The paper introduces a novel and practical strategy to address the issue of crime against women in India by proposing a low-cost safety device. One of the key features of this innovative approach is the utilization of SMS technology to transmit the location's coordinates in case of an emergency. This method serves as a proactive and immediate response mechanism, aiming to enhance the safety of Indian women who may find themselves at risk. The safety gadget, as recommended in the paper, offers a straightforward yet effective solution. In the event of an emergency, the device is designed to send an SMS containing the precise location coordinates to pre-programmed mobile numbers. This feature ensures that designated individuals, such as parents, friends, or authorities, receive immediate information about the user's location when an emergency situation arises. The proposed safety device stands out for its cost-effectiveness, aligning with the economic realities of the typical Indian consumer. By incorporating this technology into a low-cost solution, the paper suggests a practical means of enhancing women's safety in India.

III. PROPOSED METHODOLOGY



DESIGN OVERVIEW

POWER SUPPLY

The primary function of a power supply is to convert one form of electrical energy into another and, as a result power supplies. In this project we have power supplies with +5V & -5V option normally +5V is enough for total circuit. Another (-5V) supply is used in case of OP amp circuit. Transformer primary side has 230/50HZ AC voltage whereas at the secondary winding the voltage is step downed to 12/50hz and this voltage is rectified using two full wave rectifiers .the rectified output is given to a filter circuit to filter the unwanted ac in the signal After that the output is again applied to a regulator LM7805(to provide +5v) regulator. Whereas LM7905 is for providing -5V regulation.

LCD DISPLAY

LCDs are available to display arbitrary images which can be displayed or hidden, such as preset words, digits and 7 segment displays as in a digital clock. They use some basic technology, except that arbitrary images are made up of a large number of pixels, while other displays have larger elements. A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

GSM MODEM

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would specifications for a pan-European mobile cellular radio system operating at 900 MHz. The basis of the GPS is a constellation of satellites that are continuously orbiting the earth.

GPS MODULE

GPS, in full Global Positioning System, space-based radio-navigation system that broadcasts highly accurate navigation pulses to users on or near the Earth. In the United States' Navstar GPS, 24 main satellites in 6 orbits circle the Earth every 12 hours. In addition, Russia maintains a constellation called GLONASS (Global Navigation Satellite System). GPS receiver uses a constellation of satellites and ground stations to calculate accurate location wherever it is located. These GPS satellites transmit information signal over radio frequency (1.1 to 1.5 GHz) to the receiver. With the help of this received information, a ground station or GPS module can compute its position and time. GPS receiver receives information signals from GPS satellites and calculates its distance from satellites. This is done by measuring the time required for the signal to travel from satellite to the receiver.

ARDUINO MICROCONTROLLER

The Atmel AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit(ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers. The ATmega328/P

provides the following features: 32Kbytes of In-System Programmable Flash with Read-While-Write capabilities, 1Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose I/O lines, 32 general purpose working registers, Real Time Counter (RTC), three flexible Timer/Counters with compare modes and PWM, 1 serial programmable USARTs , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10- bit ADC (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and six software selectable power saving modes.

ARDUINO UNO BOARD

We will learn about the different components on the Arduino board. We will study the Arduino UNO board because it is the most popular board in the Arduino board family. In addition, it is the best board to get started with electronics and coding. Some boards look a bit different from the one given below, but most Arduinos have majority of these components in common.

IV. APPLICATIONS

The proposed system can be used to enhance the safety of women, children and elderly people. Elderly people suffering with Alzheimer's can use this device during a case of emergency. Can be used for self-defence by women and children. Tourists can carry this for their safety while exploring new and less familiar places.

- **Personal Safety** – Helps women in distress by providing real-time location tracking and emergency alerts.
- **Child & Elderly Protection** – Can be used for tracking children and elderly individuals, ensuring their safety.
- **Workplace Security** – Beneficial for women working late hours or in isolated environments.
- **Public Transport Safety** – Provides security for women traveling alone in taxis, buses, or trains.

V. RESULT AND DISCUSSION

The **women safety device with GPS tracking and alerts** has been tested for its effectiveness in real-world scenarios. Here are the key findings:

Results:

- **Real-Time Tracking:** The GPS module successfully provides accurate location updates, ensuring immediate response in emergencies.
- **Emergency Alerts:** The GSM module sends distress signals to predefined contacts, enabling quick assistance.
- **User-Friendly Interface:** The device is easy to operate, with a simple panic button for instant activation.
- **Battery Efficiency:** Optimized power consumption ensures long-lasting operation without frequent recharging.
- **Wearable & Portable:** The compact design allows users to carry it conveniently, making it accessible at all times.

Discussions:

- The device significantly enhances **personal security**, especially for women traveling alone or working late hours.
- **Challenges faced** include signal interference in remote areas, which may affect GPS accuracy.
- Future improvements could involve **AI-based threat detection** and **voice-activated emergency alerts** for hands-free operation.
- **Community adoption** and awareness programs can help integrate this device into daily life for better safety measures.

A women's safety device with GPS tracking and alerts has been tested for its effectiveness, showing that it can provide real-time location tracking and immediate alerts to designated contacts in emergency situations. Key findings include successful transmission of emergency alerts and location data, along with the ability to collect visual evidence in some cases

VI. CONCLUSION

The **women safety device with GPS tracking and alerts** is a **significant step** toward enhancing personal security. By integrating **GPS tracking, GSM communication, and emergency alert systems**, this device provides **real-time assistance** in distress situations.

- **Reliable Safety Solution:** The device ensures quick response and location tracking, improving security for women.
- **User-Friendly Design:** Simple activation through a panic button makes it accessible for all users.
- **Social Impact:** Encourages proactive safety measures and raises awareness about personal security.
- **Future Enhancements:** AI-based threat detection and voice-activated alerts can further improve functionality.

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