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Emergency Safety Device for Women and Children

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Abstract: ***Every girl's top concern in today's society is how to stay safe from harassment. The world is become considerably more dangerous for women and children. In many nations, nefarious practices including molestations, dowries, crimes against women, and worst of all rape are on the rise. According to WHO and NCRB social government organization estimates, 35% of women worldwide experience abnormal health suffering in public settings. Every girl's only persistent thought is the day when they would be able to walk freely around the streets at all times without having to worry about their safety. The right to be free from violence, harassment, and discrimination applies to women. Women can be helped by removing the barriers they encounter in this dangerous atmosphere. Women can achieve their full potential as people and contributors to the workforce if the barriers they confront in this hazardous atmosphere are removed. The advanced women safety system presented in this article, called "EMERGENCY SAFETY DEVICE FOR WOMEN AND CHILDREN" will contact and send alert messages to neighboring police stations and family members when a woman or children is in danger. When triggered, the device sends a distress alert to pre-selected guardians or emergency services, including the child's precise location and real-time tracking data. Additional features, to alert guardians if a child moves beyond a safe area, two-way communication, and automated audio recording during emergencies, enhance the device's functionality. By leveraging these technologies, the proposed solution aims to provide parents with peace of mind while equipping children with a reliable and intuitive tool for personal safety. This development holds the potential to significantly reduce response times during emergencies and contribute to a safer environment for children globally. The location information is delivered as an SMS alert to numbers that have been saved in terms of latitude and longitude when a woman or children presses the button or it is automatically enabled when she is in distress. The protection and safety of women and children are the main goals of this project.***

Keywords: Women Safety, Child Protection, Emergency Alert System, GPS Tracking, Real-Time Monitoring, Personal Security Device.

I. INTRODUCTION ESDWC

The main purpose of this device is to act as an emergency/defense device for women as well as child who are in potential danger of being attacked. The Women or child possessing this device will press the panic button if in danger. An SMS containing the latitude and longitude coordinates will be sent to mobile numbers informing them about the danger and the location. For sending the message to relevant controlling authority, GSM technology can be used. But it is not sufficient in now a days so we are including some other advance features in this project. A camera, Microphone and speaker are essential components, enhancing both monitoring and communication capabilities. This concept was devised for the rouse of serious crime against women or child in India and to help curb those crimes. Women's safety in India has become a concerning issue, crimes against women growing at an appropriate rate. Crimes like kidnapping, sexual harassment towards women and young girls have been increasing day by day. The cases of crime against women have been registered of the total 4.05 lakhs by National Crime Records Bureau (NCRB) during 2019 and it has increased till now. Violence against women is a serious problem in India. Overall, one-third of women age 15-49 have experienced physical violence and about 1 in 10 has experienced sexual violence. During the first four faces of the COVID-19 related lockdown, Indian women filed more domestic violence complaints than recorded in a similar period in the last 10 years. Women continue to experience crisis and harassment, which persists as a never-ending issue in today's society when technology has advanced to new heights and every issue has a contemporary answer. Because they are constantly concerned for their daughters' safety, parents won't let their girls travel alone. Every time they go outside, they wanted to feel secure and safe. A challenge to achieving their goals and fulfilling their responsibilities is the rise in crimes and abuse against women. Women workers are concerned about their safety and security when they have to travel at odd hours, go far away, or go to remote regions for work. Also, the growth and development of women may be threatened by this insecurity. The goal of the research is to develop a portable safety gadget for women that uses IoT to constantly monitor the user using a variety of sensors interfaced an Arduino. IoT was a technology we employed to offer safety. This system includes a number of sensors, including temperature, moisture, GPS, and GSM sensors.

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This gadget was created with women's safety. So she won't be afraid to go out alone. Also, it is portable and easy to use, allowing them to carry it with them wherever they go. Delivering our prototype to all working women, kids, college students, and seniors is our main goal.

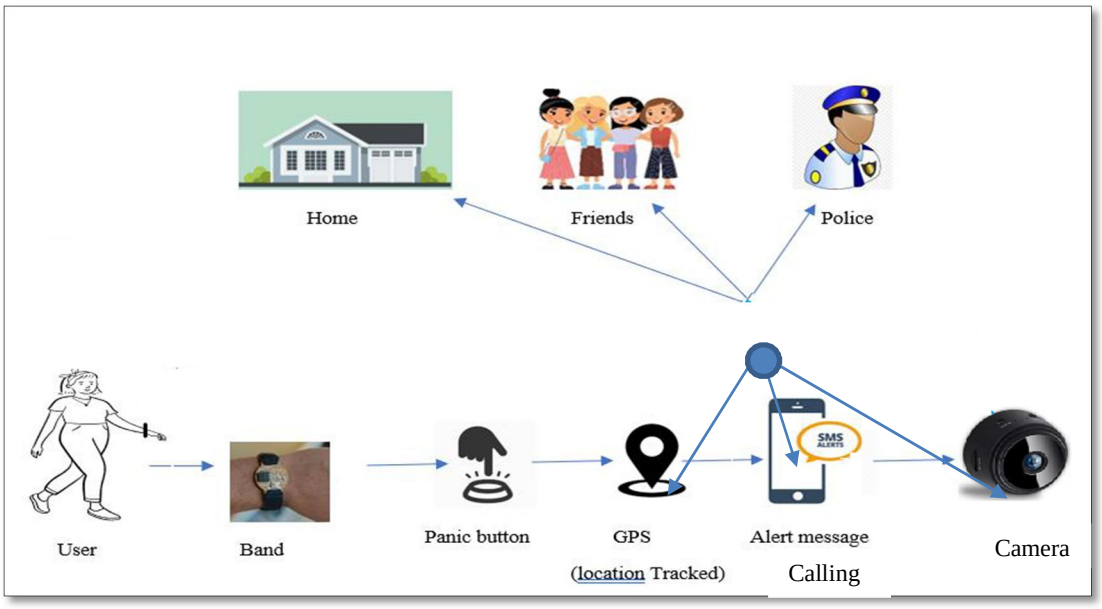


Fig.1: Conceptual Diagram

Recommendation provided as per Indian Standards:

To ensure the safe, reliable, and standards compliant operation of the Arduino-based women and child safety device, the following recommendations are made in accordance with relevant Indian norms:

- *Electronic Safety Compliance (IS/IEC 60950-1):* The Arduino Nano and other connected modules (GSM, GPS, sensors) should follow safety guidelines under IS/IEC 60950-1 for low-voltage IT equipment.
- *Battery and Charging Safety (IS 16046:2015 / IEC 62133):* The Li-Po battery and TP4056 charging circuit must conform to IS 16046, ensuring safety from overcharge, over-discharge, and thermal risks.
- *Wireless Communication Compliance (TRAI / DoT Norms):* The SIM800L, GSM module must operate within licensed frequency bands as per Department of Telecommunications (DoT), and emergency SMS alerts must align with **TRAI's DLT** (Distributed Ledger Technology) guidelines.
- *Enclosure and Field Deployment (IS 14772):* For practical use, the final device casing should meet **IP54 or higher** rating for protection against dust and water ingress, particularly for outdoor use.
- *Emergency System Integration (ERSS - 112 India):* The system should be designed to integrate with India's Emergency Response Support System (ERSS), enabling automatic location sharing during panic events.

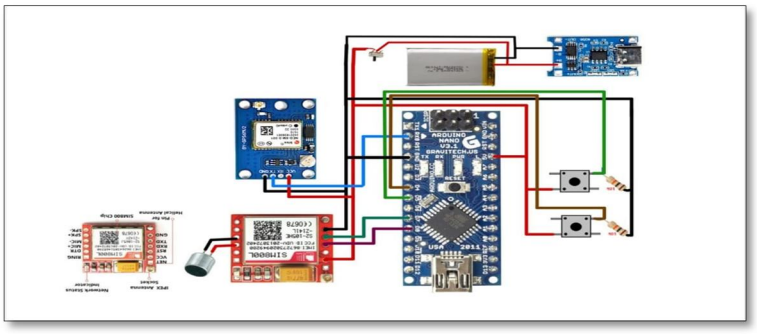


Fig.2: Simulation Diagram

II. IMPORTANCE FACTOR AND ITS IMPORTANCE

This system integrates Arduino based embedded technology to create an efficient, low-cost, and user-friendly safety solution for women and children. The importance factor lies in its ability to perform real-time tracking, alert generation, and evidence collection using GSM, and GPS modules. With the rise in crimes and the lack of quick-response systems, this device offers a portable and reliable means of protection**.** It enhances personal security by sending instant location updates and capturing surrounding audio or visuals, empowering vulnerable individuals and addressing safety concerns in both urban and rural environments.

III. LITERATUREREVIEW

[1] Dr.Paithankar Prasad Rajendra et al., (2017) proposed the vehicle tracking system uses GPS and GSM to track and provide complete location information to user over mobile phone is a total security and fleet management solution. It is the technology used to determine the location of a vehicle using different methods like GPS and other navigation system operating via satellite and ground based stations.

[2] J. SriRamPavan et al., (2018) proposed this project which presents a women safety device with GPS tracking and alerts using ARDUINO. The system can be interconnected with the alarm system and alert the neighbours. This detection and messaging system is composed of a GPS receiver, ARDUINO and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude.

[3] T. Sowmya et al., (2018) of Bapatla Women's Engineering College proposed a paper which covers descriptive details about the design and implementation of "System". The System consists of an Arduino UNO, GSM module (SIM900A), GPS module (Neo-6M), IoT module (ESP8266), Accelerometer Sensor (ADXL345), Buzzer, Panic Button, LCD. In this project, when a woman senses danger she has to press the Panic Button of the device. Once the system is activated, it tracks the current location using GPS (Global Positioning System) and sends an emergency message using GSM (Global System for Mobile communication) to the registered mobile number and nearby police station. IOT module is used to track the location continuously and update it into the webpage. Accelerometer Sensor can detect when she would fall, the buzzer is used as an alarm to alert the nearby people so that they may understand that someone is in need.

[4] A. Anny Leema et al., (2019) of School of Information Technology & Engineering proposed an idea of using Internet of things (IOT) for Women Safety with alarm. IOT interconnects billions of devices and exchange useful information which plays a vital role in women safety. This paper summarizes the various safety measures available for women and this task goes under the piece of keen security. New perspective of women security caution framework with Arduino is proposed which has the capacity of sending SMS alert to the relatives of the victim so that women can go out and do things without hesitation. Our framework additionally has one Arduino robber alert in the framework which detects and warns the authorized person on any unauthorized intrusion.

[5] Dr. C K Gomathy et al., of Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya (2021) proposed the project which presents a wearable safety device for women using the Arduino. The purpose of this device is to safeguard women in the event they might face any danger. The device uses wireless sensor network to communicate and to send alerts to them. The GPS and GSM are used to share the used to share the user's location directly to the relevant authorities and saved contacts. The switch in the device work for sending manual alerts in case of emergency and as panic switch to get the shock, then the Buzzer will also activate along laser diode. In this paper, mobile-based application (I safe apps) is developed with the android support to know whether a woman is safe. It gives the location of the woman in danger by giving fake phone calls, video forwarding, location and first-aid information.

IV. CONCLUSIONS AND OUTLINE OF PROPOSED WORK

The Arduino-based safety device proposed in this study provides an effective, affordable, and user-friendly solution to enhance the security of women and children in emergency situations. By combining GPS and GSM technology with a camera, and a panic button, the system ensures real-time location tracking and immediate communication with emergency contacts. This compact and portable device is designed to be easily carried and used in various situations, offering peace of mind and a reliable response mechanism during potential threats. Its successful implementation can significantly contribute to personal safety and crime prevention, especially in vulnerable areas.

1) Integration with a dedicated mobiles for live tracking and alerts.
2) Connectivity with India's ERSS (Emergency Response Support System – 112).
3) Miniaturization of the device for better portability and design aesthetics.
4) Use of NavIC (Indian GPS system) for better location accuracy within India.
5) Enhancement of battery life and power optimization for long-term use.
6) Development of cloud-based storage for incident logs and audio/video data.

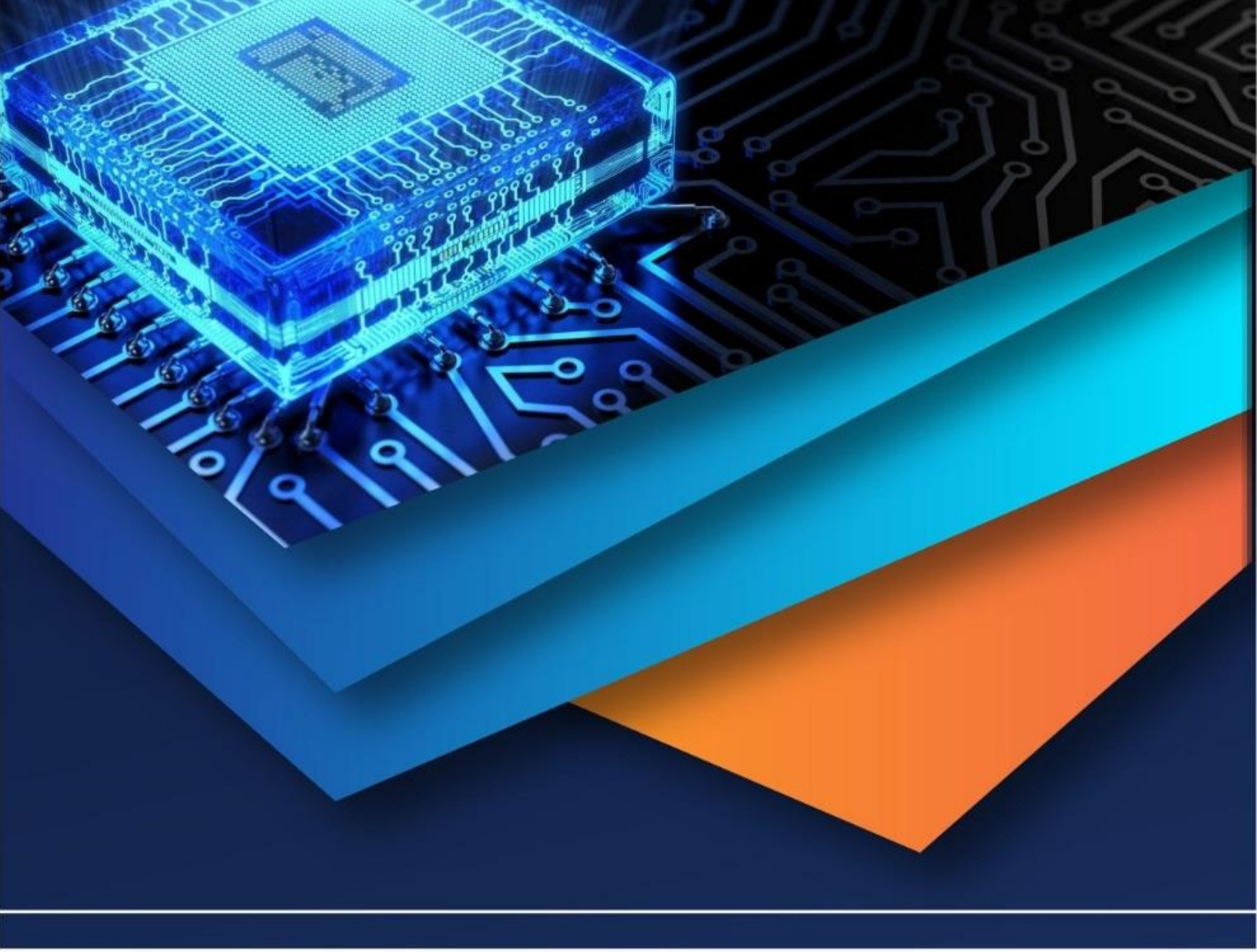
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[2] IEEE P2933 - Standard for the Safety and Well-being of Women in Smart Cities.
[3] IEEE P2413 - Standard for an Architectural Framework for the Internet of Things (IoT)
[4] IJARSCT-1548 - Women Safety Device with GPS Tracking Using Arduino



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