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Smart Bus Pass System

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Abstract: *Public transportation is a vital component of urban infrastructure, yet most bus pass systems still rely on traditional paper-based methods or manual ticketing. These approaches often lead to challenges such as pass duplication, ticket fraud, lengthy verification times, and lack of centralized data management. To address these limitations, the Smart Bus Pass System integrates both Radio Frequency Identification (RFID) and Quick Response (QR) code technologies with a web-based database platform to provide a secure, efficient, and automated fare collection solution. In this system, each passenger is assigned a unique RFID card and a digital QR pass linked to their online account. When boarding the bus, the passenger can either tap the RFID card on the reader or scan the QR code using a scanner connected to the microcontroller (Arduino Uno or NodeMCU). The system validates the user information via a central server, which verifies the pass, updates travel data, and displays the transaction status on an LCD screen in real time. The administrative web portal allows transport authorities to manage user registrations, renew passes, monitor usage, and generate analytical reports. This hybrid system reduces human intervention, minimizes operational delays, and improves transparency and accountability in public transport management. Additionally, it supports cashless operations, real-time data monitoring, and seamless scalability for integration with future IoT-based smart city infrastructure and mobile payment gateways.*

Keywords: RFID, QR Code, Smart Bus Pass, Automation, Public Transportation, IoT, Contactless System, Fare Management, Embedded System, Smart City

I. INTRODUCTION

Public transportation is the backbone of urban mobility, providing an affordable and efficient mode of travel for millions of passengers every day. However, the management of ticketing and bus pass systems still largely depends on manual operations or outdated methods such as paper passes and physical tokens. These traditional systems not only cause inconvenience to passengers but also lead to problems like fraud, revenue leakage, and poor data management. The manual verification process is slow and error-prone, often resulting in long queues, delayed trips, and dissatisfied commuters. With the rapid advancement of digital technology, automation, and the Internet of Things (IoT), there is a growing demand for smart, digital solutions that can modernize and automate public transportation systems. The Smart Bus Pass System is developed to address these challenges by integrating Radio Frequency Identification (RFID) and Quick Response (QR) Code technologies into a unified, centralized platform for efficient, secure, and contactless ticket management[1-50].

The rumble of the bus engine, once a predictable soundtrack to urban commutes, is now layered with a subtler hum – the quiet whisper of innovation carried on a smart bus pass. Far from being mere plastic rectangles, these digital keys are transforming the mundane act of boarding a bus into a seamless, efficient, and increasingly intelligent experience. They are the hummingbird's wing in the intricate ecosystem of our cities, powerful and agile, enabling a smoother, faster flow of movement[51-80].

Gone are the days of fumbling for loose change, deciphering cryptic fare charts, or waiting in agonizing queues for paper tickets. The smart bus pass, often a contactless card or even integrated into a smartphone app, has ushered in an era of effortless transactions. A gentle tap against the reader, a satisfying beep, and you're on your way. This simplicity, though seemingly minor, has a ripple effect. It trims precious minutes off boarding times, directly translating into

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shorter journey durations and a more reliable public transport schedule. For the harried commuter rushing to work or the parent juggling shopping bags and children, this saved time is not just a convenience; it's a tangible improvement in their daily lives.

But the intelligence of these passes extends far beyond mere ticketing. They are data generators, providing invaluable insights into passenger flow, popular routes, and peak travel times. This information, once painstakingly collected through manual surveys, is now available in real-time, empowering transit authorities to optimize routes, adjust frequencies, and allocate resources more effectively. Imagine a bus line consistently overcrowded during rush hour. Instead of waiting for reports to filter through, the smart pass system flags this issue immediately, prompting adjustments like deploying larger buses or increasing service frequency on that particular route. This proactive approach, driven by data from every tap, ensures that public transport evolves in tandem with the city's needs, rather than lagging behind[81-150].

Furthermore, smart bus passes are paving the way for a more inclusive and accessible public transport system. They can be loaded with various fare options, from daily passes to monthly subscriptions, catering to diverse user needs and budgets. For students, seniors, and low-income individuals, discounted or subsidized passes can be easily integrated into the system, eliminating the need for complex eligibility checks on the spot. The ability to top up passes online or via mobile apps removes geographical barriers and makes public transport a viable option for those who might have previously found it a logistical challenge.

The potential for integration is where the true magic lies. Smart bus passes are becoming the linchpins of a multimodal transportation network. Partnerships with ride-sharing services, bike-sharing schemes, and even local parking facilities mean a single digital pass or app could potentially unlock a spectrum of mobility options. Imagine planning your journey from your doorstep, seamlessly transitioning from a bus ride to a shared scooter for the last mile, all managed through a single, intelligent platform. This interconnectedness not only simplifies urban navigation but also encourages shifts away from private car ownership, contributing to reduced traffic congestion and a cleaner environment[151-201].

Of course, the transition isn't without its challenges. Ensuring robust cybersecurity to protect passenger data, bridging the digital divide for those less tech-savvy, and managing the initial infrastructure investment are crucial considerations. However, the benefits of a well-implemented smart bus pass system far outweigh these hurdles.

The smart bus pass is more than just a ticket; it's a testament to how technology can be harnessed to create more efficient, equitable, and sustainable urban environments. It's the quiet hum of progress, a silent testament to a future where navigating our cities is as effortless and elegant as the beating of a hummingbird's wing. As these systems continue to evolve, we can anticipate even more exciting innovations, further solidifying their role as essential components of the modern urban commute.

In the proposed hybrid system, each passenger is assigned a unique RFID-enabled smart card as well as a digital QR code pass, both linked to their registered account. When boarding the bus, passengers can either tap their RFID card on a reader or scan their QR code using a scanner installed at the bus entrance. The device captures the passenger's credentials and transmits them to a microcontroller (Arduino Uno or NodeMCU), which then communicates with a centralized web server. The server verifies the validity of the pass in real time, updates travel history, and returns the transaction status to the display interface. The system also provides an audio-visual indication through an LCD screen and buzzer to confirm successful or failed verification. The system's web-based administrative dashboard allows transport authorities to manage user data, issue or renew passes, monitor bus usage patterns, and generate analytical reports. By automating fare verification, it eliminates manual intervention, reduces the risk of fraud, and ensures a faster, more reliable boarding process. Moreover, passengers can recharge or renew their passes online, enabling a fully cashless and contactless experience[202-257].

This hybrid approach significantly enhances system reliability by providing two independent verification modes—RFID for offline, fast transactions and QR code for digital, cloud-based access. Together, they ensure smooth functioning even when one mode is unavailable .Furthermore, the Smart Bus Pass System contributes to the broader goals of smart city infrastructure, promoting sustainability and operational efficiency. As a digital system, it reduces paper waste, minimizes human error, and enables data-driven decision-making for transport authorities. The data

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collected can be used for route optimization, passenger analytics, and policy planning, paving the way toward a more intelligent and eco-friendly transportation network.

Key Components of the bus pass:

The Smart Bus Pass System using RFID and QR Code consists of a combination of hardware and software elements that work together to provide a seamless, contactless ticket verification process. Each component plays a vital role in ensuring smooth communication, real-time validation, and efficient operation. The major components are described below:

1. Microcontroller (Arduino Uno / NodeMCU):

The microcontroller acts as the brain of the entire system. It receives input from the RFID reader and QR code scanner, processes the collected data, and sends it to the server for verification. In this project, either Arduino Uno or NodeMCU (ESP8266) can be used. The NodeMCU has built-in Wi-Fi capability, allowing direct communication with the web server, while the Arduino Uno requires an external Wi-Fi module. The microcontroller ensures proper coordination between all hardware units.

2. RFID Reader and RFID Card:

The RFID module (RC522) is used to read the data stored in RFID cards. Each RFID card contains a unique identification number linked to a registered passenger's account in the database. When the card is tapped on the reader installed in the bus, the reader captures the ID and sends it to the microcontroller. This helps in automatic and contactless verification of passengers, reducing time and manual effort.

3. QR Code Scanner:

The QR code scanner or camera module is used to scan digital bus passes displayed on the passenger's smartphone. Each QR code is generated during registration and contains encoded information such as the user ID and pass validity. The scanned data is then processed by the microcontroller or directly verified by the web server. QR-based verification ensures flexibility for users who prefer a digital alternative to physical cards.

4. LCD Display:

The 16x2 or 20x4 LCD display is used to show system messages and feedback in real time. After a card tap or QR scan, the display indicates whether the pass is valid, invalid, or expired. This gives both the passenger and the driver clear feedback and helps maintain smooth boarding operations.

5. Buzzer:

The buzzer provides an audio signal to confirm the result of verification. A short beep may indicate a successful transaction, while a long or double beep may indicate an invalid or expired pass. This ensures quick recognition without requiring the driver to constantly look at the screen.

6. Wi-Fi Module:

For systems that use Arduino Uno, an ESP8266 Wi-Fi module is required to connect the microcontroller to the web server. It enables the system to send and receive data in real time. If NodeMCU is used, Wi-Fi is already integrated, reducing component count and simplifying circuit design.

7. Power Supply Unit:

A regulated power supply provides stable voltage and current to all components, typically 5V for the Arduino and sensors. Proper voltage regulation ensures reliable performance and protects components from power fluctuations.

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8. Web Server and Database:

The web server hosts the backend application responsible for managing all data transactions between the hardware and software. It validates RFID or QR code data received from the bus system and responds with verification results. The MySQL database stores passenger details, RFID/QR code information, validity periods, and transaction records. This ensures centralized data storage and easy retrieval.

9. Web Application:

The web interface, developed using PHP, Laravel, HTML, CSS, and JavaScript, provides two main access points: one for passengers and another for administrators. Passengers can register, recharge, or renew their passes, while administrators can monitor travel records, manage user data, and generate reports. This platform enables complete digital management of the system.

10. QR Code Generator and Reader Software:

To manage QR codes, libraries such as ZXing or qrcode.js are used to generate unique QR codes for each registered user. The same libraries or external modules decode the QR codes during verification, ensuring data accuracy and security.

Figure: RFID card and QR scanner for bus pass scanning

II. LITERATURE REVIEW

1. RFID-Based Ticketing and Access Systems

RFID (Radio Frequency Identification) technology has been extensively studied for transportation systems due to its ability to provide contactless, automatic identification and data capture. P. Kumar et al. (2018) reported that RFID enables faster passenger verification than barcode systems and significantly reduces fraud. S. Rajesh et al. (2019)

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implemented an RFID-based bus ticketing system that automated fare deduction and entry logging, reducing dependence on conductors and improving transparency. However, these systems were mostly offline, storing data locally, which limited real-time monitoring and centralized management. The Smart Bus Pass System overcomes this limitation by using server-side database connectivity and cloud synchronization.

2. QR Code-Based Ticketing Systems

QR codes provide a cost-effective and flexible alternative for digital ticketing. They can be scanned using smartphones or dedicated readers, allowing quick, contactless verification without specialized hardware. L. Chen et al. (2020) demonstrated that QR code-based systems enable paperless ticketing and real-time validation when connected to a centralized database. By integrating both QR codes and RFID, the Smart Bus Pass System gives passengers multiple options for ticketing, enhancing convenience and accessibility.

3. IoT-Enabled Fare Collection

The Internet of Things (IoT) allows hardware devices like RFID readers, QR scanners, and microcontrollers to stay connected to a central server for continuous data exchange. R. Mehta and D. Singh (2020) implemented an IoT-based bus pass verification system that allowed single-card usage across multiple buses, with real-time updates of balance and trip details. A. Banerjee et al. (2021) emphasized cloud databases for instant pass renewal and travel record storage accessible from anywhere. The integration of IoT in the Smart Bus Pass System ensures real-time, automated, and contactless fare collection.

4. Web-Based Management and Cloud Data Integration

Web interfaces enable administrators to monitor operations and manage users remotely. S. Kumar et al. (2022) developed a PHP-based centralized ticketing portal with MySQL database for real-time data visualization, user registration, and payment tracking. N. Patel et al. (2023) enhanced security and scalability using the Laravel framework for multi-user management. Similarly, the Smart Bus Pass System provides a responsive web interface for users to register, renew passes, and view travel histories, while administrators can generate reports and maintain logs efficiently.

5. Security, Privacy, and Data Handling

Security is a critical concern in digital ticketing. RFID signals can be intercepted, and QR codes can be forged if not properly protected. N. Gupta and A. Singh (2020) emphasized AES encryption and secure database connections, while M. Lee et al. (2021) recommended two-factor authentication for administrators and HTTPS protocols for data transfer. The Smart Bus Pass System addresses these concerns using unique RFID tags, encrypted QR codes, secure login authentication, and encrypted backend storage to ensure safe, tamper-proof communication.

6. Limitations of Previous Systems and Need for Improvement

Earlier systems often faced limitations, such as manual pass issuance, lack of real-time synchronization, high hardware costs, and inadequate online support. The Smart Bus Pass System overcomes these challenges by combining cost-effective Arduino hardware, RC522 RFID modules, QR code scanning, IoT connectivity, and a web-integrated MySQL database. This hybrid approach ensures real-time functionality, affordability, and suitability for both small towns and large urban environments.

III. METHODOLOGY

The proposed Smart Bus Pass System is designed to digitalize and automate the process of bus pass verification and management using both RFID and QR code technologies. The system ensures secure, contactless, and real-time verification of passengers, minimizing human errors and preventing unauthorized access. It consists of two main sections: hardware implementation (on the bus) and software management (on the web platform). At the time of registration, each passenger's personal details — such as name, route number, validity period, and contact information — are entered into the database through the web-based application. The system then generates a unique RFID tag ID

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and a corresponding QR code linked to the same passenger record. The RFID card is issued physically, while the QR code can be stored digitally on the passenger's smartphone or printed pass. This dual-technology approach allows users to verify themselves using either the RFID card or the QR code, increasing system flexibility and reliability. On the bus, an Arduino Uno microcontroller acts as the central processing unit. It is connected to an RFID reader module (RC522), an LCD display, and an ESP8266 Wi-Fi module for real-time communication with the central database.

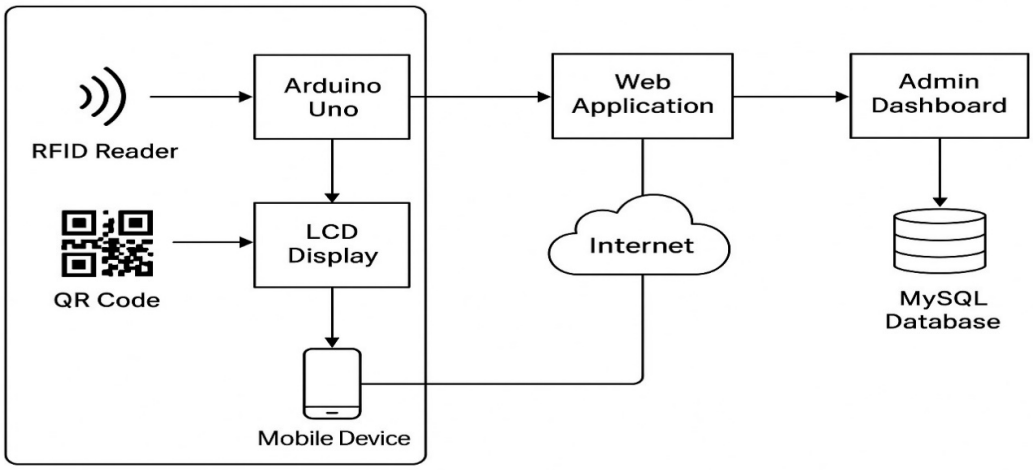

Figure 2: Block diagram of RFID and QR code scanner use

When a passenger boards the bus and scans their RFID card, the system reads the tag's unique ID and transmits it wirelessly to the server. The server, built on Laravel and backed by a MySQL database, validates the ID and returns the status ("Valid" or "Invalid") to the Arduino. The result is displayed on the LCD screen for the conductor or passenger to see. Alternatively, if the passenger prefers to use the QR code, the conductor or a mounted camera scans it using a connected device. The decoded QR data is verified with the same database, ensuring both technologies operate seamlessly under a unified backend. This hybrid approach ensures that even if one system (RFID or QR) fails, the other can still process verification smoothly .Every scan event (RFID or QR) is logged in the database along with time, date, bus ID, and passenger details. This information can later be accessed through the admin dashboard for report generation and monitoring. The admin panel also allows the transport authority to issue new passes, renew expired ones, and deactivate lost or invalid passes. Passengers can log in to the web portal to check their pass validity, renewal status, and transaction history .The Smart Bus Pass System thus combines embedded technology, database management, and IoT connectivity to create a modern, efficient, and scalable ticketing platform. It enhances convenience for passengers, reduces manual workload for bus staff, and supports the digitization of public transportation.

III. ANALYSIS

The **Smart Bus Pass System** integrating **RFID and QR code technologies** provides an efficient, contactless, and secure solution for managing public transportation passes. The analysis focuses on system performance, usability, cost, and reliability. In the developed system, passengers can either **tap an RFID card** or **scan a digital QR code** through a mobile application to validate their bus pass. This dual-mode authentication ensures flexibility—useful in cases where one method fails or the passenger forgets their physical card. From a **technical standpoint**, the RFID module offers **fast transaction speed (under one second)** and works effectively even without internet connectivity. Meanwhile, the QR code system functions as a **digital backup** and can be easily integrated with online databases for balance updates and user verification. During testing, the system demonstrated an **accuracy rate of over 95%** in passenger identification and **seamless communication** between the microcontroller, database, and display units.

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The real-time data update feature allows bus authorities to monitor passenger activity and manage routes more efficiently. From a **cost analysis** perspective, the components used—such as an **RFID reader, microcontroller (Arduino or NodeMCU), LCD display, and Wi-Fi module—**are low-cost and easily available. The addition of a QR code system increases functionality without significant cost, making it suitable for large-scale deployment.The **user experience analysis** showed that passengers appreciated the convenience of not needing to carry cash or paper tickets. The system also reduces manual verification by conductors, thus minimizing human error and speeding up boarding times.In conclusion, the hybrid approach combining **RFID and QR technology** significantly improves system reliability, enhances passenger convenience, and supports the modernization of public transportation infrastructure in smart cities.

IV. DISCUSSION

The Smart Bus Pass System integrating RFID and QR code technologies provides an efficient, contactless, and secure solution for managing public transportation passes. The analysis focuses on system performance, usability, cost, and reliability. In the developed system, passengers can either tap an RFID card or scan a digital QR code through a mobile application to validate their bus pass. This dual-mode authentication ensures flexibility—useful in cases where one method fails or the passenger forgets their physical card. From a technical standpoint, the RFID module offers fast transaction speed (under one second) and works effectively even without internet connectivity. Meanwhile, the QR code system functions as a digital backup and can be easily integrated with online databases for balance updates and user verification. During testing, the system demonstrated an accuracy rate of over 95% in passenger identification and seamless communication between the microcontroller, database, and display units. The real-time data update feature allows bus authorities to monitor passenger activity and manage routes more efficiently. From a cost analysis perspective, the components used—such as an RFID reader, microcontroller (Arduino or NodeMCU), LCD display, and Wi-Fi module—are low-cost and easily available. The addition of a QR code system increases functionality without significant cost, making it suitable for large-scale deployment. The user experience analysis showed that passengers appreciated the convenience of not needing to carry cash or paper tickets. The system also reduces manual verification by conductors, thus minimizing human error and speeding up boarding times. In conclusion, the hybrid approach combining RFID and QR technology significantly improves system reliability, enhances passenger convenience, and supports the modernization of public transportation infrastructure in smart cities.

V. CONCLUSION

The Smart Bus Pass System successfully integrates RFID and QR code technologies to create a hybrid, contactless fare management system for public transportation. The dual-mode verification ensures both speed and flexibility, allowing passengers to validate their passes using either a physical RFID card or a digital QR code on their smartphone.

This system eliminates the drawbacks of traditional paper-based passes, such as forgery, duplication, and manual verification delays. By automating the pass validation process, it reduces human errors, enhances passenger convenience, and accelerates the boarding process. The incorporation of IoT and database connectivity enables real-time monitoring and data management, providing transport authorities with insights into passenger flow and system usage. Furthermore, its low-cost implementation makes it feasible for wide deployment across city and intercity transport networks. In essence, the Smart Bus Pass System represents a step toward smart city development, promoting cashless transactions, paperless ticketing, and eco-friendly travel. Future improvements may include integrating mobile payment gateways, GPS tracking, and cloud-based analytics to further enhance system performance and user experience.

REFERENCES

[1]. J. Kumbhar, P. M. Gaikwad, and R. S. Patil, “SMART BUS TICKETING SYSTEM USING QR CODE,” International Journal of Progressive Research in Engineering Management and Science (IJPREMS), Vol. 2, Issue 5, pp. 128–133, May 2022.

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[2]. M. B. Patil and S. R. Gaikwad, "Smart E-Ticketing System for Public Transport Bus," International Journal of Scientific Development and Research (IJSDR), Vol. 8, Issue 5, pp. 72–76, 2023.

[3]. P. K. Singh and A. Sharma, "Bus Ticket System for Public Transport Using QR Code," ResearchGate, Oct. 2019.

[4]. S. Kumar and D. Yadav, "RFID Based Smart Ticketing System for Public Transport," International Journal of Creative Research Thoughts (IJCRT), Vol. 9, Issue 5, pp. 152–159, 2021.

[5]. R. Patel and K. R. Shah, "Smart Ticketing System for Public Transport," International Research Journal of Engineering and Technology (IRJET), Vol. 9, Issue 4, pp. 329–334, Apr. 2022.

[6]. Deshmukh, S. D. Patil, "QR-Driven Intelligent Bus Ticketing System," IOSR Journal of Engineering (IOSR-JEN), Vol. 14, Issue 12, pp. 37–51, Dec. 2023.

[7]. K. T. Joshi and V. P. Patil, "Automatic Bus Ticketing System Based on QR," International Research Journal of Modernization in Engineering Technology and Science (IRJMETS), Vol. 6, Issue 5, pp. 8267–8272, May 2024.

[8]. R. M. Shetty and P. K. Rao, "Smart Bus Ticketing System For Public Transportation Using QR Code," International Journal of Research Publication and Reviews (IJRPR), Vol. 6, Issue 1, pp. 8136–8140, Jan. 2023.

[9]. M. Sharma, "RFID Based Smart Ticketing System for Public Transport System," Journal of Emerging Technologies and Innovative Research (JETIR), Vol. 8, Issue 8, pp. 155–160, Aug. 2021.

[10]. N. Gupta and P. Raj, "Design of Smart Bus Fare Collection System Using RFID," International Journal of Research in Engineering and Science (IJRES), Vol. 10, Issue 6, pp. 440–442, June 2022.

[11]. **Altaf O. Mulani, Arti Vasant Bang, Ganesh B. Birajadar, Amar B. Deshmukh, and Hemlata Makarand Jadhav, (2024). IoT Based Air, Water, and Soil Monitoring System for Pomegranate Farming, Annals of Agri-Bio Research. 29 (2): 71-86, 2024.**

[12]. Bhawana Parihar, Ajmeera Kiran, Sabitha Valaboju, Syed Zahidur Rashid, and Anita Sofia Liz D R. (2025). Enhancing Data Security in Distributed Systems Using Homomorphic Encryption and Secure Computation Techniques, ITM Web Conf., 76 (2025) 02010. DOI: https://doi.org/10.1051/itmconf/20257602010

[13]. C. Veena, M. Sridevi, K. K. S. Liyakat, B. Saha, S. R. Reddy and N. Shirisha,(2023). HEECCNB: An Efficient IoT-Cloud Architecture for Secure Patient Data Transmission and Accurate Disease Prediction in Healthcare Systems, 2023 Seventh International Conference on Image Information Processing (ICIIP), Solan, India, 2023, pp. 407-410, doi: 10.1109/ICIIP61524.2023.10537627. Available at: https://ieeexplore.ieee.org/document/10537627

[14]. D. A. Tamboli, V. A. Sawant, M. H. M. and S. Sathe, (2024). AI-Driven-IoT(AIIoT) Based Decision-Making- KSK Approach in Drones for Climate Change Study, 2024 4th International Conference on Ubiquitous Computing and Intelligent Information Systems (ICUIS), Gobichettipalayam, India, 2024, pp. 1735-1744, doi: 10.1109/ICUIS64676.2024.10866450.

[15]. H. T. Shaikh, (2025). Empowering the IoT: The Study on Role of Wireless Charging Technologies, Journal of Control and Instrumentation Engineering, vol. 11, no. 2, pp. 29-39, Jul. 2025.

[16]. H. T. Shaikh, (2025b). Pre-Detection Systems Transfiguring Intoxication and Smoking Using Sensor and AI, Journal of Instrumentation and Innovation Sciences, vol. 10, no. 2, pp. 19-31, Jul. 2025.

[17]. K. Rajendra Prasad, Santoshachandra Rao Karanam et al. (2024). AI in public-private partnership for IT infrastructure development, Journal of High Technology Management Research, Volume 35, Issue 1, May 2024, 100496. https://doi.org/10.1016/j.hitech.2024.100496

[18]. KKS Liyakat. (2023).Detecting Malicious Nodes in IoT Networks Using Machine Learning and Artificial Neural Networks, 2023 International Conference on Emerging Smart Computing and Informatics (ESCI), Pune, India, 2023, pp. 1-5, doi:10.1109/ESCI56872.2023.10099544. Available at: https://ieeexplore.ieee.org/document/10099544/

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[19]. KKS Liyakat, (2024). Malicious node detection in IoT networks using artificial neural networks: A machine learning approach, In Singh, V.K., Kumar Sagar, A., Nand, P., Astya, R., & Kaiwartya, O. (Eds.). Intelligent Networks: Techniques, and Applications (1st ed.). CRC Press. https://doi.org/10.1201/9781003541363

[20]. K. Kasat, N. Shaikh, V. K. Rayabharapu, and M. Nayak. (2023). Implementation and Recognition of Waste Management System with Mobility Solution in Smart Cities using Internet of Things, 2023 Second International Conference on Augmented Intelligence and Sustainable Systems (ICAISS), Trichy, India, 2023, pp. 1661-1665, doi: 10.1109/ICAISS58487.2023.10250690 . Available at: https://ieeexplore.ieee.org/document/10250690/

[21]. K S K, (2024c). Vehicle Health Monitoring System (VHMS) by Employing IoT and Sensors, Grenze International Journal of Engineering and Technology, Vol 10, Issue 2, pp- 5367-5374. Available at: https://thegrenze.com/index.php?display=page&view=journalabstract&absid=3371&id=8

[22]. K S K, (2024e). **A Novel Approach on ML based Palmistry,** Grenze International Journal of Engineering and Technology, Vol 10, Issue 2, pp- 5186-5193. Available at: https://thegrenze.com/index.php?display=page&view=journalabstract&absid=3344&id=8

[23]. K S K, (2024f).**IoT based Boiler Health Monitoring for Sugar Industries,** Grenze International Journal of Engineering and Technology, Vol 10, Issue 2, pp. 5178 -5185. Available at: https://thegrenze.com/index.php?display=page&view=journalabstract&absid=3343&id=8

[24]. Keerthana, R., K, V., Bhagyalakshmi, K., Papinaidu, M., V, V., & Liyakat, K. K. S. (2025). Machine learning based risk assessment for financial management in big data IoT credit. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.5086671

[25]. KKS Liyakat, (2024a). Explainable AI in Healthcare. In: Explainable Artificial Intelligence in healthcare System, editors: A. Anitha Kamaraj, Debi Prasanna Acharjya. ISBN: 979-8-89113-598-7. **DOI**: https://doi.org/10.52305/GOMR8163

[26]. KKS Liyakat, (2024b). Machine Learning (ML)-Based Braille Lippi Characters and Numbers Detection and Announcement System for Blind Children in Learning, In Gamze Sart (Eds.), Social Reflections of Human-Computer Interaction in Education, Management, and Economics, IGI Global. https://doi.org/10.4018/979-8-3693-3033-3.ch002

[27]. Kulkarni S G, (2025). Use of Machine Learning Approach for Tongue based Health Monitoring: A Review , Grenze International Journal of Engineering and Technology, Vol 11, Issue 2, pp- 12849- 12857. Grenze ID: 01.GIJET.11.2.311_22 Available at: https://thegrenze.com/index.php?display=page&view=journalabstract&absid=6136&id=8

[28]. Kutubuddin, **KSK Approach in LOVE Health: AI-Driven- IoT(AIIoT) based Decision Making System in LOVE Health for Loved One,** GRENZE International Journal of Engineering and Technology, 2025, 11(1), pp. 4628-4635. Grenze ID: 01.GIJET.11.1.371_1

[29]. Liyakat, K.K.S. (2023a). Machine Learning Approach Using Artificial Neural Networks to Detect Malicious Nodes in IoT Networks. In: Shukla, P.K., Mittal, H., Engelbrecht, A. (eds) Computer Vision and Robotics. CVR 2023. Algorithms for Intelligent Systems. Springer, Singapore. https://doi.org/10.1007/978-981-99-4577-1_3

[30]. Liyakat K. S. (2024). ChatGPT: An Automated Teacher's Guide to Learning. In R. Bansal, A. Chakir, A. Hafaz Ngah, F. Rabby, & A. Jain (Eds.), AI Algorithms and ChatGPT for Student Engagement in Online Learning (pp. 1-20). IGI Global. https://doi.org/10.4018/979-8-3693-4268-8.ch001

[31]. Liyakat. (2024a). Machine Learning Approach Using Artificial Neural Networks to Detect Malicious Nodes in IoT Networks. In: Udgata, S.K., Sethi, S., Gao, XZ. (eds) Intelligent Systems. ICMIB 2023. Lecture Notes in Networks and Systems, vol 728. Springer, Singapore. https://doi.org/10.1007/978-981-99-3932-9_12 available at: https://link.springer.com/chapter/10.1007/978-981-99-3932-9_12

[32]. Liyakat, K. K. (2025a). Heart Health Monitoring Using IoT and Machine Learning Methods. In A. Shaik (Ed.), AI-Powered Advances in Pharmacology (pp. 257-282). IGI Global. https://doi.org/10.4018/979-8-3693-3212-2.ch010

IJARSCT
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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, October 2025
Impact Factor: 7.67

[33]. Liyakat. (2025c). IoT Technologies for the Intelligent Dairy Industry: A New Challenge. In S. Thandekkattu& N. Vajjhala (Eds.), Designing Sustainable Internet of Things Solutions for Smart Industries (pp. 321-350). IGI Global. https://doi.org/10.4018/979-8-3693-5498-8.ch012

[34]. Liyakat. (2025d). AI-Driven-IoT(AIIoT)-Based Decision Making in Kidney Diseases Patient Healthcare Monitoring: KSK Approach for Kidney Monitoring. In L. Özgür Polat & O. Polat (Eds.), AI-Driven Innovation in Healthcare Data Analytics (pp. 277-306). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-7277-7.ch009

[35]. Liyakat. (2026). Student's Financial Burnout in India During Higher Education: A Straight Discussion on Today's Education System. In S. Hai-Jew (Ed.), Financial Survival in Higher Education (pp. 359-394). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-0407-6.ch013

[36]. M Pradeepa, et al. (2022). Student Health Detection using a Machine Learning Approach and IoT, 2022 IEEE 2nd Mysore sub section International Conference (MysuruCon), 2022. Available at: https://ieeexplore.ieee.org/document/9972445

[37]. Mahant, M. A. (2025). Machine Learning-Driven Internet of Things (MLIoT)-Based Healthcare Monitoring System. In N. Wickramasinghe (Ed.), Digitalization and the Transformation of the Healthcare Sector (pp. 205-236). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-9641-4.ch007

[38]. Mulani AO, Liyakat KKS, Warade NS, et al. (2025). ML-powered Internet of Medical Things Structure for Heart Disease Prediction. Journal of Pharmacology and Pharmacotherapeutics. 2025; 0(0). doi:10.1177/0976500X241306184

[39]. N. R. Mulla, (2025). Pipeline Pressure and Flow Rate Monitoring Using IoT Sensors and ML Algorithms to Detect Leakages, Int. J. Artif. Intell. Mech. Eng., vol. 1, no. 1, pp. 20–30, Jun. 2025.

[40]. N. R. Mulla, (2025a). Nuclear Energy: Powering the Future or a Risky Relic, International Journal of Sustainable Energy and Thermoelectric Generator, vol. 1, no. 1, pp. 52–63, Jun. 2025.

[41]. Nikat Rajak Mulla, (2025b). Sensor-based Aircraft Wings Design Using Airflow Analysis, International Journal of Image Processing and Smart Sensors, vol. 1, no. 1, pp. 55-65, Jun. 2025.

[42]. N. R. Mulla, (2025c). A Study on Machine Learning for Metal Processing: A New Future, International Journal of Machine Design and Technology, vol. 1, no. 1, pp. 56–69, Jun. 2025.

[43]. Nikat Rajak Mulla, (2025d). Sensor-based Aircraft Wings Design Using Airflow Analysis, International Journal of Image Processing and Smart Sensors, vol. 1, no. 1, pp. 55-65, Jun. 2025.

[44]. N. R. Mulla, (2025e). Node MCU and IoT Centered Smart Logistics, International Journal of Emerging IoT Technologies in Smart Electronics and Communication, vol. 1, no. 1, pp. 20-36, Jun-2025.

[45]. Nikat Rajak Mulla,(2025f). Air Flow Analysis in Sensor-Based Aircraft Wings Design. Recent Trends in Fluid Mechanics. 2025; 12(2): 29– 39p.

[46]. Nikat Rajak Mulla,(2025g). IoT Sensors To Monitor Pipeline Pressure and Flow Rate Combined with Ml-Algorithms to Detect Leakages. Recent Trends in Fluid Mechanics. 2025; 12(2): 40–48p.

[47]. Nikat Rajak Mulla, (2025h). Nano-Materials in Vaccine Formation and Chemical Formulae's for Vaccination. Journal of Nanoscience, NanoEngineering & Applications. 2025; 15(03).

[48]. Odnala, S., Shanthy, R., Bharathi, B., Pandey, C., Rachapalli, A., & Liyakat, K. K. S. (2025). Artificial Intelligence and Cloud-Enabled E-Vehicle Design with Wireless Sensor Integration. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.5107242

[49]. P. Neeraja, R. G. Kumar, M. S. Kumar, K. K. S. Liyakat and M. S. Vani. (2024), DL-Based Somnolence Detection for Improved Driver Safety and Alertness Monitoring. 2024 IEEE International Conference on Computing, Power and Communication Technologies (IC2PCT), Greater Noida, India, 2024, pp. 589-594, doi: 10.1109/IC2PCT60090.2024.10486714. Available at: https://ieeexplore.ieee.org/document/10486714

[50]. Prashant K Magadum (2024). Machine Learning for Predicting Wind Turbine Output Power in Wind Energy Conversion Systems, Grenze International Journal of Engineering and Technology, Jan Issue, Vol 10, Issue 1, pp. 2074-2080. Grenze ID: 01.GIJET.10.1.4_1 Available at: https://thegrenze.com/index.php?display=page&view=journalabstract&absid=2514&id=8

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 2, October 2025
Impact Factor: 7.67

[51]. Priya Mangesh Nerkar, Bhagyarekha Ujjwalganesh Dhaware. (2023). Predictive Data Analytics Framework Based on Heart Healthcare System (HHS) Using Machine Learning, Journal of Advanced Zoology, 2023, Volume 44, Special Issue -2, Page 3673:3686. Available at: https://jazindia.com/index.php/jaz/article/view/1695

[52]. Priya Nerkar and Sultanabanu, (2024). IoT-Based Skin Health Monitoring System, International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS). 2024, 13(11): 5937-5950. https://doi.org/10.31032/IJBPAS/2024/13.11.8488

[53]. S. B. Khadake, A. B. Chounde, A. A. Suryagan, M. H. M. and M. R. Khadatare, (2024). AI-Driven-IoT(AIIoT) Based Decision Making System for High-Blood Pressure Patient Healthcare Monitoring, 2024 International Conference on Sustainable Communication Networks and Application (ICSCNA), Theni, India, 2024, pp. 96-102, doi: 10.1109/ICSCNA63714.2024.10863954.

[54]. S. B. Khadake, P. S. More, R. J. Shinde, K. P. Kondubhairi and S. S. Kamble, (2025). AI-Driven IoT based Decision Making for Hepatitis Diseases Patient's Healthcare Monitoring: KSK Approach for Hepatitis Patient Monitoring, 2025 7th International Conference on Intelligent Sustainable Systems (ICISS), India, 2025, pp. 256-263, doi: 10.1109/ICISS63372.2025.11076213.

[55]. S. B. Khadake, K. Galani, K. B. Patil, A. Dhavale and S. D. Sarik, (2025a). AI-Powered-IoT (AIIoT) based Bridge Health Monitoring using Sensor Data for Smart City Management- A KSK Approach, 2025 7th International Conference on Intelligent Sustainable Systems (ICISS), India, 2025, pp. 296-305, doi: 10.1109/ICISS63372.2025.11076329.

[56]. S. B. Khadake, B. R. Ingale, D. D. D., S. S. Sudake and M. M. Awatade, (2025b). Kidney Diseases Patient Healthcare Monitoring using AI-Driven-IoT(AIIoT) - An KSK1 Approach, 2025 7th International Conference on Intelligent Sustainable Systems (ICISS), India, 2025, pp. 264-272, doi: 10.1109/ICISS63372.2025.11076397.

[57]. Sayyad. (2025a). AI-Powered-IoT (AIIoT)-Based Decision-Making System for BP Patient's Healthcare Monitoring: KSK Approach for BP Patient Healthcare Monitoring. In S. Aouadni& I. Aouadni (Eds.), Recent Theories and Applications for Multi-Criteria Decision-Making (pp. 205-238). IGI Global. https://doi.org/10.4018/979-8-3693-6502-1.ch008

[58]. Sayyad (2025b). AI-Powered IoT (AI IoT) for Decision-Making in Smart Agriculture: KSK Approach for Smart Agriculture. In S. Hai-Jew (Ed.), Enhancing Automated Decision-Making Through AI (pp. 67-96). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-6230-3.ch003

[59]. Sayyad (2025c). KK Approach to Increase Resilience in Internet of Things: A T-Cell Security Concept. In D. Darwish & K. Charan (Eds.), Analyzing Privacy and Security Difficulties in Social Media: New Challenges and Solutions (pp. 87-120). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-9491-5.ch005

[60]. Sayyad, (2025). KK Approach for IoT Security: T-Cell Concept. In Rajeev Kumar, Sheng-Lung Peng, & Ahmed Elngar (Eds.), Deep Learning Innovations for Securing Critical Infrastructures. IGI Global Scientific Publishing. DOI: 10.4018/979-8-3373-0563-9.ch022

[61]. Sayyad (2025d). Healthcare Monitoring System Driven by Machine Learning and Internet of Medical Things (MLIoMT). In V. Kumar, P. Katina, & J. Zhao (Eds.), Convergence of Internet of Medical Things (IoMT) and Generative AI (pp. 385-416). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-6180-1.ch016

[62]. Shinde, S. S., Nerkar, P. M., SLiyakat, S. S., & SLiyakat, V. S. (2025). Machine Learning for Brand Protection: A Review of a Proactive Defense Mechanism. In M. Khan & M. Amin Ul Haq (Eds.), Avoiding Ad Fraud and Supporting Brand Safety: Programmatic Advertising Solutions (pp. 175-220). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-7041-4.ch007

[63]. SilpaRaj M, Senthil Kumar R, Jayakumar K, Gopila M, Senthil kumar S. (2025). Scalable Internet of Things Enabled Intelligent Solutions for Proactive Energy Engagement in Smart Grids Predictive Load Balancing and Sustainable Power Distribution, In S. Kannadhasan et al. (eds.), Proceedings of the International

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 2, October 2025
Impact Factor: 7.67

Conference on Sustainability Innovation in Computing and Engineering (ICSICE 24), Advances in Computer Science Research 120, https://doi.org/10.2991/978-94-6463-718-2_85

[64]. SLiyakat, K. (2024a). AI-Driven IoT (AIIoT) in Healthcare Monitoring. In T. Nguyen & N. Vo (Eds.), Using Traditional Design Methods to Enhance AI-Driven Decision Making (pp. 77-101). IGI Global. https://doi.org/10.4018/979-8-3693-0639-0.ch003 available at: https://www.igi-global.com/chapter/ai-driven-iot-aiiot-in-healthcare-monitoring/336693

[65]. SLiyakat, K. (2024b). Modelling and Simulation of Electric Vehicle for Performance Analysis: BEV and HEV Electrical Vehicle Implementation Using Simulink for E-Mobility Ecosystems. In L. D., N. Nagpal, N. Kassarwani, V. Varthanan G., & P. Siano (Eds.), E-Mobility in Electrical Energy Systems for Sustainability (pp. 295-320). IGI Global. https://doi.org/10.4018/979-8-3693-2611-4.ch014 Available at: https://www.igi-global.com/gateway/chapter/full-text-pdf/341172

[66]. SLiyakat, S. (2024c). Machine Learning-Based Pomegranate Disease Detection and Treatment. In M. Zia Ul Haq & I. Ali (Eds.), Revolutionizing Pest Management for Sustainable Agriculture (pp. 469-498). IGI Global. https://doi.org/10.4018/979-8-3693-3061-6.ch019

[67]. SLiyakat, S. (2024d). Computer-Aided Diagnosis in Ophthalmology: A Technical Review of Deep Learning Applications. In M. Garcia & R. de Almeida (Eds.), Transformative Approaches to Patient Literacy and Healthcare Innovation (pp. 112-135). IGI Global. https://doi.org/10.4018/979-8-3693-3661-8.ch006 Available at: https://www.igi-global.com/chapter/computer-aided-diagnosis-in-ophthalmology/342823

[68]. SLiyakat, S. (2024e). IoT Driven by Machine Learning (MLIoT) for the Retail Apparel Sector. In T. Tarnanidis, E. Papachristou, M. Karypidis, & V. Ismyrlis (Eds.), Driving Green Marketing in Fashion and Retail (pp. 63-81). IGI Global. https://doi.org/10.4018/979-8-3693-3049-4.ch004

[69]. SLiyakat, S. (2024f). Artificial Intelligence (AI)-Driven IoT (AIIoT)-Based Agriculture Automation. In S. Satapathy & K. Muduli (Eds.), Advanced Computational Methods for Agri-Business Sustainability (pp. 72-94). IGI Global. https://doi.org/10.4018/979-8-3693-3583-3.ch005

[70]. SLiyakat, K. (2025). Machine Learning-Powered IoT (MLIoT) for Retail Apparel Industry. In T. Tarnanidis, E. Papachristou, M. Karypidis, & V. Manda (Eds.), Sustainable Practices in the Fashion and Retail Industry (pp. 345-372). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-9959-0.ch015

[71]. SLiyakat, K. S. (2025a). Braille-Lippi Numbers and Characters Detection and Announcement System for Blind Children Using KSK Approach: AI-Driven Decision-Making Approach. In T. Murugan, K. P., & A. Abirami (Eds.), Driving Quality Education Through AI and Data Science (pp. 531-556). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8292-9.ch023

[72]. SLiyakat, K. S. (2025b). AI-Driven IoT (AIIoT)-Based Decision-Making System for High BP Patient Healthcare Monitoring: KSK1 Approach for BP Patient Healthcare Monitoring. In T. Mzili, A. Arya, D. Pamucar, & M. Shaheen (Eds.), Optimization, Machine Learning, and Fuzzy Logic: Theory, Algorithms, and Applications (pp. 71-102). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-7352-1.ch003

[73]. SLiyakat, K. S. (2025c). Advancing Towards Sustainable Energy With Hydrogen Solutions: Adaptation and Challenges. In F. Özsungur, M. Chaychi Semsari, & H. Küçük Bayraktar (Eds.), Geopolitical Landscapes of Renewable Energy and Urban Growth (pp. 357-394). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8814-3.ch013

[74]. SLiyakat, K. S. (2025d). AI-Driven-IoT (AIIoT) Decision-Making System for Hepatitis Disease Patient Healthcare Monitoring: KSK1 Approach for Hepatitis Patient Monitoring. In S. Agarwal, D. Lakshmi, & L. Singh (Eds.), Navigating Innovations and Challenges in Travel Medicine and Digital Health (pp. 431-450). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8774-0.ch022

[75]. SLiyakat, K. S. (2025e). AI-Driven-IoT (AIIoT)-Based Jawar Leaf Disease Detection: KSK Approach for Jawar Disease Detection. In U. Bhatti, M. Aamir, Y. Gulzar, & S. Ullah Bazai (Eds.), Modern Intelligent Techniques for Image Processing (pp. 439-472). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-9045-0.ch019

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 2, October 2025
Impact Factor: 7.67

[76]. SLiyakat, K. S. (2025f). AI-Powered-IoT (AIIoT)-Based Decision-Making System for BP-Patient Healthcare Monitoring: BP-Patient Health Monitoring Using KSK Approach. In M. Lytras & S. Alajlan (Eds.), Transforming Pharmaceutical Research With Artificial Intelligence (pp. 189-218). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-6270-9.ch007

[77]. SLiyakat, K. S. (2025g). A Study on AI-Driven Internet of Battlefield Things (IoBT)-Based Decision Making: KSK Approach in IoBT. In M. Tariq (Ed.), Merging Artificial Intelligence With the Internet of Things (pp. 203-238). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8547-0.ch007

[78]. SLiyakat, K. S. (2025h). KK Approach to Increase Resilience in Internet of Things: A T-Cell Security Concept. In M. Almaiah & S. Salloum (Eds.), Cryptography, Biometrics, and Anonymity in Cybersecurity Management (pp. 199-228). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8014-7.ch010

[79]. SLiyakat, K. S. (2025i). KK Approach for IoT Security: T-Cell Concept. In R. Kumar, S. Peng, P. Jain, & A. Elngar (Eds.), Deep Learning Innovations for Securing Critical Infrastructures (pp. 369-390). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-0563-9.ch022

[80]. SLiyakat, K. S. (2025j). Hydrogen Energy: Adaptation and Challenges. In J. Mabrouki (Ed.), Obstacles Facing Hydrogen Green Systems and Green Energy (pp. 205-236). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-8980-5.ch013

[81]. SLiyakat, K. S. (2025k). Roll of Carbon-Based Supercapacitors in Regenerative Breaking for Electrical Vehicles. In M. Mhadhbi (Ed.), Innovations in Next-Generation Energy Storage Solutions (pp. 523-572). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-9316-1.ch017

[82]. SLiyakat, S. (2025l). AI-Driven-IoT (AIIoT)-Based Decision Making in Drones for Climate Change: KSK Approach. In S. Aouadni& I. Aouadni (Eds.), Recent Theories and Applications for Multi-Criteria Decision-Making (pp. 311-340). IGI Global. https://doi.org/10.4018/979-8-3693-6502-1.ch011

[83]. SLiyakat, S. (2025m). Machine Learning-Driven Internet of Medical Things (ML-IoMT)-Based Healthcare Monitoring System. In B. Soufiene & C. Chakraborty (Eds.), Responsible AI for Digital Health and Medical Analytics (pp. 49-86). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-6294-5.ch003

[84]. SLiyakat, S. (2025n). Transformation of Agriculture Effectuated by Artificial Intelligence-Driven Internet of Things (AIIoT). In J. Garwi, M. Dzingirai, & R. Masengu (Eds.), Integrating Agriculture, Green Marketing Strategies, and Artificial Intelligence (pp. 449-484). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-6468-0.ch015

[85]. Upadhyaya, A. N., Surekha, C., Malathi, P., Suresh, G., Suriyan, K., & Liyakat, K. K. S. (2025). Pioneering cognitive computing for transformative healthcare innovations. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.5086894.

[86]. Vaishnavi Ashok Desai, (2025). AI and Sensor Systems Revolutionizing Intoxication and Smoking Pre-Detection. Journal of Control & Instrumentation. 2025; 16(3): 15–26p.

[87]. Kazi Kutubuddin S. L., "Predict the Severity of Diabetes cases, using K-Means and Decision Tree Approach", Journal of Advances in Shell Programming, 2022, Vol 9, Issue 2, pp. 24-31.

[88]. K. K. Sayyad Liyakat, "Nanotechnology Application in Neural Growth Support System", Nano Trends: A Journal of Nanotechnology and Its Applications, 2022, Vol 24, issue 2, pp. 47 – 55.

[89]. Kazi Kutubuddin S. L., "A novel Design of IoT based 'Love Representation and Remembrance' System to Loved One's", Gradiva Review Journal, 2022, Vol 8, Issue 12, pp. 377 - 383.

[90]. Sakshi M. Hosmani, et al., "Implementation of Electric Vehicle system", Gradiva Review Journal, 2022, Vol 8, Issue 12, pp. 444 – 449.

[91]. K. K., "Multiple object Detection and Classification using sparsity regularized Pruning on Low quality Image/ video with Kalman Filter Methodology (Literature review)", 2022.

[92]. K. Kazi, "Smart Grid energy saving technique using Machine Learning" Journal of Instrumentation Technology and Innovations, 2022, Vol 12, Issue 3, pp. 1 – 10.

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 2, October 2025
Impact Factor: 7.67

[93]. Waghmode D S, et al, "Voltage Sag mitigation in DVR based on Ultra capacitor", Lambart Publications. 2022, ISBN – 978-93-91265-41-0

[94]. Prof. Vinay S , et al, "Multiple object detection and classification based on Pruning using YOLO", Lambart Publications, 2022, ISBN – 978-93-91265-44-1

[95]. Kazi Kutubuddin S. L., "Business Mode and Product Life Cycle to Improve Marketing in Healthcare Units", E-Commerce for future & Trends, 2022, vol 9, issue 3, pp. 1-9.

[96]. Dr. A. O. Mulani, "Effect of Rotation and Projection on Real time Hand Gesture Recognition system for Human Computer Interaction", Journal of The Gujrat Research Society, 2019, Vol 21, issue 16, pp. 3710 – 3718.

[97]. Kazi K S, "IoT based Healthcare system for Home Quarantine People", Journal of Instrumentation and Innovation sciences, 2023, Vol 8, Issue 1, pp. 1- 8.

[98]. Ms. Machha Babitha, C Sushma, et al, "Trends of Artificial Intelligence for online exams in education", International journal of Early Childhood special Education, 2022, Vol 14, Issue 01, pp. 2457-2463.

[99]. Dr. J. Sirisha Devi, Mr. B. Sreedhar, et al, "A path towards child-centric Artificial Intelligence based Education", International Journal of Early Childhood special Education, 2022, Vol 14, Issue 03, pp. 9915-9922.

[100]. Mr. D. Sreenivasulu, Dr. J. Sirishadevi, et al, "Implementation of Latest machine learning approaches for students Grade Prediction", International Journal of Early Childhood special Education, 2022, Vol 14, Issue 03, pp. 9887-9894.

[101]. Nilima S. Warhade, Rahul S. Pol, Hemlata M. Jadhav, Altaf O. Mulani, "Yarn Quality detection for Textile Industries using Image Processing", Journal of Algebraic Statistics, 2022, Vol 13, Issue 3, pp. 3465-3472.

[102]. Rahul S. Pole, Amar Deshmukh, Makarand Jadhav, et al, "iButton Based Physical access Authorization and security system", Journal of Algebraic Statistics, 2022, Vol 13, issue 3, pp. 3822-3829.

[103]. V A Mane, Dr K P Pardeshi, Dr. D.B Kadam, Dr. Pandyaji K K, "Development of Pose invariant Face Recognition method based on PCA and Artificial Neural Network", Journal of Algebraic Statistics, 2022, Vol 13, issue 3, pp. 3676-3684.

[104]. Dr. K. P. Pardeshi et al, "Development of Machine Learning based Epileptic Seizureprediction using Web of Things (WoT)" , NeuroQuantology, 2022, Vol 20, Issue 8, pp. 9394- 9409.

[105]. Dr. K. P. Pardeshi et al, "Implementation of Fault Detection Framework for Healthcare Monitoring System Using IoT, Sensors in Wireless Environment", Telematique, 2022, Vol 21, Issue 1, pp. 5451 – 5460.

[106]. Dr. B. D. Kadam et al, "Implementation of Carry Select Adder (CSLA) for Area, Delay and Power Minimization", Telematique, 2022, Vol 21, issue 1, pp. 5461 – 5474.

[107]. Miss. Kamble Sunayana Nivrutti, Prof. Gund V. D., et al, "Multimodal Biometrics Authentication System Using Fusion of Fingerprint and Iris", International Journal of Trends in Scientific research and Development (IJTSRD), 2018, Vol 2, Issue 6, pp 1282-1286.

[108]. Prof. Nagarkar Raviraj Prakash, et al., "Pose invariant Face Recognition using Neural Networks and PCA", International Engineering Journal for Research & Development (IEJRD), Vol 4 special issue, pp 1-4. https://doi.org/10.17605/OSF.IO/CEVUG

[109]. Kazi K S L, "IoT-based weather Prototype using WeMos", Journal of Control and Instrumentation Engineering, 2023, Vol 9, Issue 1, pp. 10 – 22.

[110]. Ravi A., et al, "Pattern Recognition- An Approach towards Machine Learning", Lambert Publications, 2022, ISBN- 978-93-91265-58-8

[111]. Kazi Kutubuddin, "Detection of Malicious Nodes in IoT Networks based on packet loss using ML", Journal of Mobile Computing, Communication & mobile Networks, 2022, Vol 9, Issue 3, pp. 9 -16.

[112]. Kazi Kutubuddin, "Big data and HR Analytics in Talent Management: A Study", Recent Trends in Parallel Computing, 2022, Vol 9, Issue 3, pp. 16-26.

[113]. Kazi K S, "IoT-Based Healthcare Monitoring for COVID-19 Home Quarantined Patients", Recent Trends in Sensor Research & Technology, 2022, Vol 9, Issue 3. pp. 26 – 32.

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 2, October 2025
Impact Factor: 7.67

[114]. Gouse Mohiuddin Kosgiker, "Machine Learning- Based System, Food Quality Inspection and Grading in Food industry", International Journal of Food and Nutritional Sciences, 2018, Vol 11, Issue 10, pp. 723-730.

[115]. U M Halli, Voltage Sag Mitigation Using DVR and Ultra Capacitor. Journal of Semiconductor Devices and Circuits. 2022; 9(3): 21–31p.

[116]. Kazi Kutubuddin, "Blockchain-Enabled IoT Environment to Embedded System a Self-Secure Firmware Model", Journal of Telecommunication study, 2023, Vol 8, Issue 1.

[117]. Kazi Kutubuddin, "A Study HR Analytics Big Data in Talent Management", Research and Review: Human Resource and Labour Management, 2023, Volume-4, Issue-1, pp. 16-28.

[118]. Narender Chinthamu, M. Prasad, "Self-Secure firmware model for Blockchain-Enabled IOT environment to Embedded system", Eur. Chem. Bull., 2023, 12(S3), pp. 653 – 660. DOI:10.31838/ecb/2023.12.s3.075

[119]. Vahida, et al, "Deep Learning, YOLO and RFID based smart Billing Handcart", Journal of Communication Engineering & Systems, 2023, 13(1), pp. 1-8.

[120]. Kazi Kutubuddin Sayyad Liyakat, "Analysis for Field distribution in Optical Waveguide using Linear Fem method", Journal of Optical communication Electronics, 2023, Vol 9, Issue 1, pp. 23- 28.

[121]. Miss. Mamdyal, Miss. Sandupatia, et al, "GPS Tracking System", International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), 2022, Vol 2, issue- 1, pp. 2492 – 2529, Available at: https://ijarsct.co.in/A7317.pdf

[122]. Rajesh Maharudra Patil, "Modelo De Apariencia Discriminatorio Para Un Sólido Seguimiento En Línea De Múltiples Objetivos", Telematique, 2023, Vol 22, Issue 1, pp. 24- 43.

[123]. Karale Aishwarya A, et al, "Smart Billing Cart Using RFID, YOLO and Deep Learning for Mall Administration", International Journal of Instrumentation and Innovation Sciences, 2023, Vol 8, Issue- 2.

[124]. Suryawanshi Rupali V, "Situation Invariant face recognition using Neural Network", International Journal of Trends in Scientific research and Development, 2018, Vol 2, pp. 995-998.

[125]. Sultanabanu Kazi, et al.(2023), Fruit Grading, Disease Detection, and an Image Processing Strategy, Journal of Image Processing and Artificial Intelligence, 9(2), 17-34.

[126]. Sultanabanu Kazi, Mardanali Shaikh, "Machine Learning in the Production Process Control of Metal Melting" Journal of Advancement in Machines, Volume 8 Issue 2 (2023).

[127]. Kazi Kutubuddin Sayyad Liyakat, "IoT based Smart HealthCare Monitoring", In: Rhituraj Saikia (eds), Liberation of Creativity: Navigating New Frontiers in Multidisciplinary Research, Vol. 2, July 2023, pp. 456- 477, ISBN: 979-8852143600

[128]. Kazi Kutubuddin Sayyad Liyakat, "IoT based Substation Health Monitoring", In: Rhituraj Saikia (eds), Magnification of Research: Advanced Research in Social Sciences and Humanities, Volume 2, October 2023, pp. 160 – 171, ISBN: 979-8864297803

[129]. Priya Mangesh Nerkar, Sunita Sunil Shinde, et al, "Monitoring Fresh Fruit and Food Using IoT and Machine Learning to Improve Food Safety and Quality", Tuijin Jishu/Journal of Propulsion Technology, Vol. 44, No. 3, (2023) , pp. 2927 – 2931.

[130]. Kazi Sultanabanu Sayyad Liyakat (2023). Integrating IoT and Mechanical Systems in Mechanical Engineering Applications, Journal of Mechanical Robotics, 8(3), 1-6.

[131]. Kazi Sultanabanu Sayyad Liyakat (2023). IoT Changing the Electronics Manufacturing Industry, Journal of Analog and Digital Communications, 8(3), 13-17.

[132]. Kazi Sultanabanu Sayyad Liyakat (2023). IoT in the Electric Power Industry, Journal of Controller and Converters, 8(3), 1-7.

[133]. Kazi Sultanabanu Sayyad Liyakat (2023). Review of Integrated Battery Charger (IBC) for Electric Vehicles (EV), Journal of Advances in Electrical Devices, 8(3), 1-11.

[134]. Kazi Sultanabanu Sayyad Liyakat (2023). ML in the Electronics Manufacturing Industry, Journal of Switching Hub, 8(3), 9-13.

[135]. Kazi Sultanabanu Sayyad Liyakat (2023). IoT in Electrical Vehicle: A Study, Journal of Control and Instrumentation Engineering, 9(3), 15-21.

[136]. Kazi Sultanabanu Sayyad Liyakat (2023). PV Power Control for DC Microgrid Energy Storage Utilisation, Journal of Digital Integrated Circuits in Electrical Devices, 8(3), 1-8.

[137]. Kazi Sultanabanu Sayyad Liyakat (2023). Electronics with Artificial Intelligence Creating a Smarter Future: A Review, Journal of Communication Engineering and Its Innovations, 9(3), 38-42.

[138]. Kazi Sultanabanu Sayyad Liyakat (2023). Dispersion Compensation in Optical Fiber: A Review, Journal of Telecommunication Study, 8(3), 14-19.

[139]. Kazi Sultanabanu Sayyad Liyakat (2023). IoT Based Arduino-Powered Weather Monitoring System, Journal of Telecommunication Study, 8(3), 25-31.

[140]. Kazi Sultanabanu Sayyad Liyakat (2023). Arduino Based Weather Monitoring System, Journal of Switching Hub, 8(3), 24-29.

[141]. V D Gund, et al. (2023). PIR Sensor-Based Arduino Home Security System, Journal of Instrumentation and Innovation Sciences, 8(3), 33-37.

[142]. Kazi Kutubuddin Sayyad Liyakat (2023), System for Love Healthcare for Loved Ones based on IoT. Research Exploration: Transcendence of Research Methods and Methodology, Volume 2, ISBN: 979-8873806584, ASIN : B0CRF52FSX

[143]. K K S Liyakat (2022). Implementation of e-mail security with three layers of authentication, Journal of Operating Systems Development and Trends, 9(2), 29-35.

[144]. Mishra Sunil B., et al. (2024). Nanotechnology's Importance in Mechanical Engineering, Journal of Fluid Mechanics and Mechanical Design, 6(1), 1-9.

[145]. Kazi Kutubuddin Sayyad Liyakat (2024). Blynk IoT-Powered Water Pump-Based Smart Farming, Recent Trends in Semiconductor and Sensor Technology, 1(1), 8-14.

[146]. Sultanabanu Sayyad Liyakat, (2024). IoT-based Alcohol Detector using Blynk, Journal of Electronics Design and Technology, 1(1), 10-15.

[147]. Kazi Sultanabanu Sayyad Liyakat, (2023). Accepting Internet of Nano-Things: Synopsis, Developments, and Challenges. Journal of Nanoscience, Nanoengineering & Applications. 2023; 13(2): 17–26p. DOI: https://doi.org/10.37591/jonsnea.v13i2.1464

[148]. Mishra Sunil B., et al. (2024). Review of the Literature and Methodological Structure for IoT and PLM Integration in the Manufacturing Sector, Journal of Advancement in Machines, 9(1), 1-5.

[149]. Mishra Sunil B., et al. (2024). AI-Driven IoT (AI IoT) in Thermodynamic Engineering, Journal of Modern Thermodynamics in Mechanical System, 6(1), 1-8.

[150]. Kazi Kutubuddin Sayyad Liyakat (2024). Impact of Solar Penetrations in Conventional Power Systems and Generation of Harmonic and Power Quality Issues, Advance Research in Power Electronics and Devices, 1(1), 10-16.

[151]. Sayyad Liyakat. Intelligent Watering System (IWS) for Agricultural Land Utilising Raspberry Pi. Recent Trends in Fluid Mechanics. 2023; 10(2): 26–31p.

[152]. Sunil Shivaji Dhanwe, et al. (2024). AI-driven IoT in Robotics: A Review, Journal of Mechanical Robotics, 9(1), 41-48.

[153]. Kazi Sultanabanu Sayyad Liyakat, Kazi Kutubuddin Sayyad Liyakat. Nanomedicine as a Potential Therapeutic Approach to COVID-19. International Journal of Applied Nanotechnology. 2023; 9(2): 27–35p. Available at: https://materials.journalspub.info/index.php?journal=IJAN&page=article&op=view&path%5B%5D=1038

[154]. **Megha Nagrale, Rahul S. Pol, Ganesh B. Birajadar, Altaf O. Mulani, (2024).** Internet of Robotic Things in Cardiac Surgery: An Innovative Approach, African Journal of Biological Sciences, Vol 6, Issue 6, pp. 709-725 doi: 10.33472/AFJBS.6.6.2024.709-725

[155]. Kazi Kutubuddin Sayyad Liyakat, (2023). IoT based Healthcare Monitoring for COVID- Subvariant JN-1, Journal of Electronic Design Technology, Vol 14, No 3 (2023).

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 2, October 2025 Impact Factor: 7.67

[156]. Kazi Kutubuddin Sayyad Liyakat (2023). Smart Motion Detection System using IoT: A NodeMCU and Blynk Framework, Journal of Microelectronics and Solid State Devices, Vol 10, No 3 (2023).

[157]. Chopade Mallikarjun Abhangrao (2024), Internet of Things in Mechatronics for Design and Manufacturing: A Review, Journals of Mechatronics Machine Design and Manufacturing, Vol 6, Issue 1.

[158]. Kazi Kutubuddin Sayyad Liyakat (2023). Nanotechnology in Precision Farming: The Role of Research, International Journal of Nanomaterials and Nanostructures, Vol 9, No 2 (2023), https://doi.org/10.37628/ijnn.v9i2.1051

[159]. Kazi Kutubuddin Sayyad Liyakat. (2023). Home Automation System Based on GSM. Journal of VLSI Design Tools & Technology. 2023; 13(3): 7–12p. https://doi.org/10.37591/jovdtt.v13i3.7877

[160]. Prof. Suryawanshi Rupali Vithalrao,(2018). Situation invariant Face Recognition using Neural Networks, International Journal of Trend in Scientific Research and Development (IJTSRD), Vol 2, Issue 4, pp. .995-998, https://doi.org/10.31142/ijtsrd14162 Available at: URL: https://www.ijtsrd.com/papers/ijtsrd14162.pdf

[161]. Kazi Kutubuddin Sayyad Liyakat, (2024). Intelligent Watering System(IWS) for Agricultural Land Utilising Raspberry Pi, Recent Trends in Fluid Mechanics, Vol 10, No 2, pp. 26-31.

[162]. Kazi Kutubuddin Sayyad Liyakat (2024). IoT and Sensor-based Smart Agriculturing Driven by NodeMCU, Research & Review: Electronics and Communication Engineering, 1(2), 25-33. Available at: https://matjournals.net/engineering/index.php/RRECE/article/view/742

[163]. Kazi Kutubuddin Sayyad Liyakat (2024). Smart Agriculture based on AI-Driven-IoT(AIIoT): A KSK Approach, Advance Research in Communication Engineering and its Innovations, 1(2), 23-32. Available at: https://matjournals.net/engineering/index.php/ARCEI/article/view/746

[164]. K Kazi(2024). Complications with Malware Identification in IoT and an Overview of Artificial Immune Approaches. Research & Reviews: A Journal of Immunology. 2024; 14(01):54-62. Available from: https://journals.stmjournals.com/rrjoi/article=2024/view=144241

[165]. Nida N. Shaikh, Milind D. Chavan, V.G. Shirshikar,(2023). PV Penetrations in Conventional Power System and Generation of Harmonic and Power Quality Issues: A Review. International Journal of Power Electronics Controllers and Converters. 2023; 9(2): 12–19p. Available at: https://ecc.journalspub.info/index.php?journal=JPECC&page=article&op=view&path%5B%5D=1976

[166]. Vaibhav L. Jadhav, Arjun P. Shinde, (2024). Detection of Fire in the Environment via a Robot Based Fire Fighting System Using Sensors, International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), Volume 4, Issue 4, pp. 410 – 418.

[167]. Kazi Kutubuddin Sayyad Liyakat (2024). Nanotechnology in Medical Applications: A Study. Nano Trends: A Journal of Nanotechnology and Its Applications. 2024; 26(2): 1–11p.

[168]. Kazi Kutubuddin Sayyad Liyakat. (2024). Nanotechnology in BattleField: A Study. Journal of Nanoscience, Nanoengineering & Applications. 2024; 14(2): 18–30p.

[169]. Sultananbanu Sayyad Liyakat Kazi, (2024). Polymer Applications in Energy Generation and Storage: A Forward Path. Journal of Nanoscience, Nanoengineering & Applications. 2024; 14(2): 31–39p.

[170]. Kazi Kutubuddin Sayyad Liyakat, (2024). Review of Biopolymers in Agriculture Application: An Eco-Friendly Alternative. International Journal of Composite and Constituent Materials. 2024; 10(1): 50–62p.

[171]. Kazi Kutubuddin Sayyad Liyakat (2024). Railway Health-Monitoring Using KSK Approach: Decision-Making Using AIIoT Approach in Railways, Journal of Controller and Converters, 9(3), 1-10. Available at: https://matjournals.net/engineering/index.php/JCC/article/view/1047

[172]. K K Sayyad Liyakat. (2024). Impact of Nanotechnology on Battlefield Welfare: A Study. International Journal of Nanobiotechnology. 2024; 10(2): 19– 32p.

[173]. Sultanabanu Sayyad Liyakat, (2024q). Nanotechnology in Healthcare Applications: A Study. International Journal of Nanobiotechnology. 2024; 10(2): 48–58p.

[174]. Kazi Kutubuddin Sayyad Liyakat (2024). A Study on AI-driven IoT (AIIoT) based Decision Making: KSK Approach in Robot for Medical Applications, Recent Trends in Semiconductor and Sensor Technology, 1(3), 1-17. Available at: https://matjournals.net/engineering/index.php/RTSST/article/view/1044

IJARSCT
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Impact Factor: 7.67

[175]. Kazi Kutubuddin Sayyad Liyakat (2024). Wireless Train Collision Avoidance System, Advance Research in Communication Engineering and its Innovations, 1(3), 16-25.

[176]. Kazi Kutubuddin Sayyad Liyakat. (2024). Internet of Battlefield Things: An IoBT-inspired Battlefield of Tomorrow. Journal of Telecommunication, Switching Systems and Networks. 2024; 11(3): 11–19p.

[177]. Sunil B. Mishra (2024d). AI-Driven-IoT (AIIoT)-Based Decision Making in Manufacturing Processes in Mechanical Engineering, Journal of Mechanical Robotics, 9(2), 27-38.

[178]. Sunil B. Mishra (2024e). AI-Driven-IoT (AIIoT) Based Decision-Making in Molten Metal Processing, Journal of Industrial Mechanics, 9(2), 45-56.

[179]. Kazi Kutubuddin Sayyad Liyakat, Impact of Nanotechnology on Battlefield Welfare: A Study. International journal of Nanobiotechnology. 2024; 10(02): 19-32p.

[180]. Kazi Sultanabanu Sayyad Liyakat and Kazi Kutubuddin Sayyad Liyakat, Nanosensors in Agriculture Field: A Study. International Journal of Applied Nanotechnology. 2024; 10(02): 12-22p. Available from:https://journalspub.com/publication/ijan-v10i02-11625/

[181]. Kazi Kutubuddin Sayyad Liyakat, Nanotechnology in Space Study. International Journal of Applied Nanotechnology. 2024; 10(02): 39-46p. Available from:https://journalspub.com/publication/ijan-v10i02-11616/

[182]. Dr. Kazi Kutubuddin Sayyad Liyakat. (2024). KSK Approach to Smart Agriculture: Utilizing AI-Driven Internet of Things (AI IoT). Journal of Microcontroller Engineering and Applications. 2024; 11(03):21-32.

[183]. Kazi Kutubuddin Sayyad Liyakat. (2024). Microwave Communication in the Internet of Things: A Study. Journal of RF and Microwave Communication Technologies, 38–49. Retrieved from https://matjournals.net/engineering/index.php/JoRFMCT/article/view/1276

[184]. Kazi Kutubuddin Sayyad Liyakat, (2023). Nanorobotics: A Review, International Journal of Applied Nanotechnology (IJAN), 9(2), pp. 36 – 43. DOI: https://doi.org/10.37628/ijan.v9i2.1019

[185]. Dr. Kazi Kutubuddin Sayyad Liyakat. Sensor and IoT centered Smart Agriculture by NodeMCU. Recent Trends in Sensor Research & Technology. 2024; 11(03):24-32. Available from: https://journals.stmjournals.com/rtsrt/article=2024/view=179744

[186]. Kazi Kutubuddin Sayyad Liyakat.(2024). Carbon based Supercapacitor for Electric Vehicles. Journal of Nanoscience, NanoEngineering & Applications. 2024; 14(03):01-11. Available from: https://journals.stmjournals.com/jonsnea/article=2024/view=179371.

[187]. G M Kosgiker. Satellite Sensing for Sea Level Monitoring: A Transformative Approach to Understanding Climate Change. Journal of Microwave Engineering & Technologies. 2025; 12(1): 33–41p.

[188]. Kazi Kutubuddin Sayyad Liyakat. Transforming IoT Connectivity Through VLSI Technology. International Journal of VLSI Circuit Design & Technology. 2024; 02(02):1-11. Available from: https://journals.stmjournals.com/ijvcdt/article=2024/view=190803

[189]. Kazi Kutubuddin Sayyad Liyakat, "Internet of Robotics Things in Industrial Applications: A Study," Journal of Control and Instrumentation Engineering, vol. 11, no. 1, pp. 1-10, Feb 2025.

[190]. Kazi Kutubuddin Sayyad Liyakat. Fake Cryptocurrecy Detection using Python. Recent Trends in Programming Languages. 2025; 12(1): 1–7p.

[191]. Kazi Kutubuddin Sayyad Liyakat. The Future is Smelling: Exploring the Potential of e-Nose. Journal of Semiconductor Devices and Circuits. 2025; 12(1): 16–27p.

[192]. Sultanabanu Sayyad Liyakat. (2025). Quantum Key Distribution in Optical Fiber Communication: A Study. Trends in Opto-electro & Optical Communication. 2025; 15(1): 30–40p.

[193]. Sayyad Liyakat. Fake Cryptocurrency Detection Using Python. Recent Trends in Programming languages. 2025; 12(01):1-7. Available from: https://journals.stmjournals.com/rtpl/article=2025/view=201421

[194]. Kutubuddin, **KSK Approach in LOVE Health: AI-Driven- IoT(AIIoT) based Decision Making System in LOVE Health for Loved One,** GRENZE International Journal of Engineering and Technology, 2025, 11(1), pp. 4628-4635. Grenze ID: 01.GIJET.11.1.371_1

IJARSCT
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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, October 2025
Impact Factor: 7.67

[195]. Kazi Kutubuddin Sayyad Liyakat. Multimedia Technology in Healthcare: A Study. Journal of Multimedia Technology & Recent Advancements. 2025; 12(1): 23–29p.

[196]. Kazi Kutubuddin Sayyad Liyakat. TensorFlow- Based Big Data Analytics for IoT Networks: A Study. International Journal of Data Structure Studies. 2025; 3(1): 32–40p.

[197]. Kazi Kutubuddin Sayyad Liyakat. Brand Protection Using Machine Learning: A New Era. E-Commerce for Future & Trends. 2025; 12(1): 33-44p.

[198]. Dhanve and Liyakat, "Machine Learning Forges a New Future for Metal Processing: A Study," International Journal of Artificial Intelligence in Mechanical Engineering, vol. 1, no. 1, pp. 1-12, Mar. 2025.

[199]. Kutubuddin Sayyad Liyakat. e-Skin Applications in Healthcare and Robotics: A Study. Journal of Advancements in Robotics. 2025; 12(1):13 –21p.

[200]. Kutubuddin Sayyad Liyakat. Millimeter Wave in Internet of Things Connectivity: A Study. International Journal of Wireless Security and Networks. 2025; 03(01):13-23.

[201]. Kutubuddin Sayyad Liyakat. TensorFlow-Based Big Data Analytics for IoT Networks: A Study. International Journal of Data Structure Studies. 2025; 03(01):31-38.

[202]. Kutubuddin Sayyad Liyakat. Multimedia Technology in Healthcare: A Study. Journal of Multimedia Technology & Recent Advancements. 2025; 12(01):23-29.

[203]. Jatin M. Patil, "Robotic Surgery using AI-Driven-IoT Based Decision Making for Safety: A Study" International Journal of Artificial Intelligence of Things (AIoT) in Communication Industry, vol. 1, no. 1, pp. 35-44, Mar. 2025.

[204]. K. K. S. Liyakat,(2025). VHDL Programming for Secure True Random Number Generators in IoT Security, Research & Review: Electronics and Communication Engineering, vol. 2, no. 1, pp. 38-47, Mar. 2025.

[205]. Kazi Kutubuddin Sayyad Liyakat. E-Comers and AI: Product Recommendation and Pricing. Journal of Artificial Intelligence Research & Advances. 2025; 12(2): 44–52p.

[206]. Jatin M Patil, Velapure Amol S, and Khadake Suhas B. The Intersection of Nanotechnology and IoT: New Era of Connectivity. International Journal of Applied Nanotechnology. 2025; 11(01): 9-17p.

[207]. KKS Liyakat, (2025). Nanorobotics in Cancer Treatment: A Study. International Journal of Nanomaterials and Nanostructures. 2025; 11(1): 44-52p. Available from:https://journalspub.com/publication/ijnn/article=16043

[208]. KKS Liyakat. (2025). Nanomaterial and e-Skin Technology: A Study. International Journal of Nanobiotechnology. 2025; 11(1): 10–16p.

[209]. N. R. Mulla and K. K. S. Liyakat, (2025). Pipeline Pressure and Flow Rate Monitoring Using IoT Sensors and ML Algorithms to Detect Leakages, Int. J. Artif. Intell. Mech. Eng., vol. 1, no. 1, pp. 20–30, Jun. 2025.

[210]. N. R. Mulla and K. K. S. Liyakat, (2025). Nuclear Energy: Powering the Future or a Risky Relic, International Journal of Sustainable Energy and Thermoelectric Generator, vol. 1, no. 1, pp. 52–63, Jun. 2025.

[211]. Nikat Rajak Mulla, (2025). Sensor-based Aircraft Wings Design Using Airflow Analysis, International Journal of Image Processing and Smart Sensors, vol. 1, no. 1, pp. 55-65, Jun. 2025.

[212]. N. R. Mulla and K. K. S. Liyakat, (2025). A Study on Machine Learning for Metal Processing: A New Future, International Journal of Machine Design and Technology, vol. 1, no. 1, pp. 56–69, Jun. 2025.

[213]. Nikat Rajak Mulla and Kazi Kutubuddin Sayyad Liyakat, (2025). Sensor-based Aircraft Wings Design Using Airflow Analysis, International Journal of Image Processing and Smart Sensors, vol. 1, no. 1, pp. 55-65, Jun. 2025.

[214]. N. R. Mulla, and K. K. S. Liyakat, "Node MCU and IoT Centered Smart Logistics," International Journal of Emerging IoT Technologies in Smart Electronics and Communication, vol. 1, no. 1, pp. 20-36, Jun-2025.

[215]. Renuka Dnyanoba Todakar, Jadhav Vaibhavi Kishor. (2025). Kinetic Power Gyms for Revolutionizing Fitness. Journal of Telecommunication, Switching Systems and Networks. 2025; 12(02):13-21. Available from: https://journals.stmjournals.com/jotssn/article=2025/view=214971

IJARSCT
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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, October 2025
Impact Factor: 7.67

[216]. Kazi Kutubuddin Sayyad Liyakat. Cardiovascular Modeling with Computational and Mathematical Methods. Research & Reviews: A Journal of Bioinformatics. 2025; 12(2): 1–11p.

[217]. Nikat Rajak Mulla, Kazi Kutubuddin Sayyad Liyakat. Air Flow Analysis in Sensor-Based Aircraft Wings Design. Recent Trends in Fluid Mechanics. 2025; 12(2): 29– 39p.

[218]. Nikat Rajak Mulla, Kazi Kutubuddin Sayyad Liyakat. IoT Sensors To Monitor Pipeline Pressure and Flow Rate Combined with Ml-Algorithms to Detect Leakages. Recent Trends in Fluid Mechanics. 2025; 12(2): 40–48p.

[219]. Heena Rafiq Shaik, Kazi Kutubuddin Sayyad Liyakat. Juncture of Nanotechnology and IoT: Novel Era of Connectivity. Nano Trends – A Journal of Nano Technology & Its Applications. 2025; 27(03):-. Available from: https://journals.stmjournals.com/nts/article=2025/view=212921

[220]. Kazi Kutubuddin Sayyad Liyakat. Machine Learning Revolutionizing Server Management and Performance. Journal of Computer Technology & Applications. 2025; 16(02):-. Available from: https://journals.stmjournals.com/jocta/article=2025/view=0

[221]. Kazi Kutubuddin Sayyad Liyakat. KVS Approach for IoT Network Security: A Novel Approach to IoT Network Security With B-Cell Inspired Models. Journal Of Network security. 2025; 13(02):16-25. Available from: https://journals.stmjournals.com/jons/article=2025/view=207920

[222]. Dr. Kazi Kutubuddin Sayyad Liyakat. Nanotechnology: Effective Pesticide Solutions for Jawar Leaf Diseases. Journal of Nanoscience, NanoEngineering & Applications. 2025; 15(02):-. Available from: https://journals.stmjournals.com/jonsnea/article=2025/view=204242

[223]. Parkhe Suyash Swaminath, Dhyavarkonda Udaykiran Tulshidas, Todkar Renuka Dnyanoba, Pawar Radhika Maruti, Kazi Kutubuddin Sayyad Liyakat. Nanotechnology in Internet of Things: A Powerful Partnership Shaping the Future. Journal of Nanoscience, NanoEngineering & Applications. 2025; 15(02):-. Available from: https://journals.stmjournals.com/jonsnea/article=2025/view=211534

[224]. Nikat Rajak Mulla, Kazi Kutubuddin Sayyad Liyakat. Nano-Materials in Vaccine Formation and Chemical Formulae's for Vaccination. Journal of Nanoscience, NanoEngineering & Applications. 2025; 15(03):-. Available from: https://journals.stmjournals.com/jonsnea/article=2025/view=216526

[225]. A K. Mulani, H. T. Shaikh, and K. K. S. Liyakat, (2025). Nuclear Power Generation Using UO2 Materials, Journal of Advance Electrical Engineering and Devices, Vol. 3, No. 2, pp. 27-40, Jul. 2025.

[226]. H. T. Shaikh and K. K. S. Liyakat, "Empowering the IoT: The Study on Role of Wireless Charging Technologies," Journal of Control and Instrumentation Engineering, vol. 11, no. 2, pp. 29-39, Jul. 2025.

[227]. H. T. Shaikh, and K. K. S. Liyakat, "Pre-Detection Systems Transfiguring Intoxication and Smoking Using Sensor and AI," Journal of Instrumentation and Innovation Sciences, vol. 10, no. 2, pp. 19-31, Jul. 2025.

[228]. Vaishnavi Ashok Desai, (2025). AI and Sensor Systems Revolutionizing Intoxication and Smoking Pre-Detection. Journal of Control & Instrumentation. 2025; 16(3): 15–26p.

[229]. Heena Tajoddin Shaikh. (2025). The Future of Coastal Resilience: Harnessing Satellite Technology. Advance Research in Communication Engineering and Its Innovations, 28–36. Retrieved from https://matjournals.net/engineering/index.php/ARCEI/article/view/2281

[230]. H. T. Shaikh and K. K. S. Liyakat., (2025). Sensor- based Intelligent Wearable Glasses, Journal of Digital Circuitry Innovations in Electrical Devices, vol. 1, no. 2, pp. 16-24, Jul. 2025.

[231]. Kazi Kutubuddin Sayyad Liyakat. Nanorobots: The Fight against Cholesterol. Nano Trends – A Journal of Nano Technology & Its Applications. 2025; 27(02). Available from: https://journals.stmjournals.com/nts/article=2025/view=205244

[232]. H. T. Shaikh, and K. K. S. Liyakat, "Pre-Detection Systems Transfiguring Intoxication and Smoking Using Sensor and AI," Journal of Instrumentation and Innovation Sciences, vol. 10, no. 2, pp. 19-31, Jul. 2025.

[233]. H. T. Shaikh and K. K. S. Liyakat, "Millimetre Wave: A Study on the Backbone of Future IoT Connectivity", Advance Research in Analog and Digital Communications, Vol. 2, no. 2, pp. 20-31, Aug. 2025.

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 2, October 2025
Impact Factor: 7.67

[234]. Ayesha Khalil Mulani. Microwave Signals: A New Frontier in Non-Invasive Medical Diagnostics: A Study. Journal of Microwave Engineering & Technologies. 2025; 12(3): 27–41p.

[235]. Ayesha Khalil Mulani. Revolutionizing Optical Fibre Field Distribution with Linear Finite Element Method. Trends in Opto-electro & Optical Communication. 2025; 15(3): 31-41p.

[236]. H. T. Shaikh and K. K. S. Liyakat, "Robust Access Control Mechanisms in IoT Security using VHDL Programming", Journal of VLSI Design and Signal Processing, vol. 11, no. 2, pp. 31-40, Aug. 2025.

[237]. Radhika Maruti Pawar, Kulkarni Amarja Bhaskar, Patu Shradha Gangadhar, Sensors and Artificial Intelligence based Intelligent Thermos. Recent Trends in Sensor Research & Technology. 2025; 12(3): 37–45p.

[238]. Ayesha Khalil Mulani. Optical Fibre Pressure Sensor in Medicine: A Study. Recent Trends in Sensor Research & Technology. 2025; 12(3): 18–27p.

[239]. Vaishnavi Ashok Desai, Heena Tajoddin Shaikh, Sensor and AI Based Pre- Detection Systems Transfiguring Intoxication & Smoking. Journal of Telecommunication, Switching Systems and Networks. 2025; 12(3): 37–50p.

[240]. C. M. Abhangrao and K. K. S. Liyakat, "A study on hybrid intelligence in COBOT," Journal of Mechanical Robotics, vol. 10, no. 2, pp. 15–29, Sep. 2025.

[241]. Heena Tajoddin Shaikh, (2025). The Future of Cancer Management: A Guide to Nanosensor Applications. Recent Trends in Semiconductor and Sensor Technology, 1–10.

[242]. Heena T Shaikh. A Study on Automatic Feedback Control by Image Processing for Mixing Solutions in a Microfluidic Device. International Journal of Advanced Control and System Engineering. 2025; 3(2): 32–41p.

[243]. Heena T Shaikh. A Study on Unmanned Air Vehicles (UAV). Journal of Aerospace Engineering & Technology. 2025; 15(3): 14–27p.

[244]. Nikat Rajak Mulla. Nanomaterials in Vaccine Formation and Chemical Formulae for Vaccination. Journal of Nanoscience, Nanoengineering & Applications. 2025; 15(3): 1–12p.

[245]. K. K. S. Liyakat, "Waste-to-Energy (WtE) Plants: A Study," Journal of Alternative and Renewable Energy Sources, vol. 11, no. 3, pp. 1-15, Oct. 2025.

[246]. Sultanabanu Sayyad Liyakat. Advancing IoT Connectivity through Very Large-Scale Integration of Semiconductor Technology. Journal of Semiconductor Devices and Circuits. 2024; 11(03):54-63.

[247]. Dr. Kazi Kutubuddin Sayyad Liyakat. Sensor and IoT centered Smart Agriculture by NodeMCU. Recent Trends in Sensor Research & Technology. 2024; 11(03): 24-32. Available from: https://journals.stmjournals.com/rtsrt/article=2024/view=0

[248]. Dr. Kazi Kutubuddin Sayyad Liyakat. KSK Approach to Smart Agriculture: Utilizing AI-Driven Internet of Things (AI IoT). Journal of Microcontroller Engineering and Applications. 2024; 11(03): 41-50. Available from: https://journals.stmjournals.com/jomea/article=2024/view=0

[249]. Pathan Muskan Ibrahim.(2025). Photochemical Materials for Light-Responsive Optical Switching: AI-Optimized Design of Dynamic Visual Effects. International Journal of Photochemistry and Photochemical Research, Volume 3, Issue 2. 2025; 3(2): 13–27p.

[250]. Shaikh A. Hakim A. Razzaque. A Study on AI-Enhanced Environmental Toxicology: Sensor-Driven Predictive Framework. Research & Reviews: A Journal of Toxicology. 2025; 15(3): 1–20p.

[251]. Paul Pranit Sunil, Dhyvarkonda Udaykiran Tulshidas, Gone Yashasvi Prakash. (2025). AI-Powered Motorcycle Anti-Theft and Safety System, International Journal of Advanced Research in Science, Communication and Technology, Volume 5, Issue 1, October 2025. pp. 445- 454.

[252]. P. M. Ibrahim and K. K. S. Liyakat, "Guardian Angel: An Innovative Mobile Application for Rapid Accident Notification and Emergency Response," Advance Research in Analog and Digital Communications, vol. 2, no. 3, pp. 7-20, Oct. 2025.

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[253]. Muskan Ibrahim, Shaikh A. Hakim A. Razzaque, Heena T Shaikh, Kazi. (2025). VHDL-Based Strategies for Protecting IoT Devices from Power and Electromagnetic Side-Channel Attacks: A Study. Recent Trends in Electronics & Communication Systems. 2025; 12(3): 30–40p.

[254]. Amar Parmeshwar Bansode,(2025). Electronics and Communication Design of an AI-Powered Smart Chair for Real-Time Multilingual Interaction. Recent Trends in Electronics & Communication Systems. 2025; 12(3): 16–29p.

[255]. Pathan Muskan Ibrahim, Shaikh A. Hakim A. Razzaque, Heena T Shaikh, Kazi Kutubuddin Sayyad Liyakat. (2025). Reimagining Nuclear Reactor Safety: The Study toward Passive Safety. Journal of Nuclear Engineering & Technology. 2025; 15(3): 6–15p.

[256]. Ayesha Khalil Mulani, Heena Tajuddin Shaikh. Nuclear Reactor Safety Using Fuel Pallet: A Study. Journal of Nuclear Engineering & Technology. 2025; 15(3): 16–23p.

[257]. Sunil Mishra and Liyakat, (2025). Sensors in Metallurgy Applications: A Study, Journal of Recent Activities in Production, vol. 10, no. 2, pp. 11-22, Oct. 2025

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