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Fingerprint-Based Voting Machine

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Abstract: *This project introduces a "Fingerprint-Based Biometric Smart Electronic Voting Machine" using Arduino, designed to improve the security, reliability, and efficiency of the voting process. Traditional voting systems are often prone to errors, duplication of votes, and fraudulent practices. To address these challenges, this system utilizes a fingerprint sensor to uniquely identify each voter, ensuring that only registered individuals can cast their vote and that each voter is allowed to vote only once.Once a voter is successfully authenticated through their fingerprint, they can choose their preferred candidate using simple push buttons. The system immediately records the vote in the Arduino's memory and provides real-time confirmation through an LCD screen, LED indicators, and a buzzer. If authentication fails, the voter is notified instantly, preventing unauthorized access. By automating voter verification and vote recording, this system significantly reduces human error and the chances of electoral fraud. Additionally, it allows for easy and quick counting of votes, making the election process faster and more transparent. The design is scalable, cost-effective, and flexible, with the potential to incorporate advanced features in the future, such as transmitting results online, supporting multiple languages, or integrating with a physical ballot box. In essence, this smart voting machine combines modern biometric technology with simple electronics to create a safer, more efficient, and user-friendly voting experience, promoting trust and accuracy in elections.*

Keywords: Fingerprint-Based Biometric Smart Electronic Voting Machine

I. INTRODUCTION

Voting is a cornerstone of democracy, allowing citizens to express their choices and participate in decision-making processes. Traditional paper-based voting systems, however, face several challenges such as voter impersonation, multiple voting, ballot tampering, and errors during counting. These issues can compromise the fairness and transparency of elections. Electronic Voting Machines (EVMs) have been introduced in many countries to overcome some of these challenges, but even EVMs may face limitations if proper voter verification is not implemented. To further enhance election security and streamline the process, biometric authentication can be integrated into voting systems. Fingerprint recognition is one of the most reliable biometric methods because each individual has a unique fingerprint pattern, which is difficult to replicate or forge. This project proposes a Fingerprint-Based Biometric Smart Electronic Voting Machine using Arduino, which combines the advantages of biometric verification with the simplicity and flexibility of Arduino-based electronics. The system works by first authenticating voters through a fingerprint sensor. Once verified, the voter can select a candidate using push buttons, and the vote is securely recorded in the system's memory or on an SD card. The process provides immediate visual and auditory feedback using an LCD display, LEDs, and a buzzer, ensuring transparency and user confidence. The system is scalable, cost-effective, and suitable for small-scale elections in institutions like schools, colleges, or local organizations. With additional enhancements such as Wi-Fi connectivity, online result transmission, or physical ballot box integration, it can be adapted for larger applications. By combining security, efficiency, and user-friendliness, this project aims to demonstrate a practical solution for modernizing the voting process while maintaining the integrity of elections.

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II. LITERATURE REVIEW

The integrity, transparency, and efficiency of electoral processes have become increasingly significant in modern democracies. Traditional paper-based voting systems, while widely used, face critical challenges such as vote duplication, miscounting, tampering, and lengthy result compilation. These vulnerabilities have motivated the development of electronic voting systems, particularly those leveraging biometric technologies. Among various biometric approaches, fingerprint recognition has emerged as a reliable and practical method for voter authentication due to its uniqueness, permanence, and cost-effectiveness.

A. R. Sharma et al. [1] proposed a fingerprint-based electronic voting system aimed at eliminating fraudulent voting and ensuring that only registered voters could cast a vote. In their system, voters were authenticated through fingerprint scanning, and once verified, could select their preferred candidate using push-button interfaces. The votes were recorded digitally within the Arduino controller memory, and immediate confirmation was provided via LCD displays and LED indicators. This setup minimized human intervention and errors associated with manual counting, thereby improving election accuracy and transparency. The authors also highlighted that such systems could be scaled for larger polling booths with careful management of voter databases and periodic sensor calibration. Their work laid the foundation for low-cost, reliable biometric voting solutions suitable for small- to medium-scale elections.

Expanding on this concept, R. K. Gupta et al. [2] developed a hybrid electronic voting framework that combined fingerprint recognition with smart card verification. The dual-authentication mechanism enhanced security by ensuring that only authorized voters could participate, even in scenarios where one authentication mode failed or was compromised. Experimental results demonstrated that hybrid systems reduced impersonation and duplication attempts, increasing public confidence in electronic voting systems. However, the study noted challenges in terms of hardware cost, maintenance, and synchronization of voter data across multiple polling stations. Despite these limitations, the research emphasized that hybrid biometric systems offer significant advantages in high-stakes elections where security and reliability are critical.

S. K. Patel et al. [3] focused on cost-effective hardware implementation by integrating fingerprint sensors with Arduino microcontrollers, push-button candidate selection, and LCD displays. The study demonstrated that low-cost, open-source microcontrollers could effectively manage authentication, vote recording, and result tallying in real-time. Feedback mechanisms such as LEDs and buzzers were incorporated to notify voters of successful authentication or voting errors, enhancing the system's user-friendliness. Patel et al. also discussed potential enhancements, including cloud-based storage for secure vote backups and real-time result transmission to central election authorities. Their work highlighted that such a modular system could be deployed in smaller polling stations, rural areas, and developing regions where high-cost electronic voting machines may not be feasible.

Effective fingerprint-based voting systems rely heavily on the underlying recognition algorithms. T. R. Sharma et al. [4] explained that fingerprint authentication involves several stages: image acquisition, preprocessing, feature extraction, template storage, and matching. During preprocessing, techniques such as contrast enhancement, noise reduction, and ridge orientation normalization are applied to improve image quality. Feature extraction focuses on identifying minutiae points, ridge endings, bifurcations, and ridge counts, which are unique to each individual. Matching algorithms then compare the live fingerprint scan with stored templates to verify voter identity. Common approaches include minutiae-based matching, ridge-based pattern matching, and neural network-assisted recognition. The accuracy of these algorithms is crucial to minimize false acceptance rates (FAR) and false rejection rates (FRR), which directly impact system reliability and voter trust.

Environmental conditions, such as dirt, moisture, or worn fingerprints, can reduce sensor performance. Sharma et al. [4] recommended preprocessing and adaptive matching algorithms to mitigate these effects. Additionally, sensor quality and calibration play a vital role in ensuring accurate recognition over time. High-quality optical or capacitive fingerprint sensors are preferred due to their reliability and resistance to wear and environmental interference.

Security and privacy are critical in electronic voting systems. A. Kumar et al. [5] emphasized the need for encrypting fingerprint templates and vote data to prevent unauthorized access. Secure communication protocols between polling machines and central servers are essential to maintain data integrity and prevent tampering. Kumar et al. also explored blockchain integration as a means to create immutable, tamper-proof vote records. This approach ensures that once a vote

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is cast, it cannot be altered or deleted, significantly increasing voter confidence and system transparency. Privacy concerns are equally important, as fingerprint templates must be stored in a manner that prevents misuse or unauthorized sharing of biometric data. Techniques such as template encryption, hashing, and secure cloud storage are often recommended to address these challenges.

While fingerprint recognition is widely used due to its balance of cost, reliability, and uniqueness, other biometric modalities such as iris scanning, facial recognition, and voice authentication have also been explored. Iris scanning offers very high accuracy but requires specialized cameras and is often costly, making it less feasible for large-scale elections [6]. Facial recognition can be convenient and contactless, but it is vulnerable to lighting variations, aging, and spoofing attempts. Voice recognition, while feasible in remote voting scenarios, is highly sensitive to background noise and illness-related voice changes. Compared to these alternatives, fingerprint recognition provides a practical compromise between cost, accuracy, and ease of deployment, particularly for hardware-constrained systems like Arduino-based machines.

R. P. Verma et al. [7] detailed the hardware aspects of fingerprint-based electronic voting systems. A typical setup includes a fingerprint sensor for biometric input, push-buttons for candidate selection, LCDs or LEDs for feedback, and a microcontroller such as Arduino for processing and storage. Buzzers are often incorporated to provide audio confirmation of authentication or voting errors. The modular design allows scalability, where multiple polling units can be interconnected or managed centrally. Power management, wiring reliability, and sensor placement are important design considerations to ensure uninterrupted operation during elections.

Recent studies emphasize the potential benefits of integrating fingerprint-based voting systems with cloud platforms or IoT frameworks. S. K. Patel et al. [3] and P. Singh et al. [8] proposed storing encrypted vote records and fingerprint templates on cloud servers to enable secure centralized management, real-time monitoring, and fast result computation. IoT connectivity can also facilitate remote system diagnostics, software updates, and election monitoring, reducing logistical challenges and human intervention. Cloud and IoT integration also allow for real-time analytics, audit trails, and long-term data storage, which are valuable for post-election verification, transparency, and research purposes

Despite the advantages, fingerprint-based electronic voting systems face several challenges. Sensor accuracy can be affected by environmental factors such as dust, moisture, or low-quality fingerprints. Large-scale deployment requires careful database management to handle millions of voter templates efficiently. Hardware maintenance, calibration, and power management are critical to ensure continuous system operation. Additionally, implementing secure, encrypted communication protocols and cloud infrastructure can increase costs and complexity, particularly in developing regions. Patel et al. [3] noted that accessibility considerations, such as multilingual interfaces and user-friendly designs, are essential to ensure participation from all voter demographics.

Future research in fingerprint-based electronic voting is focused on enhancing security, scalability, and usability. Hybrid biometric systems combining fingerprint, iris, or facial recognition could further reduce fraudulent voting attempts and improve accuracy. AI-assisted fingerprint matching and predictive analytics could optimize authentication speed and reliability. Integration with blockchain, cloud, and IoT technologies will likely enhance transparency, auditability, and real-time monitoring. Moreover, designing intuitive user interfaces with multilingual and accessibility features will ensure wider adoption and voter confidence. Large-scale pilot studies and real-world implementation trials are needed to validate these systems under diverse environmental and operational conditions.

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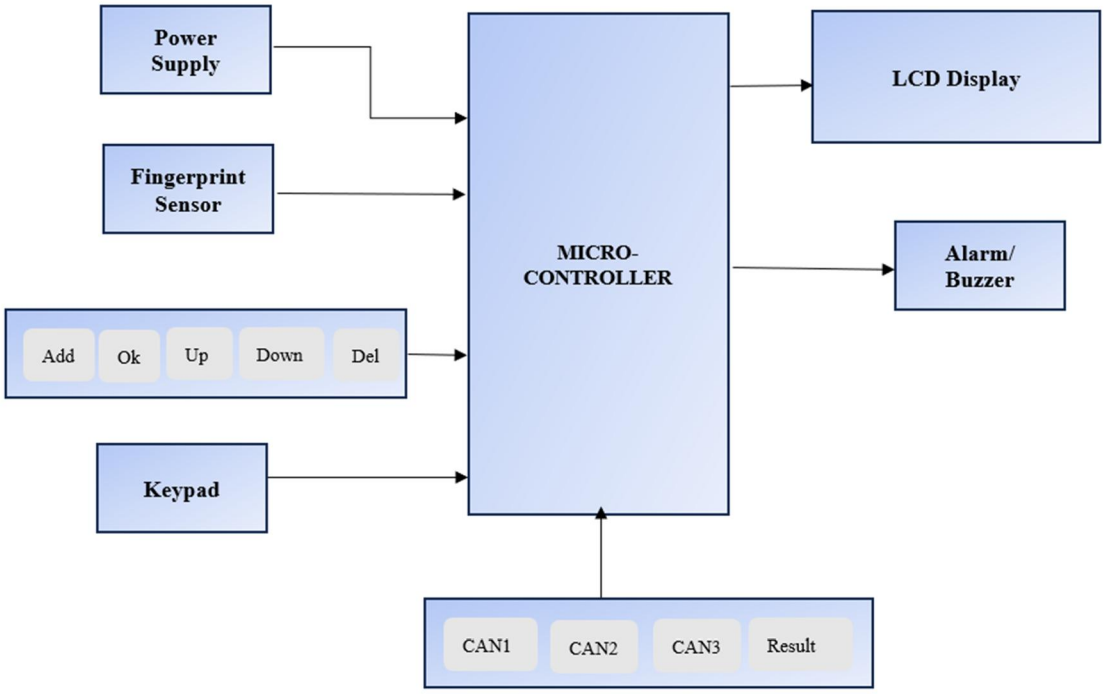
III. METHODOLOGY



R307 Fingerprint Sensor :

Fig1. R307 Fingerprint Sensor

The R307 Fingerprint Sensor Module is one of the most widely used and cost-effective biometric modules for personal identification and security-based projects. In the context of a Fingerprint-Based Electronic Voting Machine, it serves as the core component responsible for voter authentication. This sensor captures and verifies the fingerprint of each individual voter, ensuring that only authorized users can cast their vote, thus preventing duplication or impersonation.

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The R307 operates based on optical fingerprint recognition technology. When a user places their finger on the scanning surface, the sensor's optical module illuminates the finger using an internal LED. The reflected light from the ridges and valleys of the fingerprint is captured by a CMOS image sensor, which converts the optical image into a digital signal. The built-in DSP (Digital Signal Processor) inside the module processes this image to extract key features, known as minutiae points — such as ridge endings and bifurcations — which are then used to create a unique fingerprint template. This template is stored in the sensor's internal memory during enrollment and later used for comparison during verification.

Arduino UNO

Fig2.Ardino Uno

The Arduino Uno is an open-source microcontroller board developed by *Arduino.cc*. It is based on the ATmega328P microcontroller and is widely used for electronic prototyping, embedded systems, and IoT applications due to its simplicity, affordability, and flexibility.

In this project, the Arduino Uno acts as the control unit, executing the logical flow of the voting process — from fingerprint authentication to vote storage and confirmation display.

It interprets signals from the fingerprint sensor to verify voter identity, activates the corresponding voting interface once authentication is successful, and stores the voting data securely in memory. The microcontroller also handles output feedback via the LCD, LED indicators, and buzzer to guide voters throughout the process.

LCD Display:

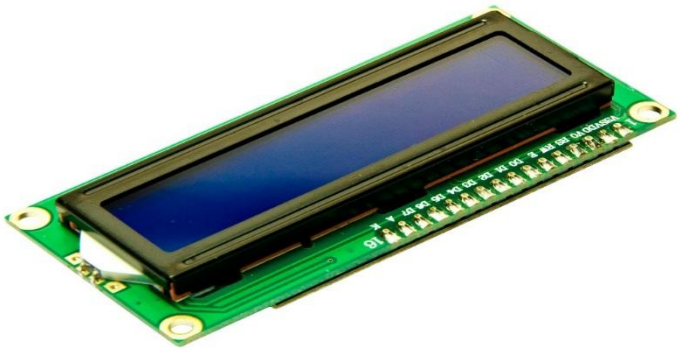

Fig3. LCD Display

An LCD works on the principle of light modulation rather than light emission. It uses liquid crystal molecules that align in a particular direction when an electric field is applied across them. These molecules control the passage of light, creating visible characters or graphics on the screen. The LCD does not produce light itself; instead, it relies on a backlight to illuminate the display, while the liquid crystals selectively block or allow light to pass through specific segments to form characters.In the 16x2 character LCD, each character is made up of a 5x8 pixel matrix, allowing alphanumeric display and limited custom symbols. The display module internally uses the Hitachi HD44780 controller, which simplifies communication with microcontrollers like the Arduino.

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Keypad:

The keypad is an essential input device used in the *Fingerprint-Based Biometric Smart Electronic Voting Machine* to allow authenticated voters to select their preferred candidate. It consists of a matrix of buttons (usually 3x4 or 4x4), where each key represents a number, letter, or function.The keypad works on the principle of row and column scanning. When a button is pressed, it connects a specific row and column line, which the Arduino detects to determine which key was pressed. This design minimizes the number of input pins required while still allowing multiple keys to be read accurately. In this project, the keypad provides a simple and intuitive way for voters to cast their votes after fingerprint authentication. It is connected directly to the Arduino, which reads the input, records the vote, and displays confirmation on the LCD screen.

Fig4. keypad

Buzzer:

Fig5.Buzzer

The buzzer is a small audio signaling device used in the project to provide sound feedback during various operations, such as successful fingerprint authentication, vote confirmation, or error alerts. It helps users know the system's status instantly without always looking at the LCD display.

The buzzer operates by converting electrical signals into sound through the rapid vibration of a piezoelectric element or magnetic coil. When the Arduino sends a high signal to the buzzer pin, it produces a tone, and when the signal is low, it remains silent.

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Switches:

The switches are basic electromechanical components used in the voting machine to perform essential control operations such as system reset, start, or power on/off. In some cases, additional switches may be assigned to functions like admin control, voter registration, or vote submission depending on the project design.A switch works on a simple ON/OFF principle — when pressed, it completes an electrical circuit, allowing current to flow (logic HIGH), and when released, it breaks the circuit (logic LOW). The Arduino continuously monitors the switch states to detect when an action is initiated.In this project, switches play a vital role in controlling user interactions and ensuring that operations occur in a proper sequence — for example, starting the fingerprint scanning process or resetting the system after a vote is cast.

Zero PCB:

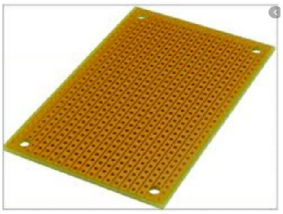

Fig7.Zero PCB

A Zero PCB (Printed Circuit Board), also known as a Dot Board or Perforated Board, is a type of prototyping board used to assemble and test electronic circuits without the need for a custom-designed PCB. It consists of a grid of holes (or copper pads) arranged in a standard spacing pattern, where electronic components such as resistors, switches, sensors, and ICs can be soldered to form a complete working circuit.In this project, the Zero PCB is used to mount and interconnect all the components of the voting machine—such as the fingerprint sensor, Arduino connections, switches, buzzer, and LCD. This setup provides a solid and semi-permanent prototype, making it more reliable and durable than breadboard-based connections while still being flexible for design modifications.The main advantage of using a Zero PCB is that it allows easy customization of circuit layout. Wires or solder bridges can be used to make electrical connections between components according to the circuit diagram. It is ideal for students, hobbyists, and researchers for building and testing hardware-based projects before designing a professional printed circuit board.

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IV. RESULTS

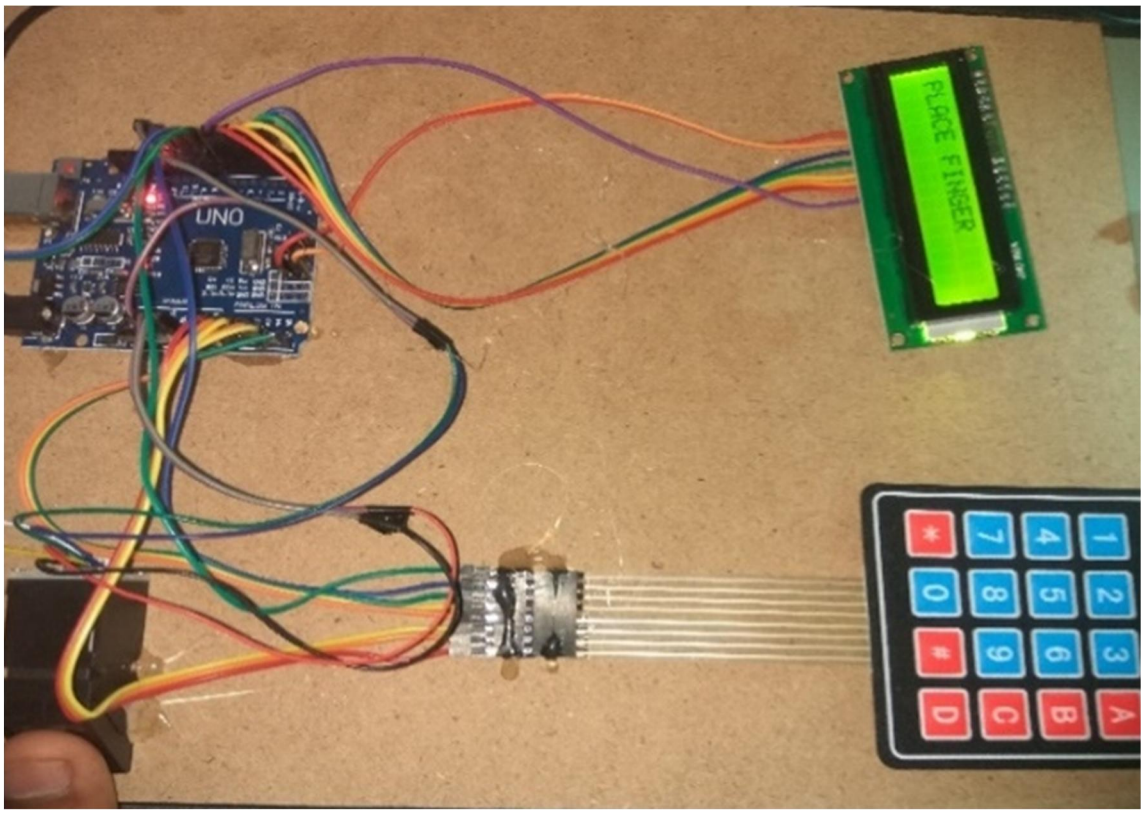

Fig. Result 1

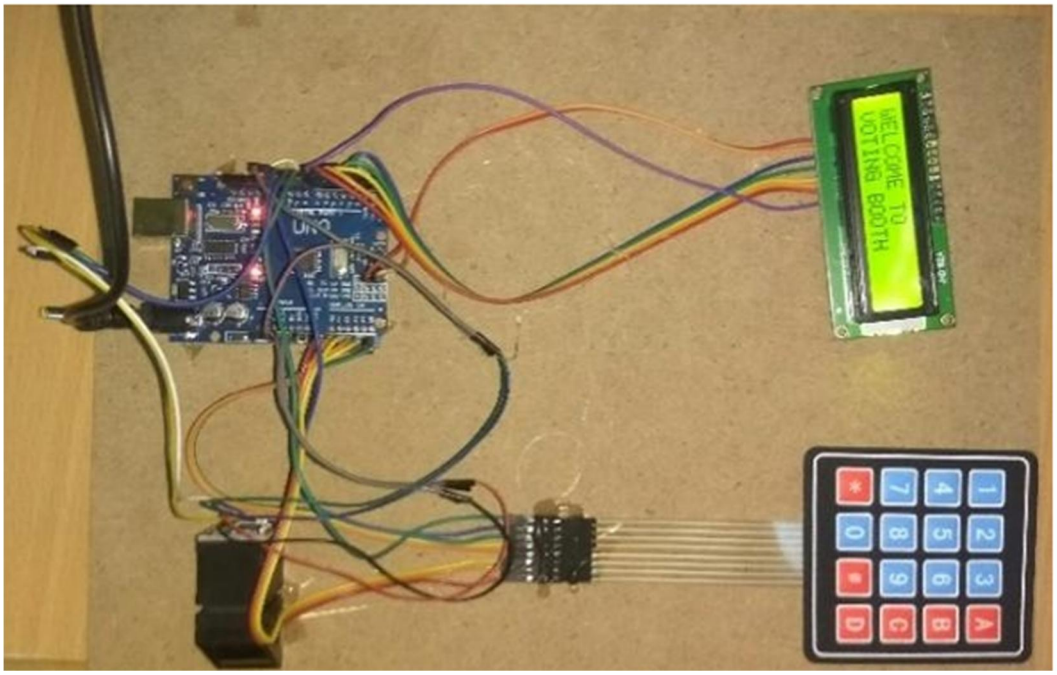

Fig.Result 2

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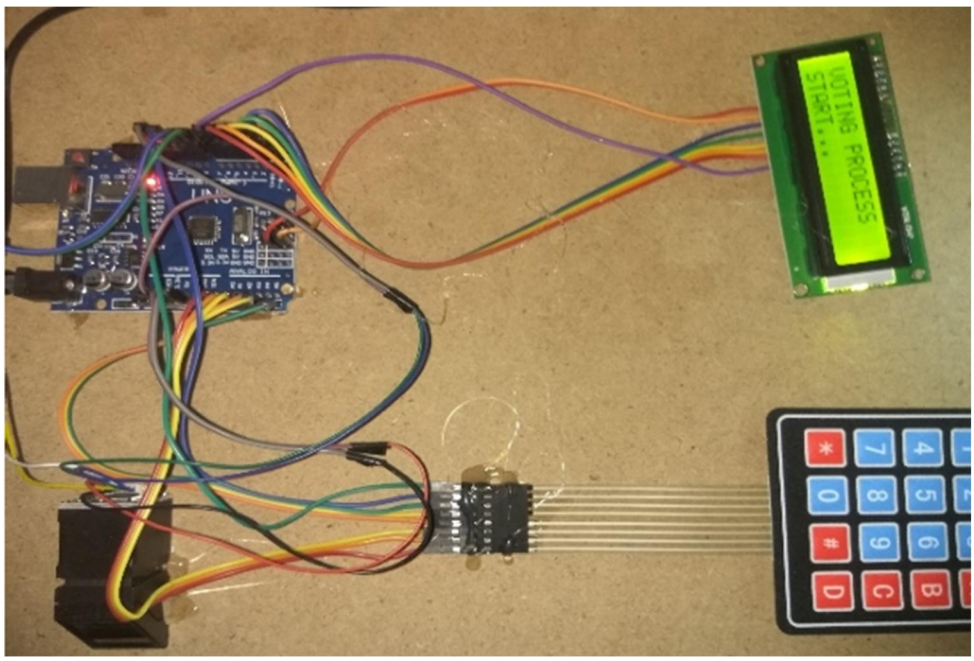

Fig.Result 3

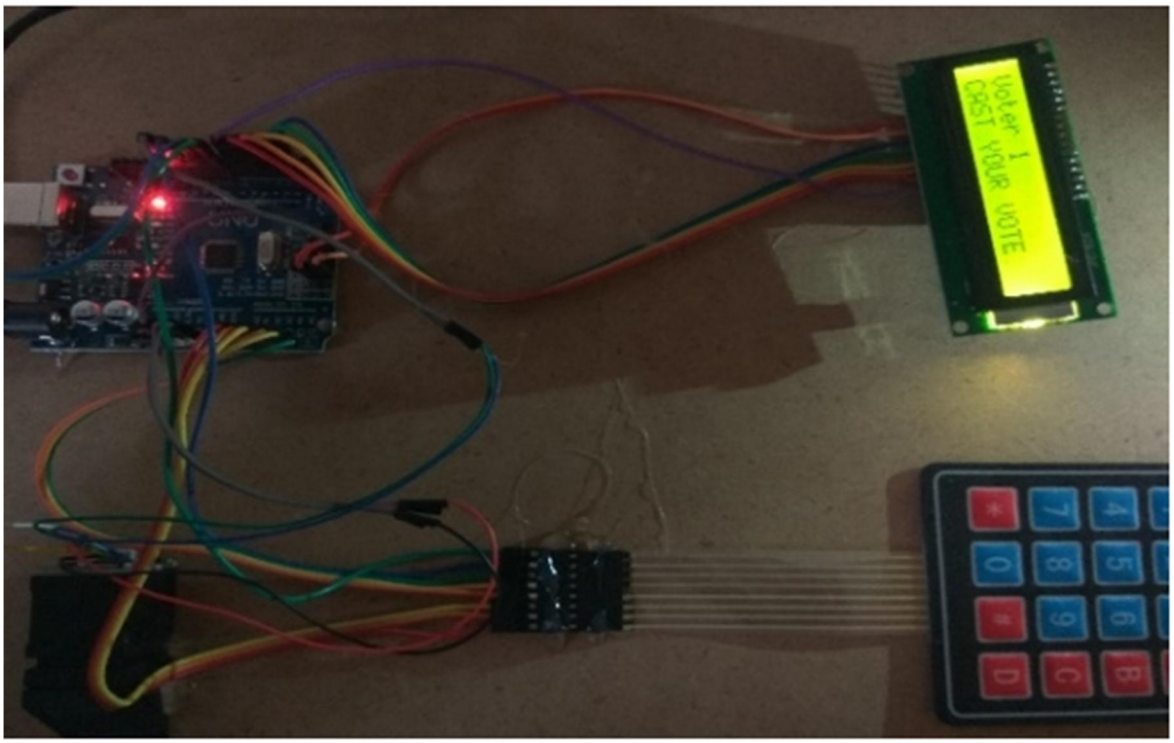

Fig. Result 4

V. DISCUSSIONS

The *Fingerprint-Based Biometric Smart Electronic Voting Machine* was thoroughly tested under controlled scenarios to evaluate the performance, reliability, and efficiency of its biometric and electronic components. The fingerprint sensor accurately authenticated voters, ensuring that only registered users could cast their vote. The system consistently prevented multiple voting attempts, demonstrating the effectiveness of biometric security in minimizing electoral fraud.

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Once authentication was successful, the keypad interface allowed voters to select their preferred candidate. All inputs were correctly detected by the Arduino, and the votes were reliably recorded in the system memory. The LCD display provided clear and immediate feedback, guiding voters through each step, including instructions, authentication status, and confirmation of vote submission. This real-time visual feedback improved user confidence and reduced the chances of errors during voting.

The buzzer successfully provided audio confirmation, signaling successful fingerprint verification, vote submission, or error alerts in cases of authentication failure or invalid input. The LEDs further enhanced system feedback by indicating operational status, confirming successful voting, or highlighting errors.

Integration of the Zero PCB and jumper wires ensured stable connections between all modules, allowing the system to operate seamlessly without wiring issues. The use of PCB-mounted switches enabled precise control of administrative functions, such as system reset or test operations, ensuring that the voting process remained organized and error-free.

During testing, the system demonstrated high accuracy and reliability, with rapid response times for fingerprint verification and vote recording. No instances of data loss or input misinterpretation were observed, confirming the robustness of the Arduino-based design. The modular nature of the setup also allowed for easy expansion, such as adding online vote transmission, multi-language support, or additional security features, without affecting core functionality.

Overall, the results validate that combining biometric fingerprint authentication, keypad input, and visual/audio feedback creates a secure, efficient, and user-friendly voting system. This approach effectively reduces human errors, prevents electoral fraud, and ensures that votes are accurately recorded, making it a practical solution for modern electronic voting applications.

VI. CONCLUSION

The *Fingerprint-Based Biometric Smart Electronic Voting Machine* successfully demonstrates how biometric authentication and microcontroller technology can be integrated to create a secure, efficient, and reliable voting system. By utilizing a fingerprint sensor, the system ensures that only registered voters can cast their votes, effectively preventing multiple voting attempts and reducing the risk of electoral fraud.

The combination of Arduino-based processing, keypad input, LCD display, buzzer, and LEDs provides a user-friendly interface that guides voters step by step, confirms actions in real time, and minimizes human errors. The modular design, built on a Zero PCB with stable wiring using jumper wires, allows for easy maintenance, scalability, and potential future upgrades, such as online vote transmission or multilingual support.

Testing and evaluation under controlled scenarios confirmed the accuracy, responsiveness, and robustness of the system. Voter authentication and vote recording occurred without errors or data loss, and all feedback mechanisms (visual and audio) worked reliably. This demonstrates that a small-scale, low-cost electronic voting system can achieve high security and operational efficiency, making it suitable for institutions, small elections, and pilot implementations.

In conclusion, this project highlights the practical advantages of biometric-based electronic voting, including increased security, reduced human error, faster vote tallying, and improved transparency. It provides a strong foundation for future advancements in digital voting technology, bridging the gap between traditional paper-based voting and fully secure, scalable electronic election systems.

REFERENCES

1. 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.
2. 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.
3. Gadade, B., Mulani, A. O., & Harale, A. D. IoT Based Smart School Bus and Student Tracking System. Sanshodhak, Volume 19, June 2024.
4. Dhanawadel, A., Mulani, A. O., & Pise, A. C. IOT based Smart farming using Agri BOT. Sanshodhak, Volume 20, June 2024.
5. Mulani, A., & Mane, P. B. (2016). DWT based robust invisible watermarking. Scholars' Press.

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6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. Nagane, U. P., & Mulani, A. O. (2021). Moving object detection and tracking using Matlab. Journal of Science and Technology, 6(1), 2456-5660.
13. 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.
14. Ghodake, M. R. G., & Mulani, M. A. (2016). Sensor based automatic drip irrigation system. Journal for Research, 2(02).
15. 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.
16. 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.
17. 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.
18. 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).
19. 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.
20. 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.
21. 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.
22. Kulkarni, P., & Mulani, A. O. (2015). Robust invisible digital image mamarking using discrete wavelet transform. International Journal of Engineering Research & Technology (IJERT), 4(01), 139-141.
23. 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.
24. Mulani, A. O., & Shinde, G. N. (2021). An approach for robust digital image watermarking using DWT□ PCA. Journal of Science and Technology, 6(1).
25. 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.
26. 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.

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27. 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.
28. 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.
29. Takale, S., & Mulani, A. (2022). DWT-PCA based video watermarking. Journal of Electronics, Computer Networking and Applied Mathematics (JECNAM) ISSN, 2799-1156.
30. Kamble, A., & Mulani, A. O. (2022). Google assistant based device control. Int. J. of Aquatic Science, 13(1), 550-555.
31. 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.
32. 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.
33. 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.
34. 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.
35. 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.
36. Gadade, B., & Mulani, A. (2022). Automatic System for Car Health Monitoring. International Journal of Innovations in Engineering Research and Technology, 57-62.
37. Shinde, M. R. S., & Mulani, A. O. (2015). Analysisof Biomedical Image Using Wavelet Transform. International Journal of Innovations in Engineering Research and Technology, 2(7), 1-7.
38. 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.
39. 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.
40. 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.
41. 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.
42. Takale, S., & Mulani, D. A. (2022). Video Watermarking System. International Journal for Research in Applied Science & Engineering Technology (IJRASET), 10.
43. Mandwale, A., & Mulani, A. O. (2015, January). Different approaches for implementation of Viterbi decoder. In IEEE international conference on pervasive computing (ICPC).
44. 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.
45. 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.
46. Kambale, A. (2023). Home automation using google assistant. UGC care approved journal, 32(1), 1071-1077.
47. 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.
48. 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.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

49. Mandwale, A., & Mulani, A. O. (2016). Implementation of High Speed Viterbi Decoder using FPGA. International Journal of Engineering Research & Technology, IJERT.
50. 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.
51. Shinde, R., & Mulani, A. O. (2015). Analysis of Biomedical Image‖. International Journal on Recent & Innovative trend in technology (IJRITT).
52. Sawant, R. A., & Mulani, A. O. (2022). Automatic PCB Track Design Machine. International Journal of Innovative Science and Research Technology, 7(9).
53. 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).
54. Gadade, B., Mulani, A. O., & Harale, A. D. (2024). Iot based smart school bus and student monitoring system. Naturalista Campano, 28(1), 730-737.
55. 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.
56. Salunkhe, D. S. S., & Mulani, D. A. O. (2024). Solar Mount Design Using High-Density Polyethylene. NATURALISTA CAMPANO, 28(1).
57. 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.
58. 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.
59. 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.
60. 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.
61. Godse, A. P. A.O. Mulani (2009). Embedded Systems (First Edition).
62. 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.
63. 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.
64. 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.
65. 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.
66. 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).
67. 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.
68. Pol, D. R. S. (2021). Cloud Based Memory Efficient Biometric Attendance System Using Face Recognition. Stochastic Modeling & Applications, 25(2).
69. Nagtilak, M. A. G., Ulegaddi, M. S. N., Adat, M. A. S., & Mulani, A. O. (2021). Breast Cancer Prediction using Machine Learning.
70. Rahul, G. G., & Mulani, A. O. (2016). Microcontroller Based Drip Irrigation System.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

71. 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.
72. Mulani, A., & Mane, P. B. (2016). DWT based robust invisible watermarking. Scholars' Press.
73. 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).
74. 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).
75. Altaf Osman Mulani, Electric Vehicle Parameters Estimation Using Web Portal, Recent Trends in Electronics & Communication Systems, Volume 10, Issue 3, 2023.
76. 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.
77. 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.
78. 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.
79. 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.
80. 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.
81. 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.
82. 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.
83. 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.
84. 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.
85. 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.
86. 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.
87. 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.
88. 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.

89. 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.
90. 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.
91. 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.
92. 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.
93. 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.
94. 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.
95. Karande, K. J., & Talbar, S. N. (2014). Independent component analysis of edge information for face recognition. Springer India.
96. Karande, K. J., & Talbar, S. N. (2008). Face recognition under variation of pose and illumination using independent component analysis. ICGST-GVIP, ISSN.
97. 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.
98. 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.
99. 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.
100. 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
101. 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.
102. https://doi.org/10.15680/IJIRCCE.2018.0604036
103. 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
104. 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).
105. 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
106. 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

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

107. 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.
108. 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.
109. 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.
110. 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.
111. 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.
112. 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.
113. 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.
114. 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.
115. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", International Conference on Recent Trends, Feb 2012, IOK COE, Pune.
116. 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.
117. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition using MFCC & DTW Features", ePGCON 2012, 23rd and 24th April 2012 organized by Commins COE for Woman, Pune.
118. 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.
119. Siddheshwar Gangonda and Prachi Mukherji, "Speech Processing for Marathi Numeral Recognition", ePGCON 2011, 26th April 2011 organized by MAEER's MIT, Kothrud, Pune-38.
120. Siddheshwar Gangonda, "Medical Image Processing", Aavishkar-2K7, 17th and 18th March 2007 organized by Department of Electronics and Telecommunication Engineering, SVERI's COE, Pandharpur.
121. Siddheshwar Gangonda, "Image enhancement & Denoising", VISION 2k7, 28th Feb-2nd March 2007 organized by M.T.E. Society's Walchand College of Engineering, Sangli.
122. Siddheshwar Gangonda, "Electromagnetic interference & compatibility" KSHITIJ 2k6, 23rd and 24th Sept. 2006 organized by Department of Mechanical Engineering, SVERI's COE, Pandharpur.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

123. 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
124. 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.
125. A. C. Pise, et. al., "Smart Vehicle: A Systematic Review", International Journal - The Ciência & Engenharia - Science & Engineering Journal ISSN: 0103-944XVolume 11 Issue 1, 2023pp: 992–998, 2023.
126. 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.
127. 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.
128. A. C. Pise, et. al., "IoT Based Landmine Detection Robot", International Journal of Research in Science & EngineeringISSN: 2394-8299Vol: 03, No. 04, June-July 2023.
129. 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.
130. A. C. Pise, et. al., "Python Algorithm to Estimate Range of Electrical Vehicle", Web of Science, Vol 21, No 1 (2022) December 2022
131. 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).
132. 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.
133. 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
134. 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.
135. 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.
136. 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.
137. 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
138. A. C. Pise, et. al., "Adaptive Noise Cancellation in Speech Signal", International Journal of Innovative Engg and Technology, 2017
139. 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
140. A. C. Pise, et. al.,"Review on Agricultural Plant Diseases Detection by Image Processing", ISSN 2278-62IX, IJLTET, Vol 7, Issue 1 May 2016
141. A. C. Pise, et. al. "Segmentation of Retinal Images for Glaucoma Detection", International Journal of Engineering Research and Technology (06, June-2015).

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

142. A. C. Pise, et. al. "Color Local Texture Features Based Face Recognition", International Journal of Innovations in Engineering and Technology(IJIET) , Dec. 2014
143. 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.
144. 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.
145. 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
146. 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.
147. 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.
148. 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.
149. 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.
150. A. C. Pise, et. al., "Facial Expression Recognition Using Facial Features," IEEE International Conference on Communication and Electronics Systems (ICCES 2018), October 2018.
151. 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.
152. 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.
153. 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.
154. 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.
155. 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.
156. 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.
157. 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
158. A. C. Pise, et. al. "Single Chip Solution For Multimode Robotic Control", Ist IEEE International Conferene on Computing Communication and Automation, 26-27 Feb2015.
159. 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
160. A. C. Pise, P. Bankar, "Face Recognition using Color Local Texture Features", International Conference on Electronics and Telecommunication, Electrical and Computer Engineering, Apr.2014.
161. 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.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

162. 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.
163. 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.
164. 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.
165. 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.
166. 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.
167. A. C. Pise, et. al. "Segmentation of Optic Disk and Optic Cup from retinal Images", ICEECMPE – Chennai, June 2015
168. A. C. Pise, et. al. "Diseases Detection of Pomegranate Plant", IEEE Sponsored International conference on Computation of Power, Energy , April 2015.
169. A. C. Pise, et. al. "Compensation Techniques for I/Q Imbalance in Direct-Conversion Receivers", Conference at SCOE, Pune 2010.
170. 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
171. A. C. Pise, et. al. "Compensation Techniques for I/Q Imbalance in Direct Conversion Receiver", Conference at PICT, Pune 2008.
172. A. C. Pise, et. al. "I/Q Imbalance compensation Techniques in Direct Conversion Receiver ", Conference at DYCOE, Pune 2008.
173. A. C. Pise, et. al. "DUCHA: A New Dual channel MAC protocol for Multihop Ad-Hoc Networks", Conference at SVCP, Pune 2007.
174. Godase, V., Pawar, P., Nagane, S., & Kumbhar, S. (2024). Automatic railway horn system using node MCU. Journal of Control & Instrumentation, 15(1).
175. 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.
176. 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.
177. 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.
178. 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.
179. Dange, R., Attar, E., Ghodake, P., & Godase, V. (2023). Smart agriculture automation using ESP8266 NodeMCU. J. Electron. Comput. Netw. Appl. Math, (35), 1-9.
180. Godase, V. (2025). Optimized Algorithm for Face Recognition using Deepface and Multi-task Cascaded Convolutional Network (MTCNN). Optimum Science Journal.
181. Mane, V. G. A. L. K., & Gangonda, K. D. S. Pipeline Survey Robot.
182. 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.
183. Godase, V., & Jagadale, A. (2019). Three element control using PLC, PID & SCADA interface. International Journal for Scientific Research & Development, 7(2), 1105-1109.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

184. 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.
185. 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.
186. Godase, V. (2025). Comparative study of ladder logic and structured text programming for PLC. Available at SSRN 5383802.
187. Godase, V., Modi, S., Misal, V., & Kulkarni, S. Real-time object detection for autonomous drone navigation using YOLOv8,Ⅱ. Advance Research in Communication Engineering and its Innovations, 2(2), 17-27.
188. Godase, V. (2025). Smart energy management in manufacturing plants using PLC and SCADA. Advance Research in Power Electronics and Devices, 2(2), 14-24.
189. 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.
190. Godase, V. (2025). Graphene-Based Nano-Antennas for Terahertz Communication. International Journal of Digital Electronics and Microprocessor Technology, 1(2), 1-14.
191. 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.
192. 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.
193. 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.
194. 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.
195. 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.
196. 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.
197. 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.
198. 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.
199. Nagane, M.S., Pawar, M.P., & Godase, P.V. (2022). Cinematica Sentiment Analysis. Journal of Image Processing and Intelligent Remote Sensing.
200. Godase, V.V. (2025). Tools of Research. SSRN Electronic Journal.
201. Godase, V. (n.d.). EDUCATION AS EMPOWERMENT: THE KEY TO WOMEN'S SOCIO ECONOMIC DEVELOPMENT. Women Empowerment and Development, 174–179.
202. 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).
203. 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).
204. Dhope, V. (2024). SMART PLANT MONITORING SYSTEM. In International Journal of Creative Research Thoughts (IJCRT). https://www.ijcrt.org

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 5, Issue 4, October 2025 Impact Factor: 7.67

205. 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/zendo.15056435
206. M. M. Zade, Bramhadev B. Rupanar, Vrushal S. Shilawant , Akansha R. Pawar(2025) "IOT Flood Monitoring & Alerting System using Rasberry Pi-Pico "International Journal of Research Publication & Reviews , Volume 6 ,Issue 3,ISSN:2582-7421.DOI:https://ijrpr.com/uploads/V6ISSUE3/IJRPR40251.pdf
207. 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
208. 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.
209. Mr.M.M.Zade published the paper on "Cloud Based Patient Health Record Tracking web Developement",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.
210. 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
211. 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
212. 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
213. 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
214. 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
215. 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
216. 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.
217. Mr. Mahesh M Zade & Mr.S.M.Karve,"Implementation of Reed Solomen Encoder & Decoder Using FPGA",National Conference on Advanced Trends in Engineering, Association with IRJMS, Karmyogi Engineering College, Shelave, Pandharpur, March 2016.
218. 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.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 4, October 2025
Impact Factor: 7.67

219. 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, SVERI's College of Engineering Pandharpur, NCET 2013.

220. 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.