International Journal of Engineering & Extended Technologies Research (IJEETR)

|ISSN: 2322-0163| www.ijeetr.com | A Bimonthly, Peer Reviewed, Scholarly Indexed Journal |

| Volume 8, Issue 2, March - April 2026 |

DOI:10.15662/IJEETR.2026.0802076

A Novel Architecture for Women Safety using BLE and Arduino-UNO

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Publication History: Received: 25.02.2026; Revised: 20.03.2026; Accepted: 25.03. 2026; Published: 28.03.2026.

ABSTRACT: Today in the current global scenario,women harassment is a major problem. In proposed method unique device is used which consists of multiple components. It also have "Smart band" that can easily communicate with internet and mobile phone. . The trigger micro-controller (ATMEGA 328P), GSM module (SIM900), GPS module (Neo-6M), BLE (HM 10) module, Buzzer and Vibrating Sensor are used in the proposed method. In this research paper, the women has to press trigger button when ever she is in danger. The current location is tracked by using GPS (Global Positioning System) and the device sends emergency brake message by using GSM (Global System for Mobile communication) to the registered mobile number and nearby police station. The Web page is updated using IOT(Internet of Things). Neuro Stimulator will produce non-lethal electric shock in emergency situations to detect the attacker, buzzer is used as an alarm to alert the nearby people so that they may understand that someone is in need vibrating sensor will send the last location in case if the device gets defected. The main advantage of this device is that it can be carried every where.

KEYWORDS: GSM, IOT, BLE and GPS

I. INTRODUCTION

In Today's World the safety of women is in danger especially in India. The crime rate against women is increasing day by day at faster rate. Especially harassment, molestation, eve-teasing, kidnapping and domestic violence. Many deterrent measures have been implemented by the government to avoid these misbehaving activities but still has not affected the growing rate of these crimes and has remained unaffected. The problem of harassment in work place is increasingly coming out day-by-day. The harassment at a workplace is unwanted behavior of a person that causes discomfort, offence or distress to the other. Majority of such cases are happened to woman by men working at high position in an organization. Women is getting kidnapped at every 44 minutes, crime at every 47 minutes, 17 dowry deaths every day. The fear of harassment against women is not only the condition at outside but it may also happen at homes, Women are not so physically fit as compared to men so in case of a need a helping hand would be a boon for them Students face incidents like child trafficking and kidnapping, when they are waiting to embark or disembark a school bus. Loaded with security apps for women, your smart phone can help you send emergency alerts to chosen people and also let people know about your whereabouts if anything goes wrong. Sometimes here might be a situation that when women had an accident in the late night and there are no one to help them, In such situations the person will not be able to tell the situation that he/she facing. And they do not know the basic first-aid details and to know the person where the incident has happened. Nowadays though there are many apps and devices evolved for women safety via smart phone which can be activated only by a touch or one click or shake the mobile.

II. EXISTING SYSTEM

In existing system device is used instead of BLE IBEACON and WI-FI is used for point to point communication [1]. The power consumption required by this technology is high. The author used AI (Artificial intelligence) for women safety along with IBEACONS and sensors [2]. Most of IBEACONS are battery powered so, more maintenance is required. The author used equipment which are intelligent and of low cost. With the help of machine learning and IOT the women security is done in smart way. There is no need of human intervention in this smart devices [3]. The author explained about women safety precautions with IOT in paper [4]. A very low power IOT network with some sensors is used for smart women safety device[5]. To enhance women protection and to improve women threats smart sensors are used [6]. A modified WSN along with IOT is used in precise women safety for monitoring women in the society [7].

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An Intelligent irrigation method with Bluetooth is used to improve the protection of women[8]. In smart monitoring of women using IOT, the system will send message about location to the registered family mobile numbers and the police station that can lively monitor the women [9]. Smart protection of women is based on smart devices such as Micro controllers and sensors. In this paper the author used deep learning techniques for protection of women [10]. The continuous monitoring of women is done by using wearable devices or RFID tags.This paper emphasized on the combination of wireless sensors and IOT for smart monitoring of women [12].

Hence the above methods have few draw backs , a novel technique is built by combining some of the techniques in the above literature survey. In this research paper a novel women safety device is proposed with BLE(Bluetooth Low Energy) and Arduino UNO.So, the Police Station and Family members can continuously monitor the women and children.

III. PROPOSED SYSTEM

Here Arduino UNO board is used along with bridge wave rectifier, GSM,GPS, HM 10 BLE ,LCD (Liquid Crystal Display-NT-C1611) display, Buzzer, Alarm and IOT. The famous ATMEGA328P Micro-controller is used in Arduino UNO. It is basically RISC (Reduced Instruction Set for Computer) processor.

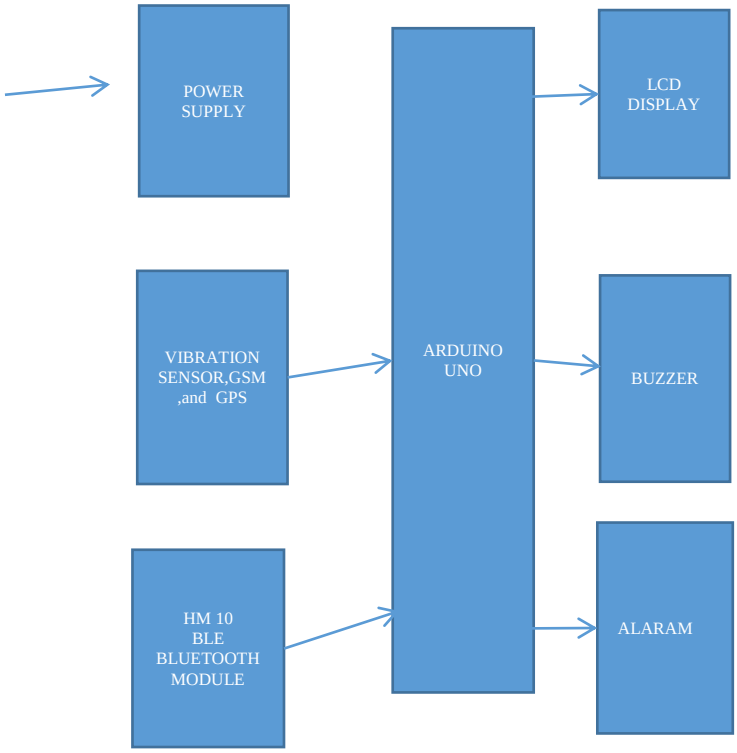

Fig.1. Block Diagram for women safety device

It has six analog output pins and fourteen digital input pins . Its clock frequency used for this processor is 16 MHz. It requires 5v power supply for proper operation of the circuit. By using 6 PWM (Pulse Width Modulation) pins the circuit connections are made. The sensors are connected to 2,3, and 4 digital pins in Arduino board. When the women is in danger situation , she has to press trigger button so the buzzer rings and give alert to near by persons. If the women is monitored from remote then threat is detected by vibration sensor and it gives input to microprocessor, then the GPS module tracks the threat location and the device sends message to near by police station and also to the registered number, by using GSM. The block diagram of women's safety is shown in Figure 1.The Arduino UNO board is shown I figure 2. The specifications of ARDUINO UNO is mentioned in Table 1. The Figure 2 depicts pin out diagram for ATMEGA328P Microcontroller. It has got 28 pins as shown in figure 3.

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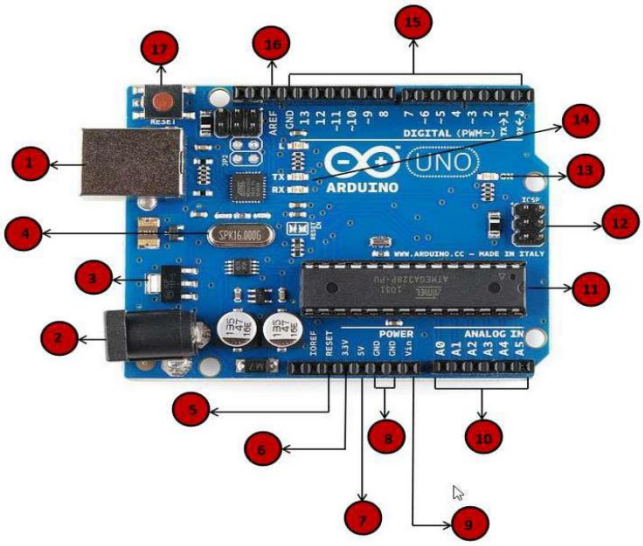

Fig2. Arduino UNO board

In Arduino UNO board some numbers are indicated with red colour. The number 1 indicates USB interface. The pin number 2 depicts about external power supply. The voltage regulator is shown by pin number 3. The pin number 4 explains about crystal oscillator. The pin number number 5 indicates RESET pin which resets the Micro-controller. The pin number 6 voltage is 3.3V output voltage. The pin number 7 indicates supply voltage which is given to Arduino board. The pin number 8 is used as GND pins. The pin number 9 depicts about $V_{IN.}$ The pin number 10 indicates six Analog pins marked by A_0 to A_5. The pin number 11 shows ATMEGA 328 Micro-controller which is manufactured by ATMEL company. The pin number 12 is ICSP pin which is Serial Peripheral device (SPI). The SPI will slave the output device to the master with the help of master bus. The pin number 13 is power Light Emitting Diode (LED) indicator. The transmitter (TX) and Receiver(RX) is indicated by pin number 14. The pin number 15 shows fourteen digital I/O pins and they are represented by D_0 to $D_{13.}$, Six of which provides PWM. The pin number 16 indicates AREF which means Analog Reference.

TABLE.1. Specifications of Arduino UNO

Feature	specfications
Microcontroller	ATMEGA328
Supply voltage	15V
Clock frequency	16 MHz
SRAM	2KB
EEPROM	1KB
D.C Current for the I/O pins	40mA
D.C Current for the 3.2V pins	50mA
Flash memory	32KB
Analog input pins for Arduino	6
Digital input pins for Arduino	14
Input voltage	7V-12V

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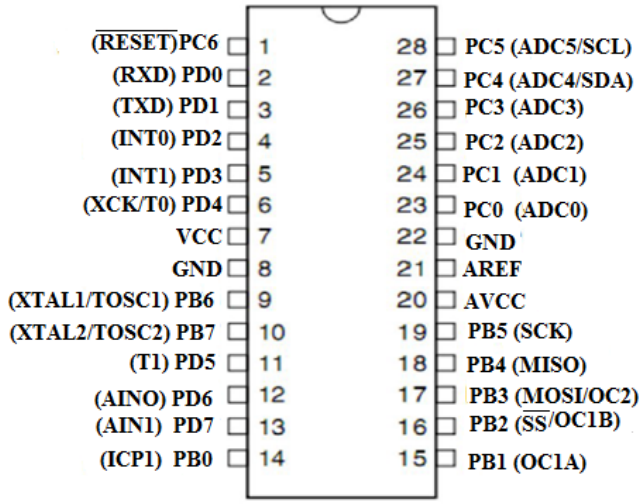

Fig3. Pin out diagram for Micro controller ATMEGA

328P in Arduino UNO

The PB, PC , and PD indicates port B, port C and Port D pins respectively. The port B is a Bidirectional port with 8 bits. It has several internal pull up resistors. The Port B buffer has drive characteristics which are symmetrical at the output. When the input is low at Port B then pull-up transistors are activated. The port B is in high impedance state when RESET Pin is activated. The AREF pin is Analog Reference pin for Analog to Digital converter. The eight pin is supply pin and the twenty second pin is ground pin. The port C is a Bidirectional port with 7 bits. It has several internal pull up resistors. The Port C buffer has drive characteristics which are symmetrical at output. When input is low at Port B then pull-up transistors are activated. The port C is in high impedance state when RESET Pin is activated. The port D is a Bidirectional port with 8 bits. It has several internal pull up resistors. The Port D buffer has drive characteristics which are symmetrical at output. When the input is low at Port D then pull-up transistors are activated.

When women is in dangerous situation, then vibration sensor senses the vibrations and give it as input to Arduino UNO. The micro-controller will send signal to output devices such as LCD and Buzzer. The Buzzer will start ringing and give alert to the near by persons.The GSM tracks the location of the women and HM 10 BLE module is used for the wireless communication. The HM 10 BLE module has low bandwidth and it consumes less power. A message will be sent to the nearest police station or to the home by GPS module. So, the women can be protected by any kind of treats in the society.

IV. RESULTS

After performing experiment on Arduino-UNO with women protection circuit, certain results was observed on LCD display. The Figure 4 shows all the sensors connected to Aurdino-UNO board with jumper wires. The supply voltage is taken from 7805 IC regulator, which gives 5V as output. The Figure 5 is displaying that GPS is ready. The Figure 6 depicts that the hardware kit is ready. The Figure 7 explains about the location of women ie., Latitude and Longitude.With this latitude and Longitude we can track the women and help them. The Figure 8 depicts about women is in safe zone. The LCD displays every thing is fine if the women is not having any threat. The Figure 9 describes about complete hardware kit with various modules like ARDUINO UNO 328P, and HM 10 BLE module.

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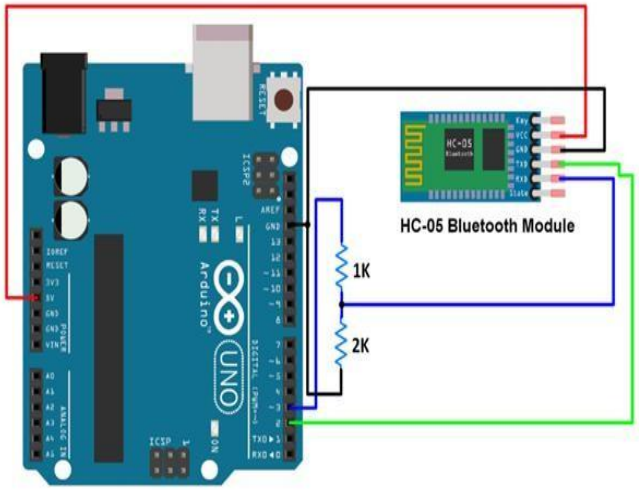

Fig.4. ARDUINO UNO ATMEGA 328 along with BLUE TOOTH module

Fig5. LCD is displaying details about GPS

Fig.6. LCD is displaying details about the system

Fig 7.GPS showing the latitude and longitude of the location

Fig8. LCD is displaying FINE when there is no threat to women

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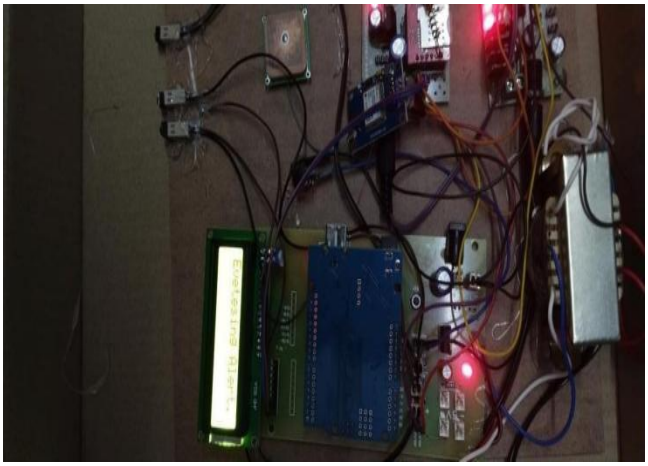

Fig9. complete hardware kit for women safety using ARDUINO UNO and BLE

V. CONCLUSION AND FUTURE SCOPE

In this research paper a novel women safety prototype model is designed and was implemented by using ARDUINO UNO 328P, HC 10 BLE BLUETOOTH module, GPS, and GSM modules .

With this women safety project we can locate the latitude and longitude of the women using GPS and message is sent to near by police station or to her home with the help of GSM.

By using HC 10 BLE BLUETOOTH module there is low power consumption and low bandwidth requirement up to short distance.

With the novel proposed method we can track the women in dangerous situation and also we can take proper action where ever needed. The same circuit is used for children who are abandoned.
In future avanced version of BLE is used for more accuracy

VI. ACKNOWLEDEMENT

we would like to thank Sree Rama Engineering College for providing necessary equipment to perform this Research work.

REFERENCES

1. Y. Y. Maulana, D. Mahmudin, R. Indrawijaya, G. Wiranto,"Monitoring kualitas air secara real-time terintegrasi," JurnalElektronika dan Telekomunikasi, vol. 15, no. 1, pp. 23-27, 2015.
2. Y. Y. Maulana, G. Wiranto, D. Kurniawan, I. Syamsu, D. Mahmudin,"Online monitoring of shrimp aquaculture in bangka island using wireless sensor network," International Journal on Advanced Science, Engineering and Information Technology, vol. 8, no. 2, pp.358-364, 2018.
3. H. Hojaiji, O. Goldstein, C. E. King, M. Sarrafzadeh and M. Jerrett, "Design and calibration of a wearable and wireless research grade air quality monitoring system for real-time data collection,"2017 IEEE Global Humanitarian Technology Conference (GHTC), San Jose, CA, pp.1-10, 2017.
4. Mat, M. R. M. Kassim and A. N. Harun, "Precision agriculture applications using wireless moisture sensor network," 2015 IEEE12th Malaysia International Conference on Communications (MICC), Kuching,voL.102, pp. 18-23, 2015.
5. S. Heble, A. Kumar, K. V. V. D. Prasad, S. Samirana, P. Rajalakshmi and U. B. Desai, "A low power IoT network for smart agriculture," 2018 IEEE 4th World Forum on Internet of Things (WFIoT), Singapore, pp. 609-614, 2018.
6. S. Jaiganesh, K. Gunaseelan and V. Ellappan, "IOT agriculture to improve food and farming technology," 2017 Conference on Emerging Devices and Smart Systems (ICEDSS), Tiruchengode, pp.260-266, 2017.
7. S. Xiong, L. Wang, X. Qu and Y. Zhan, "Application research of WSN in precise agriculture irrigation," 2009 International Conference on Environmental Science and Information Application Technology, Wuhan, pp. 297-

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300, 2009.

8. Mohanraj, V. Gokul, R. Ezhilarasie and A. Umamakeswari, "Intelligent drip irrigation and fertigation using wireless sensor networks," 2017 IEEE Technological Innovations in ICT for Agriculture and Rural Development (TIAR), Chennai, pp. 36-41,2017.
9. Jash Dosh,i Tirth Kumar Patel, and Santosh kumar B,"Smart Farming using IoT, a solution for optimally monitoring farming conditions" , Springer Conference EUSPN-19, Vol.50 ,pp.746-751,2019.
10. E S Mohamed, AA.Belal, SKA Elmabod, Mohamed A EL-Shirbeny, A.Gad, Mohamed B Zaharan, "Smart farming for improving agricultural management" , The Egypitian Journal of Remote Sensing and Space Science, vol. 24, no. 3, pp.971-981, 2021.
11. C.Nagarajan and M.Madheswaran - 'Stability Analysis of Series Parallel Resonant Converter with Fuzzy Logic Controller Using State Space Techniques'- Taylor &Francis, Electric Power Components and Systems, Vol.39 (8), pp.780-793, May 2011. DOI: 10.1080/15325008.2010.541746
12. C.Nagarajan and M.Madheswaran - 'Experimental verification and stability state space analysis of CLL-T Series Parallel Resonant Converter' - Journal of Electrical Engineering, Vol.63 (6), pp.365-372, Dec.2012. DOI: 10.2478/v10187-012-0054-2
13. C.Nagarajan and M.Madheswaran - 'Performance Analysis of LCL-T Resonant Converter with Fuzzy/PID Using State Space Analysis'- Springer, Electrical Engineering, Vol.93 (3), pp.167-178, September 2011. DOI 10.1007/s00202-011-0203-9
14. S.Tamilselvi, R.Prakash, C.Nagarajan,"Solar System Integrated Smart Grid Utilizing Hybrid Coot-Genetic Algorithm Optimized ANN Controller" Iranian Journal Of Science And Technology-Transactions Of Electrical Engineering, DOI10.1007/s40998-025-00917-z,2025
15. S.Tamilselvi, R.Prakash, C.Nagarajan," Adaptive sliding mode control of multilevel grid-connected inverters using reinforcement learning for enhanced LVRT performance" Electric Power Systems Research 253 (2026) 112428, doi.org/10.1016/j.epsr.2025.112428
16. S.Thirunavukkarasu, C. Nagarajan, 2024, "Performance Investigation on OCF and SCF study in BLDC machine using FTANN Controller," Journal of Electrical Engineering And Technology, Volume 20, pages 2675–2688, (2025), doi.org/10.1007/s42835-024-02126-w
17. C. Nagarajan, M.Madheswaran and D.Ramasubramanian- 'Development of DSP based Robust Control Method for General Resonant Converter Topologies using Transfer Function Model'- Acta Electrotechnica et Informatica Journal , Vol.13 (2), pp.18-31,April-June.2013, DOI: 10.2478/aeei-2013-0025.
18. C.Nagarajan and M.Madheswaran - 'DSP Based Fuzzy Controller for Series Parallel Resonant converter'- Springer, Frontiers of Electrical and Electronic Engineering, Vol. 7(4), pp. 438-446, Dec.12. DOI 10.1007/s11460-012-0212-0.
19. C.Nagarajan and M.Madheswaran - 'Experimental Study and steady state stability analysis of CLL-T Series Parallel Resonant Converter with Fuzzy controller using State Space Analysis'- Iranian Journal of Electrical & Electronic Engineering, Vol.8 (3), pp.259-267, September 2012.
20. C.Nagarajan and M.Madheswaran, "Analysis and Simulation of LCL Series Resonant Full Bridge Converter Using PWM Technique with Load Independent Operation" has been presented in ICTES'08, a IEEE / IET International Conference organized by M.G.R.University, Chennai.Vol.no.1, pp.190-195, Dec.2007
21. Suganthi Mullainathan, Ramesh Natarajan, "An SPSS and CNN modelling based quality assessment using ceramic materials and membrane filtration techniques", Revista Materia (Rio J.) Vol. 30, 2025, DOI: https://doi.org/10.1590/1517-7076-RMAT-2024-0721
22. M Suganthi, N Ramesh, "Treatment of water using natural zeolite as membrane filter", Journal of Environmental Protection and Ecology, Volume 23, Issue 2, pp: 520-530,2022
23. Abdul- Fattah, M.K. Abdel-Fattah, E.S. Mohamed, E.M. Wagdi, S.A. Shahin, A.A. Aldosari, R. Lasaponara, M.A. Alnaimy , "Quantitative evaluation of soil quality using Principal Component Analysis: The case study of El-Fayoum depression Egypt", vol. 13, no. 4, pp.1824, 2021.
24. M Dhanaraju, P.Chenniappan, K Ramalingam, S Pazhanivelan, R Kaliaperumal, " Smart Farming: Internet of Things (IoT)-Based Sustainable Agriculture", MDPI, vol. 12, no. 10, pp.1745, 2022.
25. Sugumar, R. (2025). Designing Resilient and Scalable Cloud-Native Frameworks for Generative AI Content Production. *International Journal of Research Publications in Engineering, Technology and Management (IJRPETM), 8(6), 13268-13279.*
26. Soundappan, S. J. (2020). Big Data Analytics in Healthcare: Applications for Pandemic Forecastin. *International Journal of Advanced Research in Computer Science & Technology (IJARCST), 3(1), 2248-2253.*