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WOMEN SAFETY DEVICE USING IOT

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Abstract:
In the contemporary global context, women face a number of issues, including harassment by other women. Our proposal is to create a system that combines many devices. The hardware consists of a portable system that is constantly in communication with a logical phone with internet connectivity. An ESP8266 Node MCU, a SIM800L GSM module, a Neo-6M GPS module, a buzzer, and a push button make up the system. In this project, a lady must touch the device's panic button if she feels threatened. After activation, the device uses GPS (Global Positioning device) to track the user's current location and GSM (Global System for Mobile communication) to send an emergency message to the police control room and the registered mobile number. The position is continuously tracked and updated into the webpage using an IoT module.
The primary benefit of this idea is that, because to its compact size and ability to protect women, it can be taken anywhere.

Keywords: Node MCU(ESP8266), GPS module, GSM module, buzzer, push button, women safety, tracking.

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1. Introduction

In today's world, protecting women's safety and security is crucial, yet it is still an ongoing problem. The safety precautions that are already in place frequently fall short of adequately protecting women in a variety of settings, despite repeated efforts to address gender-based violence and harassment. With cutting-edge technology solutions, the Internet of Things (IoT) offers a promising path toward improving women's safety. This study presents an Internet of Things (IoT)-based women safety device that uses the power of linked devices to offer emergency response, real-time monitoring, and communication.Women experience particular safety issues and difficulties on a daily basis, such as harassment on the street and domestic abuse. These dangers have the potential to significantly impact women's wellbeing by restricting their freedom of movement and ability to engage in a variety of activities. A comprehensive strategy integrating technology innovation with public awareness and support is needed to address these issues. The goal of the Internet of Things-based women safety gadget is to close this

gap by providing a proactive and adaptable safety solution that is suited to the requirements of women in various situations.

2. Objective

A women safety gadget that makes use of IoT technologies aims to offer complete safety solutions that are adapted to the unique requirements and difficulties that women encounter in a variety of settings. These devices are primarily intended to improve personal security by providing instant access to support systems and assistance in times of need. Fast interventions are made possible by real-time monitoring and reaction capabilities, which are made possible by features like automatic warnings and panic buttons. Help can be dispatched effectively by using GPS and other positioning technology to ensure accurate location tracking. Proactive risk mitigation can also be facilitated by these devices' potential integration of preventive features like smart warnings that are triggered by user behavior or environmental variables. These gadgets help women appear secure and in charge, enabling them to go through everyday life fearlessly and promoting their autonomy. Additionally, by having features like audio-visual recording, these gadgets facilitate the gathering of evidence, assisting legal proceedings and holding offenders accountable. The overall goal is to make women's environments safer, fight for societal change, and increase awareness of safety issues all while continuously changing to match the changing demands of users and technical improvements.

3. Proposed System

A reliable way to improve security can be provided by a women's safety gadget that uses NodeMCU, GPS, and GSM modules in conjunction with IoT technologies. The system tracks the user's location in real-time by integrating a NodeMCU microcontroller with GPS functionality. Users can press a button to sound an alert in case of emergency, which causes the NodeMCU to send preconfigured contacts an SOS message with the user's coordinates using the GSM module. For continuous monitoring, it is optional to send location updates continuously. In order to extend the battery life, the gadget has power-saving capabilities and feedback systems like LEDs or an LCD screen for the user interface. Firmware is responsible for data parsing, GSM connectivity, and power management. Users can store emergency contacts and adjust settings through a companion mobile app or web interface. Data encryption and secure transmission are two examples of security solutions that protect user privacy and prevent unwanted access. Iterative improvements are driven by field testing and user input prior to mass manufacturing and deployment, providing women with a covert yet efficient way to request help in hazardous situations.

4. Block Diagram

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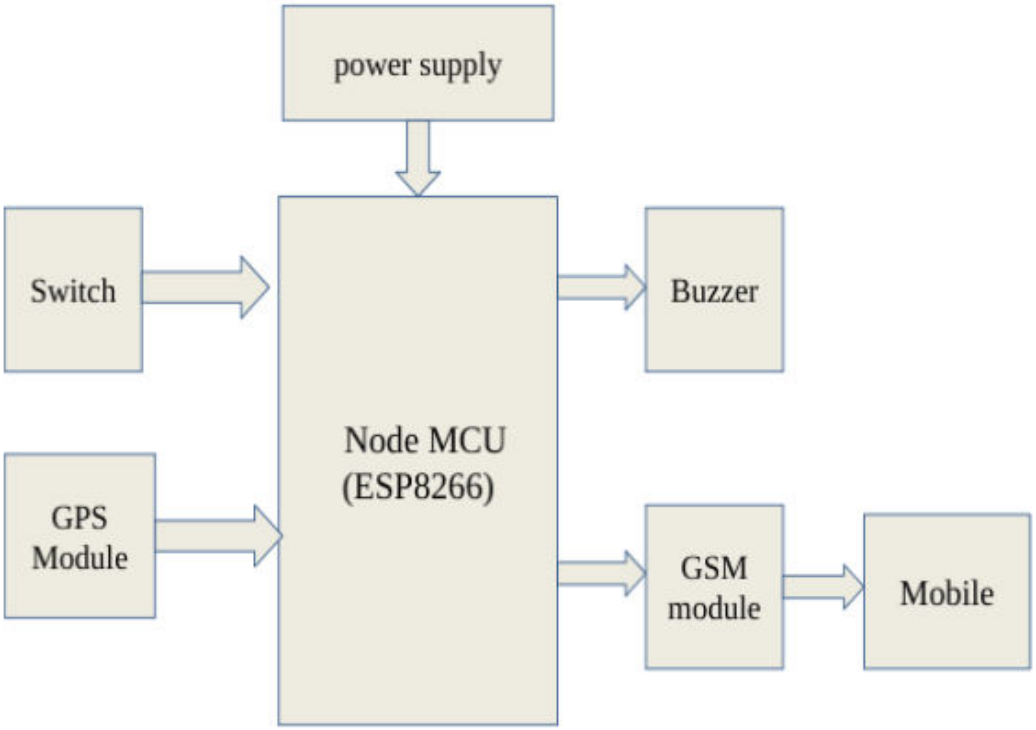

Fig 1 : Block Diagram of Women safety device

5. Working Principle

Using NodeMCU, GPS, and GSM modules, an IoT-powered women's safety device provides a complete solution for improving personal security. The technology works on a straightforward but efficient principle: a woman can use a button or gesture sensor to activate the device in the event that she feels threatened or comes across an emergency. The NodeMCU microcontroller, which is coupled to the GPS and GSM modules, comes to life when it is turned on. Using the GPS module, it quickly determines the user's current location coordinates. It then uses this crucial information to send an SOS message over the GSM network to specified emergency contacts, which might be friends, family, or law enforcement. For continuous surveillance, the device has the option to continuously update the user's location.Power-saving techniques are incorporated into the system to ensure extended functionality. This kind of gadget greatly improves women's safety and peace of mind in a variety of settings by giving them a discrete and trustworthy way to ask for assistance in difficult situations.

6. Implementation

There are various important phases involved in implementing a women's safety gadget with GPS and GSM capabilities using IoT and NodeMCU. It is first necessary to construct and integrate the hardware, which includes the NodeMCU microcontroller, GPS module, GSM module, and related peripherals, into a small, portable enclosure. To communicate with the GPS module and the GSM module to send SOS messages and receive precise location data, the NodeMCU firmware must be written. In order to initiate alerts, this firmware should also be able to process user input from buttons or gesture sensors. To guarantee long-term functionality and optimize battery usage, power management features should also be included.

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In addition, a companion web application or mobile application can be created to let users change device status, add or remove emergency contacts, and adjust settings. To give users and their loved ones even more peace of mind, this interface may also send notifications and real-time location tracking to selected contacts.

Finally, to guarantee the system's performance and dependability in real-world situations, extensive testing and validation are essential. This include conducting user acceptability testing to get input and make any required adjustments, as well as testing the device's GPS and GSM operation in a variety of settings. The gadget can be made available to consumers after it has been properly tested and put into operation, providing them with an effective tool for improving their personal safety and security.

7. Results

The outcome of integrating NodeMCU, GPS, and GSM modules with IoT technologies to create a women's safety gadget is a powerful solution that greatly improves personal security. By combining these technologies, the gadget gives women a strong yet covert way to ask for assistance in dangerous circumstances. Upon activation, by pressing a button or using a gesture sensor, the gadget quickly uses the GPS module to determine the user's exact location and transmits this information to pre-designated emergency contacts via a GSM network SOS message. With the ability to communicate in real-time, assistance can be requested quickly, thereby averting harm or deescalating dangerous circumstances. To give even more peace of mind, the gadget can also provide continuous surveillance by periodically updating the contacts who have been designated with its location. The gadget guarantees extended operation with the thoughtful application of power-saving technologies, making it a dependable partner for women in a variety of settings. In summary, this approach not only increases women's protection but also gives them self-assurance and tranquility, enabling them to go through the world with more security and independence.

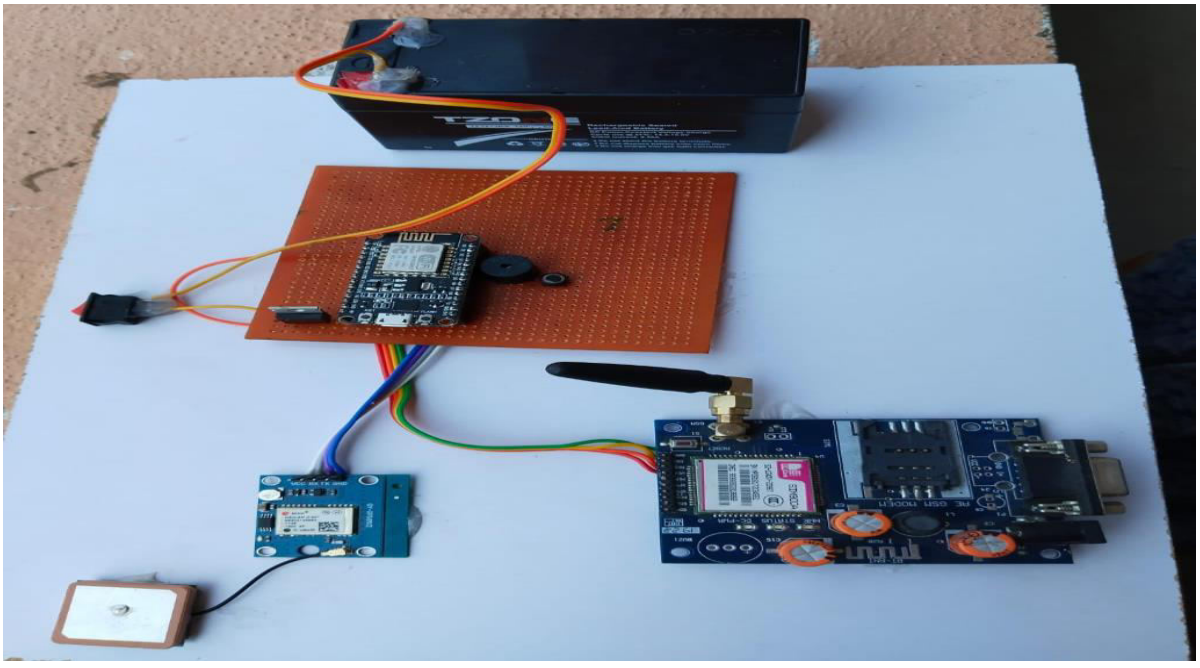

Fig 2. Hardware Implementation of Women safety device

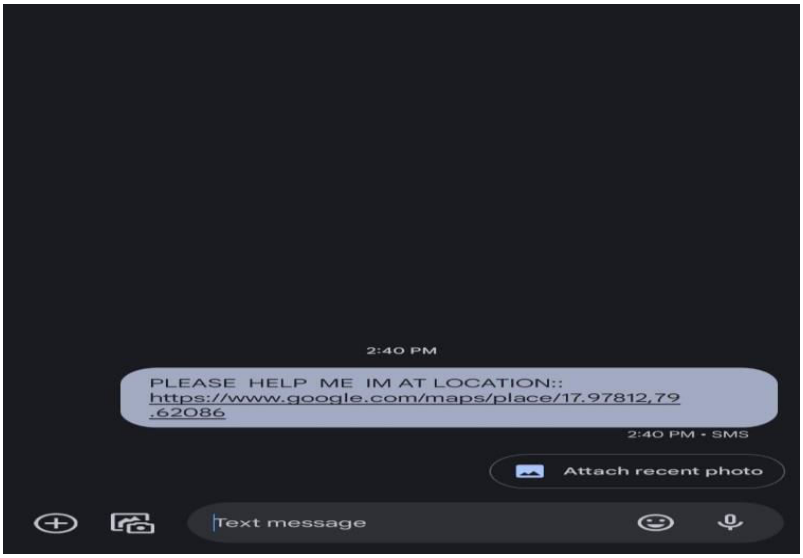

Fig 3. Message Received by Family members/friends

The above figure shows that the message and the location received by the family or the friends by the victim which was already registered in the code. When they click on the link the current location of the victim will appear.

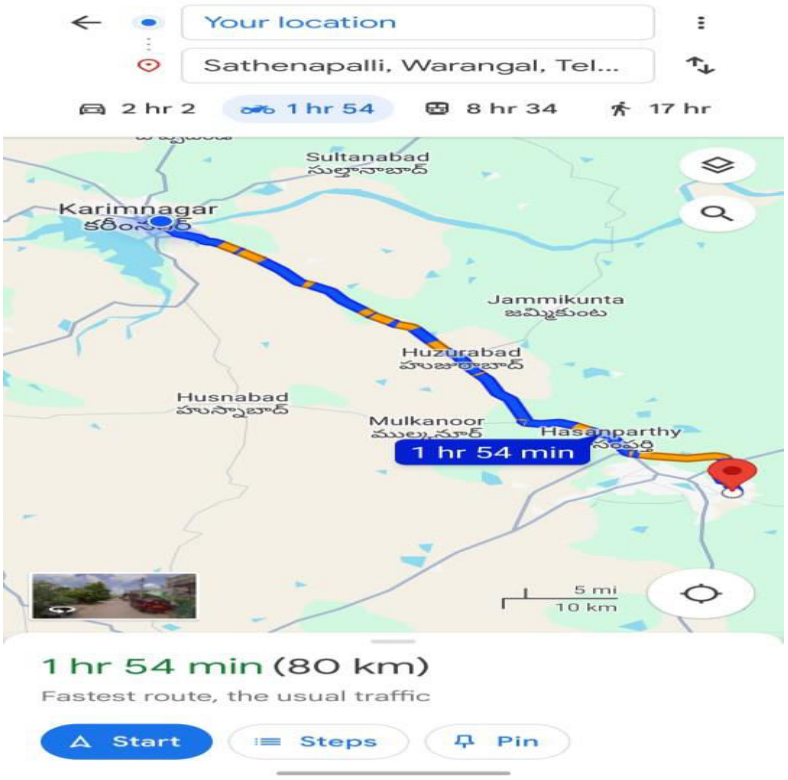

Fig 4. Current Location of the victim

The above figure shows the exact location of the victim. We can track the location minute, the movement of the victim can also be observed by this.

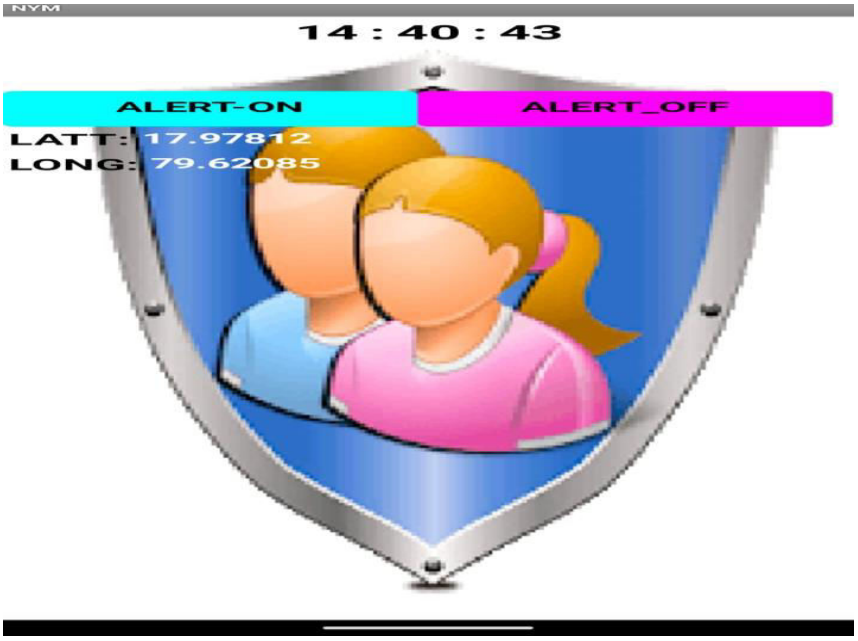

Fig 5.Longitude and latitude values of the victim

8. Conclusion:

In conclusion, a Women Safety gadget that makes use of IoT technology provides a comprehensive answer to women's safety issues. Through the integration of several sensors, communication modules, and sophisticated algorithms, Users of such a device benefit from real-time monitoring, prompt support, and peace of mind. By utilizing features such as fall detection, GPS tracking, panic buttons, and audio/video recording capabilities, users can notify emergency services or specified contacts in the event of danger. The cloud connectivity of the system guarantees data storage and accessibility, while robust encryption algorithms protect user security and privacy. Additional factors that promote wider awareness and adoption of the gadget include its integration with mobile apps, community involvement programs, and user education activities. In the end, we may strive toward establishing safer and more inclusive environments by equipping women with easily available and trustworthy safety technology.

8. Future Scope

In the future we can implement this project using facial expressions and video analysis using matlab and embedded systems with in a particular location video frame is detected using camera human object present in a frame is identified. If more than two persons are present in a frame and the distance between two are less than a threshold, the servo motor will rotate to that region and their movement is tracked. If there is a random movement is present, the gender detection gets activated and at least one woman is present in that particular frame then facial feature points are acquired using the second camera. Within the system the real time acquired facial features are compared with a data base for identifying the current facial expression. If the facial expression of women is fear or anger the message will send to the control room and an alarm will be activated in the surroundings. The system which we implemented is only a prototype as an initiative step towards women safety in public places.

References

[1] Madhu Kumar Vanteru, K.A. Jayabalaji, i-Sensor Based healthcare monitoring system by LoWPAN-based rchitecture,Measurement: Sensors,Volume 28,2023,100826,ISSN 2665-9174,https://doi.org/10.1016/j.measen.2023.100826.

[2] Ramesh, P.S., Vanteru, Madhu.Kumar., Rajinikanth, E. *et al.* Design and Optimization of Feedback Controllers for Motion Control in the Manufacturing System for Digital Twin. *SN COMPUT. SCI.* **4**, 782 (2023). https://doi.org/10.1007/s42979-023-02228-8

[3] Madhu. Kumar. Vanteru, T. V. Ramana, *et al* , "Modeling and Simulation of propagation models for selected LTE propagation scenarios," 2022 International Conference on Recent Trends in Microelectronics, Automation, Computing and Communications Systems (ICMACC), Hyderabad, India, 2022, pp. 482-488, doi: 10.1109/ICMACC54824.2022.10093514.

[4] Allanki Sanyasi Rao, **Madhu Kumar Vanteru** et al. (2023). PAPR and BER Analysis in FBMC/OQAM System with Pulse Shaping Filters and Various PAPR Minimization Methods. *International Journal on Recent and Innovation Trends in Computing and Communication*, *11*(10), 2146–2155. https://doi.org/10.17762/ijritcc.v11i10.8899.

[5] N. Sivapriya, Madhu Kumar Vanteru, et al , "Evaluation of PAPR, PSD, Spectral Efficiency, BER and SNR Performance of Multi-Carrier Modulation Schemes for 5G and Beyond," *SSRG International Journal of Electrical and Electronics Engineering*, vol. 10, no. 11, pp. 100-114, 2023. *Crossref,* https://doi.org/10.14445/23488379/IJEEE-V10I11P110

[6] Chandini Banapuram, Azmera Chandu Naik, Madhu Kumar Vanteru, et al, "A Comprehensive Survey of Machine Learning in Healthcare: Predicting Heart and Liver Disease, Tuberculosis Detection in Chest X-Ray Images," *SSRG International Journal of Electronics and Communication Engineering*, vol. 11, no. 5, pp. 155-169, 2024. *Crossref,* https://doi.org/10.14445/23488549/IJECE-V11I5P116.

[7] Madhu. Kumar. Vanteru, et al, "Empirical Investigation on Smart Wireless Autonomous Robot for Landmine Detection with Wireless Camera," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India, 2022, pp. 200-205, doi: 10.1109/IC3I56241.2022.10072936.

[8] S. Bhatnagar, Madhu. Kumar. Vanteru et al., "Efficient Logistics Solutions for E-Commerce Using Wireless Sensor Networks," in IEEE Transactions on Consumer Electronics, doi: 10.1109/TCE.2024.3375748.

[9] V, Sravan Kumar, Madhu Kumar Vanteru et al. 2024. "BCSDNCC: A Secure Blockchain SDN Framework for IoT and Cloud Computing". *International Research Journal of Multidisciplinary Technovation* 6 (3):26-44. https://doi.org/10.54392/irjmt2433.

[10] Madhu Kumar, Vanteru. & Ramana, T.. (2022). Fully scheduled decomposition channel estimation based MIMO-POMA structured LTE. International Journal of Communication Systems. 35. 10.1002/dac.4263.

[11] Vanteru. Madhu. Kumar and T. V. Ramana, "Position-based Fully-Scheduled Precoder Channel Strategy for POMA Structured LTE Network," 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), Coimbatore, India, 2019, pp. 1-8, doi: 10.1109/ICECCT.2019.8869133.

[12] Madhu. Kumar. Vanteru, T. V. Ramana, A. C. Naik, C. Adupa, A. Battula

and D. Prasad, "Modeling and Simulation of propagation models for selected LTE propagation scenarios," 2022 International Conference on Recent Trends in Microelectronics, Automation, Computing and Communications Systems (ICMACC), Hyderabad, India, 2022, pp. 482-488, doi: 10.1109/ICMACC54824.2022.10093514.

[13] Vanteru.Madhu Kumar,Dr.T.V.Ramana" Virtual Iterative Precoding Based LTE POMA Channel Estimation Technique in Dynamic Fading Environments" International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-6, April 2019

[14] Vanteru .Madhu Kumar,Dr.T.V.Ramana, Rajidi Sahithi" User Content Delivery Service for Efficient POMA based LTE Channel Spectrum Scheduling Algorithm" International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-9 Issue-2S3, December 2019.

[15] Vanteru.Madhu Kumar,Dr.T.V.Ramana" Virtual Iterative Precoding Based LTE POMA Channel Estimation Technique in Dynamic Fading Environments" International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-6, April 2019

[16] Karthik Kumar Vaigandla and J. Benita, " PAPR REDUCTION OF FBMC-OQAM SIGNALS USING PHASE SEARCH PTS AND MODIFIED DISCRETE FOURIER TRANSFORM SPREADING," ARPN Journal of Engineering and Applied Sciences, VOL. 18, NO. 18, pp.2127-2139, SEPTEMBER 2023

[17] aigandla, Karthik Kumar and Benita, J. 'Selective Mapping Scheme Based on Modified Forest Optimization Algorithm for PAPR Reduction in FBMC System'. Journal of Intelligent & Fuzzy Systems, vol. 45, no. 4, pp. 5367-5381, October 2023, DOI: 10.3233/JIFS-222090.

[18] Vaigandla, K. K. ., & Benita, J. (2023). A Novel PAPR Reduction in Filter Bank Multi-Carrier (FBMC) with Offset Quadrature Amplitude Modulation (OQAM) Based VLC Systems. *International Journal on Recent and Innovation Trends in Computing and Communication*, *11*(5), 288–299. https://doi.org/10.17762/ijritcc.v11i5.6616

[19] Karthik Kumar Vaigandla, J.Benita, "PRNGN - PAPR Reduction using Noise Validation and Genetic System on 5G Wireless Network," *International Journal of Engineering Trends and Technology*, vol. 70, no. 8, pp. 224-232, 2022. Crossref, https://doi.org/10.14445/22315381/IJETT-V70I8P223

[20] Karthik Kumar Vaigandla and J.Benita (2022), Novel Algorithm for Nonlinear Distortion Reduction Based on Clipping and Compressive Sensing in OFDM/OQAM System. IJEER 10(3), 620-626. https://doi.org/10.37391/IJEER.100334.

[21] K. K. Vaigandla, "Communication Technologies and Challenges on 6G Networks for the Internet: Internet of Things (IoT) Based Analysis," *2022 2nd International Conference on Innovative Practices in Technology and Management (ICIPTM)*, 2022, pp. 27-31, doi: 10.1109/ICIPTM54933.2022.9753990.

[22] Vaigandla, K. K., Karne, R., Siluveru, M., & Kesoju, M. (2023). Review on Blockchain Technology : Architecture, Characteristics, Benefits, Algorithms, Challenges and Applications. *Mesopotamian Journal of CyberSecurity*, *2023*, 73–85. https://doi.org/10.58496/MJCS/2023/012

[23] Karthik Kumar Vaigandla, Allanki Sanyasi Rao and Kallepelli Srikanth. Study of Modulation Schemes over a Multipath Fading Channels. International

Journal for Modern Trends in Science and Technology 2021, 7 pp. 34-39. https://doi.org/10.46501/IJMTST0710005

[24] Karthik Kumar Vaigandla, Bolla Sandhya Rani, Kallepelli Srikanth, Thippani Mounika, RadhaKrishna Karne, “Millimeter Wave Communications: Propagation Characteristics, Beamforming, Architecture, Standardization, Challenges and Applications”. Design Engineering, Dec. 2021, pp. 10144-10169,

[25] Karthik Kumar Vaigandla, Radhakrishna Karne, Allanki Sanyasi Rao, "Analysis of MIMO-OFDM: Effect of Mutual Coupling, Frequency Response, SNR and Channel Capacity", YMER Digital - ISSN:0044-0477, vol.20, no.10 - 2021, pp.118-126, 2021.

[26] Karthik Kumar Vaigandla, Shivakrishna Telu, Sandeep Manikyala, Bharath Kumar Polasa, Chelpuri Raju, "Smart And Safe Home Using Arduino," International Journal Of Innovative Research In Technology, Volume 8, Issue 7, 2021,pp.132-138

[27] Karthik Kumar Vaigandla, Mounika Siluveru and Sandhya Rani Bolla, “Analysis of PAPR and Beamforming For 5G MIMO-OFDM”, International journal of analytical and experimental modal analysis, Volume XII, Issue X, 2020, pp.483-490.

[28] D. Priyanka, V. Karthik, " Wireless Surveillance Robot with Motion Detection and Live Video Transmission and Gas Detection," International Journal of Scientific Engineering and Technology Research, Vol.04,Issue.17, June-2015, Pages:3099-3106