Empowering Farmers with Self-Determined Pricing of Agriculture Products Through Web Application

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Abstract. Farmers face challenges with fair pricing and transparency due to reliance on middlemen and unclear product authenticity. Current solutions are fragmented and lack a unified approach. By developing a web-based application that empowers farmers by allowing them to set their own prices, categorize products as organic or inorganic, analyze price trends, and use secure payments. The platform will feature KYC authentication, nutrition reports, personalized food recommendations, a feedback system, and direct buyer engagement tools. This aims to enhance farmer autonomy, build consumer trust, and create a transparent, fair agricultural market

Keywords. Agriculture, Fair Pricing, Organic Products, Web Application, KYC Authentication, Secure Payment, Price Trends

1. INTRODUCTION

The agricultural sector faces significant challenges with fair pricing and product transparency due to reliance on middlemen and lack of clear product authenticity. Farmers often lack control over the pricing of their produce, leading to exploitation and low profits. Existing solutions are fragmented, failing to provide a unified platform that addresses these challenges comprehensively. This project proposes a web-based application that empowers farmers to set their own prices, categorize products as organic or inorganic, and engage directly with buyers. By leveraging KYC authentication, secure payments, and price trend analysis, the platform fosters transparency, trust, and farmer autonomy. This research aims to design an accessible and integrated platform to enhance the agricultural market's efficiency and fairness, building on recent literature advocating for digital empowerment in agriculture.

2. RESEARCH METHODOLOGY

The methodology for developing the web application to empower farmers in pricing their agricultural products included the following components:

2.1 User-Centered Design

The application’s design followed a user-centered approach to ensure that it addresses the unique needs of farmers. Initial feedback was gathered from farmers and agricultural professionals through surveys and focus groups, focusing on critical issues like fair pricing, direct buyer interaction, and product transparency. This feedback shaped the platform's core functionalities, such as allowing farmers to set prices, classify products, and communicate directly with buyers.

2.2 Development Framework

The application was developed using an agile framework, which allowed for iterative testing and feedback loops. This iterative approach enabled rapid adjustments and continuous improvement based on user feedback. For the tech stack, we employed Java full-stack technologies: MongoDB for database management, Node.js and Express.js for backend development, and React.js for a responsive frontend. This framework

facilitated continuous integration and deployment, keeping the platform adaptive to user needs and emerging trends in the agricultural market.

2.3 Evidence-Based Practices

To ensure the platform's functionality and reliability, evidence-based practices from existing literature on digital empowerment in agriculture were incorporated. Features like KYC authentication, price trend analysis, and secure payment gateways were implemented based on best practices in digital marketplace design and secure online transactions. This approach ensured that the platform could securely handle user data, financial transactions, and authentication processes.

2.4 Data Collection and Analysis

Data was collected through usage analytics, user surveys, and feedback mechanisms within the platform. Key metrics for analysis included user engagement (logins, feature usage), transaction success rates, and feedback on user satisfaction. Both qualitative and quantitative methods were used to assess the application's impact on transparency, farmer autonomy, and market fairness.

2.5 Community Engagement

The application promotes community engagement by incorporating tools that facilitate direct communication between farmers and buyers. This includes feedback and review systems where buyers can leave comments on purchases, and farmers can respond. This feature helps build trust, fosters transparent interactions, and allows users to share experiences, ultimately strengthening the platform's community base. User participation in this feature was monitored to gauge community engagement levels and the effectiveness of the platform in fostering transparent farmer-buyer relationships.

Through this comprehensive methodology, the application aims to empower farmers by providing a digital platform for fair pricing, direct engagement, and secure transactions, all while ensuring data integrity and user satisfaction.

3. THEORY AND CALCULATION

3.1 Theory

The theoretical foundation for this project revolves around empowering farmers in the agricultural market, enhancing transparency, and fostering fair pricing mechanisms. The platform is grounded in two primary frameworks: market empowerment and transparency.

Market Empowerment Theory: This theory is rooted in the concept of shifting control from intermediaries (such as middlemen) directly to producers (farmers), empowering them to make decisions that directly influence their profitability. By enabling farmers to set their own prices and manage their product listings, the platform minimizes dependency on middlemen, which often leads to profit dilution and exploitative pricing. This empowerment approach ensures that farmers can price their products based on market demand, production costs, and quality—ultimately leading to fairer trade practices and increased income for farmers.

Transparency Framework: Transparency is essential for fostering trust in digital marketplaces, especially in agriculture, where consumers increasingly demand knowledge about product origins and production methods (organic vs. inorganic). By incorporating KYC (Know Your Customer) authentication, the platform ensures the authenticity of both buyers and sellers, building trust on both sides. Additionally, product categorization (organic/inorganic) and detailed nutrition reports allow consumers to make informed choices. This transparency framework is intended to enhance the reputation of the marketplace, foster loyalty, and attract quality-conscious buyers, contributing to a more equitable agricultural ecosystem.

Data-Driven Decision Making: An underlying element of the platform's design is the integration of data analytics to support both farmers and buyers. Farmers can view price trends and historical data, enabling them to set competitive prices based on market insights. For buyers, access to personalized recommendations and price trends supports informed purchasing decisions. This data-driven approach is grounded in information systems theory, which suggests that data accessibility and analytics enhance decision-making, leading to more efficient and effective market interactions.

3.2 Calculation

To evaluate the platform's impact, a series of performance metrics and comparative analyses are planned. These calculations assess the platform's effectiveness in enhancing transparency, trust, and economic outcomes for farmers and buyers.

Profitability Analysis:

Calculation Method: The study calculates the average profit margins of farmers before and after using the platform. Profitability is calculated as the difference between sales revenue (based on farmer-determined pricing) and production costs, then compared to revenues from traditional market channels.

Expected Outcome: By bypassing intermediaries, farmers are expected to retain a higher share of profits, translating into improved income levels. This analysis helps quantify the financial benefits of direct farmer-to-buyer sales.

User Engagement Metrics:

Calculation Method: Engagement metrics include the frequency of logins, session duration, and interaction with platform features (such as KYC verification, product categorization, and direct messaging). These metrics will be measured across a sample of platform users over a specified period.

Expected Outcome: Higher engagement is hypothesized to correlate with increased trust in the platform. For instance, frequent use of secure payment and messaging features may indicate stronger buyer-seller relationships and satisfaction with transaction security.

Trust and Transparency Evaluation:

Calculation Method: The study will use qualitative feedback from both farmers and buyers on the platform's transparency, particularly focusing on trust factors such as product authenticity (organic/inorganic classification) and KYC authentication. Feedback is collected through user surveys and analyzed for sentiment and recurring themes.

Expected Outcome: Increased buyer satisfaction with product authenticity and security measures is expected, which will likely lead to enhanced trust and repeat interactions. Positive feedback will also help identify areas for improvement in the platform's transparency mechanisms.

Transaction Security Analysis:

Calculation Method: The effectiveness of the secure payment system will be evaluated by tracking transaction success rates and analyzing reports of failed or disputed transactions. Metrics include the percentage of successful transactions and any correlation with KYC authentication status.

Expected Outcome: The platform's secure payment feature is designed to foster confidence in transactions, minimizing disputes and enhancing trust in direct payments. A high transaction success rate would indicate robust security, while any issues may suggest the need for additional authentication layers.

Consumer Price Sensitivity and Purchase Behavior:

Calculation Method: The study will analyze buyer behavior based on price fluctuations and product classifications. For instance, buyer engagement with organic products versus inorganic, and price elasticity (how demand responds to changes in price) will be calculated using sales data.

Expected Outcome: This analysis is expected to provide insights into consumer preferences, helping farmers optimize pricing strategies for different product types (organic or inorganic). Understanding price sensitivity can inform farmers on how to price competitively without compromising profitability.

4. RESULTS AND DISCUSSION

The web-based application developed in this study aims to empower farmers by allowing them to set their own prices, differentiate products by quality (organic or inorganic), and engage directly with buyers. Preliminary testing and user feedback reveal several promising outcomes and insights regarding the platform's effectiveness in enhancing farmer autonomy, improving transparency, and fostering trust.

4.1 Results

1. User Management and KYC Authentication:

Outcome: The platform implements a robust user management system with KYC (Know Your Customer) authentication. This feature is crucial for building a secure environment, ensuring that only verified users can participate in transactions. Farmers have secure access to set product prices, while buyers benefit from knowing they are dealing with authenticated sellers.

Impact: KYC authentication increases confidence among buyers, making it more likely they will trust the platform and make purchases, thus fostering a safer marketplace. Farmers also experience greater confidence in engaging with verified buyers, which reduces the risk of fraudulent transactions.

2. Pricing Control for Farmers:

Outcome: Farmers are empowered to set their prices based on market insights and personal preferences, a capability that contrasts with traditional market channels where prices are often dictated by middlemen. The application allows farmers to view price trends, helping them make informed pricing decisions.

Impact: Direct control over pricing gives farmers more autonomy, potentially leading to higher profit margins by eliminating intermediaries. Farmers report greater satisfaction, knowing that their products' prices reflect their production costs and the demand dynamics. This ability to control pricing is foundational for improving their financial independence and market participation.

3. Product Categorization (Organic/Inorganic):

Outcome: The platform allows farmers to classify products as organic or inorganic, providing buyers with a clear distinction in product quality. Buyers receive nutrition reports and detailed product information, enhancing their ability to make informed choices.

Impact: This feature adds value for health-conscious consumers who prioritize organic products. Farmers who produce organic goods can market these at potentially higher prices, attracting a specific consumer base willing to pay more for quality. Product transparency builds trust, helping buyers feel secure in their purchases and likely to return to the platform for future transactions.

4. Direct Farmer-to-Buyer Engagement:

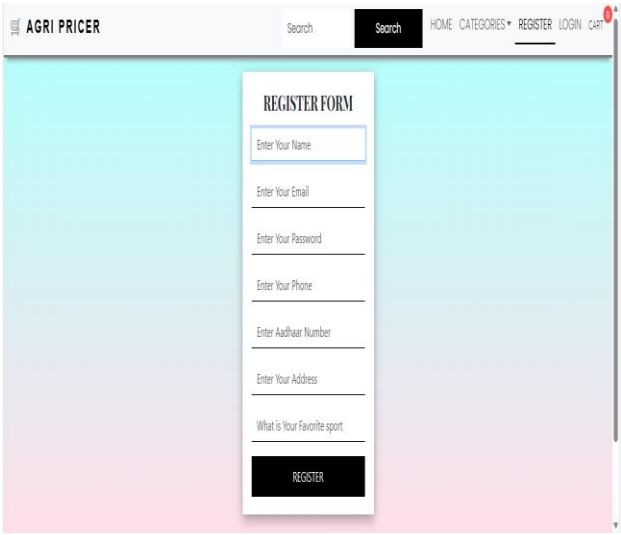
Outcome: The platform includes messaging and feedback tools that enable direct communication between farmers and buyers, removing the need for intermediaries. This direct engagement allows buyers to ask questions, request information, and develop trust with farmers.

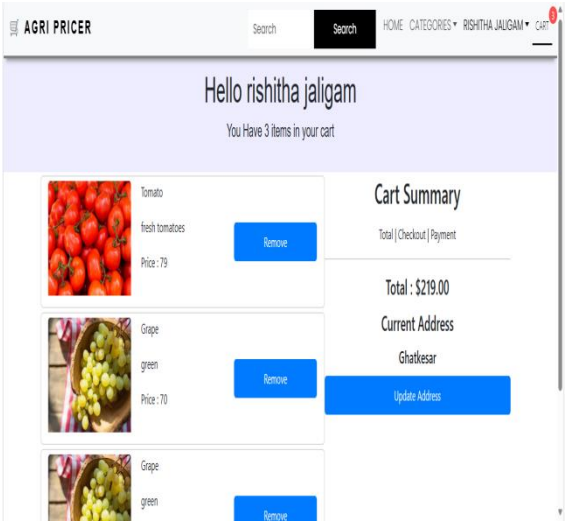
Impact: By facilitating transparent interactions, the platform fosters a more personal, trust-based buyer-seller relationship. Buyers are more likely to feel loyal to farmers they can communicate with directly, and farmers benefit from receiving direct feedback on their products. This strengthens the relationship between producers and consumers, encouraging repeat transactions and brand loyalty.

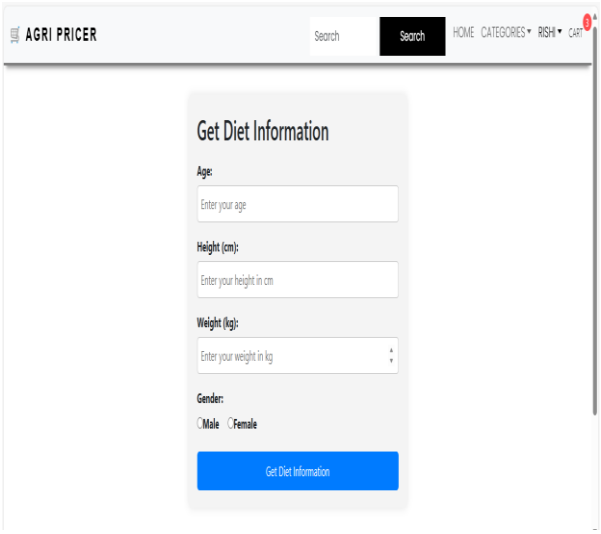
5. Secure Payment System:

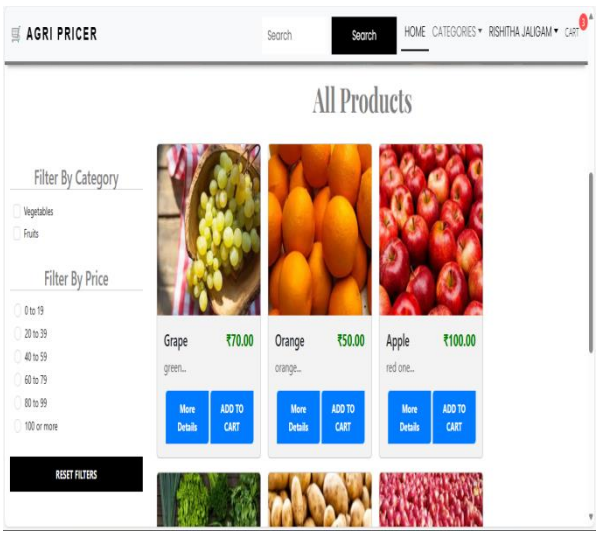
Outcome: The application features an encrypted, secure payment system that ensures transaction safety and reduces the likelihood of fraud. This security measure supports the entire buying and selling process, from product listing to transaction completion.

Impact: The secure payment gateway builds trust among users, as both buyers and farmers are assured of a reliable financial exchange. The ease and security of payments contribute to a positive user experience, encouraging both parties to use the platform consistently. This feature is particularly valuable in a digital agricultural marketplace, where payment reliability is essential for encouraging adoption.









4.2 Discussion

The Results section highlights the effectiveness of various platform features, while the Discussion delves deeper into their broader implications for the agricultural market and potential challenges.

1. Enhancing Farmer Autonomy and Economic Stability:

The platform's ability to let farmers set their prices, manage their products, and engage directly with buyers represents a shift toward greater farmer empowerment. This autonomy addresses a core issue in traditional agriculture—middleman dependency—which often leads to reduced profits and limited control over product representation.

Farmers can now align prices with production costs and demand, making them financially more resilient and independent. This empowerment also encourages farmers to adopt sustainable practices (e.g., organic farming) if they can price such products higher, promoting environmental consciousness.

2. Building Transparency and Trust with Buyers:

Transparency is a cornerstone of the platform, achieved through KYC authentication and product categorization (organic/inorganic). This transparency meets the growing consumer demand for authenticity in food sourcing, appealing especially to health-conscious buyers. Buyers know who they are purchasing from and can make informed decisions, which fosters loyalty and trust.

The feedback and messaging system strengthens these relationships further, creating a community where buyers and sellers interact openly. This level of transparency and open communication is rare in traditional marketplaces, where buyers often lack visibility into product origins or the people behind them.

3. Improving Market Efficiency and Fairness:

By removing intermediaries and providing direct engagement, the platform streamlines the marketplace, reducing unnecessary costs and inefficiencies. This increases the fairness of transactions, as farmers receive a higher percentage of the sale price, and buyers pay a price reflective of actual production and quality rather than markups from intermediaries.

The secure payment system complements this efficiency by ensuring that transactions are seamless and trustworthy, minimizing the risks associated with online transactions in agriculture.

4. Challenges and Future Considerations:

User Engagement: While initial feedback has been positive, the platform's long-term success depends on consistent engagement from both farmers and buyers. Strategies such as training programs for farmers on digital literacy and marketing campaigns to attract buyers may be needed to ensure active participation.

Scalability: As the user base grows, scalability will be crucial to maintaining platform performance and transaction security. Future iterations may need to enhance server capabilities and integrate more robust data analytics to handle larger volumes of users and transactions without compromising efficiency.

Data Security Risks: Although the platform uses KYC and secure payments, data security remains a potential risk, especially as it scales. Strengthening data protection mechanisms and regularly updating cybersecurity protocols will be necessary to safeguard sensitive user information.

5. Opportunities for Expansion:

Given the initial positive results, future versions of the platform could incorporate advanced features such as predictive analytics for pricing, more detailed market trend insights, and integration with logistics services to support product delivery.

Expanding beyond individual buyers to include institutional buyers (e.g., restaurants, hotels) could increase farmers' reach, broadening the platform's market impact and enabling even more profitable sales channels.

5. CONCLUSIONS

This research highlights the potential for digital tools to empower farmers and create a fair, transparent marketplace. By providing a platform that integrates pricing autonomy, secure payments, and product transparency, we address critical gaps in the agricultural market. The positive results from initial testing indicate that the platform effectively enhances farmer autonomy and consumer trust. Future work will focus on expanding the application's features to include more in-depth analysis tools and testing the scalability of the solution with a larger group of farmers and buyers.

6. DECLARATIONS

6.1 Study Limitations

The research team reports no significant limitations in the current study regarding the platform's design, features, or initial testing outcomes. However, some potential limitations are acknowledged for future consideration:

Scalability: While the platform performed well in preliminary testing, future challenges may arise as the user base expands. The infrastructure may need additional resources and optimizations to handle a larger volume of farmers, buyers, and transactions.

User Adaptation and Digital Literacy: Successful adoption of the platform by farmers may be influenced by their comfort and familiarity with digital tools. Additional support, such as digital literacy training for farmers less experienced with online platforms, may be necessary to ensure widespread and effective use.

Data Privacy and Security: Although KYC authentication and secure payment mechanisms are in place, safeguarding sensitive user data will be critical as the platform grows. Further investment in cybersecurity protocols and regular updates will be essential to maintain user trust and data integrity.

6.2 Funding Source

The study was conducted without external funding. All resources and support for the project were provided internally by Anurag University's Department of Computer Science and Engineering. The absence of external funding helps to maintain objectivity, as there are no financial stakeholders influencing the research outcomes or the platform's development goals.

6.3 Acknowledgments

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6.4 Competing Interests

The authors declare no competing interests. This means that there are no conflicts, financial or otherwise, that could have influenced the research outcomes or the presentation of findings. The absence of competing interests ensures that the research was conducted and reported with transparency, integrity, and an unbiased focus on improving the agricultural sector's transparency and fairness through digital tools.

REFERENCES

1. Mukiri, R. R., Kumar, B. S., & Prasad, B. V. V. (2019, February). Effective Data Collaborative Strain Using RecTree Algorithm. In *Proceedings of International Conference on Sustainable Computing in Science, Technology and Management (SUSCOM), Amity University Rajasthan, Jaipur-India*.
2. Rao, B. T., Prasad, B. V. V. S., & Peram, S. R. (2019). Elegant Energy Competent Lighting in Green Buildings Based on Energetic Power Control Using IoT Design. In *Smart Intelligent Computing and Applications: Proceedings of the Second International Conference on SCI 2018, Volume 1* (pp. 247-257). Springer Singapore.
3. Someswar, G. M., & Prasad, B. V. V. S. (2017, October). USVGM protocol with two layer architecture for efficient network management in MANET'S. In *2017 2nd International Conference on Communication and Electronics Systems (ICCES)* (pp. 738-741). IEEE.
4. Alapati, N., Prasad, B. V. V. S., Sharma, A., Kumari, G. R. P., Veeneetha, S. V., Srivalli, N., ... & Sahitya, D. (2022, November). Prediction of Flight-fare using machine learning. In *2022 International Conference on Fourth Industrial Revolution Based Technology and Practices (ICFIRTP)* (pp. 134-138). IEEE.
5. Alapati, N., Prasad, B. V. V. S., Sharma, A., Kumari, G. R. P., Bhargavi, P. J., Alekhya, A., ... & Nandini, K. (2022, November). Cardiovascular Disease Prediction using machine learning. In *2022 International Conference on Fourth Industrial Revolution Based Technology and Practices (ICFIRTP)* (pp. 60-66). IEEE.
6. Narayana, M. S., Babu, N., Prasad, B. V. V. S., & Kumar, B. S. (2011). Clustering Categorical Data--Study of Mining Tools for Data Labeling. *International Journal of Advanced Research in Computer Science*, *2*(4).
7. Shankar, G. S., Onyema, E. M., Kavin, B. P., Gude, V., & Prasad, B. S. (2024). Breast Cancer Diagnosis Using Virtualization and Extreme Learning Algorithm Based on Deep Feed Forward Networks. *Biomedical Engineering and Computational Biology*, *15*, 11795972241278907.
8. Kulkarni, R., & Prasad, B. S. (2022). Predictive Modeling Of Heart Disease Using Artificial Intelligence. *Journal of Survey in Fisheries Sciences*, 791-801.
9. Gowda, B. M. V., Murthy, G. V. K., Upadhye, A. S., & Raghavan, R. (1996). Serotypes of Escherichia coli from pathological conditions in poultry and their antibiogram.
10. Balasubbareddy, M., Murthy, G. V. K., & Kumar, K. S. (2021). Performance evaluation of different structures of power system stabilizers. *International Journal of Electrical and Computer Engineering (IJECE)*, *11*(1), 114-123.
11. Murthy, G. V. K., & Sivanagaraju, S. (2012). S. Satyana rayana, B. Hanumantha Rao," Voltage stability index of radial distribution networks with distributed generation,". *Int. J. Electr. Eng*, *5*(6), 791-803.
12. Anuja, P. S., Kiran, V. U., Kalavathi, C., Murthy, G. N., & Kumari, G. S. (2015). Design of elliptical patch antenna with single & double U-slot for wireless applications: a comparative approach. *International Journal of Computer Science and Network Security (IJCSNS)*, *15*(2), 60.
13. Murthy, G. V. K., Sivanagaraju, S., Satyanarayana, S., & Rao, B. H. (2015). Voltage stability enhancement of distribution system using network reconfiguration in the presence of DG. *Distributed Generation & Alternative Energy Journal*, *30*(4), 37-54.
14. Reddy, C. N. K., & Murthy, G. V. (2012). Evaluation of Behavioral Security in Cloud Computing. *International Journal of Computer Science and Information Technologies*, *3*(2), 3328-3333.
15. Madhavi, M., & Murthy, G. V. (2020). Role of certifications in improving the quality of Education in Outcome Based Education. *Journal of Engineering Education Transformations*, *33*(Special Issue).
16. Varaprasad Rao, M., Srujan Raju, K., Vishnu Murthy, G., & Kavitha Rani, B. (2020). Configure and management of internet of things. In *Data Engineering and Communication Technology: Proceedings of 3rd ICDECT-2K19* (pp. 163-172). Springer Singapore.
17. Murthy, G. V. K., Suresh, C. H. V., Sowjankumar, K., & Hanumantharao, B. (2019). Impact of distributed generation on unbalanced radial distribution system. *International Journal of Scientific and Technology Research*, *8*(9), 539-542.

18. Balram, G., & Kumar, K. K. (2022). Crop field monitoring and disease detection of plants in smart agriculture using internet of things. *International Journal of Advanced Computer Science and Applications*, *13*(7).
19. Balram, G., & Kumar, K. K. (2018). Smart farming: Disease detection in crops. *Int. J. Eng. Technol*, *7*(2.7), 33-36.
20. Balram, G., Rani, G. R., Mansour, S. Y., & Jafar, A. M. (2001). Medical management of otitis media with effusion. *Kuwait Medical Journal*, *33*(4), 317-319.
21. Balram, G., Anitha, S., & Deshmukh, A. (2020, December). Utilization of renewable energy sources in generation and distribution optimization. In *IOP Conference Series: Materials Science and Engineering* (Vol. 981, No. 4, p. 042054). IOP Publishing.
22. Hnamte, V., & Balram, G. (2022). Implementation of Naive Bayes Classifier for Reducing DDoS Attacks in IoT Networks. *Journal of Algebraic Statistics*, *13*(2), 2749-2757.
23. Prasad, P. S., & Rao, S. K. M. (2017). HIASA: Hybrid improved artificial bee colony and simulated annealing based attack detection algorithm in mobile ad-hoc networks (MANETs). *Bonfring International Journal of Industrial Engineering and Management Science*, *7*(2), 01-12.
24. Prasad, PVS Siva, and S. Krishna Mohan Rao. "A Survey on Performance Analysis of ManetsUnder Security Attacks." *network* 6, no. 7 (2017).
25. Reddy, B. A., & Reddy, P. R. S. (2012). Effective data distribution techniques for multi-cloud storage in cloud computing. *CSE, Anurag Group of Institutions, Hyderabad, AP, India*.
26. Srilatha, P., Murthy, G. V., & Reddy, P. R. S. (2020). Integration of Assessment and Learning Platform in a Traditional Class Room Based Programming Course. *Journal of Engineering Education Transformations*, *33*(Special Issue).
27. Reddy, P. R. S., & Ravindranadh, K. (2019). An exploration on privacy concerned secured data sharing techniques in cloud. *International Journal of Innovative Technology and Exploring Engineering*, *9*(1), 1190-1198.
28. Reddy, P. R. S., Bhoga, U., Reddy, A. M., & Rao, P. R. (2017). OER: Open Educational Resources for Effective Content Management and Delivery. *Journal of Engineering Education Transformations*, *30*(3).
29. Madhuri, K., Viswanath, N. K., & Gayatri, P. U. (2016, November). Performance evaluation of AODV under Black hole attack in MANET using NS2. In *2016 international conference on ICT in Business Industry & Government (ICTBIG)* (pp. 1-3). IEEE.
30. Kovoor, M., Durairaj, M., Karyakarte, M. S., Hussain, M. Z., Ashraf, M., & Maguluri, L. P. (2024). Sensor-enhanced wearables and automated analytics for injury prevention in sports. *Measurement: Sensors*, *32*, 101054.
31. Rao, N. R., Kovoor, M., Kishor Kumar, G. N., & Parameswari, D. V. L. (2023). Security and privacy in smart farming: challenges and opportunities. *International Journal on Recent and Innovation Trends in Computing and Communication*, *11*(7 S).
32. Madhuri, K. (2023). Security Threats and Detection Mechanisms in Machine Learning. *Handbook of Artificial Intelligence*, 255.
33. Madhuri, K. (2022). A New Level Intrusion Detection System for Node Level Drop Attacks in Wireless Sensor Network. *Journal of Algebraic Statistics*, *13*(1), 159-168.
34. DASTAGIRAIAH, D. (2024). A SYSTEM FOR ANALYSING CALL DROP DYNAMICS IN THE TELECOM INDUSTRY USING MACHINE LEARNING AND FEATURE SELECTION. *Journal of Theoretical and Applied Information Technology*, *102*(22).
35. Sukhavasi, V., Kulkarni, S., Raghavendran, V., Dastagiraiah, C., Apat, S. K., & Reddy, P. C. S. (2024). Malignancy Detection in Lung and Colon Histopathology Images by Transfer Learning with Class Selective Image Processing.
36. Sudhakar, R. V., Dastagiraiah, C., Pattem, S., & Bhukya, S. (2024). Multi-Objective Reinforcement Learning Based Algorithm for Dynamic Workflow Scheduling in Cloud Computing. *Indonesian Journal of Electrical Engineering and Informatics (IJEEI)*, *12*(3), 640-649.
37. PushpaRani, K., Roja, G., Anusha, R., Dastagiraiah, C., Srilatha, B., & Manjusha, B. (2024, June). Geological Information Extraction from Satellite Imagery Using Deep Learning. In *2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)* (pp. 1-7). IEEE.
38. Rani, K. P., Reddy, Y. S., Sreedevi, P., Dastagiraiah, C., Shekar, K., & Rao, K. S. (2024, June). Tracking The Impact of PM Poshan on Child's Nutritional Status. In *2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)* (pp. 1-4). IEEE.
39. Sravan, K., Gunakar Rao, L., Ramineni, K., Rachapalli, A., & Mohmmad, S. (2023, July). Analyze the Quality of Wine Based on Machine Learning Approach. In *International Conference on Data Science and Applications* (pp. 351-360). Singapore: Springer Nature Singapore.

40. LAASSIRI, J., EL HAJJI, S. A. Ï. D., BOUHDADI, M., AOUDE, M. A., JAGADISH, H. P., LOHIT, M. K., ... & KHOLLADI, M. (2010). Specifying Behavioral Concepts by engineering language of RM-ODP. *Journal of Theoretical and Applied Information Technology*, *15*(1).
41. Ramineni, K., Harshith Reddy, K., Sai Thrikoteshwara Chary, L., Nikhil, L., & Akanksha, P. (2024, February). Designing an Intelligent Chatbot with Deep Learning: Leveraging FNN Algorithm for Conversational Agents to Improve the Chatbot Performance. In *World Conference on Artificial Intelligence: Advances and Applications* (pp. 143-151). Singapore: Springer Nature Singapore.
42. Samya, B., Archana, M., Ramana, T. V., Raju, K. B., & Ramineni, K. (2024, February). Automated Student Assignment Evaluation Based on Information Retrieval and Statistical Techniques. In *Congress on Control, Robotics, and Mechatronics* (pp. 157-167). Singapore: Springer Nature Singapore.
43. Sekhar, P. R., & Sujatha, B. (2020, July). A literature review on feature selection using evolutionary algorithms. In *2020 7th International Conference on Smart Structures and Systems (ICSSS)* (pp. 1-8). IEEE.
44. Sekhar, P. R., & Sujatha, B. (2023). Feature extraction and independent subset generation using genetic algorithm for improved classification. *Int. J. Intell. Syst. Appl. Eng*, *11*, 503-512.
45. Sekhar, P. R., & Goud, S. (2024). Collaborative Learning Techniques in Python Programming: A Case Study with CSE Students at Anurag University. *Journal of Engineering Education Transformations*, *38*(Special Issue 1).
46. Pesaramelli, R. S., & Sujatha, B. (2024, March). Principle correlated feature extraction using differential evolution for improved classification. In *AIP Conference Proceedings* (Vol. 2919, No. 1). AIP Publishing.
47. Amarnadh, V., & Moparthi, N. R. (2023). Comprehensive review of different artificial intelligence-based methods for credit risk assessment in data science. *Intelligent Decision Technologies*, *17*(4), 1265-1282.
48. Amarnadh, V., & Moparthi, N. R. (2024). Prediction and assessment of credit risk using an adaptive Binarized spiking marine predators' neural network in financial sector. *Multimedia Tools and Applications*, *83*(16), 48761-48797.
49. Amarnadh, V., & Moparthi, N. R. (2024). Range control-based class imbalance and optimized granular elastic net regression feature selection for credit risk assessment. *Knowledge and Information Systems*, 1-30.
50. Amarnadh, V., & Akhila, M. (2019, May). RETRACTED: Big Data Analytics in E-Commerce User Interest Patterns. In *Journal of Physics: Conference Series* (Vol. 1228, No. 1, p. 012052). IOP Publishing.
51. Ravinder Reddy, B., & Anil Kumar, A. (2020). Survey on access control mechanisms in cloud environments. In *Advances in Computational Intelligence and Informatics: Proceedings of ICACII 2019* (pp. 141-149). Springer Singapore.
52. Reddy, M. B. R., Nandini, J., & Sathwik, P. S. Y. (2019). Handwritten text recognition and digital text conversion. *International Journal of Trend in Research and Development*, *3*(3), 1826-1827.
53. Reddy, B. R., & Adilakshmi, T. (2023). Proof-of-Work for Merkle based Access Tree in Patient Centric Data. *structure*, *14*(1).
54. Reddy, B. R., Adilakshmi, T., & Kumar, C. P. (2020). Access Control Methods in Cloud Enabledthe Cloud-Enabled Internet of Things. In *Managing Security Services in Heterogenous Networks* (pp. 1-17). CRC Press.
55. Reddy, M. B. R., Akhil, V., Preetham, G. S., & Poojitha, P. S. (2019). Profile Identification through Face Recognition.
56. Dutta, P. K., & Mitra, S. (2021). Application of agricultural drones and IoT to understand food supply chain during post COVID-19. *Agricultural informatics: automation using the IoT and machine learning*, 67-87.
57. Matuka, A., Asafo, S. S., Eweke, G. O., Mishra, P., Ray, S., Abotaleb, M., ... & Chowdhury, S. (2022, December). Analysing the impact of COVID-19 outbreak and economic policy uncertainty on stock markets in major affected economies. In *6th Smart Cities Symposium (SCS 2022)* (Vol. 2022, pp. 372-378). IET.
58. Saber, M., & Dutta, P. K. (2022). Uniform and Nonuniform Filter Banks Design Based on Fusion Optimization. *Fusion: Practice and Applications*, *9*(1), 29-37.
59. Mensah, G. B., & Dutta, P. K. (2024). Evaluating if Ghana's Health Institutions and Facilities Act 2011 (Act 829) Sufficiently Addresses Medical Negligence Risks from Integration of Artificial Intelligence Systems. *Mesopotamian Journal of Artificial Intelligence in Healthcare*, *2024*, 35-41.
60. Aydın, Ö., Karaarslan, E., & Gökçe Narin, N. (2023). Artificial intelligence, vr, ar and metaverse technologies for human resources management. *VR, AR and Metaverse Technologies for Human Resources Management (June 15, 2023)*.
61. Thamma, S. R. (2025). Transforming E-Commerce with Pragmatic Advertising Using Machine Learning Techniques.

62. Thamma, S. R. T. S. R. (2024). Optimization of Generative AI Costs in Multi-Agent and Multi-Cloud Systems.
63. Thamma, S. R. T. S. R. (2024). Revolutionizing Healthcare: Spatial Computing Meets Generative AI.
64. Thamma, S. R. T. S. R. (2024). Cardiovascular image analysis: AI can analyze heart images to assess cardiovascular health and identify potential risks.
65. Thamma, S. R. T. S. R. (2024). Generative AI in Graph-Based Spatial Computing: Techniques and Use Cases.
66. Harinath, D., Bandi, M., Patil, A., Murthy, M. R., & Raju, A. V. S. (2024). Enhanced Data Security and Privacy in IoT devices using Blockchain Technology and Quantum Cryptography. *Journal of Systems Engineering and Electronics (ISSN NO: 1671-1793)*, *34*(6).
67. Harinath, D., Patil, A., Bandi, M., Raju, A. V. S., Murthy, M. R., & Spandana, D. (2024). Smart Farming System–An Efficient technique by Predicting Agriculture Yields Based on Machine Learning. *Technische Sicherheit (Technical Security) Journal*, *24*(5), 82-88.
68. Masimukku, A. K., Bandi, M., Vallu, S., Patil, A., Vasundhara, K. L., & Murthy, M. R. (2025). Innovative Approaches in Diabetes Management: Leveraging Technology for Improved Healthcare Outcomes. *International Meridian Journal*, *7*(7).
69. Bandi, M., Masimukku, A. K., Vemula, R., & Vallu, S. (2024). Predictive Analytics in Healthcare: Enhancing Patient Outcomes through Data-Driven Forecasting and Decision-Making. *International Numeric Journal of Machine Learning and Robots*, *8*(8), 1-20.
70. Moreb, M., Mohammed, T. A., & Bayat, O. (2020). A novel software engineering approach toward using machine learning for improving the efficiency of health systems. *IEEE Access*, *8*, 23169-23178.
71. Ravi, P., Batta, G. S. H. N., & Yaseen, S. (2019). Toxic comment classification. *International Journal of Trend in Scientific Research and Development (IJTSRD)*.
72. Pallam, R., Konda, S. P., Manthripragada, L., & Noone, R. A. (2021). Detection of Web Attacks using Ensemble Learning. *learning*, *3*(4), 5.
73. Reddy, P. V., Ravi, P., Ganesh, D., Naidu, P. M. K., Vineeth, N., & Sameer, S. (2023, July). Detection and Evaluation of Cervical Cancer by Multiple Instance Learning. In *2023 2nd International Conference on Edge Computing and Applications (ICECAA)* (pp. 627-633). IEEE.
74. Ravi, P., Haritha, D., & Niranjan, P. (2018). A Survey: Computing Iceberg Queries. *International Journal of Engineering & Technology*, *7*(2.7), 791-793.
75. Chidambaram, R., Balamurugan, M., Senthilkumar, R., Srinivasan, T., Rajmohan, M., Karthick, R., & Abraham, S. (2013). Combining AIET with chemotherapy–lessons learnt from our experience. *J Stem Cells Regen Med*, *9*(2), 42-43.
76. Karthick, R., & Sundhararajan, M. (2014). Hardware Evaluation of Second Round SHA-3 Candidates Using FPGA. *International Journal of Advanced Research in Computer Science & Technology (IJARCST 2014)*, *2*(2).
77. Sudhan, K., Deepak, S., & Karthick, R. (2016). SUSTAINABILITY ANALYSIS OF KEVLAR AND BANANA FIBER COMPOSITE.
78. Karthick, R., Gopalakrishnan, S., & Ramesh, C. (2020). Mechanical Properties and Characterization of Palmyra Fiber and Polyester Resins Composite. *International Journal of Emerging Trends in Science & Technology*, *6*(2).
79. Karthick, R., Pandi, M., Dawood, M. S., Prabaharan, A. M., & Selvaprasanth, P. (2021). ADHAAR: A RELIABLE DATA HIDING TECHNIQUES WITH (NNP2) ALGORITHMIC APPROACH USING X-RAY IMAGES. *3C Tecnologia*, 597-608.
80. Deepa, R., Karthick, R., Velusamy, J., & Senthilkumar, R. (2025). Performance analysis of multiple-input multiple-output orthogonal frequency division multiplexing system using arithmetic optimization algorithm. *Computer Standards & Interfaces*, *92*, 103934.
81. Selvan, M. Arul, and S. Miruna Joe Amali. "RAINFALL DETECTION USING DEEP LEARNING TECHNIQUE." (2024).
82. Selvan, M. Arul. "Fire Management System For Indutrial Safety Applications." (2023).
83. Selvan, M. A. (2023). A PBL REPORT FOR CONTAINMENT ZONE ALERTING APPLICATION.
84. Selvan, M. A. (2023). CONTAINMENT ZONE ALERTING APPLICATION A PROJECT BASED LEARNING REPORT.
85. Selvan, M. A. (2021). Robust Cyber Attack Detection with Support Vector Machines: Tackling Both Established and Novel Threats.
86. Reddy, A. S., Prathap, P., Subbaiah, Y. V., Reddy, K. R., & Yi, J. (2008). Growth and physical behaviour of Zn1− xMgxO films. *Thin Solid Films*, *516*(20), 7084-7087.
87. Ambujam, S., Audhya, M., Reddy, A., & Roy, S. (2013). Cutaneous angiosarcoma of the head, neck, and face of the elderly in type 5 skin. *Journal of Cutaneous and Aesthetic Surgery*, *6*(1), 45-47.

88. Reddy, K. R., Prathap, P., Revathi, N., Reddy, A. S. N., & Miles, R. W. (2009). Mg-composition induced effects on the physical behavior of sprayed Zn1− xMgxO films. *Thin Solid Films*, *518*(4), 1275-1278.
89. Prathap, P., Reddy, A. S., Reddy, G. R., Miles, R. W., & Reddy, K. R. (2010). Characterization of novel sprayed Zn1− xMgxO films for photovoltaic application. *Solar energy materials and solar cells*, *94*(9), 1434-1436.
90. Babbar, R., Kaur, A., Vanya, Arora, R., Gupta, J. K., Wal, P., ... & Behl, T. (2024). Impact of Bioactive Compounds in the Management of Various Inflammatory Diseases. *Current Pharmaceutical Design*, *30*(24), 1880-1893.
91. Lokhande, M., Kalpanadevi, D., Kate, V., Tripathi, A. K., & Bethapudi, P. (2023). Study of Computer Vision Applications in Healthcare Industry 4.0. In *Healthcare Industry 4.0* (pp. 151-166). CRC Press.
92. Parganiha, R., Tripathi, A., Prathyusha, S., Baghel, P., Lanjhiyana, S., Lanjhiyana, S., ... & Sarkar, D. (2022). A review of plants for hepatic disorders. *J. Complement. Med. Res*, *13*(46), 10-5455.
93. Tripathi, A. K., Soni, R., & Verma, S. (2022). A review on ethnopharmacological applications, pharmacological activities, and bioactive compounds of Mimosa pudica (linn.). *Research Journal of Pharmacy and Technology*, *15*(9), 4293-4299.
94. Tripathi, A. K., Dwivedi, C. P., Bansal, P., Pradhan, D. K., Parganiha, R., & Sahu, D. An Ethnoveterinary Important Plant Terminalia Arjuna. *International Journal of Health Sciences*, (II), 10601-10607.
95. Mishra, S., Grewal, J., Wal, P., Bhivshet, G. U., Tripathi, A. K., & Walia, V. (2024). Therapeutic potential of vasopressin in the treatment of neurological disorders. *Peptides*, *174*, 171166.
96. Koliqi, R., Fathima, A., Tripathi, A. K., Sohi, N., Jesudasan, R. E., & Mahapatra, C. (2023). Innovative and Effective Machine Learning-Based Method to Analyze Alcoholic Brain Activity with Nonlinear Dynamics and Electroencephalography Data. *SN Computer Science*, *5*(1), 113.
97. Tripathi, A. K., Diwedi, P., Kumar, N., Yadav, B. K., & Rathod, D. (2022). Trigonella Foenum Grecum L. Seed (Fenugreek) Pharmacological Effects on Cardiovascular and Stress Associated Disease. *NeuroQuantology*, *20*(8), 4599.
98. Sahu, P., Sharma, G., Verma, V. S., Mishra, A., Deshmukh, N., Pandey, A., ... & Chauhan, P. (2022). Statistical optimization of microwave assisted acrylamide grafting of Linum usitatissimum Gum. *NeuroQuantology*, *20*(11), 4008.
99. Biswas, D., Sharma, G., Pandey, A., Tripathi, A. K., Pandey, A., Sahu, P., ... & Chauhan, P. (2022). Magnetic Nanosphere: Promising approach to deliver the drug to the site of action. *NeuroQuantology*, *20*(11), 4038.
100. Ramya, S., Devi, R. S., Pandian, P. S., Suguna, G., Suganya, R., & Manimozhi, N. (2023). Analyzing Big Data challenges and security issues in data privacy. *International Research Journal of Modernization in Engineering Technology and Science*, *5*(2023), 421-428.
101. Pandian, P. S., & Srinivasan, S. (2016). A Unified Model for Preprocessing and Clustering Technique for Web Usage Mining. *Journal of Multiple-Valued Logic & Soft Computing*, *26*.
102. Muthukumar, K. K. M., & Pandian, S. Analyzing and Improving the Performance of Decision Database with Enhanced Momentous Data Types. *Asia Journal of Information Technology*, *16*(9), 699-705.
103. Pandian, P. S. (2023). RETRACTED: Adopting security checks in business transactions using formal-oriented analysis processes for entrepreneurial students. *International Journal of Electrical Engineering & Education*, *60*(1_suppl), 1357-1365.
104. Karthick, R., & Pragasam, J. (2019). D “Design of Low Power MPSoC Architecture using DR Method” Asian Journal of Applied Science and Technology (AJAST) Volume 3, Issue 2.
105. Karthick, R. (2018). Deep Learning For Age Group Classification System. *International Journal Of Advances In Signal And Image Sciences*, *4*(2), 16-22.
106. Karthick, R., Akram, M., & Selvaprasanth, P. (2020). A Geographical Review: Novel Coronavirus (COVID-19) Pandemic. *A Geographical Review: Novel Coronavirus (COVID-19) Pandemic (October 16, 2020). Asian Journal of Applied Science and Technology (AJAST)(Quarterly International Journal) Volume*, *4*, 44-50.
107. Karthick, R. (2018). Integrated System For Regional Navigator And Seasons Management. *Journal of Global Research in Computer Science*, *9*(4), 11-15.
108. Kavitha, N., Soundar, K. R., Karthick, R., & Kohila, J. (2024). Automatic video captioning using tree hierarchical deep convolutional neural network and ASRNN-bi-directional LSTM. *Computing*, *106*(11), 3691-3709.
109. Selvan, M. A. (2023). INDUSTRY-SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM.
110. Selvan, M. Arul. "PHISHING CONTENT CLASSIFICATION USING DYNAMIC WEIGHTING AND GENETIC RANKING OPTIMIZATION ALGORITHM." (2024).
111. Selvan, M. Arul. "Innovative Approaches in Cardiovascular Disease Prediction Through Machine Learning Optimization." (2024).

112. Kumar, T. V. (2024). A Comparison of SQL and NO-SQL Database Management Systems for Unstructured Data.
113. Kumar, T. V. (2024). A Comprehensive Empirical Study Determining Practitioners' Views on Docker Development Difficulties: Stack Overflow Analysis.
114. Kumar, T. V. (2024). Developments and Uses of Generative Artificial Intelligence and Present Experimental Data on the Impact on Productivity Applying Artificial Intelligence that is Generative.
115. Kumar, T. V. (2024). A New Framework and Performance Assessment Method for Distributed Deep Neural NetworkBased Middleware for Cyberattack Detection in the Smart IoT Ecosystem.
116. Sharma, S., & Dutta, N. (2024). Examining ChatGPT's and Other Models' Potential to Improve the Security Environment using Generative AI for Cybersecurity.
117. Sharma, S., & Dutta, N. (2016). Analysing Anomaly Process Detection using Classification Methods and Negative Selection Algorithms.
118. Sakshi, S. (2023). Development of a Project Risk Management System based on Industry 4.0 Technology and its Practical Implications.
119. Arora, P., & Bhardwaj, S. (2021). Methods for Threat and Risk Assessment and Mitigation to Improve Security in the Automotive Sector. *Methods*, *8*(2).
120. Arora, P., & Bhardwaj, S. (2020). Research on Cybersecurity Issues and Solutions for Intelligent Transportation Systems.
121. Arora, P., & Bhardwaj, S. (2019). The Suitability of Different Cybersecurity Services to Stop Smart Home Attacks.
122. Arora, P., & Bhardwaj, S. (2017). A Very Safe and Effective Way to Protect Privacy in Cloud Data Storage Configurations.
123. Arora, P., & Bhardwaj, S. (2017). Investigation and Evaluation of Strategic Approaches Critically before Approving Cloud Computing Service Frameworks.
124. Arora, P., & Bhardwaj, S. (2017). Enhancing Security using Knowledge Discovery and Data Mining Methods in Cloud Computing.
125. Arora, P., & Bhardwaj, S. (2019). Safe and Dependable Intrusion Detection Method Designs Created with Artificial Intelligence Techniques. *machine learning*, *8*(7).
126. Sharma, S., & Dutta, N. (2024). Examining ChatGPT's and Other Models' Potential to Improve the Security Environment using Generative AI for Cybersecurity.
127. Sakshi, S. (2023). Development of a Project Risk Management System based on Industry 4.0 Technology and its Practical Implications.
128. Sharma, S., & Dutta, N. (2018). Development of New Smart City Applications using Blockchain Technology and Cybersecurity Utilisation. *Development*, *7*(11).
129. Sharma, S., & Dutta, N. (2017). Classification and Feature Extraction in Artificial Intelligence-based Threat Detection using Analysing Methods.
130. Sharma, S., & Dutta, N. (2017). Development of Attractive Protection through Cyberattack Moderation and Traffic Impact Analysis for Connected Automated Vehicles. *Development*, *4*(2).
131. Sharma, S., & Dutta, N. (2016). Analysing Anomaly Process Detection using Classification Methods and Negative Selection Algorithms.
132. Sharma, S., & Dutta, N. (2015). Evaluation of REST Web Service Descriptions for Graph-based Service Discovery with a Hypermedia Focus. *Evaluation*, *2*(5).
133. Sharma, S., & Dutta, N. (2015). Cybersecurity Vulnerability Management using Novel Artificial Intelligence and Machine Learning Techniques.
134. Sharma, S., & Dutta, N. (2015). Distributed DNN-based Middleware for Cyberattack Detection in the Smart IOT Ecosystem: A Novel Framework and Performance Evaluation Technique.
135. Sakshi, S. (2024). A Large-Scale Empirical Study Identifying Practitioners' Perspectives on Challenges in Docker Development: Analysis using Stack Overflow.
136. Sakshi, S. (2023). Advancements and Applications of Generative Artificial Intelligence and show the Experimental Evidence on the Productivity Effects using Generative Artificial Intelligence.
137. Bhat, S. (2024). Building Thermal Comforts with Various HVAC Systems and Optimum Conditions.
138. Bhat, S. (2020). Enhancing Data Centre Energy Efficiency with Modelling and Optimisation of End-To-End Cooling.
139. Bhat, S. (2016). Improving Data Centre Energy Efficiency with End-To-End Cooling Modelling and Optimisation.
140. Bhat, S. (2015). Deep Reinforcement Learning for Energy-Saving Thermal Comfort Management in Intelligent Structures.
141. Bhat, S. (2015). Design and Function of a Gas Turbine Range Extender for Hybrid Vehicles.
142. Bhat, S. (2023). Discovering the Attractiveness of Hydrogen-Fuelled Gas Turbines in Future Energy Systems.

143. Bhat, S. (2019). Data Centre Cooling Technology's Effect on Turbo-Mode Efficiency.
144. Bhat, S. (2018). The Impact of Data Centre Cooling Technology on Turbo-Mode Efficiency.
145. Bhat, S. (2015). Technology for Chemical Industry Mixing and Processing. *Technology*, *2*(2).
146. Bauri, K. P., & Sarkar, A. (2016). Flow and scour around vertical submerged structures. *Sādhanā*, *41*, 1039-1053.
147. Bauri, K. P., & Sarkar, A. (2020). Turbulent bursting events within equilibrium scour holes around aligned submerged cylinder. *Journal of Turbulence*, *21*(2), 53-83.
148. Bauri, K. P., & Sarkar, A. (2019). Turbulent burst-sweep events around fully submerged vertical square cylinder over plane bed. *Environmental Fluid Mechanics*, *19*, 645-666.
149. Bauri, K. P. (2022). Coherent structures around submerged circular and square cylinders due to change of orientation angle in steady current over plane bed. *Acta Geophysica*, *70*(5), 2223-2250.
150. Polamarasetti, A. (2024, November). Research developments, trends and challenges on the rise of machine learning for detection and classification of malware. In *2024 International Conference on Intelligent Computing and Emerging Communication Technologies (ICEC)* (pp. 1-5). IEEE.
151. Polamarasetti, A. (2024, November). Machine learning techniques analysis to Efficient resource provisioning for elastic cloud services. In *2024 International Conference on Intelligent Computing and Emerging Communication Technologies (ICEC)* (pp. 1-6). IEEE.
152. Polamarasetti, A. (2024, November). Role of Artificial Intelligence and Machine Learning to Enhancing Cloud Security. In *2024 International Conference on Intelligent Computing and Emerging Communication Technologies (ICEC)* (pp. 1-6). IEEE.
153. Gollangi, H. K., Bauskar, S. R., Madhavaram, C. R., Galla, E. P., Sunkara, J. R., & Reddy, M. S. (2020). Echoes in Pixels: The intersection of Image Processing and Sound detection through the lens of AI and Ml. *International Journal of Development Research*, *10*(08), 39735-39743.
154. Reddy, M. S., Sarisa, M., Konkimalla, S., Bauskar, S. R., Gollangi, H. K., Galla, E. P., & Rajaram, S. K. (2021). Predicting tomorrow's Ailments: How AI/ML Is Transforming Disease Forecasting. *ESP Journal of Engineering & Technology Advancements*, *1*(2), 188-200.
155. Boddapati, V. N., Sarisa, M., Reddy, M. S., Sunkara, J. R., Rajaram, S. K., Bauskar, S. R., & Polimetla, K. (2022). Data migration in the cloud database: A review of vendor solutions and challenges. *Available at SSRN 4977121*.
156. Boddapati, V. N., Sarisa, M., Reddy, M. S., Sunkara, J. R., Rajaram, S. K., Bauskar, S. R., & Polimetla, K. (2022). Data migration in the cloud database: A review of vendor solutions and challenges. *Available at SSRN 4977121*.
157. Patra, G. K., Rajaram, S. K., Boddapati, V. N., Kuraku, C., & Gollangi, H. K. (2022). Advancing Digital Payment Systems: Combining AI, Big Data, and Biometric Authentication for Enhanced Security. *International Journal of Engineering and Computer Science*, *11*(08), 10-18535.
158. Patra, G. K., Rajaram, S. K., & Boddapati, V. N. (2019). Ai And Big Data In Digital Payments: A Comprehensive Model For Secure Biometric Authentication. *Educational Administration: Theory and Practice*.
159. Boddapati, V. N., Galla, E. P., Sunkara, J. R., Bauskar, S., Patra, G. K., Kuraku, C., & Madhavaram, C. R. (2021). Harnessing the Power of Big Data: The Evolution of AI and Machine Learning in Modern Times. *ESP Journal of Engineering & Technology Advancements*, *1*(2), 134-146.
160. Singh, K., & Neeru, N. (2023). A COMPREHENSIVE STUDY OF THE IOT ATTACKS ON DIFFERENT LAYERS. *Journal Punjab Academy of Sciences*, *23*, 140-155.
161. Singh, K., & Neeru, N. (2023). A COMPREHENSIVE STUDY OF THE IOT ATTACKS ON DIFFERENT LAYERS. *Journal Punjab Academy of Sciences*, *23*, 140-155.
162. Ravi, P., Haritha, D., & Obulesh, A. (2022). Average Iceberg Queries Computation Using Bitmap Indexes On Health Care Data. *Journal of Pharmaceutical Negative Results*, 3724-3731.