



IoT Based Women Safety System

¹Aditya Digarse, ²Harsh Mishra, ³Isha Bharti, ⁴Shreya Singh, ⁵Sanket Choudhary
¹⁻⁴ Research Scholar, ⁵ Professor

Department of Electronics & Communication Engineering
Lakshmi Narain College of Technology & Science, Bhopal, Madhya Pradesh, India

ABSTRACT

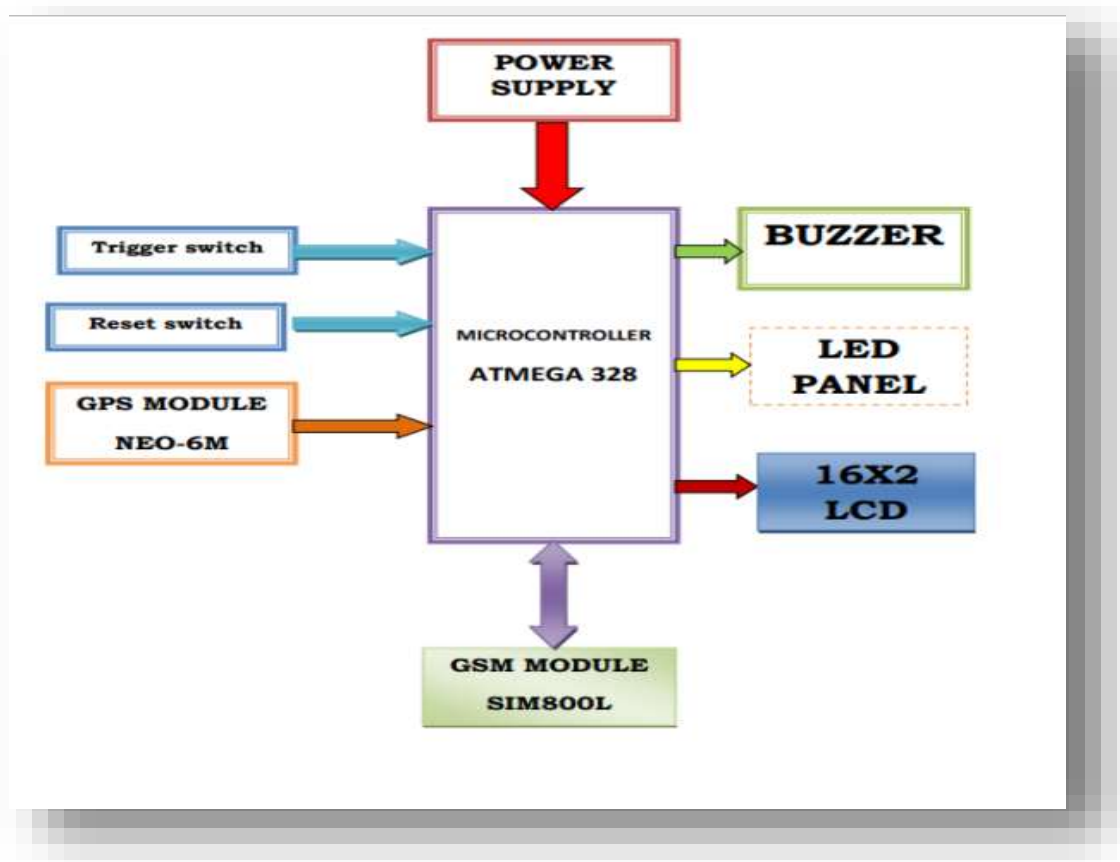
It has become quite difficult for today girls to move freely on streets. This has become a constant matter of worry and safety regarding their safety. There has been a tremendous increase the harassments against women these days. 54% of all the harassments registered are women harassments. We can't change the society but we can increase the security of girls. This proposed system for women consists of a wearable safety device which operates with sos button. This project is built using raspberry pi, GSM module and GSM modem. The sos button is provided in the band. If women get into any trouble, then if she presses sos button then the message is sent to registered mobile number. The message along with the location details is sent to the already registered mobile numbers and other emergency contacts. The location of the user is tracked using GPS. The LCD display will display the status of the project. This tracking system is a combination of raspberry pi, GPS receiver and GSM modem. The GPS receiver receives the location data from the satellite in the form of latitude and longitude. When a person presses the sos button, the raspberry pi processor processes this information and send it to the predefined registered mobile numbers through GSM modem. This research work can be applied in the safety sector for women. It reduces the crime rate against women to a major extent. The working of this women's safety system revolves around the quick and coordinated response to distress signals, leveraging cutting-edge technologies to provide real-time communication, location tracking, and alerts. The integration of these components ensures a comprehensive and effective solution to address the pressing issue of women's safety in public spaces. Being safe and secure is the demand of the day. Our effort behind this project is to design and fabricate a gadget which is so compact in itself that provide advantage of personal security system. This design will deal with most of the critical issues faced by women and will help them to be secure. The proposed mechanism provides viewing the location of the victim in terms of latitude and longitude which can further be tracked using Google maps. This system helps to decrease the crime rate against women. Women's security is a critical issue in current situation. These crimes can be brought to an end with the help of real time implementation of our proposed system.

I. INTRODUCTION:

Safety of women in India is a vast topic now-a-days. We cannot say that women are safe in India by seeing the last few year crimes against women especially in the national capital. Women generally are afraid to go alone outside. It is a very sad reality of the country that its women citizens are living with fear all time. Personal safety of women has been the topic of importance for every Indian citizen. Despite of formation of various effective rules and regulations by the Indian government to handle and control the crimes against women, the number of crimes against women are increasing day by day. The status of women in the country has been more offensive and dreadful in the last few years. It has decreased the confidence level of women for safety in their own country. We should not blame the government because women safety is not

only the responsibility of government only, it is the responsibility of every Indian citizen. Women in India known as the better half of Indian society, today, are becoming the most vulnerable section as far as their safety and security is concerned. This surely indicate that there has been an increasing rage of such sexual overdrives in present generation. Rape is the fourth most common crime against Women in India. According to latest National Crime Records Bureau (NCRB) 2013 annual report, 33,707 rape cases are reported across only India. The number of reported rape cases has been steadily increasing over the past decade. A step towards curbing incidents of this heinous crime is to develop a device that can sense the impending danger automatically and help in rescuing the victims from such act. Research shows that such devices exist commercially but requires manual pressing of button to trigger alarm. Since the mental state of women as well as children is affected during such act consequently manual pressing of button is not ideal. The citizens of India, have to take up some fundamental duties to contribute towards bringing an order to ensure dignity and respect for women so that she can also enjoy her human rights and fundamental rights with sense of pride, freedom and confidence. To ensure this, the society must work together to give an edge to the solution. For example, women in the society must be provided with devices with latest technology which provides her location using GPS technology to a central control room of police or send messages of her address to nearby locations. Public outrage after the brutal rape and murder of the 23 year old student, “Nirbhaya” in Delhi on 16 December 2012 has focused greater attention on necessity for holistic measures for security and safety of women. Sadly despite a strong legislation there has been no reduction in incidents of assault and physical abuse of women underlining larger socio-political ills and environmental changes in Indian society today.

II. WORK FLOW :



The algorithm used in the women safety app is

“Advanced Encryption Standard”

Advanced Encryption Standard is the most common algorithm in women security apps. It assists users in encrypting the messages they send via the app. Also uses GPS to transmit the precise location that the person is.

III. WORKING:

The working of the proposed women's safety system involves the seamless integration of various technologies, including Arduino Uno, GSM (Global System for Mobile Communications) module, GPS (Global Positioning System) receiver, and an SOS button on a wearable device. The system is designed to respond swiftly to emergency situations, ensuring the safety of women by providing real-time communication, location tracking, and alerts to designated contacts:

Step-by-Step Working Process

SOS Button Activation: The wearable device is equipped with an SOS button, strategically placed for quick and easy access. In an emergency, when a woman feels threatened or requires assistance, she presses the SOS button on the device.

SOS Signal Processing by Arduino Uno: Upon pressing the SOS button, a signal is generated and transmitted to the Arduino Uno processor integrated into the wearable device. The Arduino Uno, acting as the central processing unit, interprets the SOS signal and initiates the subsequent actions.

Location Data Acquisition through GPS: Simultaneously, the GPS receiver component of the system starts collecting location data in the form of latitude and longitude coordinates. The GPS technology provides accurate and real-time location information, crucial for quick response in emergency situations.

Communication via GSM Module: The Arduino Uno then communicates with the GSM module to send distress messages to registered mobile numbers and other emergency contacts. The distress message includes information about the user's location obtained from the GPS receiver.

Emergency Message Transmission: The GSM module, being a communication interface, utilizes the mobile network to transmit the distress message to the predefined contacts. The message contains not only the SOS alert but also the precise location details, enhancing the effectiveness of the emergency response.

Alerts Displayed on LCD Interface: The wearable device is equipped with an LCD display that provides real-time status updates to the user. The display indicates the progress of the distress signal transmission and can serve as a visual reassurance to the user during the emergency.

Multiple Emergency Contacts Notified: In addition to the primary contact, the system ensures a wider network of support by notifying other pre-defined emergency contacts. This multi-contact approach enhances the chances of prompt assistance and creates a community-driven safety network.

Response and Assistance: Once the distress message is received by the designated contacts, they can take immediate action to provide assistance to the user in distress. The combination of real-time location data and communication capabilities facilitates a swift and effective response.

Integration of Technologies

Arduino Uno: Acts as the central processing unit, receiving and interpreting the SOS signal, processing location data, and facilitating communication with the GSM module. **GPS Receiver:** Provides accurate and real-time location data, ensuring that responders have precise information about the user's whereabouts.

GSM Module: Enables communication by sending distress messages to registered mobile numbers, leveraging the existing mobile network infrastructure.

SOS Button: Serves as the trigger for the entire system, initiating the sequence of actions to ensure the safety of the user.

LCD Display: Offers a user-friendly interface for real-time status updates, keeping the user informed about the actions being taken on their behalf.

IV. CIRCUIT OPERATION:

An IoT-based women's safety system uses GPS and GSM modules to track a woman's location and send emergency messages and calls to pre-defined numbers when activated. The device is designed so that the victim must trigger a button to activate it. The system does not necessarily require a smartphone and ensures accuracy and reliability.

V. COMPONENTS

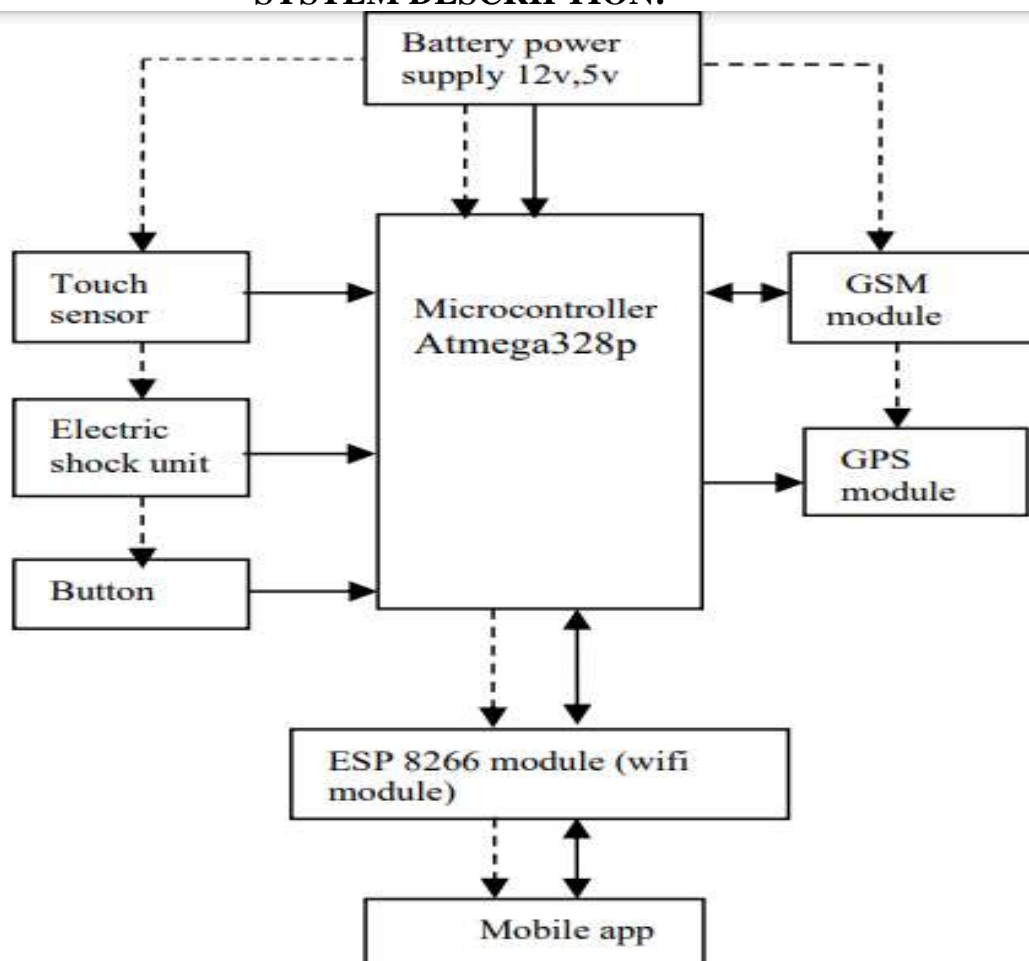
A. Microcontroller: Generally, microcontrollers are used to interface various peripherals in the circuit. Arduino Uno is a microcontroller which has AT mega 328. The key features of Uno board are Pinout, Stronger reset circuit and AT mega 16U2 replace the 8U2.

B. Capacitive Touch Sensor: Capacitive touch sensors are generally used in devices like mobile phones and MP3 players, they are also found in home appliances and industrial applications. The key features of capacitive touch sensor are robustness, cost, product design and durability.

C. Global System for Mobiles: Interaction between computer and the system is enabled by GSM/GPRS. GPRS is nothing but extension of GSM which has high data transmission rate. There is different type of GSM modules available, we are using SIM 900 GSM.

D. Global Positioning System: GPS is used to determine the receiver's position such as latitude, longitude and altitude. Change in receiver position is also determined with more accuracy and the velocity also determined.

SYSTEM DESCRIPTION:



VI. ADVANTAGES

The proposed women's safety system offers numerous advantages, addressing critical concerns and contributing to a safer environment for women in various situations. Here are several key advantages of the system:

Rapid Emergency Response:The system enables a swift and immediate response to emergency situations. The integration of an SOS button, GPS technology, and GSM communication ensures that distress signals are quickly processed, and assistance is dispatched promptly.

Real-Time Location Tracking:The inclusion of GPS technology allows for accurate and real-time location tracking. This feature is crucial in providing responders with precise information about the user's whereabouts, facilitating a quicker and more targeted intervention.

User-Friendly Interface:The wearable device incorporates a user-friendly LCD display that provides real-time status updates. This feature enhances the user's confidence and reassures them that the system is actively working to ensure their safety.

Community Support Network:The system goes beyond notifying a single emergency contact by including multiple pre-defined contacts. This approach creates a community-driven support network, increasing the likelihood of prompt assistance and fostering a sense of collective responsibility for women's safety.

Discreet and Accessible Design:The wearable device is designed to be discreet and easily accessible, allowing women to incorporate it seamlessly into their daily lives.

The Swift Response:The integration of GPS and GSM technologies ensures a rapid and efficient response to emergency situations.

Community Support:Notifying multiple emergency contacts creates a network of support, enhancing the user's safety through collective vigilance.

Empowerment:The wearable device and its functionalities empower women, providing them with a proactive tool to enhance their personal safety and well-being.

Versatility:The system's adaptability allows for potential expansion and application in various safety contexts, contributing to overall community well-being.

VII. RESULT

In the pursuit of ensuring the safety and security of women in the current societal landscape, the proposed women's safety device stands as a formidable solution. By incorporating a multifaceted approach to personal security, this device not only addresses immediate threats but also fosters a sense of community through its innovative features. The inclusion of a buzzer in the device design is a critical element aimed at alerting nearby individuals in case of an unfortunate incident. This audible signal not only draws attention to the distress but also acts as a deterrent, potentially preventing further harm. The device recognizes the importance of swift responses from the community and leverages this audible alert system to create a network of support in the vicinity.

The integration of text messages plays a pivotal role in escalating the situation to a broader audience. By notifying close relatives, law enforcement, and individuals registered within the application, the device ensures that a web of support is activated instantaneously. Including the victim's current location in these messages is a key feature, providing crucial information for timely assistance. This real-time communication channel serves as a lifeline, significantly enhancing the chances of a rapid response and

intervention. Furthermore, the device goes beyond individual safety by incorporating a community-building aspect through its dedicated application. By creating a platform where users can register and join a supportive network, the device fosters a sense of solidarity among community members. This community-driven approach amplifies the potential for assistance in critical situations. In times of distress, the application not only alerts registered users but also encourages them to respond and aid fellow community members in need.

VIII. CONCLUSIONS

In essence, this IoT-powered women's safety device transcends the traditional boundaries of personal security. It not only provides an active defense mechanism for immediate threats but also establishes a foundation for building social awareness and community resilience. By leveraging technology to connect individuals and facilitate rapid communication, the device transforms into a powerful tool for empowerment, collaboration, and collective safety. In an era where personal security is paramount, this comprehensive solution emerges as a beacon of hope, promoting not just individual safety but a united front against societal challenges. By dumping the codes into respective Arduino Uno then they will perform their operations and will communicate with each other.

For dumping code into Arduino, Assembly language is used. GPS is used to send the current location of victim to their respective relatives and guardians so that the victim can be tracked easily.

GPS sends the latitude and longitude information to the cloud. Then the cloud analysis the data and it generates a link with all.

IX. REFERENCES

- [1] Shaista Khanam, Trupti Shah, (2019) Self Defence Device with GSM Alert and GPS Tracking with Fingerprint Verification for Women Safety, International Conference on Electronics Communication and Aerospace Technology [ICECA], IEEE.
- [2] N. Islam, Md. Anisuzzaman, (2019) Sikder Sunbeam Islam, Mohammed Rabiul Hossain, Abu Jafar Mohammad Obaidullah, Design and Implementation of Women Auspice System by Utilizing GPS and GSM, International Conference on Electrical, Computer and Communication Engineering (ECCE), IEEE.
- [3] Sharifa Rania Mahmud, Jannatul Maowa, Ferry Wahyu Wibowo, (2017) Women Empowerment: One Stop Solution for Women, 2nd International Conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), IEEE.
- [4] Anand Jatti, Madhvi Kannan, Alisha RM, Vijayalakshmi P, Shrestha Sinha, (2016) Design and Development of an IOT Based Wearable Device for The Safety and Security of Women and Girl Children, International Conference on Recent Trends in Electronics Information Communication Technology, IEEE.
- [5] Sunil K Punjabi, Suvarna Chaur, Ujwala Ravale, Deepti Reddy, (2018) Smart Intelligent System for Women and Child Security, 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), IEEE.
- [6] M. Kavitha, V. Sivachidam baranathan, (2018) Women Self-Protecting System Using Internet of Things, International Conference on Computational Intelligence and Computing Research (ICCIC), IEEE.

- [7] R. Pavithra, S. Karthikeyan, (2017) Survey on Women's Safety Mobile App Development, International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), IEEE.
- [8] Madhura Mahajan, KTV Reddy, Manita Rajput, (2016) Design and Implementation of Rescue System for Safety of Women International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET), IEEE.
- [9] Nandita Viswanath, Naga Vaishnavi Pakyala, G. Muneeswari, (2016) Smart Foot Device for Women Safety, IEEE Region Ten Symposium (TENSYP), IEEE.
- [10] G. Gulati, T. K. Anand, T. S. Anand, and S. Singh, Modern era and security of women: An intellectual device, Int. Res. J. Eng. Technol. (IRJET), vol. 7, no. 4, pp. 212218, 2020.