



SMART FERTILIZER DISTRIBUTION SYSTEM

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Abstract:

The Automatic Fertilizer Dispensing System is a smart agricultural system developed to reduce manual effort and improve the efficiency of fertilizer application. The proposed system uses an ESP8266 Wi-Fi controller, motor driver module, servo motor, rechargeable battery pack, fertilizer storage container, and a mobile platform. The ESP8266 provides wireless communication and allows the user to control the system through a web page using its IP address. The motor driver controls the movement of the mobile platform, while the servo motor operates the fertilizer dispensing mechanism. When a command is given through the web interface, the system moves in the required direction and the fertilizer can be dispensed at the desired location. The system does not use any sensors in the current prototype.

This system helps in minimizing fertilizer wastage, preventing over-fertilization, and improving crop growth. It also reduces labor costs and supports modern farming techniques. By promoting precise and controlled fertilizer application, the system contributes to higher productivity and sustainable agricultural practices.

Keywords: Smart Fertilizer Distribution, Internet of Things (IoT), Precision Agriculture, Automated Fertilizer Application, Fertilizer Management, Wireless Communication, Agricultural Automation, Remote Monitoring, Smart Agriculture, Fertilizer Flow Control.



1. INTRODUCTION

Agriculture is one of the most important sectors contributing to the economic growth of developing countries such as India, where a large population depends on farming for their livelihood [1]. Increasing food demand, limited agricultural resources, and the need for higher crop productivity have encouraged the adoption of modern farming technologies [2]. Among various agricultural practices, the timely and accurate application of fertilizers plays a crucial role in ensuring healthy plant growth and maximizing crop yield [3].

Conventional fertilizer application methods are mostly manual and often result in uneven distribution of nutrients. These methods require significant labor and consume time, while excessive fertilizer application can increase production costs and cause environmental pollution [4]. On the other hand, insufficient fertilizer application can adversely affect crop growth and productivity. Therefore, an efficient and controlled fertilizer application system is essential for sustainable agriculture [3], [4].

The proposed Automatic Fertilizer Dispensing System is a smart agricultural solution developed using an ESP8266 microcontroller, motor driver module, servo motor, rechargeable battery pack, and fertilizer storage container mounted on a mobile platform. The ESP8266 acts as the main control unit and manages the operation of the dispensing mechanism. The servo-controlled mechanism regulates the release of fertilizer, while the mobile platform enables the system to move within the agricultural field.

The system can be operated wirelessly through a smartphone using an IP-based interface, reducing manual effort and providing convenient control of the fertilizer dispensing mechanism. Controlled dispensing can help improve the consistency of fertilizer application and reduce unnecessary wastage. Such automated approaches are increasingly associated with precision agriculture and improved resource utilization [2], [5].

Thus, the proposed Automatic Fertilizer Dispensing System provides a simple, cost-effective, and electronically controlled solution for fertilizer application in agriculture. The system mainly focuses on automation, wireless control, controlled fertilizer dispensing, and reduction of manual effort. Future enhancements may include soil-moisture sensors, nutrient sensors, GPS-based navigation, obstacle detection, and IoT-based monitoring for fully autonomous fertilizer management [5]

2. LITERATURE SURVEY

The development of smart and automated agricultural systems has attracted significant attention from researchers in recent years. Various studies have focused on the use of automation, wireless control, robotic vehicles, IoT technology, and precision agriculture techniques to improve farming efficiency and reduce manual labor. Researchers have proposed different methods for automated fertilizer application, including sensor-based systems, GPS-based navigation, IoT monitoring, and



motor-controlled dispensing mechanisms. These studies demonstrate that automation can help achieve controlled fertilizer distribution, reduce fertilizer wastage, and improve resource utilization.

Kim et al. (2008) developed a variable-rate pneumatic granular fertilizer applicator for rice production. The system used pneumatic fertilizer metering, DGPS-based positioning and PWM motor control. The reported fertilizer application accuracy was 81.9% to 97.4%. The system demonstrated the effectiveness of variable-rate fertilizer application, but its pneumatic mechanism and DGPS-based setup increased system complexity and cost [1].

Zhang et al. (2010) developed an electro-hydraulic proportional control system for variable-rate fertilizer application. The system used a microcontroller as the main control unit and received GPS/GIS-based information to determine fertilizer application rates at different field locations. The embedded controller operated a hydraulic actuator to provide real-time variable-rate fertilization. The system achieved reliable variable-rate control with a reported control precision of less than 4%. However, the use of GPS/GIS, hydraulic control and specialized hardware increased the complexity of the system [2].

Ramesh et al. demonstrated an automated irrigation system using soil-moisture sensors, an Arduino-based controller, relays and solenoid valves. The system continuously monitored soil moisture and controlled water supply according to the moisture condition of different field sections. The study also provided provision for mixing fertilizers through the irrigation route. This work showed the potential of microcontroller-based automation for reducing manual effort in agricultural operations. However, the system mainly focused on irrigation and required suitable control of the fertilizer mixing process [3].

Liu et al. (2010) developed a variable-rate fertilization control system using a single-chip microcomputer, force sensor, data acquisition system and servo actuator. The system was designed to automatically control fertilizer application according to selected operating conditions. The study demonstrated the importance of combining sensors, a microcontroller and an actuator for automated fertilizer control. However, suitable calibration and control mechanisms are required to achieve accurate fertilizer application under different field conditions [4].

Shamshiri et al. (2020) investigated IoT-based sensor data fusion for energy-efficient greenhouse crop production. Their work highlighted the use of IoT sensors, data collection and model-based approaches for monitoring and controlling agricultural environments. The study demonstrated the importance of real-time sensing and automation in modern agriculture. However, integration of multiple sensors, communication systems and data-processing techniques can increase system complexity and implementation requirements [5].

Pawase et al. (2023) presented a review of variable-rate fertilizer application technologies. The study classified the major approaches into sensor-based and map-based variable-rate application. Sensors, GPS, microcontrollers and actuators were identified as important components of precision



fertilizer application. However, cost, calibration and system complexity remain important challenges [4].

Pawase et al. (2024) developed an on-the-go variable-rate liquid fertilizer application system using a Green Seeker sensor, microcontroller, proportional solenoid valve and pump. The system automatically adjusted fertilizer application according to crop requirements and reported fertilizer savings. However, the use of specialized sensors and real-time control increases implementation complexity [5].

Pawase et al. (2025) developed a sensor-based embedded variable-rate fertilizer applicator for maize. The system used a Green Seeker sensor, microcontroller and PWM motor driver to adjust fertilizer application according to real-time crop conditions. The system achieved real-time fertilizer control and reported a 19.18% reduction in nitrogen fertilizer use without significant yield loss. This study demonstrates that combining sensors, embedded control and automated dispensing mechanisms can improve fertilizer-use efficiency. However, suitable sensors, calibration and control algorithms are required for reliable field operation [8].

Table 3 1: Comparative review of Smart Fertilizer Distribution System

Sr. No	Author(s) & Year	Technology/Method Used	Main Components	Key Findings	Limitations	Relation with Proposed System
1	Kim, Y. et al., 2008	Variable-rate pneumatic fertilizer application	Metering mechanism, pneumatic system	81.9–97.4% fertilizer application accuracy	Complex system, mainly for large agricultural machinery	Shows importance of controlled fertilizer dispensing
2	Zhang, N. et al., 2010	GPS/GIS-based variable-rate application	Microcontroller, GPS/GIS, hydraulic actuator	Control precision less than 4%	High complexity and specialized hardware	Supports microcontroller-based variable-rate control
3	Ramesh, M. et al., 2016	Automated irrigation and fertigation	soil-moisture sensor, Arduino, relay, solenoid valve	Automatic water/fertilizer management	Mainly focused on irrigation	Shows use of sensors and microcontroller for agriculture



4	Patil, V. et al., 2017	Smart Irrigation and Fertigation System	Microcontroller based fertigation	Reduced fertilizer wastage and improved water efficiency	Limited scalability	Relevant for combining irrigation + fertilizer
5	Li, J. et al., 2019	Design of Automatic Fertilizer Applicator	Embedded system + Motor control	Automated timing and controlled dispensing	Not soil condition adaptive	Basis for motor controlled dispensing mechanism
6	Shamshir et al. (2020)	IoT-based sensor data fusion for greenhouse production	IoT sensors and data fusion	Real-time sensing improves crop monitoring and automation.	Multiple sensors increase complexity	Supports IoT-based real-time monitoring.
7	Pawase et al. (2023)	Variable-rate fertilizer application	Sensors, GPS, microcontroller and actuators	Supports precision nutrient management	Cost and sensor calibration	Provides basis for proposed VRT system
8	Pawase et al. (2024)	On-the-go variable-rate liquid fertilizer	Green Seeker, microcontroller, pump and solenoid valve	Achieved 24.30% fertilizer saving	Specialized sensors/control	similar sensor-to-actuator approach
9	Pawase et al. (2025)	Sensor-based variable-rate fertilizer applicator for maize	Green Seeker, MCU, PWM motor driver	Reduced nitrogen fertilizer use by 19.18% without significant yield loss	Calibration and control algorithm required	Closely related to proposed automated dispenser

3. METHODOLOGY

The proposed Smart Fertilizer Distribution System is designed to a fertilizer distribution using an ESP8266-based wireless control system. The methodology mainly focuses on electronic control, wireless operation, motor control, and controlled fertilizer dispensing without using any sensors.

The system consists of an ESP8266 controller, motor driver module, servo motor, rechargeable battery pack, fertilizer storage container, and mobile platform. The ESP8266 acts as the main control unit. It receives commands from the user through a web page using the IP address of the ESP8266. Based on the received command, the ESP8266 generates control signals for the motor driver and servo mechanism.

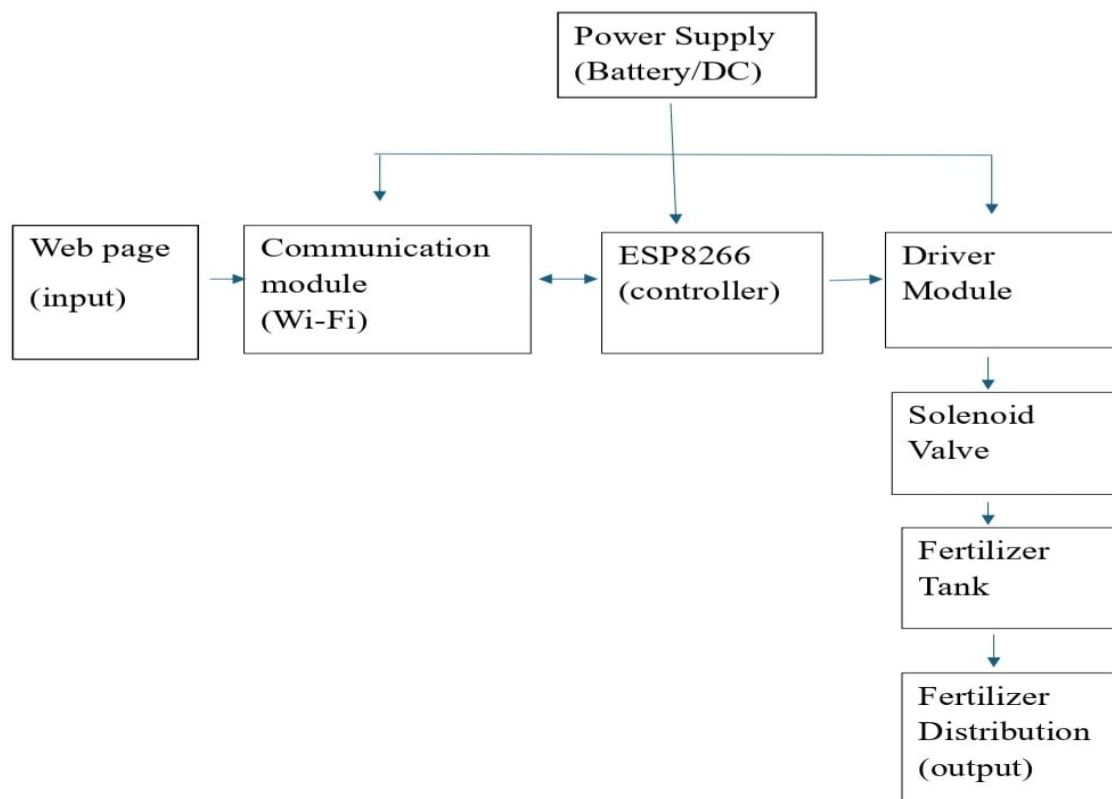


Figure 4.1 Block Diagram of smart Fertilizer Distribution system.

The motor driver module is used to control the movement of the mobile platform. It receives signals from the ESP32 and drives the motors in the required direction, such as forward, reverse, left, or right. The servo motor is connected to the fertilizer dispensing mechanism. When a dispensing command is given, the servo rotates to open the outlet of the fertilizer container and allows fertilizer to fall. After the required dispensing operation, the servo returns to its initial position and closes the outlet.



The complete system is powered by a rechargeable battery pack, which supplies power to the controller and other electronic components. The user can operate the system remotely through the web interface, eliminating the need for direct manual operation. Thus, the proposed methodology provides a simple and low-cost method for wireless movement and controlled fertilizer dispensing.

4. FUTURE SCOPE

The proposed Smart Fertilizer Distribution System can be further improved by integrating advanced soil sensors such as pH, electrical conductivity and nutrient sensors to obtain more accurate information about soil conditions. The system can also be integrated with GPS/GNSS technology to identify the exact field location and support location-based variable-rate fertilizer application. IoT connectivity can be added to enable remote monitoring of soil conditions, fertilizer quantity and system status through a mobile application or web-based dashboard.

In the future, autonomous navigation can be implemented using GPS, wheel encoders, obstacle detection sensors and path-planning techniques so that the fertilizer distribution system can move automatically along crop rows. Machine learning techniques can also be explored to estimate the required fertilizer quantity using soil and crop data. The dispensing mechanism can be further improved to achieve better fertilizer quantity control and uniform distribution. Finally, extensive field testing can be carried out for different crops, soil types and fertilizer materials to evaluate fertilizer saving, dispensing accuracy, power consumption and crop productivity.

5. CONCLUSION

The proposed Automatic Fertilizer Dispensing System provides a simple and cost-effective solution for reducing manual effort in fertilizer application. The system uses an ESP8266 Wi-Fi controller, motor driver, servo motor, rechargeable battery pack, and fertilizer storage container mounted on a mobile platform. The ESP8266 enables wireless control through a web page using an IP address, while the motor driver controls the movement of the platform and the servo motor controls fertilizer dispensing.

The developed prototype demonstrates that fertilizer can be transported and dispensed at the required location through remote commands. Since the current system does not use any sensors, its operation is based on user-controlled commands rather than automatic field-condition detection. Overall, the system provides an effective foundation for automated fertilizer application and can help reduce manual work and improve operational convenience. In the future, GPS navigation, obstacle detection, soil-moisture and nutrient sensors, and IoT-based monitoring can be added to make the system more intelligent and fully autonomous.

REFERENCES

1. Badage, R. N., & Karande, K. J. (2016). Use of Information and Communication Technologies (ICT) in career planning of rural youth of India. Proc. the Annual International Conference on Intelligent Computing, Computer.



2. Bhushan, S., & Karande, K. J. (2021). Advancing Social Media Analytics: A Robust Multi-Criteria Decision-Making Model-Based Framework. *Webology* 18 (6), 9339-9343.
3. Bhushan, S., & Karande, K. J. (2023). ENHANCING RESEARCH IN SOCIAL MEDIA ANALYTICS WITH AN ADVANCED ROBUST MULTI-CRITERIA DECISION MAKING MODEL. *Webology*.
4. Bokefode, J. D., Swapnaja A, U., Subhash V, P., Kailash J, K., & Sulabha S, A. (2015). Developing secure cloud storage system by applying AES and RSA cryptography algorithms with role based access control model. *International Journal of Computer Applications* 118 (12), 46-52.
5. Burje, P. R., Karande, K. J., & Jagadale, A. B. (2014). Embedded on-board diagnostics system using CAN network. 2014 IEEE Global Conference on Wireless Computing & Networking (GCWCN), 31-35.
6. Burje, P. R., Karande, K. J., & Jagadale, A. B. (2014). Embedded on-board diagnostics system using CAN protocol. 2014 International Conference on Communication and Signal Processing, 734-737.
7. Daithankar, M. V., & Karande, K. J. (2014). Analysis and integration of skin color models used for human face detection. 2014 IEEE Global Conference on Wireless Computing & Networking (GCWCN), 70-74.
8. Deepika, S., & Karande, K. J. (2021). Distance Log Mar Visual Acuity Comparison With Severity Of Diabetic Retinopathy. *Webology* (ISSN: 1735-188X) 18 (6).
9. Deshmukh, S. G., Karande, K. J., Ogura, K., Kheraj, V., & Deshmukh, R. S. (2022). Post-Annealing Influence on Structural, Surface and Optical Properties of Cu₃BiS₃ Thin Films for Photovoltaic Solar Cells. *Artificial Intelligence, Internet of Things (IoT) and Smart Materials* for.
10. Deshmukh, S. G., Kheraj, V., Karande, K. J., & Kulkarni, S. G. (2024). Thin Film Nanomaterials: Synthesis, Properties and Innovative Energy Applications. Bentham science publishers.
11. Deshmukh, S. G., Kheraj, V., Karande, K. J., Panchal, A. K., & Deshmukh, R. S. (2019). Hierarchical flower-like Cu₃BiS₃ thin film synthesis with non-vacuum chemical bath deposition technique. *Materials Research Express* 6 (8), 084013.
12. Deshpande, H. S., & Karande, K. J. (2016). A planar microstrip RF energy harvester 3D cube antenna for multiple frequencies reception. 2016 Conference on Advances in Signal Processing (CASP), 327-331.
13. Deshpande, H., & Karande, K. (2016). Integrated CMOS 3D Microstrip Patch Antenna Prototype for Wireless Energy Harvesting. International Conference on Communication and Signal Processing 2016 (ICCASP).



14. Deshpande, H., & Karande, K. J. (2018). Energy Optimal Radio Harvester for Multi Sensory System. 2018 IEEE Global Conference on Wireless Computing and Networking (GCWCN), 44-48.
15. Deshpande, H., Karande, K. J., & Deshmukh, S. G. (2022). RF energy harvesting multi-frequency receptor model for micropower applications. AIP Conference Proceedings 2494 (1), 060002.
16. Dhotre, V., & Karande, K. (2014). Refinement of data streams using Minimum Variance principle. 2014 International Conference on Contemporary Computing and Informatics.
17. Gade, A. A., Karande, K. J., & Jagadale, A. B. (2015). Space vector modulation based feed control using three phase induction motor. International Journal of Modern Trends in Engineering and Research 2 (7), 44-46.
18. 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 (2).
19. Gaikwad, D., Karande, K., & Deshpande, H. (2016). Pomegranate fruit diseases identification and grading. International Conference on Communication and Signal Processing 2016 (ICCASP).
20. Gidde, N. D., Karande, K. A., Jadhav, S. S., Mistry, R., Mhetre, P., & Joshi, S. (2021). Microsponge: An Overview. Journal of University of Shanghai for Science and Technology 23, 671-682.
21. Hofree, G., Ruvolo, P., Reinert, C., Bartlett, M. S., & Winkielman, P. (2012). Why are you smiling? In a strategic context, people's affective responses reflect the meaning of android's facial expressions. 2012 IEEE International Conference on Development and Learning and.
22. Ingole, A. L., & Karande, K. J. (2018). Automatic age estimation from face images using facial features. 2018 IEEE Global Conference on Wireless Computing and Networking (GCWCN).
23. Iyer, B., Nalbalwar, S. L., & Pathak, N. P. (2019). Computing, Communication and Signal Processing: Proceedings of ICCASP 2018. Springer.
24. Jadhav, G. R., & Karande, K. J. (2014). Automatic vehicle number plate recognition for vehicle parking management system. Computer Engineering and Intelligent Systems, ISSN, 2222-1719.
25. Jadhav, G. R., & Karande, K. J. (2015). Extraction of Vehicle Number Plate. International Journal of Innovations in Engineering and Techonology 6 (2).
26. Joshi, A., & Karande, K. (2023). Comprehensive survey on analysis and modelling of femur bone fracture for an operative planning. Computer Methods in Biomechanics and Biomedical Engineering: Imaging.



27. Joshi, A., & Karande, K. (2023). Comprehensive Way for Modeling of Femur Bone Fracture from CT Images. International Conference on Emerging Trends in Artificial Intelligence, Data.
28. Joshi, A., Karande, K., & Gunaki, R. (2025). FEA-based Virtual Operation and Stress Distribution Analysis of DHS Screws in Proximal Femoral Bone Fractures: A Strategic Guide for Orthopedic Surgeons in Operational Planning. Journal of Pharmacology and Pharmacotherapeutics 16 (2), 202-213.
29. Kailash J Karande, N. V. I. (2021). Multimodal Image Fusion Technique for Automated Correlation Identification in Medical Images. AU Patent 2,021,105,871.
30. Kailash J, K. (2012). Modified Modular Independent Component Analysis (ICA) Approach for Face Recognition. INTERNATIONAL CONFERENCE ON INFORMATION TECHNOLOGY, ELECTRONICS AND.
31. Kailash, K., Raza, A., Mahalingham, S., & Talwalkar, S. (2012). Outcome of universal-2 total wrist arthroplasty for rheumatoid arthritis: our experience at Wrightington. Orthopaedic Proceedings 94 (SUPP_XXXIX), 143-143.
32. Kale, K. V. (2008). Advances in computer vision and information technology. IK International Publishing House.
33. Karande, J. K., Talbar, N. S., & Inamdar, S. S. (2012). Face recognition using Oriented Laplacian of Gaussian (OLOG) and Independent Component Analysis (ICA). Digital Information and Communication Technology and it's Applications.
34. Karande, K. J. (2012). Multiscale wavelet based edge detection and Independent Component Analysis (ICA) for Face Recognition. 2012 International Conference on Communication, Information & Computing.
35. Karande, K. J. (2013). Localized spatiotemporal modular ICA for face recognition. 2013 IEEE Symposium on Computational Intelligence in Biometrics and Identity.
36. Karande, K. J. (2020). Preface. IOP Conf.series.materail science and engg 814, 011001.
37. Karande, K. J. (2022). Feed Dispense Monitoring Machine for Accurate Feeding of Hens in Poultry House. IN Patent 202,221,010,527 A.
38. Karande, K. J., & Badage, R. N. (2016). Facial feature extraction using independent component analysis. Proceedings of the Annual International Conference on Intelligent Computing.
39. Karande, K. J., & Prasad, P. S. (2020). Model Driven Methodology for JAVA. Unpublished.
40. Karande, K. J., & Talbar, S. N. (2007). Simplified and modified approach for face recognition using PCA. 2007 IET-UK International Conference on Information and Communication.
41. Karande, K. J., & Talbar, S. N. (2008). Face recognition under variation of pose and illumination using independent component analysis. ICGST-GVIP, ISSN.



42. Karande, K. J., & Talbar, S. N. (2009). Independent component analysis of edge information for face recognition. *International Journal of Image Processing IJIP* 3 (3), 120-130.
43. Karande, K. J., Katti, V. S., Sambhoji, S. S., Patil, K., Killedar, S., & Chavan, S. (2026). Secure Image Steganography: Comparing LSB, AES-LSB, and Steghide. 2026 IEEE International Conference on Industry 4.0, Artificial Intelligence.
44. Kasture, A. M., Karande, K. J., & Nawale, S. D. (2024). Optimization of Harmonic Generation in Frequency Multiplying Circuit for Wireless Application. 2024 3rd Edition of IEEE Delhi Section Flagship Conference (DELCON), 1-5.
45. Kasture, A., Karande, K., & Nawale, S. (2024). Performance Analysis of Various Nonlinear Elements in Frequency Multiplying Circuits for Wireless Applications. *INTERNATIONAL JOURNAL* 12 (4), 1332-1336.
46. Katti, V. S., & Karande, K. J. (2025). Emerging Trends and Innovations in Sentiment Analysis: A Comprehensive Review. *International Conference on ICT for Sustainable Development*, 158-166.
47. Katti, V., & Karande, K. J. (2025). Personalized depression management system using llms and reinforcement learning: A survey. *International Conference on Recent Trends in Machine Learning, IOT, Smart*.
48. Kawathekar, P. P., & Karande, K. J. (2014). 2014 International Conference on Signal propagation and computer technology (ICSPCT 2014). IEEE.
49. Kawathekar, P. P., & Karande, K. J. (2014). Severity analysis of Osteoarthritis of knee joint from X-ray images: A Literature review. 2014 International Conference on Signal propagation and computer technology.
50. Kawathekar, P. P., & Karande, K. J. (2015). Use of textural and statistical features for analyzing severity of radio-graphic osteoarthritis of knee joint. 2015 International Conference on Information Processing (ICIP), 1-4.
51. Kendule, J. A., & Karande, K. (2024). A Survey of Internet of Things Frameworks for Crowd Management System. *Modern Approaches in Machine Learning and Cognitive Science: A Walkthrough*.
52. Kendule, J. A., & Karande, K. J. (2023). Variable Synergic Squeeze Convolutional Equilibrium Network Enabled Crowd Management in IoT. *International Journal of Image, Graphics and Signal Processing* 15 (4), 69.
53. Lale, D. P., & Karande, K. J. (2016). Gender classification using facial features. *Int. J. Adv. Res. Electron. Commun. Eng.(IJARECE)* 5 (9), 2227-2231.
54. Mahajan, A. S. B., & Karande, K. J. (2015). PCA and DWT based multimodal biometric recognition system. 2015 International Conference on Pervasive Computing (ICPC), 1-4.



55. Mahesh, K. K., Kishore, P., & Kailash, J. K. (2017). Survey on iris image analysis. *Indian J. Sci. Technol* 10 (9), 1-15.
56. Mulay, A. V., & Karande, K. J. (2016). Water quality monitoring system based on wireless sensor network. *International Journal of Innovations in Engineering Research and Technology*, 1-4.
57. Mulik, S., Dhobale, N., Pujari, K., & Karande, K. (2022). The Use of Artificial Intelligence-Based Models for Biomedical. *Artificial Intelligence, Internet of Things (IoT) and Smart Materials for*.
58. Nagaswarupa, H. P., Sillanpää, M. E. T., Murthy, H. C. A., & Naik, R. (2024). *Multifunctional inorganic nanomaterials for energy applications*. CRC Press.
59. Nandgaonkar, V. N., & Karande, K. J. (2021). Significance Of Artificial Intelligence and Machine Learning Algorithms in Brain Tumor Diagnosis. *Solid State Technology* 64 (2), 7125-7131.
60. Patil, P. G., & Karande, K. J. (2016). Brain tumor detection techniques: a survey. *Int Res J Eng Technol (IRJET)* 3 (10).
61. Patil, P. G., Karande, K. J., & Surwase, S. V. (2022). Detection of brain tumor using optimized fuzzy C-means and SVM classifier. *AIP Conference Proceedings* 2494 (1), 020007.
62. Shaikh, K. M., Karande, K. J., & Surwase, S. V. (2018). Nested slot suspended patch antenna using CST microwave studio. 2018 International Conference on Information, Communication, Engineering and.
63. Surwase, S. V., & Karande, K. J. (2014). Technical aspects in development of Marathi calculator using text to speech synthesizer. 2014 IEEE Global Conference on Wireless Computing & Networking (GCWCN), 92-96.
64. Unnikrishnan, S., Surve, S., & Bhoir, D. (2011). *Advances in Computing, Communication and Control: International Conference, ICAC3 2011, Mumbai, India, January 28-29, 2011. Proceedings*. Springer Science & Business Media.
65. Unnikrishnan, S., Surve, S., & Bhoir, D. (2013). *Advances in Computing, Communication, and Control: Third International Conference, ICAC3 2013, Mumbai, India, January 18-19, 2013, Proceedings*. Springer.
66. Aasawari Boxey, D. A. O. M., Jadhav, A., Gade, P., & Ghanti, P. (2022). Face Recognition using Raspberry Pi. *Journal of Image Processing and Intelligent Remote Sensing* 2 (4), 15-23.
67. 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*.



68. Aiwale, S., Kolte, M. T., Harpale, V., Bendre, V., Khurge, D., & Bhandari, S., et al. (2024). Non-invasive anemia detection and prediagnosis. *Journal of Pharmacology and Pharmacotherapeutics* 15 (4), 408-416.
69. Altaf O. Mulani, M. S., & Jadhav, M. 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.
70. Altaf O. Mulani, P. G. F., Sardey, M. P., Kinage, K., & Sadanand, S., et al. (2024). ML-powered Internet of Medical Things (MLIoMT) Structure for Heart Disease Prediction. *Journal of Pharmacology and Pharmacotherapeutics* 16 (1), 1-8.
71. Anil, D., & A. O., M. (2024). Smart farming using IOT based Agri BOT. *Naturalista Campano* 28 (1), 723-729.
72. AnnaSaheb S Dandage, A. O. M., Rupnar, V. R., & Pise, T. A. (2025). IoT-Powered Weather Monitoring and Irrigation Automation: Transforming Modern Farming Practices. *International Journal of Telecommunications & Emerging Technologies* 11 (1).
73. Aryan Ganesh Nagtilak, A. O. M., Ulegaddi, S. N., & Mane, M. (2023). Automatic Solar Powered Pesticide Sprayer for Farming. *International Journal of Microwave Engineering and Technology* 9 (2).
74. Babaladi, S. S., & Mulani, A. O. (2026). An Overview on Timely Detection of Plant Leaf Disorder Using Deep Learning and Machine Learning Models. 2026 Contemporary Computing Innovations Conference (CCIC), 1-6.
75. Basawaraj Birajadar, G., Osman Mulani, A., Ibrahim Khalaf, O., & Farhah, N., et al. (2024). Epilepsy identification using hybrid CoPro-DCNN classifier. *University of Bahrain*.
76. Bhanvase, T. M., Mulani, A. O., & Pise, A. C. (2025). Guava Disease Detection Using Deep Convolutional Neural Networks. 2025 IEEE 7th International Conference on Cybernetics, Cognition and Machine.
77. Chaudhari, K. R., Mulani, A. O., Gajare, M. P., Jadhav, V., Yawle, P., & Bang, A. V. (2026). Bit error rate analysis of various error correction codes with concatenated RS-convolutional codes. *Journal of Discrete Mathematical Sciences and Cryptography* 29 (1), 199-214.
78. Deshmukh, A. B., Deshmukh, M. T., Chincholkar, Y. D., Patil, A. S., & Mulani, A. O. (2026). Predictive modeling of drug release kinetics using supervised machine learning algorithms. *Int. J. Drug Deliv. Technol* 16, 978-986.
79. Gadade, B., & Mulani, A. (2022). Automatic system for car health monitoring. *International Journal of Innovations in Engineering Research and Technology*.
80. Gadade, B., Mulani, A. O., & Harale, A. D. (2024). Iot based smart school bus and student monitoring system. *Naturalista Campano* 28 (1), 730-737.



81. Gadade, B., Mulani, A. O., & Harale, A. D. (2024). IoT Based Smart School Bus and Student Tracking System. IoT Based Smart School Bus and Student Tracking System.
82. Ghodake, R. G., & Mulani, A. O. (2016). Microcontroller based automatic drip irrigation system. Techno-societal 2016, international conference on advanced technologies for.
83. Ghodke, R. G., Birajdar, G. B., Mulani, A. O., Shinde, G. N., & Pawar, R. B. (2024). Design and Development of an Efficient and Cost-Effective surveillance Quadcopter using Arduino. Sanshodhak.
84. Ghodke, R. G., Birajdar, G. B., Mulani, A. O., Shinde, G. N., & Pawar, R. B. (2024). Design and Development of Wireless Controlled ROBOT using Bluetooth Technology. Sanshodhak.
85. Jadhav, D. V. S., Salunke, G. D., Chaudhari, K. R., Mulani, D. A. O., & Thigale, D. S. P., et al. (2024). Deep Learning-Based Face Mask Recognition in Real-Time Photos and Videos, Afr. J. Biomed. Res 27.
86. Jadhav, D. V. S., Salunkhe, D. S. S., Salunkhe, D. G., Yawle, P. R., & Pol, D. R. S., et al. (2024). Iot Based Health Monitoring System for Human, Afr. J. Biomed. Res 27.
87. 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.
88. Jadhav, K. P., Pawar, A., Shinde, A., Salunkhe, R., Sarade, V., & Mulani, A. O. (2024). IOT Based Industrial Power Loss Reducer Using Power Compensation. International Conference on Data Science, Machine Learning and Applications.
89. Jadhav, V. S., Salunkhe, S. S., Salunkhe, G., Yawle, P. R., Pol, R. S., & Mulani, A. O., et al. (2024). IOT based health monitoring system for Human. African Journal of Biomedical Research, 1309-1315.
90. 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.
91. Kambale, K. S., Sawant, N. M., Mulani, A. O., More, V. P., & Zambare, S. A. (2024). RNN-LSTM Based Model for Automatic Heart Disease Prediction Using the UCI Heart Disease Dataset. International Conference on Data Science, Machine Learning and Applications.
92. Kamble, A., & Mulani, A. O. (2022). Google assistant-based device control. Int. J. of Aquatic Science 13 (1), 550-555.
93. Kapase, P., Shrikhande, P., & Lokhande, S. (2022). IOT based plant monitoring system.
94. Karche, S. N., & Mulani, A. O. (2023). AESC Technique for Scalable Face Image Retrieval. International Journal of Innovative Research in Computer and Communication ... 52* Electric vehicle parameters estimation using Web portal AO Mulani Recent Trends in Electronics and Communication Systems 10 (3).



95. 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)*.
96. 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.
97. Kolhe, V. A., Pawar, S. Y., Gohery, S., Mulani, A. O., Sundari, M. S., & Kiradoo, G., et al. (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.
98. Kulkarni, P. R., Mulani, A. O., & Mane, P. B. (2016). Robust invisible watermarking for image authentication. *Emerging Trends in Electrical, Communications and Information Technologies*.
99. Kulkarni, T. M., Mulani, A. O., & Madan, T. (2024). Deep Learning Based Face-Mask Detection: An Approach to Reduce Pandemic Spreads in Human Healthcare. *African Journal of Biological Sciences* 6 (6).
100. Kutubuddin Sayyad Liyakat, K., O Mulani, A., Ibrahim Khalaf, O., & Algburi, S., et al. (2024). IoT Devices for Monitoring Health Status and Vital Signs in Patients with Cancer. *International Journal of Computing and Digital Systems* 16 (1), 1-12.
101. Liyakat, K. K. S., Warhade, N. S., Pol, R. S., Jadhav, H. M., & Mulani, A. O. (2022). Yarn quality detection for textile industries using image processing. *Journal Of Algebraic Statistics* 13 (3), 3465-3472.
102. M., C. J. M. (2021). Machine Learning based Autonomous Fire Combat Turret. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)* 12 (2).
103. Mandwale, A. J., & Mulani, A. O. (2015). Different Approaches For Implementation of Viterbi decoder on reconfigurable platform. 2015 International Conference on Pervasive Computing (ICPC), 1-4.
104. Mandwale, A. J., & Mulani, A. O. (2016). Implementation of High Speed Viterbi Decoder using FPGA. *International Journal of Engineering Research & Technology (IJERT)* 5 (2).
105. Mandwale, A., & Mulani, A. O. (2014). Implementation of convolutional encoder & different approaches for viterbi decoder. *IEEE International Conference on Communications, Signal Processing Computing*.
106. Mane, A. (2015). Area Efficient Technique for implementation of Discrete Wavelet Transform on FPGA. *IEEE Conference on Engineering & Technology (ICETECH)*.
107. Mane, A. (2017). An Efficient implementation of DWT for image compression on reconfigurable platform. *International Journal of Control Theory and Applications* 10 (15), 7.



108. Mane, A. (2018). High-Speed Area-Efficient Implementation of AES Algorithm on Reconfigurable Platform. Computer and Network Security.
109. Modi, S., Misal, V., Kulkarni, S., & Mulani, A. O. (2025). Plant Health AI Analyzer Using Supervised Learning. Plant Health 5 (4).
110. More, S. S., & Mulani, A. O. (2024). Deep Learning Assisted Analysis of Ocular Multi Diseases-A Review. International Conference on Data Science, Machine Learning and Applications.
111. More, S. S., & Mulani¹, A. O. (2026). Deep Learning Assisted Analysis of Ocular. Proceedings of the 6th International Conference on Data Science, Machine.
112. Mulani, A. O. (2016). Optical Communication. Electrotech Publications, Satara.
113. Mulani, A. O. (2025). A Robust Image Watermarking Framework Integrated with AES Encryption for Secure Digital Media Protection. Journal of Advancement in Electronics Signal Processing 2 (3), 47-56.
114. Mulani, A. O. (2025). Electric Vehicle Parameters Estimation Using Web Portal, Recent Trends in Electronics & Communication Systems, Volume 10, Issue 3, 2023. International Open-Access, Double-Blind Multidisciplinary Online 5 (4).
115. Mulani, A. O., & Kulkarni, T. M. (2023). Face mask detection system using deep learning; a comprehensive survey. International Conference on Emerging Trends in Artificial Intelligence, Data.
116. 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.
117. Mulani, A. O., & Mane, P. B. (2014). Area optimization of cryptographic algorithm on less dense reconfigurable platform. 2014 International Conference on Smart Structures and Systems (ICSSS), 86-89.
118. 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.
119. Mulani, A. O., & Mane, P. B. (2017). Fast and Efficient VLSI implementation of DWT for image compression. International Journal for Research in Applied Science and Engineering.
120. Mulani, A. O., & Shinde, G. N. (2021). An approach for robust digital image watermarking using DWT-PCA. Journal of Science and Technology 6 (1).
121. Mulani, A. O., Bang, A. V., Birajadar, G. B., Deshmukh, A. B., & Jadhav, H. M., et al. (2024). IoT based air, water and soil monitoring system for pomegranate farming.



122. 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.
123. Mulani, A. O., Deshmukh, M., Jadhav, V., Chaudhari, K., & Mathew, A. A., et al. (2025). Transforming drug therapy with deep learning: the future of personalized medicine. *Drug Research* 75 (08), 326-333.
124. 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.*
125. Mulani, A. O., Liyakat, K. K. S., Warade, N. S., Patil, A., Kolte, M. T., Kinage, K., & Rana, M., et al. (2026). Iot sensors in a wireless environment for healthcare monitoring: A framework for fault detection. *Journal of Pharmacology and Pharmacotherapeutics* 17 (1), 94-100.
126. Mulani, A. O., Modi, S. P., Misal, V. M., & Kulkarni, S. R. (2026). Development of an Eco-Efficient Pesticide Spraying Rover for Sustainable Farming. *2026 IEEE International Conference on Emerging Computing and Intelligent.*
127. Mulani, A. O., Patil, R. M., & Liyakat, K. K. S. (2023). DISCRIMINATIVE APPEARANCE MODEL FOR ROBUST ONLINE MULTIPLE TARGET TRACKING.
128. Mulani, A. O., Patil, R. M., & Liyakat, K. K. S. (2023). Modelo de apariencia discriminatorio para un sólido seguimiento en línea de múltiples objetivos. *Télématique: Revista Electrónica de Estudios Telemáticos* 22 (1), 24-43.
129. Mulani, A. O., Warade, N. S., Khalaf, O. I., Bsoul, Q., Waghole, D., & Jadhav, M., et al. (2025). Resource management optimisation of OFDM-IDMA system for 5G multi-tier backhaul networks. *Egyptian Informatics Journal* 31, 100756.
130. Mulani, A., & Mane, P. B. (2016). DWT based robust invisible watermarking. *Scholars' Press.*
131. Mulani, D. (2016). Design of Computer/Laptop independent data transfer system from one USB flash drive to another using ARM 11 processor. *International Journal of Science, Engineering and Technology Research* 5 (12).
132. Mulani, D. A. (2025). Design and Implementation of 256-bit Vedic Multiplier on Reconfigurable Platform. *Journal of Materials & Metallurgical Engineering* 15 (3).
133. Mulani, D. A. O. (2019). Effect of rotation and projection on real time hand gesture recognition system for human computer interaction. *Journal of The Gujrat Research Society* 21 (16), 3710-3718.



134. 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.
135. Mulani, P. (2018). High Speed Area Efficient FPGA Implementation of AES Algorithm. *Institute of Advanced Engineering and Science* 7 (3), 157-165.
136. Mulani, P. (2019). High throughput and area efficient FPGA Implementation of AES algorithm. *International Journal of Engineering and Advanced Technology* 8 (4), 519-523.
137. Mulani, P. K. (2015). Application of MATLAB for Second Level Discrete Wavelet Transform through Filter Bank. *International Conference on Engineering and Technology (ICETECH)*, 4.
138. Mulani, P. K. (2015). Robust invisible Watermarking for image authentication. *ICECIT* 2015, 4.
139. Mulani, P. R. K. (2015). Robust Invisible Digital Image Watermarking using Discrete Wavelet Transform. *International Journal of Engineering Research & Technology (IJERT)* 4 (01), 3.
140. Mulani, R. (2015). Analysis of Biomedical image using wavelet transformation. *International Journal of Innovations in Engineering Research and Technology*.
141. Mulani, R. A. O., Ganjewar, S. P., Kadu, P. S., & Khadke, R., et al. (2020). Smart Ration Automated Teller Machine For Pandemic Situations. IN Patent App. 202,021,048,830.
142. Mulani, R. G. A. O. (2016). Sensor based Automatic Drip Irrigation System. *Journal for Research* 2 (2), 53-56.
143. Mulani, R. K. A. O. (2017). Raspberry pi based voice operated Robot. *International Journal of Recent Engineering Research and Development* 2 (12).
144. Mulani, T. (2024). Face Mask Detection on Real Time Images and Videos using Deep Learning. *International Journal of Electrical Machine Analysis and Design (IJEMAD)* 2.
145. Nagane, U. P., & Mulani, A. O. (2021). Moving Object Detection and Tracking Using Matlab. *Journal of Science and Technology* 6 (Special Issue 1).
146. Nagrale, M., Pol, R. S., Birajadar, G. B., Mulani, A. O., Kutubuddin, K., & Liyakat, S. (2024). Internet of robotic things in cardiac surgery: an innovative approach. *Afr J Biol Sci* 6 (6), 709-725.
147. Nagtilak, M. A. G., Ulegaddi, M. S. N., Adat, M. A. S., & Mulani, A. O. (2021). Breast Cancer Prediction using Machine Learning. *International Journal of Research in Science and Engineering* 1 (2).
148. 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.



149. Pol, D. R. S., Deshmukh, A. B., Jadhav, M. M., Liyakat, K. K. S., & Mulani, A. O. (2022). I Button Based Physical Access Grid Based Realistic Optimal Path Planning. *Journal of Algebraic Statistics*, 11987-12002.
150. Pol, R. S., Bhalerao, M. V., & Mulani, A. O. (2022). A real time IoT based System Prediction and Monitoring of Landslides. *International Journal of Food and Nutritional Sciences* 11 (7).
151. Rahul, G. G., & Mulani, A. O. (2025). Microcontroller Based Drip Irrigation System. *International Open-Access, Double-Blind, Peer-Reviewed, Refereed. Multidisciplinary Online* 5 (4).
152. S.Pol, D. D. R. (2021). Cloud Based Memory Efficient Biometric Attendance System Using Face Recognition. *Stochastic Modeling & Applications* 25 (2), 403-416.
153. Sawant, N. M., Mulani, A. O., Kondooru, S., Linge, S. G., Gawande, P. G., & Koli, M. S. (2024). AgriRent: Renting the Farm Equipment. *International Conference on Data Science, Machine Learning and Applications*.
154. Shinde, G., & Mulani, A. (2019). A ROBUST DIGITAL IMAGE WATERMARKING USING DWT -PCA. *International Journal of Innovations in Engineering Research and Technology*.
155. Shinde, M., & Mulani, A. (2021). Effects Of Foot Reflexology On Lactation In Postnatal Mothers At A Tertiary Care Hospital In Karad. *International Journal Of Current Research And Review* 13 (16), 225-229.
156. Shinde, R., & Mulani, A. O. (2015). Analysis of Biomedical Imagell. *International Journal on Recent & Innovative trend in technology (IJRITT)*.
157. Shinde, R., & Mulani, A. O. (2015). Biomedical Image fusion using Wavelet transform. *International Conference On Current Advances in Electronics, Electrical and*.
158. Singh, S., Arya, K. V., Rodriguez, C. R., & Mulani, A. O. (2025). Emerging Trends in Artificial Intelligence, Data Science and Signal Processing.
159. Swami, S. S., & Mulani, A. O. (2017). An efficient FPGA implementation of discrete wavelet transform for image compression. *2017 International Conference on Energy, Communication, Data Analytics and*.
160. Takale, D. A. M. S. (2023). A video watermarking technique with video and image as watermark using DWT and PCA. *Journal of Northeastern University* 25.
161. Takale, S., & Mulani, A. (2022). DWT-PCA based video watermarking. *Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM)*.
162. Takale, S., & Mulani, A. (2022). Video Watermarking System. *International Journal for Research in Applied Science and Engineering*.



163. 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.
164. Ughade, U. R., Gikwad, S. M., Yeole, A. N., & Mulani, D. A. O. (2023). Automatic attendance system using face recognition. *Journal of Image Processing and Intelligent Remote Sensing* 3 (4), 11-18.
165. Anjali Pise, K. K. (2025). A Genetic Algorithm-Driven Energy-Efficient Routing Strategy for Optimizing Performance in VANETs. *Engineering, Technology & Applied Science Research* 15 (No. 5, 2025), 27273-27278.
166. Pise, A. C., & Karande, D. K. J. (2021). An exploratory study of cluster based routing protocol in VANET: a review. *International Journal of Advanced Research in Engineering and Technology*.
167. Pise, A. C., & Karande, K. J. (2023). Energy-Efficient Optimal Routing Protocols in VANETs. 66th Annual IETE Convention, AIC-2023 September 16-17.
168. Pise, A. C., & Karande, K. J. (2024). Investigating Energy-Efficient Optimal Routing Protocols for VANETs: A Comprehensive Study. *International Conference on Information and Communication Technology for*.
169. Pise, A. C., & Karande, K. J. (2024). K-mean energy efficient optimal cluster based routing protocol in vehicular ad-hoc networks. *Modern Approaches in Machine Learning and Cognitive Science: A Walkthrough*.
170. Pise, A. C., & Karande, K. J. (2025). Architecture, Characteristics, Applications and Challenges in Vehicular Ad Hoc Networks. 27th IEEE International Symposium on Wireless Personal Multimedia.
171. Pise, A. C., & Karande, K. J. (2025). Cluster head selection based on ACO in vehicular ad-hoc networks. *Machine Learning for Environmental Monitoring in Wireless Sensor Networks*.
172. Pise, A., & Karande, K. (2025). Hybrid Remora Optimization Algorithm for Energy Efficient Optimal Routing Scheme in VANETs. *International Journal of Intelligent Engineering & Systems* 18 (9), 584.
173. Shejwal, V., Karande, K. J., & Pise, A. C. (2025). Automated Pomegranate Disease Detection and Classification Using Vision Transformer. *International Conference on Recent Trends in Machine Learning, IOT, Smart*.
174. Dhanawadel, A., Mulani, A. O., & Pise, A. C. (2024). IOT based Smart farming using Agri BOT. *Sanshodhak*.



175. 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.
176. Nale, D., Pise, A. (2025). Web Based – Application for Result Analysis. 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_1D.
177. D. Nale and A. C. Pise, Smart Result Analysis-pdf Extractor, 2024 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS), Bhopal, India, 2024, pp. 1-6, doi: 10.1109/SCEECS61402.2024.10482279.
178. C. Pise, Jadhav P., 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.
179. C. Pise, Facial Expression Recognition Using Facial Features, IEEE International Conference on Communication and Electronics Systems (ICCES 2018), October 2018.
180. C. Pise, Jadhav P, Estimating Parameters of Cast Iron Composition using Cooling Curve Analysis, IEEE International Conference on Communication and Electronics Systems (ICCES 2018), Coimbatore, October 2018.
181. Pise, A. C. (2016, December). Android based Portable Health Support System. In *International Conference on Innovations in Engineering and Technology (CIET 2016)*, SKN Sinhgad College of Engineering (pp. 30-31).
182. A Pise, A. C. (2016, December). Bayesian Classifier & FCM Segmentation for Lung Cancer Detection in early stage. In *International Conference on Innovations in Engineering and Technology (CIET 2016)*, SKN Sinhgad College of Engineering (pp. 30-31).
183. Pise, A. C. (2016, December). Cast Iron Composition Measurement by Coding Curve Analysis. In *International Conference on Innovations in Engineering and Technology (CIET 2016)*, SKN Sinhgad College of Engineering (pp. 30-31).
184. Pise, A. C. (2016, December). War field Intelligence Defence Flaging Vehicle. In *International Conference on Innovations in Engineering and Technology (CIET 2016)*, SKN Sinhgad College of Engineering (pp. 30-31).
185. C. Pise, [Segmentation of Optic](#) Disk and Optic Cup from retinal Images, ICEECMPE – Chennai, June 2015
186. Pise, A. C. (2015, April). Diseases Detection of Pomegranate Plant. In *IEEE sponsored International Conference on Computation of Power, Energy, Information and Communication* (pp. 22-23).



187. P. V. Bankar and A. C. Pise, Face recognition by using Gabor and LBP, 2015 International Conference on Communications and Signal Processing (ICCSP), Melmaruvathur, India, 2015, pp. 0045-0048, doi: 10.1109/ICCSP.2015.7322425.
188. Lole, A. C. Pise and S. V. Surwase, Efficient implementation of UTAMF Algorithm for edge preservation on FPGA, 2015 International Conference on Green Computing and Internet of Things (ICGCIoT), Greater Noida, India, 2015, pp. 667-670, doi: 10.1109/ICGCIoT.2015.7380547.
189. Pise, A. C. (2014). Single Chip Solution For Multimode Robotic Control. Ist IEEE International Conference on Computing Communication and Automation, 26-27.
190. S. A. Thite, A. C. Pise and A. B. Jagadale, Single Chip Solution for Multimode Robotic Control, 2015 International Conference on Computing Communication Control and Automation, Pune, India, 2015, pp. 555-557, doi: 10.1109/ICCUBEA.2015.114.
191. Lole Bhagyashri A., Pise A.C and Surwase S. V., Area optimized implementation of unsymmetric trimmed adaptive Median Filter for edge preservation on FPGA, 2015 International Conference on Green Computing and Internet of Things (ICGCIoT), Greater Noida, India, 2015, pp. 86-89, doi: 10.1109/ICGCIoT.2015.7380434.
192. Pise, A. C., & Katti, V. S. (2014), Efficient Design for Monitoring of Greenhouse Parameters using Zigbee Wireless Sensor Network. In fifth SARC international conference IRF, IEEE forum ISBN (pp. 978-93).
193. Pise, A. C., & Bankar, P. (2014, April). Face Recognition using Color Local Texture Features. In International Conference on Electronics and Telecommunication, Electrical and Computer Engineering.
194. Pise, A. C. (2014, April). Monitoring parameters of Greenhouse using Zigbee Wireless Sensor Network. In 1st International Conference on Electronics and Telecommunication, Electrical and Computer Engineering (pp. 5-6).
195. Pise, A., & Deshmukh, A. (2010, April). Compensation schemes and performance Analysis of IQ Imbalances in Direct Conversion Receivers. In Proceedings of the 2009 International Conference on Signals, Systems and Automation (ICSSA 2009). Universal-Publishers.
196. Pise A., Nale D. Web Based – Application for Result Analysis, Communications in Computer and Information Science 2439 CCIS 2025, Scopus Indexed
197. Prof. A. C. Pise, Namrata Dabade, Sumitra Deshmane, Puja Gavade, AI Maze Escape Game Using Minmax Algorithm, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARST-29506](https://doi.org/10.48175/IJARST-29506)



198. Prof. Anjali Pise, Mr. Omkar Kumbhar, Mr. Sujal Mane, Mr. Ruturaj Patil, AI ChatBot Using Python, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29509](https://doi.org/10.48175/IJARSCT-29509)
199. Prof. Anjali Pise, Mr. Omkar Kumbhar, Mr. Sujal Mane, Mr. Ruturaj Patil, AI ChatBot Using Python – A Systematic Review, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429.
200. Niharika Bodake, Akshata Gaurkar, Vaishnavi Chavan, Vaishnavi Bhosale, Prof. A. C. Pise, A Review on IoT Based Solid Waste Management System, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29434](https://doi.org/10.48175/IJARSCT-29434).
201. Prof. A. C. Pise, Namrata Dabade, Sumitra Deshmane, Puja Gavade, Smart Wheelchair, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29437](https://doi.org/10.48175/IJARSCT-29437).
202. Sanket Badave, Prajwal Bhujbal, Aaditya Aradhya, Vishant Bagewadikar, A. C. Pise (2025), “Drowsiness Detection System”, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29405](https://doi.org/10.48175/IJARSCT-29405)
203. Prof. A. C. Pise, Namrata Dabade, Sumitra Deshmane, Puja Gavade, AI Maze Escape Game Using Minmax Algorithm, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29505](https://doi.org/10.48175/IJARSCT-29505)
204. Niharika Bodake, Akshata Gaurkar, Vaishnavi Chavan, Vaishnavi Bhosale, Prof. A. C. Pise, IoT Based Solid Waste Management System, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29415](https://doi.org/10.48175/IJARSCT-29415)
205. Prof. A. C. Pise, Namrata Dabade, Sumitra Deshmane, Puja Gavade, Smart Wheelchair with Automated Breaking and GPS, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29435](https://doi.org/10.48175/IJARSCT-29435)
206. Sanket Badave, Prajwal Bhujbal, Aaditya Aradhya, Vishant Bagewadikar, A. C. Pise (2025), A Review on Driver Drowsiness Detection Systems Using Image Processing and AI Techniques, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 4, October 2025, ISSN: 2581-9429. [10.48175/IJARSCT-29403](https://doi.org/10.48175/IJARSCT-29403).
207. A. C. Pise, Raut S., Smart Vehicle: A Systematic Review, International Journal of Research Publication and Reviews, ISSN 2582-7421, Vol 4, no 10, pp 2728-2731 October 2023.
208. Sonali P. Raut, & A. C. Pise. (2023). Smart Vehicle. Journal of Electronics, Computer Networking and Applied Mathematics, 4(01), 38–47. <https://doi.org/10.55529/jecnam.41.38.47>



209. Pise, A. C. IoT Based Landmine Detection Robot. International Journal of Research in Science & Engineering ISSN: 2394-8299 Vol: 03, No. 04, June-July 2023.
210. Jayshri Prakash Patale, A. B. Jagadale, A. O. Mulani, & Anjali Pise (2022). A Systematic survey on Estimation of Electrical Vehicle. Journal of Electronics, Computer Networking and Applied Mathematics, (JECNAM) ISSN, 2799-1156. 3(01), 1–6.
<https://doi.org/10.55529/jecnam.31.1.6>
211. Pise, A. C. (2022). 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, 6(04).
212. Harale, A. D., & Karande, K. J. (2026). Gabor-Augmented Two-Stream Framework With GoogLeNet-Based Temporal Attention for Semantic Dynamic Hand Gesture Recognition. Computer Animation and Virtual Worlds 37 (3), e70118.
213. Gadade, B., Mulani, A. O., & Harale, A. D. (2024). Iot based smart school bus and student monitoring system. Naturalista Campano 28 (1), 730-737.
214. Gadade, B., Mulani, A. O., & Harale, A. D. (2024). IoT Based Smart School Bus and Student Tracking System. IoT Based Smart School Bus and Student Tracking System.
215. 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.
216. Avinash D. Harale and Kailash J. Karande , “Literature review on Dynamic Hand Gesture Recognition”, AIP Conference Proceeding ,31st Oct 2022, <https://doi.org/10.1063/5.0107577>
217. A. D. Harale and K. J. Karande, “Gabor-Augmented Two-Stream Framework With GoogLeNet-Based Temporal Attention for Semantic Dynamic Hand Gesture Recognition,” Computer Animation and Virtual Worlds 37, no. 3 (2026): e70118, <https://doi.org/10.1002/cav.70118>.
218. A. D. Harale , Amruta S. Bankar and K. J. Karande, “Gestures Controlled Home Automation using Deep Learning: A Review”, International Journal of Current Engineering and Technology, Vol.11, No.6, page no-617-621, Dec 2021
219. D. Harale, Ms. Asma Hakim, Dr.K.J.Karande, “Hand gesture identification system for hearing and speech impairment”, TELEMATIQUE, Volume 23 Issue 1, 2024 page n- 497–501, April 2024
220. A.D. Harale, Atik N. Pathan and A. O. Mulani, “Hand Gesture Controlled Robotic System” International Journal of Aquatic Science, ISSN: 2008-8019 Vol 13, Issue 01, Jan 2022
221. D. Harale, K. J. Karande, Sagar S. Bhumkar, “Wireless Hand Geture Control Robot with Object Detection”, Journal of Image Processing and Intelligent Remote Sensing, ISSN 2815-0953, Vol. 3 No. 04 (2023), July 2023.



222. A.D.Harale, Ms.Asma Hakim, Altaf Mulani, K.J.Karande, “Implementation of Human Gesture Recognition Using CNN”, June 2024 ,Journal of STM.
223. Dheeraj Muttin and Avinash Harale, “IoT Based Personal Medical Assistant System”, “International Journal of Innovative Research in Technology (IJIRT)”, Volume 8 Issue 5 | ISSN: 2349-6002, October 2021.
224. Vijay Waghmode and Avinash Harale, “Development of Alphanumeric Digital Fuel Gauge for Automotive Applications”, “International Conference on Communication and Signal Processing”, IEEE, April 4-6, 2019.
225. Gorakhnath U. Waghmode and Avinash D. Harale, “A Cloud Computing Based WSNs for Agriculture Management”, Springer International Publishing, Conference: Techno-Societal DOI 10.1007/978-3-319-53556-2_107 December 2018.
226. Sanaha S. Path and Avinash D. Harale, “Silkworm Eggs Counting System Using Image Processing Algorithm”, Springer International Publishing, Conference: Techno-Societal DOI:10.1007/978-3-319-53556-2_32_ December 2018.
227. S. S. Kulkarni and A.D.Harale, “Image Processing for Driver’s Safety and Vehicle Control using Raspberry Pi and Webcam”, “IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI)-IEEE, 2017.
228. Supriya A Salunke and Avinash D Harale, “Vehicle Tracking System for School Bus by Arduino”, International Research Journal of Engineering and Technology (IRJET), ISSN: 2395-0072, Volume: 04 Issue: 03, Mar -2017.
229. Bhakti B.Bhaganagare Avinash.D.Harale, “Iris as Biometrics for Security System”, 2nd International Conference on Electrical, Computer and Communication Technologies, IEEE, 2017.
230. Supriya A Salunke and Avinash D Harale, “Vehicle Tracking System Using GPRS For School Bus”, International Journal of Engineering Research in Electrical and Electronic Engineering (IJEREEE), ISSN-2395-2717, Vol 3, Issue 1, January 2017.
231. Sanaha S. Pathan and Avinash D. Harale, “Automated silkworm eggs count”, IEEE International Conference on Advances in Electronics, Communication and Computer Technology (ICAECCT)”, Rajarshi Shahu College of Engineering, Pune India. Dec 2-3, 2016.
232. Sanaha S. Pathan and Avinash D. Harale, “Silkworm Egg Counting System Using Image Processing Algorithm -A Review”, International Research Journal of Engineering and Technology (IRJET) Volume: 03 Issue: 06, ISSN: 2395-0072, June-2016.
233. Gorakhnath U.Waghmode and Avinash D.Harale , “A survey on: Cloud Enabled Agricultural Management”, International Journal of Research (IJR), e-ISSN: 2348-6848, p- ISSN: 2348-795X Volume 2, Issue 09, September 2015.



234. Mrunmayee V. Daithankar, Kailash J. Karande and Avinash D. Harale, “Analysis of Skin Color Models for Face Detection”, International Conference on Communication and Signal Processing, IEEE April 3-5, 2014.
235. Apurva Sutar, K. J. Karande and A. D. Harale, “Deep Learning based Automated Billing Cart”, International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), ISSN (Online) 2581-9429, Volume 3, Issue 4, April 2023.
236. Apurva Sutar, K. J. Karande and A. D. Harale , “Deep Learning Based Smart Billing Cart Using RFID and Yolo”, Purakala, ISSN: 0971-2143, Vol 32 Issue 1, 2023.
237. Yogesh Jadhav, Kakade Vishal, Virendra Metkari, Siddheshwar S. Gangonda, “IOT Based Greenhouse Monitoring and Controlling System”, IJSRD - International Journal for Scientific Research & Development| Vol. 12, Issue 3, 2024 | ISSN (online): 2321-0613.
238. Akash Lawande, Kishor Mane, Kunal Davad, Siddheshwar S. Gangonda, “Pipeline Survey Robot”, IJSRD - International Journal for Scientific Research & Development| Vol. 12, Issue 3, 2024 | ISSN (online): 2321-0613.
239. 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>.
240. 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.
241. 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.
242. 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.
243. Siddheshwar Gangonda and Prachi Mukherji, “Speech Processing for Marathi Numeral Recognition”, ePGCON 2011, 26th April 2011 organized by MAEER's MIT, Kothrud, Pune-38.
244. Siddheshwar Gangonda, “Medical Image Processing”, Aavishkar-2K7, 17th and 18th March 2007 organized by Department of Electronics and Telecommunication Engineering, SVERI's COE, Pandharpur.



245. Bhaganagare, S., Chavan, S., Gavali, S., & Godase, V. (2025). The vocal cortex of the smart home: A review of esp32-based control and automation architectures. *International Journal of Advanced Research in Science, Communication and Technology*, 1071-1094.
246. 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.
247. Dange, R., Attar, E., Ghodake, P., & Godase, V. (2023). Smart agriculture automation using ESP8266 NodeMCU. *J. Electron. Comput. Netw. Appl. Math.*(35), 1-9.
248. Dhope, V., Chavan, A., Hadmode, N., & Godase, V. (2024). Smart plant monitoring system. *International Journal of Creative Research Thoughts (IJCRT)*. <https://www.ijcrt.org>.
249. Ghadage, I., Ghadge, P., Kamble, R., Mhamane, R., & Godase, V. V. (2025). Development of a cloud-connected industrial temperature and humidity monitoring system. *Development*, 5(4).
250. Ghadage, I., Ghadge, P., Kamble, R., Mhamane, R., & Godase, V. V. (n.d.). Industrial environment monitoring using IoT: A comprehensive review on temperature and humidity control
251. Godase, V., & Jagadale, A. (2019). Three element control using PLC, PID & SCADA interface. *International Journal for Scientific Research and Development*, 7(2), 1105-1109.
252. Godase, V. (2023). Smart agriculture automation using ESP8266 node MCU. *Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM)* ISSN, 2799(1156), 1.
253. Godase, V., Mulani, A., Ghodak, R., Birajadar, G., Takale, S., & Kolte, M. (2024). A MapReduce and kalman filter based secure IIoT environment in hadoop. *Sanshodhak*, 25, 38-47.
254. Godase, V., Pawar, P., Nagane, S., & Kumbhar, S. (2024). Automatic railway horn system using node MCU. *Journal of Control & Instrumentation*, 15(1).
255. 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.
256. Godase, V., Jadhav, Y., & Kakade, V. (2024). IOT based greenhouse monitoring and controlling system. *International Journal for Scientific Research & Development*, 12(3), 138-140.
257. Godase, V. (2025). A comprehensive review on PIR sensor-based light automation systems. *International Journal of Image Processing and Smart Sensors*, 1(1), 22-29.
258. Godase, V. (2025). A comprehensive review on scalable Arduino radar platform for real-time object detection and mapping. *Journal of Microprocessor and Microcontroller Research e-ISSN*, 3048-6637.
259. 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.



260. 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.
261. Godase, V. V. (2025). Artificial intelligence and human society: A double-edged sword. *Impact of Artificial intelligence On Society*.
262. Godase, V. (2025). Automated water distribution management and leakage mitigation using PLC systems. *Journal of Control and Instrumentation Engineering*.
263. Godase, V., Altaf Mulani, S. T., Ghodake, R., & Birajadar, G. (2025). Blockchain for transparent irrigation water allocation and management. *Int. Water Irrig*, 44, 518-521.
264. Godase, V. (2025). Case study: Combating adversarial attacks in AI systems. *Artificial Intelligence Education And Innovation*.
265. Godase, V. (2025). Comparative study of ladder logic and structured text programming for PLC. Available at SSRN.
266. Godase, V. (2025). Comprehensive review on explainable ai to addresses the black box challenge and its role in trustworthy systems. *Sinhgad College of Engineering, Artificial Intelligence Education and Innovation*, 127-132.
267. Godase, V. (2025). Cross-domain comparative analysis of microwave imaging systems for medical diagnostics and industrial testing. *Journal of Microwave Engineering & Technologies*, 12(2), 39-48.
268. Godase, V. (2025). Design and optimization of reconfigurable microwave filters using AI techniques. *Journal of RF and Microwave Communication Technologies*, 2(2), 26-41.
269. Godase, V. V. (2025). Digital governance and the right to information in india: Pathways to transparency. Available at SSRN 5817082.
270. 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.
271. Godase, V. V. (2025). Education as empowerment: The key to women's socio-economic development. Available at SSRN 5536520.
272. Godase, V. V. (2025). Fra-polar net: A novel image processing framework for transformer condition monitoring. *Recent Trends in Semiconductor and Sensor Technology*, 2(3), 11-24.
273. Godase, V. (2025). Graphene-based nano-antennas for terahertz communication (source details not available on Scholar profile).
274. 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*.



275. Godase, V. (2025). LoRaEdge-ESP32 synergy: Revolutionizing farm weather data collection with low-power, long-range IoT. *Advance Research in Analog and Digital Communications*.
276. 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.
277. Godase, V. (2025). Optimized algorithm for face recognition using deep face and multi-task cascaded convolutional network (MTCNN). *Optimum Science Journal*, 66-74.
278. Godase, V., Khiste, R., & Palimkar, V. (2025). Programmable smart surfaces and intelligent reflecting surfaces for enhanced wireless propagation in indoor and outdoor environments. *International Journal of Satellite-Based Communication and Wireless Networks System*, 1(2), 29-41.
279. Godase, V., Modi, S., Misal, V., & Kulkarni, S. (2025). Real-time object detection for autonomous drone navigation using yolov8,l. *Advance Research in Communication Engineering and its Innovations*, 2(2), 17-27.
280. Godase, V. (2025). Smart energy management in manufacturing plants using PLC and SCADA. *Advance Research in Power Electronics and Devices*, 2(2), 14-24.
281. Godase, V. V. (2025). Vlsi-integrated energy harvesting architectures for battery-free IoT edge systems. *Journal of Electronics Design and Technology*, 2(3), 1-12.
282. Godase, V. (2025). Voice controlled home automation using ESP32 and IoT-Based cloud integration. *International Journal of Advanced Research in Science, Communication and Technology*.
283. Godase, V., Pandhare, A., & Pandhare, S. (2026). Mechanical and thermal characterization of natural fiber-reinforced epoxy composites for structural applications. *International Journal of Composite Materials and Matrices*, 12(1), 37-48p.
284. Hipparkar, J., Mulani, A., Godase, V., Takale, S., & Ghodake, R. (2026). Real-time vision-based disease detection using edge-optimized deep learning models. In *2026 IEEE International Conference on Emerging Computing and Intelligent Technologies (ICoECIT)* (pp. 1-5). IEEE.
285. Jamadade, V. K., Ghodke, M. G., Katakdhond, S. S., & Godase, V. (2025). A review on real-time substation feeder power line monitoring and auditing systems,”. *International Journal of Emerging IoT Technologies in Smart Electronics and Communication*, 1(2), 1-16.
286. Jamadade, V., Ghodake, M., Katakdhond, S., & Godase, V. (n.d.). A comprehensive review of real-time feeder monitoring and auditing systems: Architectures, technologies, and analytics for the smart grid (source details not available on Scholar profile).
287. Jamadade, V., Ghodake, M., Katakdhond, S., & Godase, V. (n.d.). A review on ai-powered image generation system using AI



288. Kumbhar, B., Kokelar, S., Rohidas, K., & Jadhav, S. (n.d.). An overview of real-time bus tracking in smart bus stop system (source details not available on Scholar profile).
289. Nagane, S. K., Pawar, P. S., & Godase, V. V. (2022). Cinematica sentiment analysis. *Journal of Image Processing and Intelligent Remote Sensing*, 2(3), 27-32.
290. 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), 41-47.
291. Godase, M. V., Mulani, A., Ghodak, M. R., Birajadar, M. G., Takale, M. S., & Kolte, M. (2024). A MapReduce and Kalman filter based secure IIoT environment in Hadoop. *Sanshodhak*, 25, 38–47.
292. A.H.Shinde, V. V. Sardar, S. M. Ubale, and S. M. Moholkar, "IoT-Based Prepaid Energy Meter with Stealing Alert," in *Proceedings of the 6th International Conference on Recent Trends in ...*, vol. 1737, 2026, DOI: 10.1007/978-981-95-5082-1_12.
293. K. G. Landage, V. B. Manepatil, R. R. Mokashi, and A. H. Shinde, "IoT Based Smart Electricity Energy Meter," *International Journal of Progressive Research in Engineering Management and Science (IJPREAMS)*, vol. 05, no. 03, pp. 1298–1302, Mar. 2025.
294. V. Dhage, A. Nagane, R. Menkudale, and A. H. Shinde, "The Evolution of Student Monitoring Systems in School Buses: A Detailed Review," *International Journal of Electrical Machine Analysis and Design (IJEMAD)*, vol. 2, no. 1, Jan.–Jun. 2024, DOI: 10.37591/IJEMAD.
295. S. Pandhare, S. Mali, K. Sahani, and A. H. Shinde, "Sentiment Analysis Based on Movie Review," *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, vol. 5, no. 4, Oct. 2025, DOI: 10.48175/IJARSCT-29496.
296. S. Pandhare, S. Mali, K. Sahani, and A. H. Shinde, "A Systematic Review – Sentiment Analysis Based on Movie Review," *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, vol. 5, no. 4, Oct. 2025, DOI: 10.48175/IJARSCT-29495.
297. P. Devram, A. Pise, G. Tanwade, and A. H. Shinde, "A Review on Voice Assistant," *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, vol. 5, no. 4, Oct. 2025, DOI: 10.48175/IJARSCT-29487.
298. P. Devram, A. Pise, G. Tanwade, and A. H. Shinde, "Voice Assistant," *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, vol. 5, no. 4, Oct. 2025, DOI: 10.48175/IJARSCT-29488.
299. P. Devram, A. Pise, G. Tanwade, and A. H. Shinde, "Literature Review on Smart Door Lock Using Keypad & GSM," *International Journal of Advanced Research in Science,*



- Communication and Technology (IJARSCT)*, vol. 5, no. 4, Oct. 2025, DOI: 10.48175/IJARSCT-29452.
300. P. Devram, A. Pise, G. Tanwade, and A. H. Shinde, “Smart Door Lock Using Keypad & GSM,” *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, vol. 5, no. 4, Oct. 2025, DOI: 10.48175/IJARSCT-29438.
 301. 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>
 302. 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>
 303. 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>
 304. 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/IJIRCCE.2018.0604036>
 305. Obstacle avoidance and Bluetooth control car. (2025). In *International Journal of Advanced Research in Science, Communication and Technology* (Vol. 5, Issue 4) [Journal-article]. <https://www.ijarsct.co.in>
 306. Ultrasonic and arduino based radar system. (2025). In *International Journal of Advanced Research in Science, Communication and Technology* (Vol. 5, Issue 4) [Journal-article]. <https://www.ijarsct.co.in>
 307. Shitole, M., Thokale, S., Patil, N., Shingare, S., & Godase, S. K. (2025). Review on Ultrasonic Sensor-Based RADAR Systems for object detection and distance Measurement. *International Journal of Advanced Research in Science Communication and Technology*, 392–408. <https://doi.org/10.48175/ijarsct-29424>
 308. Chavan, R., Chavan, S., Gaikwad, O., Gaikwad, K., & Godase, S. K. (2025). Review of smart robotic car systems for obstacle detection and Bluetooth Control. *International Journal of Advanced Research in Science Communication and Technology*, 521–536. <https://doi.org/10.48175/ijarsct-29432>
 309. Patil, S., Navale, P., Suryawanshi, V., & Godase, S. K. (2025). Advance solar tracking and automatic sprinkler irrigation system. In SKN Sinhgad College of Engineering,



International Journal of Advanced Research in Science, Communication and Technology (Vol. 5, Issue 4) [Journal-article]. <https://www.ijarsct.co.in>

310. Navale, P., Patil, S., Suryawanshi, V., & Prof. S. K. Godase. (2025). Smart Solar-Irrigo System. In International Journal of Advanced Research in Science, Communication and Technology (Vol. 5, Issue 4) [Journal-article]. <https://www.ijarsct.co.in>
311. A Systematic Review- Sugarcane disease prediction. (2025). In International Journal of Advanced Research in Science, Communication and Technology (Vol. 5, Issue 4) [Journal-article]. <https://www.ijarsct.co.in>
312. Zade, M. M., & Mukane, D. S. (2013). Enhancement of image with the help of switching median filter. In National Conference on Emerging Trends in Electronics & Telecommunication.
313. Zade, M. M., Rupanar, B. B., Shilawant, V. S., & Pawar, A. R. (2025). IOT flood monitoring & alerting system using Raspberry Pi-Pico. International Journal of Research Publication & Reviews, 6(3).
314. Zade, M. M. (2019). Performance analysis of PSNR vs. impulse noise for the enhancement of image using SMF. In National Conference on Mathematical Modeling and Computational Intelligence.
315. Zade, M. M. (2019). Dynamic clustering of wireless sensor network using modified AODV. In National Conference on Mathematical Modeling and Computational Intelligence.
316. Zade, M. M. (2019). Classification of power quality disturbances using SVM & their efficiency comparison. In National Conference on Mathematical Modeling and Computational Intelligence.
317. Zade, M. M. (2016). Performance analysis of median filter for enhancement of highly corrupted images. In National Conference on Advanced Trends in Engineering.
318. Zade, M. M. (2016). Implementation of Reed Solomon encoder & decoder using FPGA. In National Conference on Advanced Trends in Engineering.
319. Zade, M. M. (2016). Performance of switching median filter for enhancement of image. In National Conference on Mechatronics at Sinhgad Institute of Technology.
320. Zade, M. M., Kambale, S. D., Mane, S. A., & Jadhav, P. M. (2025). IOT based early fire detection in jungles. RIGJA&AR, 2(1).
321. Zade, M. R. (2017). Finite element analysis and fatigue analysis of crane hook with different materials. International Research Journal of Engineering and Technology, 4(01).
322. Bansude, V. U., Togrikar, P. S., Karve, S. M., & Zade, M. M. (n.d.). A hybrid model for early PCSO detection using VGG16 CNN and XGBoost on multimodal data. Journal of Technical Education, 342.
323. Mahadev, M., Rahulkumar, D. R., & Shirkande, D. (n.d.). Efficient routing and data fusion in IoT-WSNs for resilient forest fire monitoring.



324. Mr. Zade Mahesh Mahadev published a paper in International Journal of Artificial Intelligence and Machine Learning on “An Iot-Enabled Resilient Wireless Sensor Network Framework For Early Forest Fire Detection And Monitoring” June 2026(SCOPUS)
325. Mr. Zade Mahesh Mahadev published a paper in International Journal of Artificial Intelligence and Machine Learning on “A Reliable, Energy-Efficient And Secure Data Aggregation Framework For Resource Constrained Wireless Sensor Networks” June 2026(SCOPUS)
326. Mr. Zade Mahesh Mahadev published a paper in Shodhkosh-Journal of Visual & Performing Arts on “Visualizing Forest Fire Risks: An Efficient and Resilient IoT-Enabled Wireless Sensor Network Approach” March 2026
327. Mr. Zade Mahesh Mahadev published a paper in Shodhkosh-Journal of Visual & Performing Arts on “The Aesthetics of Data Flow: Enhancing Reliability and Efficiency in Resource-Constrained Wireless Sensor Networks” March 2026
328. Mr. Zade Mahesh Mahadev published a paper in Anveshana’s International Journal of Research in Engineering and Applied Sciences on “EFFICIENT ROUTING AND DATA FUSION IN IOT-WSNS FOR RESILIENT FOREST FIRE MONITORING” AIJREAS VOLUME 10, ISSUE 9 (2025, SEP) (ISSN-2455-6300) ONLINE
329. Mr.M.M.Zade Presented the Paper on “Touchless Fingerprint Recognition System” (Paper-ID 907) in International Conference on “Advanced Technologies for Societal Applications: Techno-Societal 2022 organized by Shri Vithal Education & Research Institute(SVERI), Pandharpur from 9th December 2022 to 10th December 2022.
330. 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
331. 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
332. 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
333. 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
334. 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
335. 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
 336. 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.
 337. Ghadage, A., Gholave, C., Devkar, A., & Naiknavare, M. V. (2025). Email spam detection with machine learning. *International Journal of Advanced Research in Science, Communication and Technology*.
 338. Naiknavare, M. V. (2024). Innovative approaches in greenhouse technology: A critical analysis of spectral data for enhanced plant growth monitoring. *International Journal of Creative Research Thoughts*, 12(5).
 339. Rao, P. V. K. J., Madhava, M., Sreedevi, P., Kiranmayi, K., & Lakshmi, M. B. (2023). Optimisation of process parameters for centrifugal clarification of sugarcane juice for quality jaggery. *Journal of Agricultural Engineering (India)*, 60(3), 261–271.
 340. Ghadage, A., Gholave, C., Devkar, A., & Naiknavare, M. V. (n.d.). Smart poultry farming with ESP8266: A comprehensive review of monitoring and automation approaches.
 341. Khedekar, S., Jadhav, R., Pawar, S., & Naiknavare, M. V. (n.d.). Simplifying travel planning with AI-powered chatbot assistance.
 342. Advancements in Real-Time Crack Detection Techniques for Structural Health Monitoring International Journal of Advanced Research in Science, Communication and Technology, International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal, Volume 5, Issue 4, October 2025
 343. Intelligent Monitoring of Civil Infrastructure Health Tushar Ghadage, Amit Pandhare, Aaditya Metkari, Prof. V. B. Utpat International Journal of Advanced Research in Science, Communication and Technology International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal Volume 5, Issue 4, October 2025
 344. A Comprehensive Review on IoT-Based Smart Energy Meter with Real-Time Monitoring and Automated Billing System Shubham Tathe¹, Abhishek Savalgi², Amit Thombare³, Ganesh Sarak⁴, Ms. V. B. Utpat⁵, Dr. S. V. Pingale⁶ International Journal of Advanced Research in Science, Communication and Technology International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal Volume 5, Issue 4, October 2025



345. Digital Timetable Automation System Anurag Pawar¹, Prathamesh Aradhya², Akash katta³, Prof. Utpat V. B. International Journal of Advanced Research in Science, Communication and Technology International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
346. Automatic Waste Segregation Mayank Kulkarni¹, Sudesh Godase², Digvijay Khilare³, Prof. V. B. Utpat Advanced Research in Science, Communication and Technology International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal