

IoT Based Solid Waste Management System

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Abstract: *The proposed project presents an Automatic Solid Waste Management System using Arduino-based technology to separate waste into wet, dry, and metal categories. The system employs an IR sensor to detect the presence of waste, a moisture sensor to distinguish between wet and dry waste, and a proximity sensor for identifying metal waste. The Arduino UNO acts as the control unit, processing the inputs and controlling a servo motor to direct waste into the appropriate bin. This automated method ensures efficient waste segregation, reduces human effort, promotes recycling, and supports a cleaner environment. The system provides a smart, low-cost, and eco-friendly solution for modern waste management.*

This project can be implemented in public places, colleges, offices, and residential areas to improve cleanliness and reduce manual segregation. By integrating such automated systems, the burden on waste collectors can be minimized and the collected waste can be efficiently processed for recycling and composting, thus contributing to sustainable development. Furthermore, the project enhances public awareness regarding proper waste disposal, encouraging responsible environmental practices. It also demonstrates the potential of IoT and automation to solve real-life challenges. With further improvements and scalability, this system can serve as a reliable model for future smart cities.

Keywords: Automatic Waste Management, Arduino UNO, IR Sensor, Moisture Sensor, Proximity Sensor, Servo Motor

I. INTRODUCTION

Solid waste management has become one of the most critical challenges in today's rapidly urbanizing world. With the rise in population, industrial expansion, and changing lifestyles, the volume of waste generated each day has increased significantly. This growth in waste generation has led to serious issues related to hygiene, environmental pollution, and inefficient recycling processes. The improper handling and segregation of waste contribute to the contamination of soil, water, and air, affecting both human health and ecological balance. As cities expand, traditional methods of waste management are proving to be insufficient to meet the growing demand for efficiency and sustainability.

Manual segregation of waste, which is still commonly practiced in many areas, is both unhygienic and inconsistent. It requires a large amount of human labour and often exposes workers to hazardous materials and infections. Additionally, human-based sorting is time-consuming and prone to errors, making it unsuitable for large-scale waste processing. This situation highlights the urgent need for automation in waste management systems that can perform segregation efficiently, safely, and in real-time.

The proposed project, titled "IoT-Based Smart Waste Segregation System," is designed to address these challenges through automation and sensor-based technology. The system automatically classifies waste into wet, dry, and metal categories using a set of sensors connected to an Arduino UNO microcontroller. This automation eliminates the need for manual sorting, ensuring a cleaner, faster, and more hygienic process. By integrating simple yet effective hardware components with intelligent programming, the system provides a cost-effective solution suitable for both small-scale and large-scale applications such as public places, educational institutions, offices, and residential areas.



In this system, an Infrared (IR) sensor is used to detect the presence of waste, a Moisture sensor identifies whether the waste is wet or dry, and a Proximity sensor is used to detect metallic waste. Once the sensors collect data, the Arduino UNO processes this information and controls a servo motor that directs the waste into the appropriate bin. This ensures accurate segregation and minimizes human involvement, thus improving hygiene and operational efficiency. The design is simple, modular, and affordable, making it an ideal solution for developing cities that require low-cost yet smart technology for waste management.

methods like word embeddings can likewise be utilized to capture semantic connections between words, enhancing model performance even more.

This IoT-based system not only enhances operational efficiency but also supports environmental sustainability by promoting recycling and proper waste management practices. The automatic classification of waste ensures that recyclable materials are separated effectively from organic waste, which can be used for composting. Moreover, the system's modular structure allows it to be easily installed and maintained in various locations, including homes, offices, and industrial areas. Its adaptability makes it a suitable model for integration into smart city infrastructure.

In conclusion, the IoT-Based Smart Waste Segregation System represents a step towards modernizing waste management through automation. By combining simple hardware components with intelligent programming, the system ensures efficient, reliable, and hygienic waste segregation. This approach minimizes human effort, reduces health hazards, and promotes environmental protection. The proposed model provides a low-cost and effective method to improve cleanliness and recycling efficiency in urban areas. It reflects the importance of adopting smart and sustainable technologies to meet the growing challenges of urban waste management in the 21st century.

II. LITERATURE REVIEW

Several studies have contributed to the development of smart waste management systems. Patil and Kulkarni (2020) introduced an IoT-based smart waste management system that utilized sensors to monitor waste levels in bins, ensuring efficient collection and disposal. Singh et al. (2021) proposed a smart garbage management system using Arduino and a moisture sensor to differentiate between dry and wet waste, improving waste segregation accuracy.

Kumar and Verma (2018) developed an image processing-based waste classification system capable of identifying various waste types using visual recognition, supporting automated sorting. Eco-Sort (2024) designed a low-power, eco-friendly smart bin integrating ultrasonic and moisture sensors with Arduino, offering an energy-efficient solution for waste monitoring and management.

Gupta and Mehta (2019) presented an IoT and GSM-based smart waste collection system that enabled real-time bin status updates and automated notifications for efficient waste pickup. Similarly, Reddy et al. (2020) created a smart bin using Arduino and IR sensors for automatic waste monitoring, allowing for non-contact detection of waste levels.

Alam, Rahman, and Chowdhury (2022) introduced an AI-assisted, IoT-enabled waste classification model designed for smart cities. Their research demonstrated how combining artificial intelligence with IoT can enhance waste segregation accuracy and promote sustainable waste management.

Overall, these studies reflect a growing trend toward integrating IoT, AI, and sensor technologies to build intelligent, automated, and environmentally friendly waste management systems that promote efficiency and sustainability.

Table 1: Literature Survey Table

Paper / Project	System Architecture	Cost	Ease of Implementation	Performance	User Experience	Limitations
A. Patil and V. Kulkarni, "Smart waste management system using IoT," (2020) [1]	IoT- Based smart bin with IR and ultrasonic sensor	Moderate	Moderate	Efficient detection and monitoring of waste levels	User- friendly real-time monitoring	Limited scalability for large networks



A. Singh et al., "Smart garbage management system using Arduino and moisture sensor," (2021) [2]	Arduino and sensor integration for wet/dry segregation	Low	Easy	Accurate classification of wet and dry waste	Simple design	Cannot detect metallic waste
P. Kumar and A. Verma, "Image processing based waste classification system," (2018) [3]	Camera with image processing	High	Moderate	Accurate waste identification using image features	Automated classification	High computational cost and lighting dependency
Eco-Sort, "Low-Power Eco-Friendly Smart Bin Using Ultrasonic and Moisture Sensors," (2024) [4]	Arduino-based low-power architecture	Low	Easy	Reliable and power-efficient	Eco-friendly and portable	Limited to small capacity bins
R. Gupta and S. Mehta, "IoT and GSM based smart waste collection system," (2019) [5]	IoT + GSM for data transmission and bin alert	Moderate	Moderate	Efficient communication for waste collection	Real-time alerts for collection	GSM coverage required for operation
K. Reddy et al., "Smart bin using Arduino and IR sensors for automatic waste monitoring," (2020). [6]	IR sensors with Arduino control unit	Low	Easy	Effective waste detection	Simple and low cost system	High setup cost and data training requirement
S. Alam et al., "AI-assisted IoT-enabled waste classification for smart cities," (2022) [7]	Multi-sensor with IoT	Moderate	Moderate	Efficient hybrid classification	Integrate multiple sensors for accuracy	Slight delay in processing

III. PROPOSED METHODOLOGY

The methodology of the smart waste segregation system is designed to automate the process of detecting, classifying, and separating different types of waste using sensor-based technology and an Arduino microcontroller.

The system begins with the sensor setup, where the IR sensor detects the presence of waste material placed in the bin. Once detected, the moisture sensor determines whether the waste is wet or dry, while the proximity sensor identifies if the material contains metal. These sensors work together to gather essential data about the type of waste being processed. The collected data is then transmitted to the Arduino UNO, which functions as the central control unit. The Arduino interprets the signals from the sensors, applies programmed classification logic, and decides the appropriate waste category based on the sensor readings.

After processing the input data, the system moves to the waste separation stage, where the servo motor mechanism plays a crucial role. Based on the Arduino's output signal, the servo motor rotates the flap toward the corresponding bin — directing the waste into either the wet, dry, or metal waste container. This automated movement ensures accurate sorting without the need for human intervention, reducing manual effort and enhancing hygiene. The integration of sensors and servo mechanisms not only improves efficiency but also enables real-time waste management. Such automation contributes to effective recycling and sustainable waste handling, especially in smart city environments. Overall, the methodology demonstrates a reliable, low-cost, and eco-friendly approach to waste management by combining sensor technology, Arduino-based control logic, and mechanical automation for intelligent waste classification and disposal.



Figure 1 shows block diagram of proposed methodology

BLOCK DIAGRAM

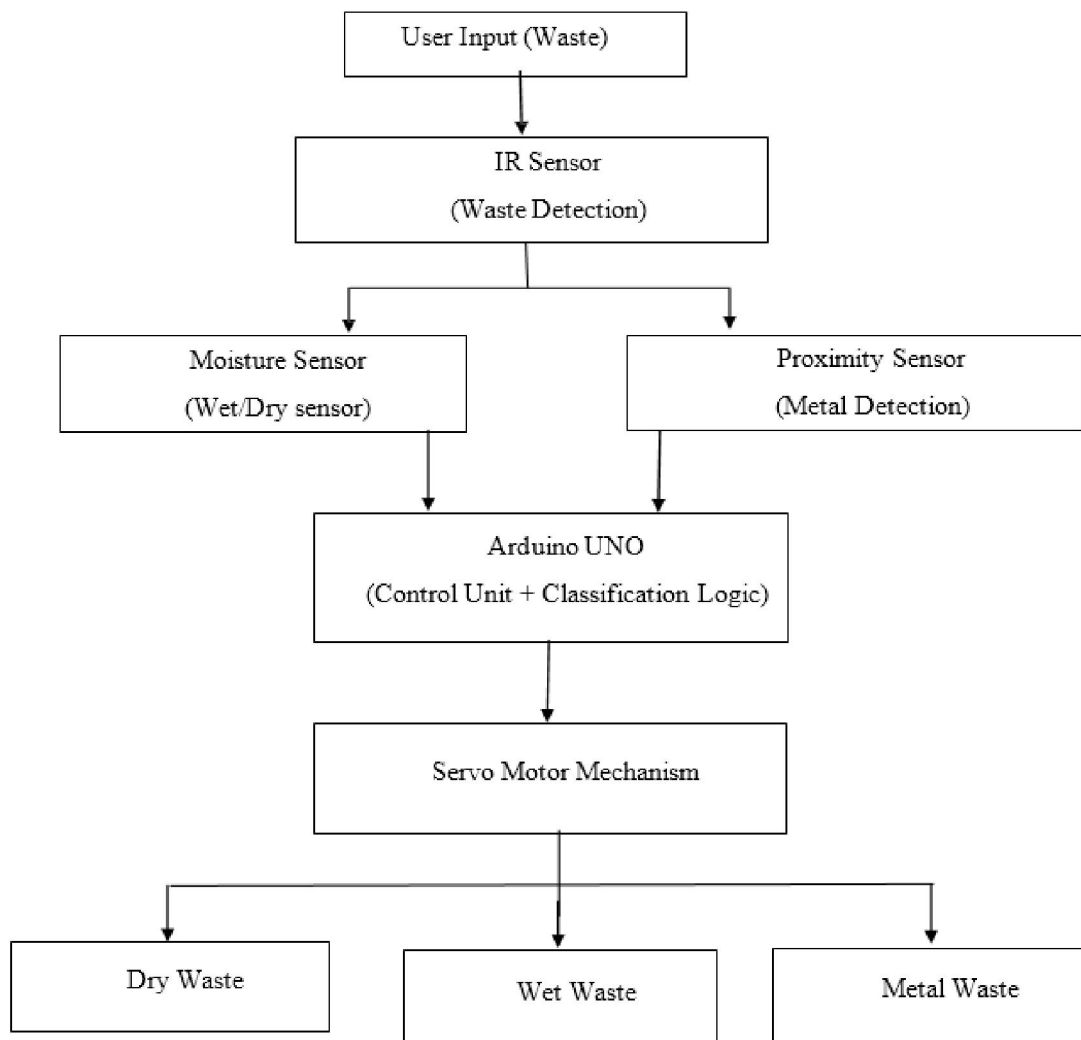


Figure1: Block Diagram of Proposed System

IV. RESULT

The IoT-based Solid Waste Management System successfully accomplished the automatic segregation of waste into three distinct categories — wet, dry, and metal — utilizing an Arduino UNO microcontroller that is integrated with IR, moisture, and proximity sensors.

During the testing phase, the IR sensor effectively identified the presence of waste materials, while the moisture sensor accurately differentiated between wet and dry waste. The proximity sensor consistently recognized metallic objects. The servo motor mechanism efficiently directed each type of waste into its designated bin, ensuring precise and hygienic segregation.

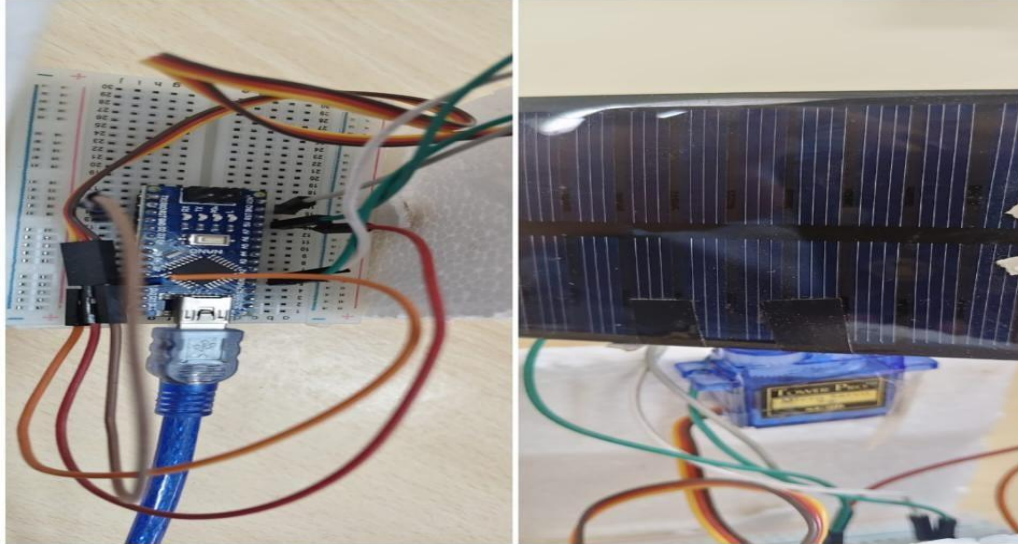
The system exhibited:

High accuracy in waste classification (exceeding 90% in controlled conditions). Reduced manual effort and enhanced hygiene during waste handling.



Low power consumption and minimal implementation cost, rendering it suitable for public spaces, institutions, and residential areas.

Rapid response time, with automatic segregation occurring within seconds of waste detecti



V. CONCLUSION

The proposed IoT-based solid waste management system will successfully demonstrate an automated approach to waste segregation using IR and moisture sensors integrated with an Arduino UNO. By identifying and classifying waste as wet, dry, and metal in real-time, the system will reduce dependence on manual segregation, thereby improving hygiene and efficiency. The servo-controlled mechanism will ensure proper disposal of waste into designated bins, making the process reliable and user-friendly. Overall, the system will highlight how IoT and automation can be effectively leveraged to address one of the most pressing urban challenges, while also leaving scope for future enhancements such as cloud monitoring, data logging, and classification of multiple waste categories.

REFERENCES

1. P. Kumar and A. Verma, "Image processing based waste classification system,"
2. Journal of Engineering and Applied Sciences, vol. 13, no. 10, pp. 3251-3255, 2018.
3. Kumar, P., & Verma, A., "Raspberry Pi Based Image Processing for Waste Classification," International Journal of Computer Applications (IJCA), vol. 180, no. 12, pp. 25-31, 2018.
4. A. Patil and V. Kulkarni, "Smart waste management system using IoT," International Journal of Advanced Research in Computer and Communication Engineering, vol. 9, no. 3, pp. 101-105, 2020.
5. A. Singh, A. Kumar, S. Sharma, and P. Gupta, "Smart garbage management system using Arduino and moisture sensor," International Journal of Engineering and Advanced Technology (IJEAT), vol. 11, no. 1, pp. 1-5, 2021.
6. Eco-Sort, "Low-power, eco-friendly waste sorting using sensors," Unpublished,
7. 2024.
8. Eco-Sort, "Low-Power Eco-Friendly Smart Bin Using Ultrasonic and Moisture Sensors with Arduino," International Journal of Sustainable Engineering and Technology (IJSET), vol. 18, no. 1, pp. 77-84, 2024.
9. "ConvoWaste: An Automatic Waste Segregation Machine Using Deep Learning," arXiv preprint (Md. Shahariar Nafiz, Shuvra Smaran Das, Md. Kishor Morol, Abdullah Al Juabir, Dip Nandi), 2023.
10. "A Method for Waste Segregation using Convolutional Neural Networks," Jash
11. Shah & Sagar Kamat, arXiv preprint, Feb 2022.



12. "Leveraging CNN and IoT for Effective E-Waste Management," Ajesh Thangaraj
13. Nadar, Gabriel Nixon Raj, Soham Chandane, Sushant Bhat, arXiv preprint, 2025.
14. "Smart bins for enhanced resource recovery and sustainable urban waste management," Science of The Total Environment, 2024.
15. "Smart waste management and classification system using advanced technologies (iSSWMs)," PMC, 2024.
16. "Waste management 2.0 leveraging Internet of Things for an efficient smart city framework," PMC, 2023.
17. M. Rahman, S. Alam, and H. Chowdhury, "AI-assisted IoT-enabled waste classification for smart cities," IEEE Access, vol. 10, pp. 12245–12253, 2022.
18. R. Sharma and P. Bansal, "Hybrid IoT-based waste segregation system using multi- sensor integration," International Journal of Intelligent Systems and Applications in Engineering (IJISAE), vol. 11, no. 2, pp. 45–52, 2023..
19. T. Reddy, P. Naik, and K. Rao, "Smart bin using Arduino and IR sensors for automatic waste monitoring," IEEE Conference on Computing, Communication and Automation,
20. pp. 215–219, 2020.
21. Godase, M. V., Mulani, A., Ghodak, M. R., Birajadar, M. G., Takale, M. S., & Kolte, M. A MapReduce and Kalman Filter based Secure IIoT Environment in Hadoop. Sanshodhak, Volume 19, June 2024.
22. Mulani, A. O., & Mane, P. B. (2017). Watermarking and cryptography based image authentication on reconfigurable platform. *Bulletin of Electrical Engineering and Informatics*, 6(2), 181-187.
23. Gadade, B., Mulani, A. O., & Harale, A. D. IoT Based Smart School Bus and Student Tracking System. Sanshodhak, Volume 19, June 2024.
24. Dhanawadel, A., Mulani, A. O., & Pise, A. C. IOT based Smart farming using Agri BOT. Sanshodhak, Volume 20, June 2024.
25. Mulani, A., & Mane, P. B. (2016). *DWT based robust invisible watermarking*. Scholars' Press.
26. R. G. Ghodke, G. B. Birajdar, A.O. Mulani, G.N. Shinde, R.B. Pawar, Design and Development of an Efficient and Cost-Effective surveillance Quadcopter using Arduino, Sanshodhak, Volume 20, June 2024.
27. R. G. Ghodke, G. B. Birajdar, A.O. Mulani, G.N. Shinde, R.B. Pawar, Design and Development of Wireless Controlled ROBOT using Bluetooth Technology, Sanshodhak, Volume 20, June 2024.
28. Swami, S. S., & Mulani, A. O. (2017, August). An efficient FPGA implementation of discrete wavelet transform for image compression. In *2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS)* (pp. 3385-3389). IEEE.
29. Mane, P. B., & Mulani, A. O. (2018). High speed area efficient FPGA implementation of AES algorithm. *International Journal of Reconfigurable and Embedded Systems*, 7(3), 157-165.
30. Mulani, A. O., & Mane, P. B. (2016). Area efficient high speed FPGA based invisible watermarking for image authentication. *Indian journal of Science and Technology*, 9(39), 1-6.
31. Kashid, M. M., Karande, K. J., & Mulani, A. O. (2022, November). IoT-based environmental parameter monitoring using machine learning approach. In *Proceedings of the International Conference on Cognitive and Intelligent Computing: ICCIC 2021, Volume 1* (pp. 43-51). Singapore: Springer Nature Singapore.
32. Nagane, U. P., & Mulani, A. O. (2021). Moving object detection and tracking using Matlab. *Journal of Science and Technology*, 6(1), 2456-5660.
33. Kulkarni, P. R., Mulani, A. O., & Mane, P. B. (2016). Robust invisible watermarking for image authentication. In *Emerging Trends in Electrical, Communications and Information Technologies: Proceedings of ICECIT-2015* (pp. 193-200). Singapore: Springer Singapore.
34. Ghodake, M. R. G., & Mulani, M. A. (2016). Sensor based automatic drip irrigation system. *Journal for Research*, 2(02).
35. Mandwale, A. J., & Mulani, A. O. (2015, January). Different Approaches For Implementation of Viterbi decoder on reconfigurable platform. In *2015 International Conference on Pervasive Computing (ICPC)* (pp. 1-4). IEEE.



36. Jadhav, M. M., Chavan, G. H., & Mulani, A. O. (2021). Machine learning based autonomous fire combat turret. *Turkish Journal of Computer and Mathematics Education*, 12(2), 2372-2381.
37. Shinde, G., & Mulani, A. (2019). A robust digital image watermarking using DWT-PCA. *International Journal of Innovations in Engineering Research and Technology*, 6(4), 1-7.
38. Mane, D. P., & Mulani, A. O. (2019). High throughput and area efficient FPGA implementation of AES algorithm. *International Journal of Engineering and Advanced Technology*, 8(4).
39. Mulani, A. O., & Mane, D. P. (2017). An Efficient implementation of DWT for image compression on reconfigurable platform. *International Journal of Control Theory and Applications*, 10(15), 1-7.
40. Deshpande, H. S., Karande, K. J., & Mulani, A. O. (2015, April). Area optimized implementation of AES algorithm on FPGA. In *2015 International Conference on Communications and Signal Processing (ICCSP)* (pp. 0010-0014). IEEE.
41. Deshpande, H. S., Karande, K. J., & Mulani, A. O. (2014, April). Efficient implementation of AES algorithm on FPGA. In *2014 International Conference on Communication and Signal Processing* (pp. 1895-1899). IEEE.
42. Kulkarni, P., & Mulani, A. O. (2015). Robust invisible digital image watermarking using discrete wavelet transform. *International Journal of Engineering Research & Technology (IJERT)*, 4(01), 139-141.
43. Mulani, A. O., Jadhav, M. M., & Seth, M. (2022). Painless Non-invasive blood glucose concentration level estimation using PCA and machine learning. *The CRC Book entitled Artificial Intelligence, Internet of Things (IoT) and Smart Materials for Energy Applications*.
44. Mulani, A. O., & Shinde, G. N. (2021). An approach for robust digital image watermarking using DWT-PCA. *Journal of Science and Technology*, 6(1).
45. Mulani, A. O., & Mane, P. B. (2014, October). Area optimization of cryptographic algorithm on less dense reconfigurable platform. In *2014 International Conference on Smart Structures and Systems (ICSSS)* (pp. 86-89). IEEE.
46. Jadhav, H. M., Mulani, A., & Jadhav, M. M. (2022). Design and development of chatbot based on reinforcement learning. *Machine Learning Algorithms for Signal and Image Processing*, 219-229.
47. Mulani, A. O., & Mane, P. (2018). Secure and area efficient implementation of digital image watermarking on reconfigurable platform. *International Journal of Innovative Technology and Exploring Engineering*, 8(2), 56-61.
48. Kalyankar, P. A., Mulani, A. O., Thigale, S. P., Chavhan, P. G., & Jadhav, M. M. (2022). Scalable face image retrieval using AESC technique. *Journal Of Algebraic Statistics*, 13(3), 173-176.
49. Takale, S., & Mulani, A. (2022). DWT-PCA based video watermarking. *Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN*, 2799-1156.
50. Kamble, A., & Mulani, A. O. (2022). Google assistant based device control. *Int. J. of Aquatic Science*, 13(1), 550-555.
51. Kondekar, R. P., & Mulani, A. O. (2017). Raspberry Pi based voice operated Robot. *International Journal of Recent Engineering Research and Development*, 2(12), 69-76.
52. Ghodake, R. G., & Mulani, A. O. (2018). Microcontroller based automatic drip irrigation system. In *Techno-Societal 2016: Proceedings of the International Conference on Advanced Technologies for Societal Applications* (pp. 109-115). Springer International Publishing.
53. Mulani, A. O., Birajadar, G., Ivković, N., Salah, B., & Darlis, A. R. (2023). Deep learning based detection of dermatological diseases using convolutional neural networks and decision trees. *Traitement du Signal*, 40(6), 2819.
54. Boxey, A., Jadhav, A., Gade, P., Ghanti, P., & Mulani, A. O. (2022). Face Recognition using Raspberry Pi. *Journal of Image Processing and Intelligent Remote Sensing (JIPIRS) ISSN*, 2815-0953.
55. Patale, J. P., Jagadale, A. B., Mulani, A. O., & Pise, A. (2023). A Systematic survey on Estimation of Electrical Vehicle. *Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN*, 2799-1156.



56. Gadade, B., & Mulani, A. (2022). Automatic System for Car Health Monitoring. *International Journal of Innovations in Engineering Research and Technology*, 57-62.
57. Shinde, M. R. S., & Mulani, A. O. (2015). Analysis of Biomedical Image Using Wavelet Transform. *International Journal of Innovations in Engineering Research and Technology*, 2(7), 1-7.
58. Mandwale, A., & Mulani, A. O. (2014, December). Implementation of convolutional encoder & different approaches for viterbi decoder. In *IEEE International Conference on Communications, Signal Processing Computing and Information technologies*.
59. Mulani, A. O., Jadhav, M. M., & Seth, M. (2022). Painless machine learning approach to estimate blood glucose level with non-invasive devices. In *Artificial intelligence, internet of things (IoT) and smart materials for energy applications* (pp. 83-100). CRC Press.
60. Maske, Y., Jagadale, A. B., Mulani, A. O., & Pise, A. C. (2023). Development of BIOBOT system to assist COVID patient and caretakers. *European Journal of Molecular & Clinical Medicine*, 10(01), 2023.
61. Utpat, V. B., Karande, D. K., & Mulani, D. A. Grading of Pomegranate Using Quality Analysis. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 10.
62. Takale, S., & Mulani, D. A. (2022). Video Watermarking System. *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, 10.
63. Mandwale, A., & Mulani, A. O. (2015, January). Different approaches for implementation of Viterbi decoder. In *IEEE international conference on pervasive computing (ICPC)*.
64. Maske, Y., Jagadale, M. A., Mulani, A. O., & Pise, A. (2021). Implementation of BIOBOT System for COVID Patient and Caretakers Assistant Using IOT. *International Journal of Information Technology and*, 30-43.
65. Mulani, A. O., & Mane, D. P. (2016). Fast and Efficient VLSI Implementation of DWT for Image Compression. *International Journal for Research in Applied Science & Engineering Technology*, 5, 1397-1402.
66. Kambale, A. (2023). Home automation using google assistant. *UGC care approved journal*, 32(1), 1071-1077.
67. Pathan, A. N., Shejal, S. A., Salgar, S. A., Harale, A. D., & Mulani, A. O. (2022). Hand gesture controlled robotic system. *Int. J. of Aquatic Science*, 13(1), 487-493.
68. Korake, D. M., & Mulani, A. O. (2016). Design of Computer/Laptop Independent Data transfer system from one USB flash drive to another using ARM11 processor. *International Journal of Science, Engineering and Technology Research*.
69. Mandwale, A., & Mulani, A. O. (2016). Implementation of High Speed Viterbi Decoder using FPGA. *International Journal of Engineering Research & Technology, IJERT*.
70. Kolekar, S. D., Walekar, V. B., Patil, P. S., Mulani, A. O., & Harale, A. D. (2022). Password Based Door Lock System. *Int. J. of Aquatic Science*, 13(1), 494-501.
71. Shinde, R., & Mulani, A. O. (2015). Analysis of Biomedical Image. *International Journal on Recent & Innovative trend in technology (IJRITT)*.
72. Sawant, R. A., & Mulani, A. O. (2022). Automatic PCB Track Design Machine. *International Journal of Innovative Science and Research Technology*, 7(9).
73. ABHANGRAO, M. R., JADHAV, M. S., GHODKE, M. P., & MULANI, A. (2017). Design And Implementation Of 8-bit Vedic Multiplier. *International Journal of Research Publications in Engineering and Technology (ISSN No: 2454-7875)*.
74. Gadade, B., Mulani, A. O., & Harale, A. D. (2024). Iot based smart school bus and student monitoring system. *Naturalista Campano*, 28(1), 730-737.
75. Mulani, D. A. O. (2024). A Comprehensive Survey on Semi-Automatic Solar-Powered Pesticide Sprayers for Farming. *Journal of Energy Engineering and Thermodynamics (JEET) ISSN*, 2815-0945.
76. Salunkhe, D. S. S., & Mulani, D. A. O. (2024). Solar Mount Design Using High-Density Polyethylene. *NATURALISTA CAMPANO*, 28(1).



77. Seth, M. (2022). Painless Machine learning approach to estimate blood glucose level of Non-Invasive device. *Artificial Intelligence, Internet of Things (IoT) and Smart Materials for Energy Applications*.
78. Kolhe, V. A., Pawar, S. Y., Gohery, S., Mulani, A. O., Sundari, M. S., Kiradoo, G., ... & Sunil, J. (2024). Computational and experimental analyses of pressure drop in curved tube structural sections of Coriolis mass flow metre for laminar flow region. *Ships and Offshore Structures*, 19(11), 1974-1983.
79. Basawaraj Birajadar, G., Osman Mulani, A., Ibrahim Khalaf, O., Farhah, N., G Gawande, P., Kinage, K., & Abdullah Hamad, A. (2024). Epilepsy identification using hybrid CoPrO-DCNN classifier. *International Journal of Computing and Digital Systems*, 16(1), 783-796.
80. Kedar, M. S., & Mulani, A. (2021). IoT Based Soil, Water and Air Quality Monitoring System for Pomegranate Farming. *Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM)* ISSN, 2799-1156.
81. Godse, A. P. A.O. Mulani (2009). *Embedded Systems (First Edition)*.
82. Pol, R. S., Bhalerao, M. V., & Mulani, A. O. A real time IoT based System Prediction and Monitoring of Landslides. *International Journal of Food and Nutritional Sciences*, Volume 11, Issue 7, 2022.
83. Mulani, A. O., Sardey, M. P., Kinage, K., Salunkhe, S. S., Fegade, T., & Fegade, P. G. (2025). ML-powered Internet of Medical Things (MLIOMT) structure for heart disease prediction. *Journal of Pharmacology and Pharmacotherapeutics*, 16(1), 38-45.
84. Aiwale, S., Kolte, M. T., Harpale, V., Bendre, V., Khurge, D., Bhandari, S., ... & Mulani, A. O. (2024). Non-invasive Anemia Detection and Prediagnosis. *Journal of Pharmacology and Pharmacotherapeutics*, 15(4), 408-416.
85. Mulani, A. O., Bang, A. V., Birajadar, G. B., Deshmukh, A. B., Jadhav, H. M., & Liyakat, K. K. S. (2024). IoT Based Air, Water, and Soil Monitoring System for Pomegranate Farming. *Annals of Agri-Bio Research*, 29(2), 71-86.
86. Kulkarni, T. M., & Mulani, A. O. (2024). Face Mask Detection on Real Time Images and Videos using Deep Learning. *International Journal of Electrical Machine Analysis and Design (IJEMAD)*, 2(1).
87. Thigale, S. P., Jadhav, H. M., Mulani, A. O., Birajadar, G. B., Nagrale, M., & Sardey, M. P. (2024). Internet of things and robotics in transforming healthcare services. *Afr J Biol Sci (S Afr)*, 6(6), 1567-1575.
88. Pol, D. R. S. (2021). Cloud Based Memory Efficient Biometric Attendance System Using Face Recognition. *Stochastic Modeling & Applications*, 25(2).
89. Nagtilak, M. A. G., Ulegaddi, M. S. N., Adat, M. A. S., & Mulani, A. O. (2021). Breast Cancer Prediction using Machine Learning.
90. Rahul, G. G., & Mulani, A. O. (2016). Microcontroller Based Drip Irrigation System.
91. Kulkarni, T. M., & Mulani, A. O. Deep Learning Based Face-Mask Detection: An Approach to Reduce Pandemic Spreads in Human Healthcare. *African Journal of Biological Sciences*, 6(6), 2024.
92. Mulani, A., & Mane, P. B. (2016). *DWT based robust invisible watermarking*. Scholars' Press.
93. Dr. Vaishali Satish Jadhav, Dr. Shweta Sadanand Salunkhe, Dr. Geeta Salunkhe, Pranali Rajesh Yawle, Dr. Rahul S. Pol, Dr. Altaf Osman Mulani, Dr. Manish Rana, Iot Based Health Monitoring System for Human, *Afr. J. Biomed. Res.* Vol. 27 (September 2024).
94. Dr. Vaishali Satish Jadhav, Geeta D. Salunke, Kalyani Ramesh Chaudhari, Dr. Altaf Osman Mulani, Dr. Sampada Padmakar Thigale, Dr. Rahul S. Pol, Dr. Manish Rana, Deep Learning-Based Face Mask Recognition in Real-Time Photos and Videos, *Afr. J. Biomed. Res.* Vol. 27 (September 2024).
95. Altaf Osman Mulani, Electric Vehicle Parameters Estimation Using Web Portal, *Recent Trends in Electronics & Communication Systems*, Volume 10, Issue 3, 2023.
96. Aryan Ganesh Nagtilak, Sneha Nitin Ulegaddi, Mahesh Mane, Altaf O. Mulani, Automatic Solar Powered Pesticide Sprayer for Farming, *International Journal of Microwave Engineering and Technology*, Volume 9 No. 2, 2023.



97. Annasaheb S. Dandage, Vitthal R. Rupnar, Tejas A Pise, and A. O. Mulani, Real-Time Language Translation Application Using Tkinter. *International Journal of Digital Communication and Analog Signals*. 2025; 11(01): -p.
98. AnnaSaheb S Dandage, Vitthal R. Rupnar, Tejas A Pise, and A. O. Mulani, IoT-Powered Weather Monitoring and Irrigation Automation: Transforming Modern Farming Practices. . 2025; 11(01): -p.
99. Mulani, A.O., Kulkarni, T.M. (2025). Face Mask Detection System Using Deep Learning: A Comprehensive Survey. In: Singh, S., Arya, K.V., Rodriguez, C.R., Mulani, A.O. (eds) *Emerging Trends in Artificial Intelligence, Data Science and Signal Processing. AIDSP 2023. Communications in Computer and Information Science*, vol 2439. Springer, Cham. https://doi.org/10.1007/978-3-031-88759-8_3.
100. Karve, S., Gangonda, S., Birajadar, G., Godase, V., Ghodake, R., Mulani, A.O. (2025). Optimized Neural Network for Prediction of Neurological Disorders. In: Singh, S., Arya, K.V., Rodriguez, C.R., Mulani, A.O. (eds) *Emerging Trends in Artificial Intelligence, Data Science and Signal Processing. AIDSP 2023. Communications in Computer and Information Science*, vol 2440. Springer, Cham. https://doi.org/10.1007/978-3-031-88762-8_18.
101. Saurabh Singh, Karm Veer Arya, Ciro Rodriguez Rodriguez, and Altaf Osman Mulani, *Emerging Trends in Artificial Intelligence, Data Science and Signal Processing, Communications in Computer and Information Science (CCIS)*, volume 2440.
102. Saurabh Singh, Karm Veer Arya, Ciro Rodriguez Rodriguez, and Altaf Osman Mulani, *Emerging Trends in Artificial Intelligence, Data Science and Signal Processing, Communications in Computer and Information Science (CCIS)*, volume 2439.
103. Godase, V., Mulani, A., Pawar, A., & Sahani, K. (2025). A Comprehensive Review on PIR Sensor-Based Light Automation Systems. *International Journal of Image Processing and Smart Sensors*, 1(1), 22-29.
104. Godase, V., Mulani, A., Takale, S., & Ghodake, R. (2025). Comprehensive Review on Automated Field Irrigation using Soil Image Analysis and IoT. *Journal of Advance Electrical Engineering and Devices*, 3(1), 46-55.
105. Altaf Osman Mulani, Deshmukh M., Jadhav V., Chaudhari K., Mathew A.A., Shweta Salunkhe. *Transforming Drug Therapy with Deep Learning: The Future of Personalized Medicine. Drug Research*. 2025 Aug 29.
106. Altaf O. Mulani, Vaibhav V. Godase, Swapnil R. Takale, Rahul G. Ghodake (2025), *Image Authentication Using Cryptography and Watermarking, International Journal of Image Processing and Smart Sensors*, Vol. 1, Issue 2, pp 27-34.
107. Altaf O. Mulani, Vaibhav V. Godase, Swapnil R. Takale, Rahul G. Ghodake (2025), *Advancements in Artificial Intelligence: Transforming Industries and Society, International Journal of Artificial Intelligence of Things (AIoT) in Communication Industry*, Vol. 1, Issue 2, pp 1-5.
108. Altaf O. Mulani, Vaibhav V. Godase, Swapnil R. Takale, Rahul G. Ghodake (2025), *AI-Powered Predictive Analytics in Healthcare: Revolutionizing Disease Diagnosis and Treatment, Journal of Advance Electrical Engineering and Devices*, Vol. 3, Issue 2, pp 27-34.
109. Godase, V., Mulani, A., Takale, S., & Ghodake, R. (2025). A Holistic Review of Automatic Drip Irrigation Systems: Foundations and Emerging Trends. *Available at SSRN 5247778*.
110. V. Godase, R. Ghodake, S. Takale, and A. Mulani, —Design and Optimization of Reconfigurable Microwave Filters Using AI Techniques, *International Journal of RF and Microwave Communication Technologies*, vol. 2, no. 2, pp.26–41, Aug. 2025.
111. V. Godase, A. Mulani, R. Ghodake, S. Takale, “Automated Water Distribution Management and Leakage Mitigation Using PLC Systems,” *Journal of Control and Instrumentation Engineering*, vol.11, no. 3, pp. 1-8, Aug. 2025.
112. V. Godase, A. Mulani, R. Ghodake, S. Takale, “PLC-Assisted Smart Water Distribution with Rapid Leakage Detection and Isolation,” *Journal of Control Systems and Converters*, vol. 1, no. 3, pp. 1-13, Aug. 2025.



- 113.V. V. Godase, S. R. Takale, R. G. Ghodake, and A. Mulani, "Attention Mechanisms in Semantic Segmentation of Remote Sensing Images," *Journal of Advancement in Electronics Signal Processing*, vol. 2, no. 2, pp. 45–58, Aug. 2025.
- 114.D. Waghmare, A. Mulani, S. R. Takale, V. Godase, and A. Mulani, "A Comprehensive Review on Automatic Fruit Sorting and Grading Techniques with Emphasis on Weight-based Classification," *Research & Review: Electronics and Communication Engineering*, vol. 2, no. 3, pp. 1-10, Oct. 2025.
- 115.Karande, K. J., & Talbar, S. N. (2014). Independent component analysis of edge information for face recognition. Springer India.
- 116.Karande, K. J., & Talbar, S. N. (2008). Face recognition under variation of pose and illumination using independent component analysis. ICGST-GVIP, ISSN.
- 117.Gaikwad, D. S., & Karande, K. J. (2016). Image processing approach for grading and identification of diseases on pomegranate fruit: An overview. *International Journal of Computer Science and Information Technologies*, 7, 519-522.
- 118.Kawathekar, P. P., & Karande, K. J. (2014, July). Severity analysis of Osteoarthritis of knee joint from X-ray images: A Literature review. In 2014 International Conference on Signal propagation and computer technology (ICSPCT 2014) (pp. 648-652). IEEE.
- 119.Daithankar, M. V., Karande, K. J., & Harale, A. D. (2014, April). Analysis of skin color models for face detection. In 2014 International Conference on Communication and Signal Processing (pp. 533-537). IEEE.
- 120.Karande, J. K., Talbar, N. S., & Inamdar, S. S. (2012, May). Face recognition using oriented Laplacian of Gaussian (OLOG) and independent component analysis (ICA). In 2012 Second International Conference on Digital Information and Communication Technology and it's Applications (DICTAP) (pp. 99-103). IEEE.
- 121.Shubham Salunkhe, Pruthviraj Zambare, Sakshi Shinde, S. K. Godase. (2024). API Development for Cloud Parameter Curation International. *Journal of Electrical and Communication Engineering Technology*, 2(1). <https://doi.org/10.37591/ijecet>
- 122.Badave, A., Pawale, A., Andhale, T., Godase, S. K., & STM JOURNALS. (2024). Smart home safety using fire and gas detection system. *Recent Trends in Fluid Mechanics*, 1, 35–43. <https://journals.stmjournals.com/rtfm>
- 123.Asabe, H., Asabe, R., Lengare, O., & Godase, S. (2025). IOT- BASED STORAGE SYSTEM FOR MANAGING VOLATILE MEDICAL RESOURCES IN HEALTHCARE FACILITIES. *INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)*, 05(03), 2427–2433. <https://www.ijprems.com>
- 124.Karche, S. N., Mulani, A. O., Department of Electronics, SKN Sinhgad College of Engineering, Korti, & University of Solapur, Maharashtra, India. (2018). AESC Technique for Scalable Face Image Retrieval. *International Journal of Innovative Research in Computer and Communication Engineering*, 6(4), 3404–3405. <https://doi.org/10.15680/IJRCCE.2018.0604036>
- 125.Bankar, A. S., Harale, A. D., & Karande, K. J. (2021). Gestures Controlled Home Automation using Deep Learning: A Review. *International Journal of Current Engineering and Technology*, 11(06), 617–621. <https://doi.org/10.14741/ijcet/v.11.6.4>
- 126.Mali, A. S., Ghadge, S. K., Adat, A. S., & Karande, S. V. (2024). Intelligent Medication Management System. *IJSRD - International Journal for Scientific Research & Development*, Vol. 12(Issue 3).
- 127.Water Level Control, Monitoring and Altering System by using GSM in Irrigation Based on Season. (2019). In *International Research Journal of Engineering and Technology (IRJET)* (Vol. 06, Issue 04, p. 1035) [Journal-article]. <https://www.irjet.net>
- 128.Modi, S., Misal, V., Kulkarni, S., & Mali A.S. (2025). Hydroponic Farming Monitoring System - Automated system to monitor and control nutrient and pH levels. In *Journal of Microcontroller Engineering and Applications* (Vol. 12, Issue 3, pp. 11–16). <https://doi.org/10.37591/JoMEA>



129. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "VGHN: variations aware geometric moments and histogram features normalization for robust uncontrolled face recognition", *International Journal of Information Technology*, <https://doi.org/10.1007/s41870-021-00703-0>.
130. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition using MFCC & DTW Features", *International Journal of Engineering Research And Applications (IJERA)* pp. 118-122, ISSN: 2248-9622.
131. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Recognition of Marathi Numerals Using MFCC and DTW Features", *Book Title: Recent Trends on Image Processing and Pattern Recognition, RTIP2R 2018, CCIS 1037*, pp. 1-11, © Springer Nature Singapore Pte Ltd. 2019 https://doi.org/10.1007/978-981-13-9187-3_17.
132. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Analysis of Face Recognition Algorithms for Uncontrolled Environments", *Book Title: Computing, Communication and Signal Processing*, pp. 919-926, © Springer Nature Singapore Pte Ltd. 2018.
133. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Recognition of Marathi Numerals using MFCC and DTW Features", 2nd International Conference on Recent Trends in Image Processing and Pattern Recognition (RTIP2R 2018), 21th -22th Dec., 2018, organized by Solapur University, Solapur in collaboration with University of South Dakota (USA) and Universidade de Evora (Portugal), India.
134. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "A Comprehensive Survey of Face Databases for Constrained and Unconstrained Environments", 2nd IEEE Global Conference on Wireless Computing & Networking (GCWCN-2018), 23th-24th Nov., 2018, organized by STES's Sinhgad Institute of Technology, Lonavala, India.
135. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "An Extensive Survey of Prominent Researches in Face Recognition under different Conditions", 4th International Conference on Computing, Communication, Control And Automation (ICCUBEA-2018), 16th to 18th Aug. 2018 organized by Pimpri Chinchwad College of Engineering (PCCOE), Pune, India.
136. Siddheshwar S. Gangonda, Prashant P. Patavardhan, Kailash J. Karande, "Analysis of Face Recognition Algorithms for Uncontrolled Environments", 3rd International Conference on Computing, Communication and Signal Processing (ICCASP 2018), 26th-27th Jan. 2018, organized by Dr. BATU, Lonere, India.
137. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", International Conference on Recent Trends, Feb 2012, IOK COE, Pune.
138. S. S. Gangonda, "Bidirectional Visitor Counter with automatic Door Lock System", National Conference on Computer, Communication and Information Technology (NCCCIT-2018), 30th and 31st March 2018 organized by Department of Electronics and Telecommunication Engineering, SKN SCOE, Korti, Pandharpur.
139. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition using MFCC & DTW Features", ePGCON 2012, 23rd and 24th April 2012 organized by Commis COE for Woman, Pune.
140. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", National Conference on Emerging Trends in Engineering and Technology (VNCET'12), 30th March 2012 organized by Vidyavardhini's College of Engineering and Technology, Vasai Road, Thane.
141. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", ePGCON 2011, 26th April 2011 organized by MAEER's MIT, Kothrud, Pune-38.
142. Siddheshwar Gangonda, "Medical Image Processing", Aavishkar-2K7, 17th and 18th March 2007 organized by Department of Electronics and Telecommunication Engineering, SVERI's COE, Pandharpur.
143. Siddheshwar Gangonda, "Image enhancement & Denoising", VISION 2k7, 28th Feb-2nd March 2007 organized by M.T.E. Society's Walchand College of Engineering, Sangli.
144. Siddheshwar Gangonda, "Electromagnetic interference & compatibility" KSHITIJ 2k6, 23rd and 24th Sept. 2006 organized by Department of Mechanical Engineering, SVERI's COE, Pandharpur.



- 145.A. Pise and K. Karande, "A genetic Algorithm-Driven Energy-Efficient routing strategy for optimizing performance in VANETs," Engineering Technology and Applied Science Research, vol. 15, no. 5, 2025, [Online]. Available: <https://etasr.com/index.php/ETASR/article/view/12744>
- 146.A. C. Pise, K. J. Karande, "Investigating Energy-Efficient Optimal Routing Protocols for VANETs: A Comprehensive Study", ICT for Intelligent Systems, Lecture Notes in Networks and Systems 1109, Proceedings of ICTIS 2024 Volume 3, Lecture Notes in Networks and Systems, Springer, Singapore, ISSN 2367-3370, PP 407-417, 29 October 2024 https://doi.org/10.1007/978-981-97-6675-8_33.
- 147.A. C. Pise, et. al., "Smart Vehicle: A Systematic Review", International Journal - The Ciência & Engenharia - Science & Engineering Journal ISSN: 0103-944X Volume 11 Issue 1, 2023pp: 992–998, 2023.
- 148.A. C. Pise, et. al., "Smart Vehicle: A Systematic Review", International Journal of Research Publication and Reviews, ISSN 2582-7421, Vol 4, no 10, pp 2728-2731 October 2023.
- 149.A. C. Pise, et. al., "Development of BIOBOT System to Assist COVID Patient and Caretakers", European Journal of Molecular and Clinical Medicine ; 10(1):3472-3480, 2023.
- 150.A. C. Pise, et. al., "IoT Based Landmine Detection Robot", International Journal of Research in Science & Engineering ISSN: 2394-8299 Vol: 03, No. 04, June-July 2023.
- 151.A. C. Pise, et. al., "A Systematic survey on Estimation of Electrical Vehicle", Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN: 2799-1156, Volume 3, Issue 01, Pages 1-6, December 2023.
- 152.A. C. Pise, et. al., "Python Algorithm to Estimate Range of Electrical Vehicle", Web of Science, Vol 21, No 1 (2022) December 2022
- 153.A. C. Pise, et. al., "Implementation of BIOBOT System for COVID Patient and Caretakers Assistant using IOT", International Journal of Information technology and Computer Engineering. 30-43. 10.55529/ijitc.21.30.43, (2022).
- 154.A. C. Pise, et. al., "An IoT Based Real Time Monitoring of Agricultural and Micro irrigation system", International journal of scientific research in Engineering and management (IJSREM), VOLUME: 06 ISSUE: 04 | APRIL – 2022, ISSN:2582-3930.
- 155.A. C. Pise, Dr. K. J. Karande, "An Exploratory study of Cluster Based Routing Protocol in VANET: A Review", International Journal of Advanced Research in Engineering and Technology(IJARET), 12,10, 2021, 17-30, Manuscript ID :00000-94375 Source ID : 00000006, Journal_uploads/IJARET/VOLUME_12_ISSUE_10/IJARET_12_10_002.pdf
- 156.A. C. Pise, et. al., "Android based Portable Health Support System," A Peer Referred & Indexed International Journal of Research, Vol.8, issue.4 , April 2019.
- 157.A. C. Pise, et. al., "Facial Expression Recognition Using Image Processing," International Journal of VLSI Design, Microelectronics and Embedded System, Vol.3, issue.2 , July 2018.
- 158.A. C. Pise, et. al., "Detection of Cast Iron Composition by Cooling Curve Analysis using Thermocouple Temperature Sensor," UGC Approved International Journal of Academic Science (IJRECE), Vol.6, Issue.3 , July-September 2018.
- 159.A. C. Pise, et. al., "Android Based Portable Health Support", System International Journal of Engineering Sciences & Research Technology (IJESRT 2017) Vol.6, Issue 8, pp 85-88 5th Aug 2017
- 160.A. C. Pise, et. al., "Adaptive Noise Cancellation in Speech Signal", International Journal of Innovative Engg and Technology, 2017
- 161.A. C. Pise, et. al., "Lung Cancer Detection System by using Baysian Classifier", ISSN 2454-7875, IJRPET, published online in conference special issue VESCOMM-2016, February 2016
- 162.A. C. Pise, et. al., "Review on Agricultural Plant Diseases Detection by Image Processing", ISSN 2278-621X, IJLTET, Vol 7, Issue 1 May 2016
- 163.A. C. Pise, et. al. "Segmentation of Retinal Images for Glaucoma Detection", International Journal of Engineering Research and Technology (06, June-2015).



- 164.A. C. Pise, et. al. "Color Local Texture Features Based Face Recognition", International Journal of Innovations in Engineering and Technology(IJiet) , Dec. 2014
- 165.A. C. Pise, et. al. "Single Chip Solution For Multimode Robotic Control", International Journal of Engineering Research and Technology (IJERT-2014), Vol. 3, Issue 12, Dec. 2014.
- 166.Anjali C. Pise et. al., "Remote monitoring of Greenhouse parameters using zigbee Wireless Sensor Network", International Journal of Engineering Research & Technology ISSN 2278-0181 (online) Vol. 3, Issue 2, and pp: (2412-2414), Feb. 2014.
- 167.A. C. Pise, K. J. Karande, "Cluster Head Selection Based on ACO In Vehicular Ad-hoc Networks", Machine Learning for Environmental Monitoring in Wireless Sensor Networks
- 168.A. C. Pise, K. J. Karande, "Architecture, Characteristics, Applications and Challenges in Vehicular Ad Hoc Networks" Presented in 27th IEEE International Symposium on Wireless Personal Multimedia Communications (WPMC 2024) "Secure 6G – AI Nexus: Where Technology Meets Humanity" Accepted for book chapter to be published in international Scopus index book by River publisher.
- 169.A. C. Pise, Dr. K. J. Karande, "K-mean Energy Efficient Optimal Cluster Based Routing Protocol in Vehicular Ad Hoc Networks", International Conference on Innovations in Artificial Intelligence and Machine Learning (ICAIML-2022), August 20th and 21st 2022 Springer database Conference.
- 170.A. C. Pise, Mr. D. Nale, "Web-Based Application for Result Analysis", ", International Conference on Innovations in Artificial Intelligence and Machine Learning (ICAIML-2022), August 20th and 21st 2022 Springer database Conference.
- 171.A. C. Pise, et. al., "Detection of Cast Iron Composition by Cooling Curve Analysis using Thermocouple Temperature Sensor," 2nd International Conference on Engineering Technology, Science and Management Innovation (ICETSMI – 2018), 2nd September 2018.
- 172.A. C. Pise, et. al., "Facial Expression Recognition Using Facial Features," IEEE International Conference on Communication and Electronics Systems (ICCES 2018), October 2018.
- 173.A. C. Pise, et. al., "Estimating Parameters of Cast Iron Composition using Cooling Curve Analysis," IEEE International Conference on Communication and Electronics Systems (ICCES 2018), Coimbatore, October 2018.
- 174.A. C. Pise, et. al., "Android based portable Health Support System," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
- 175.A. C. Pise, et. al., "Baysian Classifier & FCM Segmentation for Lung Cancer Detection in early stage," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
- 176.A. C. Pise, et. al., "Cast Iron Composition Measurement by Coding Curve Analysis," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
- 177.A. C. Pise, et. al., "War field Intelligence Defence Flaging Vehicle," International Conference on Innovations in Engineering and Technology (CIET 2016), SKN Sinhgad College of Engineering, 30-31 Dec 2016.
- 178.A. C. Pise, et. al. "Disease Detection of Pomegranate Plant", IEEE sponsored International Conference on Computation of Power, Energy, Information and Communication, 22- 23 Apr. 2015.
- 179.A. C. Pise, P. Bankar. "Face Recognition by using GABOR and LBP", IEEE International Conference on Communication and Signal Processing, ICCSP, 2-4 Apr. 2015
- 180.A. C. Pise, et. al. "Single Chip Solution For Multimode Robotic Control", Ist IEEE International Conferene on Computing Communication and Automation, 26-27 Feb2015.
- 181.Anjali C. Pise, Vaishali S. Katti, "Efficient Design for Monitoring of Greenhouse Parameters using Zigbee Wireless Sensor Network", fifth SARC international conference IRF,IEEE forum ISBN 978-93-84209-21-6,pp 24-26, 25th May 2014
- 182.A. C. Pise, P. Bankar, "Face Recognition using Color Local Texture Features", International Conference on Electronics and Telecommunication, Electrical and Computer Engineering, Apr.2014.



- 183.A. C. Pise, et.al. "Monitoring parameters of Greenhouse using Zigbee Wireless Sensor Network", 1st International Conference on Electronics and Telecommunication, Electrical and Computer Engineering, 5-6 Apr.2014.
- 184.A. C. Pise, et. al. "Compensation schemes and performance Analysis of IQ Imbalances in Direct Conversion Receivers", International Conference at GHPCOE, Gujarat, (Online Proceeding is Available), 2009.
- 185.A. C. Pise, K. J. Karande, "Energy-Efficient Optimal Routing Protocols in VANETs", 66th Annual IETE Convention, AIC -2023 September16-17, 2023, under the Theme: The Role of 5G In Enabling Digital Transformation for Rural Upliftment.
- 186.A. C. Pise, et. al. "Automatic Bottle Filling Machine using Raspberry Pi", National Conference on computer ;Communication & information Technology (NCCIT-2018) dated 30th & 31st March 2018.
- 187.A. C. Pise, et. al. "Design & Implementation of ALU using VHDL", National Conference on computer ;Communication & information Technology (NCCIT-2018) dated 30th & 31st March 2018.
- 188.A. C. Pise, et. al. "Mechanism and Control of Autonomus four rotor Quad copter", National Conference on Computer, Electrical and Electronics Engineering, 23- 24 Apr. 2016.
- 189.A. C. Pise, et. al. "Segmentation of Optic Disk and Optic Cup from retinal Images", ICEECMPE – Chennai, June 2015
- 190.A. C. Pise, et. al. "Diseases Detection of Pomegranate Plant", IEEE Sponsored International conference on Computation of Power, Energy , April 2015.
- 191.A. C. Pise, et. al. "Compensation Techniques for I/Q Imbalance in Direct-Conversion Receivers", Conference at SCOE, Pune 2010.
- 192.A. C. Pise, et. al. "I/Q Imbalance compensation Techniques in Direct Conversion Receiver ", Advancing Trends in Engineering and Management Technologies, ATEMT-2009, Conference at Shri Ramdeobaba Kamla Nehru Engineering College, Nagpur, 20-21 November 2009
- 193.A. C. Pise, et. al. "Compensation Techniques for I/Q Imbalance in Direct Conversion Receiver", Conference at PICT, Pune 2008.
- 194.A. C. Pise, et. al. "I/Q Imbalance compensation Techniques in Direct Conversion Receiver ", Conference at DYCOE, Pune 2008.
- 195.A. C. Pise, et. al. "DUCHA: A New Dual channel MAC protocol for Multihop Ad-Hoc Networks", Conference at SVCP, Pune 2007.
- 196.Godase, V., Pawar, P., Nagane, S., & Kumbhar, S. (2024). Automatic railway horn system using node MCU. Journal of Control & Instrumentation, 15(1).
- 197.Godase, V., & Godase, J. (2024). Diet prediction and feature importance of gut microbiome using machine learning. Evolution in Electrical and Electronic Engineering, 5(2), 214-219.
- 198.Jamadade, V. K., Ghodke, M. G., Katakdhond, S. S., & Godase, V. A Comprehensive Review on Scalable Arduino Radar Platform for Real-time Object Detection and Mapping.
- 199.Godase, V. (2025). A comprehensive study of revolutionizing EV charging with solar-powered wireless solutions. Advance Research in Power Electronics and Devices e-ISSN, 3048-7145.
- 200.Godase, V. (2025, April). Advanced Neural Network Models for Optimal Energy Management in Microgrids with Integrated Electric Vehicles. In Proceedings of the International Conference on Trends in Material Science and Inventive Materials (ICTMIM-2025) DVD Part Number: CFP250J1-DVD.
- 201.Dange, R., Attar, E., Ghodake, P., & Godase, V. (2023). Smart agriculture automation using ESP8266 NodeMCU. J. Electron. Comput. Netw. Appl. Math, (35), 1-9.
- 202.Godase, V. (2025). Optimized Algorithm for Face Recognition using Deepface and Multi-task Cascaded Convolutional Network (MTCNN). Optimum Science Journal.
- 203.Mane, V. G. A. L. K., & Gangonda, K. D. S. Pipeline Survey Robot.
- 204.Godase, V. (2025). Navigating the digital battlefield: An in-depth analysis of cyber-attacks and cybercrime. International Journal of Data Science, Bioinformatics and Cyber Security, 1(1), 16-27.



205. Godase, V., & Jagadale, A. (2019). Three element control using PLC, PID & SCADA interface. *International Journal for Scientific Research & Development*, 7(2), 1105-1109.
206. Godase, V. (2025). Edge AI for Smart Surveillance: Real-time Human Activity Recognition on Low-power Devices. *International Journal of AI and Machine Learning Innovations in Electronics and Communication Technology*, 1(1), 29-46.
207. Godase, V., Modi, S., Misal, V., & Kulkarni, S. (2025). LoRaEdge-ESP32 synergy: Revolutionizing farm weather data collection with low-power, long-range IoT. *Advance Research in Analog and Digital Communications*, 2(2), 1-11.
208. Godase, V. (2025). Comparative study of ladder logic and structured text programming for PLC. Available at SSRN 5383802.
209. Godase, V., Modi, S., Misal, V., & Kulkarni, S. Real-time object detection for autonomous drone navigation using YOLOv8. *Advance Research in Communication Engineering and its Innovations*, 2(2), 17-27.
210. Godase, V. (2025). Smart energy management in manufacturing plants using PLC and SCADA. *Advance Research in Power Electronics and Devices*, 2(2), 14-24.
211. Godase, V. (2025). IoT-MCU Integrated Framework for Field Pond Surveillance and Water Resource Optimization. *International Journal of Emerging IoT Technologies in Smart Electronics and Communication*, 1(1), 9-19.
212. Godase, V. (2025). Graphene-Based Nano-Antennas for Terahertz Communication. *International Journal of Digital Electronics and Microprocessor Technology*, 1(2), 1-14.
213. Godase, V., Khiste, R., & Palimkar, V. (2025). AI-Optimized Reconfigurable Antennas for 6G Communication Systems. *Journal of RF and Microwave Communication Technologies*, 2(3), 1-12.
214. Bhaganagare, S., Chavan, S., Gavali, S., & Godase, V. V. (2025). Voice-Controlled Home Automation with ESP32: A Systematic Review of IoT-Based Solutions. *Journal of Microprocessor and Microcontroller Research*, 2(3), 1-13.
215. Jamadade, V. K., Ghodke, M. G., Katakdhond, S. S., & Godase, V. A Comprehensive Review on Scalable Arduino Radar Platform for Real-time Object Detection and Mapping.
216. Godase, V. (2025). Cross-Domain Comparative Analysis of Microwave Imaging Systems for Medical Diagnostics and Industrial Testing. *Journal of Microwave Engineering & Technologies*, 12(2), 39-48p.
217. V. K. Jamadade, M. G. Ghodke, S. S. Katakdhond, and V. Godase, —A Review on Real-time Substation Feeder Power Line Monitoring and Auditing Systems,” *International Journal of Emerging IoT Technologies in Smart Electronics and Communication*, vol. 1, no. 2, pp. 1-16, Sep. 2025.
218. V. V. Godase, “VLSI-Integrated Energy Harvesting Architectures for Battery-Free IoT Edge Systems,” *Journal of Electronics Design and Technology*, vol. 2, no. 3, pp. 1-12, Sep. 2025.
219. A. Salunkhe et al., “A Review on Real-Time RFID-Based Smart Attendance Systems for Efficient Record Management,” *Advance Research in Analog and Digital Communications*, vol. 2, no. 2, pp. 32-46, Aug. 2025.
220. Vaibhav, V. G. (2025). A Neuromorphic-Inspired, Low-Power VLSI Architecture for Edge AI in IoT Sensor Nodes. *Journal of Microelectronics and Solid State Devices*, 12(2), 41-47p.
221. Nagane, M.S., Pawar, M.P., & Godase, P.V. (2022). Cinematica Sentiment Analysis. *Journal of Image Processing and Intelligent Remote Sensing*.
222. Godase, V.V. (2025). Tools of Research. *SSRN Electronic Journal*.
223. Godase, V. (n.d.). EDUCATION AS EMPOWERMENT: THE KEY TO WOMEN’S SOCIO ECONOMIC DEVELOPMENT. *Women Empowerment and Development*, 174–179.
224. Godase, V. (n.d.). COMPREHENSIVE REVIEW ON EXPLAINABLE AI TO ADDRESSES THE BLACK BOX CHALLENGE AND ITS ROLE IN TRUSTWORTHY SYSTEMS. In *Sinhgad College of Engineering, Artificial Intelligence Education and Innovation* (pp. 127–132).
225. Godase, V. (n.d.-b). REVOLUTIONIZING HEALTHCARE DELIVERY WITH AI-POWERED DIAGNOSTICS: A COMPREHENSIVE REVIEW. In *SKN Sinhgad College of Engineering, SKN Sinhgad College of Engineering* (pp. 58–61).



226. Dhope, V. (2024). SMART PLANT MONITORING SYSTEM. In International Journal of Creative Research Thoughts (IJCRT). <https://www.ijcrt.org>
227. M. M. Zade, Sushant D. Kambale, Shweta A. Mane, Prathamesh M. Jadhav. (2025) "IOT Based early fire detection in Jungles". RIGJA&AR Volume 2 Issue 1, ISSN: 2998-4459. DOI: <https://doi.org/10.5281/zenodo.15056435>
228. M. M. Zade, Bramhadev B. Rupanar, Vrushal S. Shilawant, Akansha R. Pawar (2025) "IOT Flood Monitoring & Alerting System using Raspberry Pi-Pico" International Journal of Research Publication & Reviews, Volume 6, Issue 3, ISSN: 2582-7421. DOI: <https://ijrpr.com/uploads/V6ISSUE3/IJRPR40251.pdf>
229. M. M. Zade (2022) "Touchless Fingerprint Recognition System" (Paper-ID 907) (2022) International Conference on "Advanced Technologies for Societal Applications: Techno-Societal 2022" <https://link.springer.com/book/10.1007/978-3-031-34644-6?page=6>
230. Mr. M. M. Zade published the paper on "Automation of Color Object Sorting Conveyor Belt", in International Journal of Scientific Research in Engineering & Management (IJSREM), ISSN: 2582-3930 Volume 06, Issue 11th November 2022.
231. Mr. M. M. Zade published the paper on "Cloud Based Patient Health Record Tracking web Development", in International Journal of Advanced Research in Science, Communication & Technology (IJARSCT), ISSN NO: 2581-9429 Volume 02, Issue 03, DOI 1048175/IJARSCT-3705, IF 6.252, May 2022.
232. Mr. Mahesh M Zade, "Performance analysis of PSNR Vs. Impulse Noise for the enhancement of Image using SMF", Journal of Applied Science & Computations (JASC UGC Approved), Volume VI, Issue II, Feb. 2019
233. Mr. Mahesh M Zade, "Classification of Power Quality Disturbances Using SVM & their Efficiency Comparison", Journal of Applied Science & Computations (JASC UGC Approved), Volume VI, Issue II, Feb. 2019
234. Mr. Mahesh M Zade, "Dynamic Clustering of Wireless Sensor Network Using Modified AODV", Journal of Applied Science & Computations (JASC UGC Approved), Volume VI, Issue II, Feb. 2019
235. Mr. Mahesh M Zade, "Performance analysis of PSNR Vs. Impulse Noise for the enhancement of Image using SMF", National Conference on Mathematical Modeling and Computational Intelligence 2K19 (MMCI-2k19), in association with JASC, at S. B. Patil College of Engineering, Indapur, Feb. 2019
236. Mr. Mahesh M Zade, "Classification of Power Quality Disturbances Using SVM & their Efficiency Comparison", National Conference on Mathematical Modeling and Computational Intelligence 2K19 (MMCI-2k19), in association with JASC, at S. B. Patil College of Engineering, Indapur Feb. 2019
237. Mr. Mahesh M Zade, "Dynamic Clustering of Wireless Sensor Network Using Modified AODV", National Conference on Mathematical Modeling and Computational Intelligence 2K19 (MMCI-2k19), in association with JASC, at S. B. Patil College of Engineering, Indapur Feb. 2019
238. Mr. Mahesh M Zade & Mr. S. M. Karve, "Performance Analysis of Median Filter for Enhancement of Highly Corrupted Images", National Conference on Advanced Trends in Engineering, Association with IRJMS, Karmyogi Engineering College, Shelave, Pandharpur, March 2016.
239. Mr. Mahesh M Zade & Mr. S. M. Karve, "Implementation of Reed Soloman Encoder & Decoder Using FPGA", National Conference on Advanced Trends in Engineering, Association with IRJMS, Karmyogi Engineering College, Shelave, Pandharpur, March 2016.
240. Mr. Mahesh M Zade & Dr. S. M. Mukane, "Performance of Switching Median Filter for Enhancement of Image", National Conference on Mechatronics at Sinhgad Institute of Technology and Science, Narhe, Pune, Feb. 2016.
241. Mr. Mahesh M Zade & Dr. S. M. Mukane, "Enhancement of Image with the help of Switching Median Filter", National Conference on Emerging Trends in Electronics & Telecommunication Engineering, SVETI's College of Engineering Pandharpur, NCET 2013.



242.Mr.Mahesh M Zade & Dr.S.M.Mukane,"Enhancement of Image with the help of Switching Median Filter",
International Journal of Computer Application (IJCA) SVERI's College of Engineering, Pandharpur,
Dec.2013

