

# Review on Women Safety Device and Its Application: A Global Prospects

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**Abstract:** *In today's global environment, women are less likely to venture outside. In this autonomous world, they face a slew of repercussions. In this case, we'll look at a scenario in which a woman travelling alone on the road experiences harassment from the front or behind, during the day or at night. To address these concerns, we have carried out various literature review analysis who has given valuable suggestions. When they are uneasy, their heartbeat increases, which can be detected by the pulse sensor, and their stress level is tracked, and ladies may be able to express their distress message to trusted contacts and cops using our smart gadget. Such smart security gadgets can provide speedy reactions in the case of an emergency and protect women from potentially traumatic encounters. In addition, we may measure characteristics such as hemoglobin level, oxygen level in the blood, heart rate, and stress. The key advantage of this gadget is that it is tiny and portable. The employment of advanced components in this gadget provides greater precision and reliability.*

**Keywords:** *IoT Device, Women Safety Device, Wireless Sensor Network (WSNs).*

## I- INTRODUCTION

Women have the right not to be subjected to violence or harassment. Women are not safe anywhere, and they are especially vulnerable while driving alone through lonely roads and uninhabited areas. According to the NCRB report, the overall number of crimes against women in 2019 surpassed 4 lakh incidents. When compared to 2010, the figure has increased by about 53%.

In order to provide women with security, a gadget that is easy to carry and operate in risky situations is required. The initial module of the system was suggested to include a speech module integrated within women's accessories such as a bracelet, ring, or watch. Such integrated module will activate additional tools within the system, such as GSM, GPS, and a cardiac sensor.

The entire system of the proposed function based on the voice instructions supplied to the module as a input was integrated on sensors technology. This will be important for ladies in circumstances where they may not have the opportunity to click the button. When she cries, command alert messages will be sent to the registered cell phone numbers as well as the nearest police station, along with the person's location. Another module is a camera that may be inserted into a necklace or pendant worn by ladies. This module will be used to photograph and record video of the offenders. These photographs and videos can be utilized to prosecute the perpetrator. This technology will be extremely valuable in both saving lives and preventing crimes against women. The system also includes GPS (Global Positioning System) to receive the position and GSM (Global System for Mobile Communication) to deliver alarm messages to pre-registered mobile phones. In an emergency, this technology may simply connect to the phone and give self-security when individuals are prone to panic.

## II -LITERATURE REVIEW

Deepak Kumar et al focus on how a sense of responsibility on the part of Indian society may be fostered in the ordinary Indian people so that we can focus on the safety of women around them in this

research. Tweets on Twitter, which typically include images and text as well as written messages and quotes about the safety of women in Indian cities, can be used to spread a message among the Indian Youth Culture and educate people about the importance of taking strict action and punishing those who harass women [1].

It would be done effectively using the machine learning technique. It filtered out the unwanted text and then sent a report to the appropriate office. As a result, it will assist the government in protecting women on social media. D.Madhubala et al. conducted research on online abuse as well as a sentiment analysis. It assists many scholars in gaining an understanding of sentiment analysis on social media. Similarly, the survey is conducted using a combination of diverse methodologies as well as prepared disadvantages [2].

Jayashree Agarkhed et al. focus on women's safety systems by including sensors. The "WOMEN SELF DEFENSE DEVICE" (WSDD) intends to provide security by incorporating touch and pulse sensors into an Arduino-based module. Longitude and latitude can be used to track a person's whereabouts. Additional messages are delivered to the registered contact through GSM and GPS, such as police stations, family, or friends. For the time being, non-lethal shocks are delivered to defend against the attacker [3].

Rajesh Nasare et al. offer a method in this study where we would pre-warn the user about the red alert places where she will be travelling. Our technology will monitor those using GPS, determining their present location and informing them of the susceptible spot. SWMS (Safety App for Women: a Non-Magnanimous Shield) is a smartphone application that provides a vital function for placing an emergency help call [4].

Sentimental Analysis by Bindu M et.al is used as the core idea and is accomplished by machine learning, with input from tweets to assure safety. This emotive analysis of tweets aids in raising public awareness. They all know, Twitter and Instagram are responsible for disseminating information to individuals all over the world, which aids women in expressing their emotions to the rest of the world. They chose Twitter as a significant resource because it offers text, audio, and video messages that are simple to use [5].

In this research B. Sathyasri et.al discovered that when a woman detects danger, she must hold ON the device's trigger. The gadget is engaged, it uses GPS (Global Positioning System) to track the present location and sends an emergency message through GSM (Global System for Cell phone communication) to the registered mobile number and a nearby police station. The IoT

module is used to continually track the position and refresh the webpage [6].

To address these limitations, Ignacio Rodriguez-Rodriguez et al. propose a passive continuous monitoring system that uses biosensors attached to the survivor as well as machine learning techniques to determine if an abnormal situation related to gender-based violence is occurring, activating an alarm in this case. The system's monitoring structure oversees a large number of bio-signals based on the present state of wearable and biomedical device technologies [7].

Artificial intelligence (AI)-based systems have seen substantial success in healthcare, with AI models completing medical tasks at or beyond human levels of competence. Despite these accomplishments, AI's implementation in healthcare faces a number of hurdles. The suggested framework lays the groundwork for enacting and monitoring safety regulations, recognizing risks in AI models' activities, strengthening human-AI interactions, avoiding mishaps, and having an emergency plan in place for any residual hazards [8].

The number of crimes against women is on the rise, and molestation, eve-teasing, and rape cases are frequently reported in public locations. Women's safety is the most significant worry these days, and building a safety equipment that may function as a rescue and avoid injury in the case of a hazard is quite crucial, especially for women. V. Hyundai et al. developed a smart gadget for women's protection that automates the emergency alarm system by using pressure, pulse-rate, and temperature sensors to identify a prospective atrocity automatically using outlier detection [9].

Even in these contemporary times, with so much technological improvement, women's safety has always been a concern. Women require human interaction to activate the device, such as pressing a button or shaking the systems, and also aim to provide false proof safety to women. The proposed project intends to create an IoT-based safety gadget that provides protection to women using a fingerprint-based way of device connectivity and alerts adjacent individuals and police when a woman is in danger [10].

Today, crimes against women are growing more common in our society. The development of safety technologies to create a secure and safe environment for women continues to be in high demand. When self-defense is required, the gadget can be activated by the customer on its own. The gadget has capabilities such as a warning tone and speech recognition to guarantee optimal performance. This circuit is used to convey speech instructions to voice recognizers using the SAVE

ME and SUPPORT ME commands. The gadget is constructed in a tiny container and is simple to operate, allowing a simple woman to take it with her wherever she goes [11].

Women's safety is becoming increasingly important in many regions of the world. Women's crime is on the rise at an alarming rate. To address this problem, a technology-driven solution based on the most recent technical advances might be devised. The goal is to create an Internet of Things-based wearable device that uses voice recognition to assist women in an emergency. When enabled, the gadget may send SOS signals to neighboring aid centers and family based on the person's location. The device can also gather evidence for future legal proceedings and store it in a remote location. This is accomplished through the use of Internet of Things (IoT), Voice Recognition, and Cloud Computing technologies [12]. The system is managed by a Raspberry Pi, and it has two modes: standard mode and security mode. In regular mode, the user may register their fingerprint, while in security mode, the fingerprint sensor functions as a panic button, and when a fingerprint is recognized, the system communicates the location and records the culprit's photo, which is then stored in the cloud. The machine learning system takes the user's location as input and estimates the location of the nearest safe spot [13].

S.K. Anisha et al. conducted a quick safety device that responds immediately when women are in danger. The gadget has a button, and when pressed, a "HELP" message is sent to the trusted contacts through SMS, along with the location coordinates. The gadget may also capture images and videos, which can later be examined to identify the perpetrator. When a woman feels threatened or finds herself in a dangerous circumstance, she can utilize this gadget to protect herself [14].

There are also several rehabilitation centers that are employed when a crisis has occurred. However, our proposed model will assist women in taking precautions to ensure that they never find themselves in that situation. We applied Machine Learning for this concept. Machine learning is used to train data and make accurate predictions by identifying patterns in data. We used various algorithms such as Nave Bayes, K-Nearest Neighbors, and Logistic Regression models [15].

The proposed women safety device has unique architecture, which not only support the disturbance in networks but also analyze the robustness of various sensor data analytics for optimization of smooth functioning. There will be proposed user-interface,

which will trigger data as per the necessity as and when the push notification required for the proposed device.

Following Table 1 shows the comparative analysis between various devices hardware and software integration

Table 1- Comparative analysis

Sr. no	Existing Devices[3,6,7,8]	Proposed Devices
1	Disturbance in networks and its dependability	Chances of disturbance will be significantly reduced
2	Battery backup lower	Battery backup higher
3	Software not compatible with either one of mobile, desktop or cloud.	Software compatible with mobile, desktop and cloud will be possible
4	Complex hardware integration	Less complex hardware

### III -DIFFERENT MODELS FOR WOMEN SECURITY:

#### A. Portable Device for WomenSecurity

The paper presents a portable hardware device comprised of an AVR Atmega328P microprocessor, a GSM Module, a GPS Module, a Shock Generator Circuit, and an RS232 interface.

- AVR ATmega328P:  
Atmel designed this single-chip microprocessor. It features a low power consumption and a flash memory of 32kb.
- GPSModule:  
It is used to obtain position data. The location information includes latitude, longitude, a time stamp, and so on.  
SIM28m GPS is utilized in this case.
- GSM Module:  
GSM functions as a mobile device, allowing users to send messages and make phone calls to a predetermined mobile number.
- Shock GeneratorCircuit:

It generates a voltage of roughly 1200mV and a current of 3mA. The shock generating circuit is used to electrocute the attacker.

• RS232:

It is used to send and receive serial data between two devices. It is utilized in this case to enable serial communication between GSM and GPS devices.

The shock generator is housed within the sandal. The rest of the circuitry is contained within the bag. In the event of an emergency, ladies will hit the button. When the button is pressed, a shock is created at the sandal's tip. Using RS232, the microcontroller will send signals to the GSM and GPS. GPS receives satellite signals, calculates latitude and longitude data, and transmits them to GSM. GSM continually transmits text messages containing the victim's location to predetermined numbers. When programming, several numbers can be added; if the message is not read by the first person, it will be forwarded to the next number, and soon.

B. Women Safety Device and Application-FEMME

The paper's model includes both an application and a hardware unit. When the device's emergency button is pressed once, the GSM broadcasts the victim's position to the authorities. When the emergency button is double-clicked, the system begins recording audio and relays the victim's location. GSM transmits messages and calls to the police if the emergency button is held down for an extended period of time. The victim's position is determined using a GPS gadget. The audio at the incident is recorded using an audio recorder. Hidden cameras in rooms can be identified using an RF signal by a hidden camera detector.

The application has four options: SOS, women's safety, video recorder, and concealed camera. By selecting the required options, the user can initiate the activities associated with those options. If the user presses the emergency button, the programme communicates the user's location as well as any audio recordings to the emergency contacts.

C. All in One Intelligent Safety System for Women Security

The study suggests a women's security gadget with a sophisticated function. The user must save the emergency contact information. The system is triggered by either a key or a voice command. When the system is engaged, the victim's location is relayed to the registered contacts. The victim's position may be tracked using Google Maps by following the URL provided in the message. After receiving the notification, the registered contact member's call will be immediately accepted.

- Global Positioning System (GPS)

GPS determines its position on Earth using signals transmitted by satellites in space. It receives information such as latitude, longitude, and time from satellites.

• Module for Spy Camera Detection:

It detects hidden cameras in hotel rooms, locker rooms, and other public areas. If a hidden camera is detected, the user is alerted to a potentially dangerous location.

• Module for Intrusion Detection:

This module is attached to the front entrance of the house. When an intruder attempts to open a door, the GSM module sends an alarm message to the registered number. At the receiver's end, the programme will display a warning about the hazard. The system waits for the user's acknowledgment for a predetermined amount of time; if the user does not respond, the system activates the alarm on the home side to alert those nearby.

• Area Zone Module:

Attaching the Nano sensor to the child's clothing or jewellery. The user is required to select a range for the child. If the child leaves the parent's range, the parent will receive an alert.

• Electric Shock Generator:

It generates an electric shock for self-defense.

• Recording Audio Module:

When the emergency button is pressed, the Audio Recording function is activated, which records the audio of the situation and sends it to the email address associated with the account. The audio recording is admissible as evidence in a subsequent investigation.

• Simulated Call Module:

Women may utilize this ability to make phone calls to escape awkward situations. The aforementioned women's security system may also be implemented as an application; it consists of a zone area module, a fake call module, and an SOS.

D. A Mobile Based Women Safety Application (I SafeApps)

The publication created an Android application to assist women. There are six options in the app: Add guardians, SOS, Fake call, Video call, First aid, and Instructions. By selecting "Add guardians," you will be sent to another page with two options: "Add from

contacts" and "Add new contacts." When you select Add from contacts, the programme pulls information from your phone contacts. If the Add new contacts option is chosen, we may add our own contact's name and phone number. By selecting the SOS option, a call is placed to emergency contacts, and the person's location is relayed through text message. Fake call is another essential possibility. Fake calls can be used to get out of awkward situations. Video may be recorded by selecting the "video call" option, which is distributed by email. By selecting the First Aid option, users may obtain first aid information for a variety of conditions such as heart attacks, burns, and bleeding. If the person unintentionally clicks on the choice, it navigates to another page with information about it. The "Instructions" option gives a quick overview on how to use the programme.

E. AVR Microcontroller Based Wearable Jacket for Women Safety

The report offered a portable gadget that could be worn as a jacket. It is made up of a switching unit, a GPS module, a GSM module, an LED module, and a buzzer module.

A. Switching Unit:

The system has two switches, and the following are the operations performed by each switch:

**Switch 1:** For transmitting a location to each emergency number one at a time with a one-minute delay. In addition, it is utilized to activate the alarm and flash light.

**Switch 2:** Used to convey the position to emergency contacts on a continual basis.

B. GPS Module:

GPS requires a 5V power supply to function. It returns the user's latitude and longitude information.

C. GSM Module:

It is used to transmit the user's location to designated contacts.

D. LED Module:

The LED module is powered by a 12V power source. It shines light into the attacker's eyes, causing the attacker to lose his wits.

E. Buzzer Module:

The Buzzer Module is powered by a 12V power supply. It sounds the siren to draw the attention of anyone nearby.

#### IV-CASES WITH LIVE EXAMPLE

The proposed system when network is absent will be connected to mobile and will use mobile data for communication as per conventional devices [4, 5, 8, 9].

The proposed system will have larger battery and data storage backup, compared to conventional women safety devices, which are mostly premium and costly and hardware is also bulky [21, 22].

The system will be software enable for mobile, desktop and other viewing application, we can create the API which will be compatible with various cloud and web solutions [23].

#### V-CONCLUSION

We have discussed about the various application of women safety devices. Various literature reviews have suggested high technology application powered with sensor technology and internet technology. It has been observed that amalgamation of technology has resulted in powerful predictive analytics for safer devices. Women safety devices has various types and various applications and it has been concluded from our review that controller, GPS, analytics and prediction plays a very important role for perfect women safety device.

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