Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

Implementation of Iot-based Real-time Women's Safety System

Dr. Praveen Blessington Thummalakunta,
Tejas Nemane, Priyank Naik, Sandip Palkar, Aliakbar Poonawala
Department Of Information Technology,
Zeal College of Engineering and Research Narhe, India

Abstract: **In contemporary society, despite significant technological advancements, ensuring women's safety remains a pervasive concern. The vulnerability of women, particularly when navigating solitary routes and desolate areas, underscores the critical need for innovative solutions. This research addresses the existing void in comprehensive safety devices, proposing a buzzer-based system designed to offer immediate protection and empower individuals in potentially threatening situations. The primary focus of this project is developing a portable device that, when activated, deploys a loud-volume buzzer, creating a deterrent effect and providing the user with a crucial window of opportunity to escape harm. Acknowledging the limitations of current safety mechanisms, this device aims to bridge the gap by offering a tangible, on-the-go solution that enhances women's security. Beyond instant safety, our proposed design incorporates additional features to amplify its utility. The device facilitates the sending of group messages, enabling users to alert a pre-defined network of contacts in emergencies. This collaborative communication approach enhances the collective safety of women by leveraging the strength of community support. Moreover, integrating audio recording capabilities adds an extra layer of accountability and evidence gathering. In the event of an incident, the device captures audio data that can be pivotal for law enforcement and legal proceedings. As a comprehensive safety solution, the project addresses the psychological aspect of personal security, aiming to instill confidence and resilience in women. By providing an effective means of self-defense, coupled with communication features and evidentiary support, the device seeks to empower women to navigate their daily lives with greater freedom and security. In conclusion, this research contributes to the ongoing discourse on women's safety by proposing a buzzer-based device that transcends the limitations of existing safety measures. The multifaceted approach provides instant security and fosters a sense of collective empowerment, paving the way for a safer and more secure future for women in diverse environments.**

Keywords: **Arduino nano 33 Ble sense, women safety, IoT, Safety Application Development.**

I. INTRODUCTION

In an era where technology plays an ever-increasing role in our daily lives, the potential for IoT (Internet of Things) to address critical societal issues is profound. One such issue is women's safety, a concern that transcends geographic boundaries and affects women worldwide. In response to this pressing concern, the development of wearable IoT devices has emerged as a powerful tool to empower women and enhance their safety. These devices are designed to seamlessly connect to mobile phones, enabling wearers to send messages and make calls to selected contacts directly from their mobile applications. This innovation not only provides a sense of security but also serves as a proactive solution in the fight against gender-based violence and harassment. Wearable IoT devices tailored to women's safety have gained significant traction due to their versatility, discretion, and ease of use. These accessories can be made in many forms such as pendants, bracelets, and even clothing accessories; This makes them easy to use and adaptable to a variety of interests and lifestyles. One of the best features of this device is its ability to synchronize with the mobile application, which forms the basis for managing security measures and communicating with trusted contacts. The main function of these wearable IoT devices is based on connectivity and communication. Users can pair the device with a mobile phone via Bluetooth or other wireless technology. Mobile apps are often designed to be as intuitive and functional as consumer dashboards. Users can set their favorite contacts through the app, allowing them to send notifications, messages, and calls in times of stress or emergency. Wearable IoT devices can do more than emergency communications. Most devices also include a variety of sensors and features to further increase security. For example, they may include GPS functionality to determine the user's location even in remote areas. This will help ensure that officers or elected officials can respond quickly in an emergency. Additionally, many of these devices have quick-release buttons or gestures that allow users to send emergency notifications with little to no effort. This freedom and power allow women to seek help if they feel uncomfortable speaking up or calling. The rise of IoT devices that can be used for women's safety offers a promising solution to the ongoing problem. question. These tools not only provide effective solutions to crises but can also act as a deterrent against potential attackers. By giving women the tools, they need to stay safe and expand their support networks, IoT wearables are helping create a world where women can live their lives safely and securely every day. As we delve deeper into the world of IoT technology, it is important to discover the many features and capabilities that make this technology an important factor in keeping women safe. In this discussion, we will understand the process of these tools, their integration with mobile applications, the benefits they provide, and their ability to create a safe technology world for women.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

II. LITERATURE SURVEY

V.Ebenezer, Uvaana Falicica J, Rithika Baskaran, Agatha Celesty R, Sejal R Eden [18] The paper discusses the development of a women's safety system based on IoT, which integrates various sensors and devices to create a smart and automated environment for women's protection. It aims to address the rising concerns about women's safety and provide them with the confidence to move freely without fear. This introduces smart devices with multiple functionalities like temperature and vibration sensors. It also connected with GPS which obtained the location of women and protected women. It offers the main advantage of making it wearable and easily movable and it is easy to carry it anywhere. It has hardware components with a large size and make it difficult to move from place to place. In our device, we proposed a device that has a microcontroller called Arduino Nano 33 ble sense with Bluetooth functionality. it is very small in size and makes the device wearable and easily movable. Additionally, these devices are typically connected to a central monitoring system or a smartphone application, which serves as a user interface for accessing features like emergency alerts, location tracking, and communication with predefined contacts or authorities. Researchers have explored different aspects of these systems, including the design of efficient algorithms for real-time threat detection, the usability of the accompanying mobile applications, and the integration of IoT devices with existing infrastructure such as smart city frameworks.

Ayesha Siddika1, Md. Deluar Hussai, Md. Saddam Hossain, Md. Farhaduzzaman, [2]. This describes the creation of a safety device for women using GPS and GSM technology. The device is aimed at providing women with a sense of security and protection in emergencies. It consists of an ATmega328 microcontroller, a GSM module, and a GPS module. When activated, the device tracks the woman's location using GPS and sends emergency messages and calls to pre-defined numbers, such as family members and the police station, using a GSM. The system does not require a smartphone and ensures accuracy and reliability. This system offers a two-button mechanism that will be used for initiating a buzzer and another one to rescue SMS and call the pre-defined police station, and family member's numbers. This device has some limitations If the power supply is damaged, the working system of this device will be disabled, and Arduino Uno is the heart of the circuit. If the controller is damaged the whole system will be Corrupted. To overcome the limitations of this our device offers functionalities like a single press button to initiate a buzzer as well as rescue SMS and alerting mechanism. We further build a community in the application that ensures the chance of getting help from people who enroll in the applications and may be available to help the person who is in trouble.

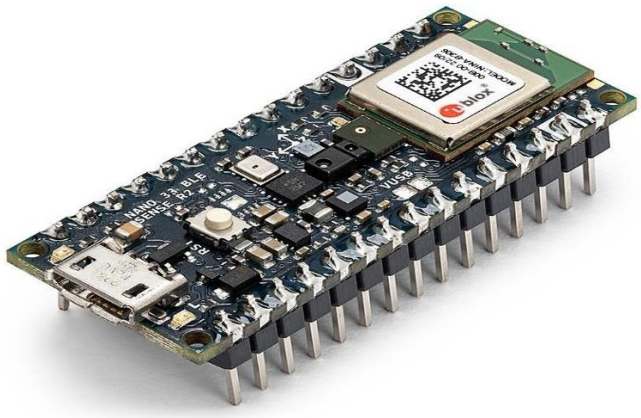
G C Harikiran, Karthik Menasinkai, Suhas Shirol [21] The paper addresses the rising crimes against women and the need for safety devices in public places. It proposes a smart wearable device that utilizes pressure, pulse rate, and temperature sensors for automatic atrocity detection and alerts. The device integrates outlier detection techniques to identify potential harm and trigger emergency messages to relatives and nearby police stations. The proposed solution involves the integration of multiple devices, primarily a smart band, and a smartphone, both equipped with various sensors and communication technologies. The smart band continuously monitors vital signs such as pulse rate and body temperature, along with detecting abnormal motion, and communicates this data to the smartphone. The authors critically evaluate existing systems for women's security, highlighting their limitations, particularly the reliance on the victim to trigger the security measures.

Muhammad Shoaib Farooq, Ayesha Masooma, Uzma Omer, Rabia Tehseen, S. A. M. Gilani, And Zabihullah Atal[16] In this paper, IoT-based devices for women's safety. Survey and comparison of existing works on women's safety devices. It proposed a device that uses technologies like IoT and Machine Learning. A device offers functionalities like Image capturing, Audio recording, Alarm system, Shock generator, and Live location tracking. But this device works on pulse rate and heartbeat and this may be triggered by events like running or by doing any work fast. Hence, we tried to avoid such scenarios and make our device work manually by using external hardware components and tried to avoid any unintentional activities.

II. METHODOLOGY

3.1) Components

1. Arduino nano 33 Ble sense rev 2



The Arduino Nano 33 BLE Sense Rev 2 is a compact and versatile development board designed for embedded electronics projects. It is an upgraded version of the Nano 33 BLE Sense, integrating a variety of sensors and communication capabilities. The board is based on the Nordic Semiconductor nRF52840 chip, offering Bluetooth Low Energy (BLE) connectivity for wireless communication.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

What sets the Nano 33 BLE Sense Rev 2 apart is its rich sensor suite, making it ideal for projects involving IoT, wearables, and edge computing. It includes a 9-axis IMU (Inertial Measurement Unit) for motion sensing, environmental sensors for temperature, humidity, and pressure, and a microphone for sound detection. These sensors enable developers to create applications that involve motion tracking, environmental monitoring, and audio processing.

Additionally, the board features a user-friendly design with a compact form factor, making it suitable for projects with space constraints. It can be programmed using the Arduino IDE, which simplifies the development process for both beginners and experienced users. Overall, the Arduino Nano 33 BLE Sense Rev 2 is a powerful and feature-packed development board, combining wireless connectivity and a diverse range of sensors to facilitate the creation of innovative and interactive projects.

2. buzzer

The Piezoelectric Buzzer is a versatile and widely used component in electronic circuits, known for its simplicity and effectiveness in generating audible alerts. It operates on the principle of the piezoelectric effect, where a piezoelectric crystal deforms when subjected to an electric field, producing vibrations that result in an audible sound.

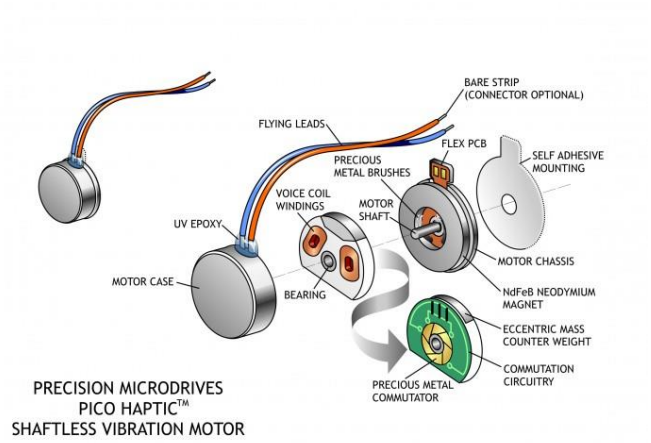
This type of buzzer is designed for continuous sound output and can produce a steady tone when powered. It is suitable for various applications such as alarms, notifications, and signalling devices. The buzzer operates within a voltage range of 3V to 24V, offering flexibility in different electronic setups.

Unlike electromagnetic buzzers, which rely on the movement of a coil within a magnetic field to produce sound, piezoelectric buzzers have no moving parts, making them more durable and energy-efficient. They are also compact and lightweight, making them suitable for space-constrained projects.

The continuous sound produced by this buzzer makes it particularly useful in scenarios where a persistent and attention-grabbing alert is required. Common applications include security systems, electronic gadgets, and industrial machinery where audible feedback is crucial for user awareness.

Integrating the piezoelectric buzzer into a circuit is straightforward, requiring a power source within the specified voltage range. The simplicity and reliability of these buzzers make them a popular choice for hobbyists, engineers, and designers seeking a cost-effective solution for audible alerts in their electronic projects.

3. Vibration motor



The ERM (Eccentric Rotating Mass) Coin Vibration Motor with a diameter of 7mm and a thickness of 2mm is a compact and efficient component widely used in various electronic devices to provide haptic feedback. These motors are known for their small size, lightweight design, and ability to generate vibrations, making them suitable for applications such as mobile phones, wearables, game controllers, and other portable electronic devices.

The "coin" designation refers to the flat, disc-like shape of the motor, resembling a coin. The ERM technology involves an eccentric mass that rotates within the motor, creating a vibration effect. When an electric current is applied to the motor, the eccentric mass generates vibrations, creating a tactile feedback sensation.

The 7mm diameter and 2mm thickness make this ERM motor particularly suitable for devices with limited space, where size constraints are critical. Despite its small dimensions, the motor is capable of producing noticeable vibrations, adding sensory dimension to user interfaces, and improving the user experience.

ERM coin vibration motors are commonly used to provide alerts, notifications, and haptic feedback in devices where sound or visual cues may be less effective or inappropriate. For example, they are employed in smartphones to signal incoming calls, and notifications, or to enhance the realism of gaming experiences by providing tactile feedback.

In summary, the 7mm diameter, 2mm thickness ERM coin vibration motor is a compact and versatile component that plays a crucial role in enhancing user experiences by delivering haptic feedback in a wide range of electronic devices.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

4. Push button

The R13-507 16mm 2-pin momentary round cap push button switch, often identified by its distinctive blue color, is a tactile switch widely used in electronic circuits for momentary input applications. With a diameter of 16mm, this compact switch is designed to fit neatly into various electronic devices and control panels.

The switch is characterized by its momentary action, meaning it returns to its original state after being pressed and released, making it suitable for applications where temporary contact is required. The 2-pin configuration simplifies the wiring process, making it easy to integrate into electronic circuits.

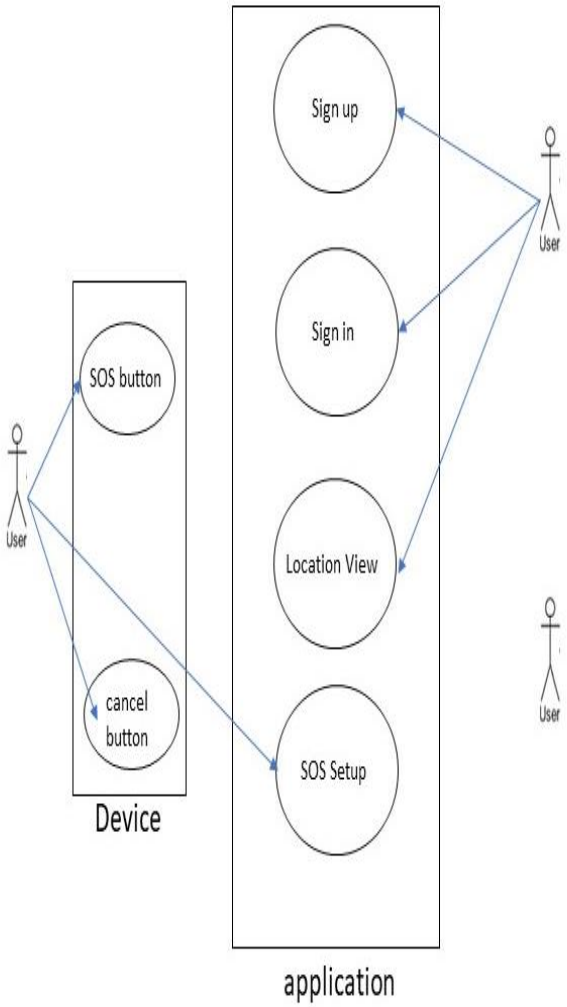
The round cap of the switch provides a comfortable and ergonomic surface for users to press. The blue color not only adds a visual distinction but can also serve as a means of organizing or categorizing different functions within a device or control panel.

These momentary push-button switches find applications in a range of electronic devices such as consumer electronics, appliances, industrial control panels, and more. They are commonly used as input controls for functions like power activation, reset, or other momentary actions in electronic systems.

Overall, the R13-507 16mm 2-pin momentary round cap push button switch is a reliable and versatile component, offering tactile feedback and durability for momentary input needs in electronic design and prototyping.

Push Botton we are using in our device to initiate the overall action. This enables the buzzer and Vibration motor and place the attacker in a panic situation and it also connects the device to a mobile application through Bluetooth.

Flow Chart :



VI. PROPOSED SYSTEM

Wearable devices have become increasingly popular in the realm of personal safety and health monitoring. The integration of Arduino Nano 33 Ble Sense Rev 2 into a wearable safety device represents a significant advancement, offering users a comprehensive solution for emergencies.

At the heart of this innovative wearable is the Arduino Nano 33 Ble Sense Rev 2, a powerful and compact microcontroller that facilitates seamless communication with a mobile phone through Bluetooth technology. This connectivity serves as a crucial link between the user and their emergency contacts, enabling quick and efficient communication in times of need.

The primary functionality of the device revolves around a strategically placed button, easily accessible to the user. When pressed, this button triggers a sequence of actions aimed at ensuring the user's safety. First and foremost, the mobile phone establishes a connection with the selected

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

contacts through Bluetooth. Subsequently, a pre-configured message is sent to these contacts, informing them of the user's situation. Simultaneously, a call is initiated, allowing for real-time communication.

To enhance the urgency and visibility of the distress signal, the device features an activated buzzer. This audible alert serves a dual purpose – it not only alerts the user that their distress signal has been sent but also attracts the attention of nearby individuals. This audible cue is instrumental in ensuring that the user receives assistance promptly, especially in crowded or noisy environments.

Understanding the importance of feedback, the wearable incorporates a vibration motor to provide tactile confirmation to the user. When the button is pressed, the vibration motor is engaged, creating distinct haptic feedback. This feedback mechanism is crucial in preventing unintentional button presses, as the user can confidently perceive the action they have initiated. This feature is designed to avoid false alarms and enhance the overall reliability of the device.

Furthermore, the device incorporates a location-sharing feature to provide additional information to the user's contacts. When the distress signal is activated, the mobile phone utilizes its location services to send the user's current location to the designated contacts. This feature is particularly valuable in emergencies where the user might be unable to communicate their location verbally.

In summary, the Arduino Nano 33 Ble Sense Rev 2-powered wearable safety device seamlessly integrates hardware and software components to create a reliable and efficient emergency communication tool. The combination of Bluetooth connectivity, message sending, phone call initiation, audible alerts, haptic feedback, and location sharing ensures that users can quickly and effectively communicate their distress, garnering assistance when needed the most. This holistic approach to personal safety showcases the potential of technology to positively impact and safeguard individuals in various situations.

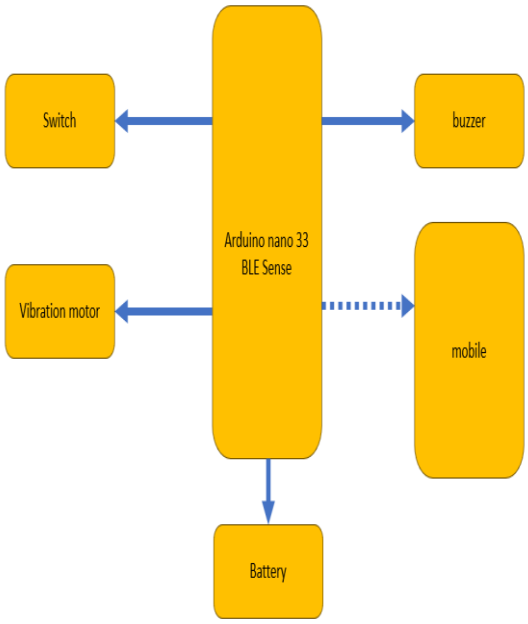


Fig.1: System Architecture

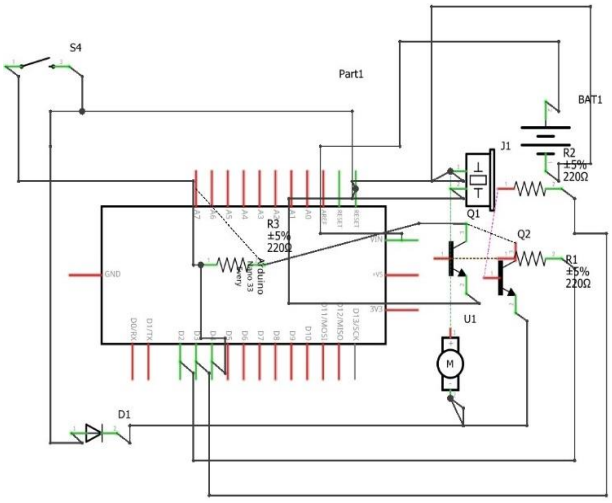


Fig 2: Circuit Design

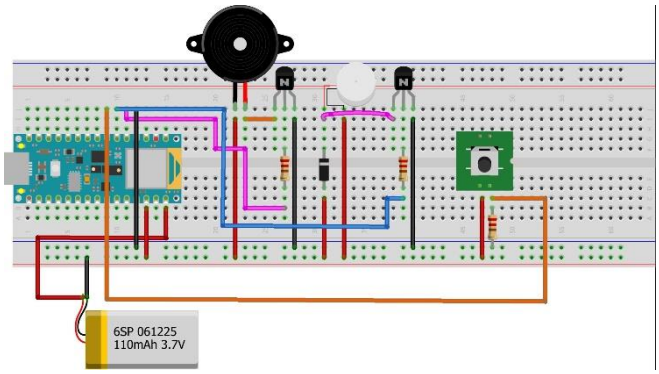
3.2) Process Flow

- The device gets enabled after pressing the push button instantly.
- After pressing the button, the function of the vibration motor is initialized and it starts vibration throughout the device.
- We also have the option to abort all further operations by pressing the push button again within 5 seconds.
- If we do not press the push button again within 5 seconds then the vibration motor stops working and the buzzer starts with an alarm.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

- After initializing the buzzer, the role of the application comes into play.
- We connect our device to an application through the Bluetooth sensor of the microcontroller.
- After connecting with an application, we provide backup safety by sharing the location to saved contacts and to the people who registered in the community.
- The people from the community get notified by the alert message and there is a maximum chance of serving help from them to the victim women.

3.3) Simulation



Arduino nano 33 ble sense rev 2 with its peripheral devices such as a buzzer, vibration motor, battery, and push button provide a comprehensive system for building a safety device. This set of components allows us to build a low-power, high-precision system that is ideal for long-term use and accurate results.

V. CONCLUSION

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.

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.

VI. REFERENCES

[1] 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. 212–218, 2020.
[2] B. S. Bala, M. Swetha, M. Tamilarasi, and D. Vinodha, ‘‘Survey on women safety using IoT,’’ Int. J. Comput. Eng. Res. Trends, vol. 5, no. 2, pp. 16–24, Jan. 2018
[3] W. Akram, M. Jain, and C. S. Hemalatha, ‘‘Design of a smart safety device for women using IoT,’’ Proc. Comput. Sci., vol. 165, pp. 656–662, Jan. 2019.
[4] B. Sathyasri, U. J. Vidhya, G. V. K. J. Sree, T. Pratheeba, and K. Ragapriya, ‘‘Design and implementation of women safety based on IoT technology,’’ Int. J. Recent Technol. Eng., vol. 7, no. 6, pp. 177–181, 2019
[5] H. Nagamma, ‘‘IoT based smart security gadget for women’s safety,’’ in Proc. 1st Int. Conf. Adv. Inf. Technol. (ICAIT), Jul. 2019, pp. 348–352.
[6] T. Khandelwal, M. Khandelwal, and P. S. Pandey, ‘‘Women safety device designed using IoT and machine learning,’’ in Proc. IEEE SmartWorld, Ubiquitous Intell. Comput., Adv. Trusted Comput., Scalable Comput. Commun., Cloud Big Data Comput., Internet People Smart City Innov., Oct. 2018, pp. 1204–1210.
[7] V. Hyndavi, N. S. Nikhita, and S. Rakesh, ‘‘Smart wearable device for women safety using IoT,’’ in Proc. 5th Int. Conf. Commun. Electron. Syst. (ICCES), Jun. 2020, pp. 459–463.
[8] S. S. Raksha, Y. R. Reddy, E. I. Meghana, K. M. Reddy, and P. K. Panda, ‘‘Design of a smart women safety band using IoT’’ Int. J. Contemp. Archit., vol. 8, no. 1, 2021.
[9] Ahir, S., Kapadia, S., Chauhan, J., &Sanghavi, N. (2018, January). The Personal Stun-A Smart Device For Women's Safety. In 2018 International Conference on Smart City and Emerging Technology (ICSCET) (pp. 1-3). IEEE
[10] Monisha, D. G., Monisha, M., Pavithra, G., &Subhashini, R. (2016). Women safety device and application-FEMME. Indian Journal of Science and Technology, 9(10)
[11]Poonam Bhilare, Akshay Mohite, Dhanashri Kamable, Swapnil Makode, and Rasika Kahane, “Women Employee Security System using GPS And GSM Based Vehicle Tracking”, Department of Computer Engineering

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Volume 13, Issue 01 January 2024

Vishwakarma IOT Savitribai Phule Pune University India, E-ISSN:-2349-7610 INTERNATIONAL JOURNAL FOR RESEARCH IN EMERGING SCIENCE AND TECHNOLOGY, Volume-2, ISSUE-1, JAN-2015.
[12] Vijaylashmi, B., Renuka, S., Chennur, P., &Patil, S. (2015). Self-defense system for women's safety with location tracking and SMS alerting through the GSM network. International Journal of Research in Engineering and Technology (IJRET), 4(5).
[13] Palvadi Srinivas Kumar, Dr. K. Suresh Babu, "Women Safety Technique Using IoT Devices" Turkish Journal of Computer and Mathematics Education Vol.12 No.13 (2021)
[14] T.P. Suma, G. Rekha, "Study on IoT based women safety device with screaming detection and video capturing" International Journal of Engineering Applied Sciences and Technology, 2021
[15] B.Sindhu Bala, M.Swetha, M.Tamilarasi and D.Vinodha "Survey on women safety using IoT" International Journal of Computer Engineering in Research Trends, Volume-5, Issue-2, 2018
[16] Muhammad Shoaib Farooq, Ayesha Masooma, Uzma Omer, Rabia Tehseen, S. A. M. Gilani, and Zabihullah Atal "The Role of IoT in Woman's Safety: A Systematic Literature Review"
[17] Sharad Saxena, Shailendra Mishra, Mohammed Baljon, Shamiksha Mishra, Sunil Kumar Sharma, Prakhar Goel, Shubham Gupta and Vinay Kishore "IoT-Based Women Safety Gadgets (WSG): Vision, Architecture, and Design Trends"
[18] V.Ebenezer, Uvaana Falicica J, Rithika Baskaran, Agatha Celesty R, Sejal R Eden "IOT Based Wrist Band for Women Safety" 2023
[19] Dr.C K Gomathy, Ms.S.Geetha "Women safety device using IoT" International Journal of Scientific Research in Engineering and Management (IJSREM) Volume: 05 Issue: 10, Oct – 2021
[20] Mrs. Chindiyababy. U, Muthuvinoth. G, Praneeth. P, Poovarasan. B, Raja. M "Women Safety System using IoT" International Journal of Advanced Research in Science, Communication and Technology (IJARSCT) Volume 3, Issue 6, April 2023
[21] G C Harikiran, Karthik Menasinkai, Suhas Shirol "Smart Security Solution for Women based on Internet Of Things(IoT)" International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) – 2016
[22] Vallidevi Krishnamurthy, Saranya. S, Sharanya Srikanth, Simran Modi "M-WPS: Mobile based Women Protection System" International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS-2017)
[23] Afiya Parveen Begum, Dr. S. Satyanarayana, Dr. K. Bhagavan "An Optimal Panoramic Strategy for Women Safety using IoT" International Journal of Engineering &Technology, 7 (1.6) (2018)
[24] Prottasha Ghosh, Tanjim Masroor Bhuiyan, Muhib Ashraf Nibir, Md. Emran Hasan, Md. Rabiul Islam, Md. Rokib Hasan, Tanvir Hossain "Smart Security Device for Women Based on IoT Using Raspberry Pi" 2021 2nd International Conference on Robotics,Electrical and Signal Processing Techniques (ICREST).
[25] Mr. Timothy D Paul, MS. A. Kalaiselvi, MS. S. Nagarathinam "Experimental analysis of women safety management system by using IoT enabled machine learning strategies" Turkish Journal of Physiotherapy and Rehabilitation
[26] Ayesha Siddika, Md. Deluar Hussain, Md. Saddam Hossain, Md. Farhaduzzaman " Analysis, Design and Development of Arduino Based Women Safety Device Using IoT" International Journal of Advancements in Research & Technology, Volume 7, Issue 9, September 2018
[27] Sunita Malaj "IoT-based smart wearable device for women safety" International Journal of Engineering Technology and Management Sciences, Issue: 6 Volume No.7 November – December 2023
[28] V. Hyndavi, N. Sai Nikhita, S. Rakesh " Smart Wearable Device for Women Safety Using IoT" Fifth International Conference on Communication and Electronics Systems (ICCES 2020)
[29] Vidhi Tyagi, Shivam Arora, Sattyam Gupta, Vijay Kr. Sharma, Vimal Kumar " Architecture of an IoT-based Women Safety System " International Journal of Advanced Science and Technology Vol. 29, No. 5, (2020)
[30] Abhilasha Singh, Abhinandan Tripathi, Pinky Sharma, Vijay Bharti " Android-based Women Safety Application"
[31] Dr .A. Manjula, Mrs .P. Sujidha, Dr .M. Sarojini Devi, Mrs. A. Usha, Ms .N. Thillainayagi "Wireless IoT based solution for Women safety" Journal of Emerging Technologies and Innovative Research (JETIR)
[32] Tejonidhi M.R., Aishwarya, Chaithra K.S., Dayana M.K., Nagamma H. "IoT based smart security gadget for women's safety" 1st International Conference on Advances in Information Technology, 2019