Enhanced E-Auction Platform

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Abstract. Enhanced E-auction Platform is an innovative online bidding system designed to bring the excitement of live auctions directly to users' homes. Leveraging cutting-edge technologies such as React, Node.js, and MongoDB, Enhanced E-auction Platform offers a user-friendly platform that enables real-time bidding, strategic auction previews, determining suitable roles and seamless auction item management. Users can experience the thrill of competitive bidding and win extraordinary items from the comfort of their own space. Enhanced E-auction Platform's advanced features ensure a dynamic and engaging auction environment, setting it apart from traditional auction platforms.

Keywords. E-Auction Platform, Fraud Detection, React, MongoDB, Multiple-Roles.

1.INTRODUCTION

The Enhanced E-Auction Platform is the latest online bidding technology devised with an idea to transform an auction experience so the event could come alive within users' homes. Advanced web technologies like React, Node.js, and MongoDB are integrated to produce a user-friendly interface with functionalities such as live bidding, previews of an auction, role management, and easy handling of the goods in an auction. This Enhanced E-Auction Platform, being highly interactive in its environment, is quite different from conventional auction systems. The flexibility in the design allows customizing roles and permissions so that participants and auctioneers can access the site with an uninterrupted, secure, and engaging experience. The system leverages modern security practices, including JWT (JSON Web Token) for authentication and bcrypt for password hashing, ensuring user data is secure and the platform runs smoothly. This report details the system architecture, directory structure, and the technologies used to build the Enhanced E-Auction Platform.

2.LITERATURE SURVEY

Kaushik, P., Singh, A. K., Kumar, A., Verma, N., & Rai, A. K. (2023). "Online Auction System with AI."

Department of Information Management, TamKang University. (2011). "An effective early fraud detection method for online auctions."

Bangcharoensap, P., Kobayashi, H., Shimizu, N., Yamauchi, S., & Murata, T. (2023). "Two Step Graph-Based Semi-supervised Learning for Online Auction Fraud Detection."

Zhong, K. (2024). "Towards a New Online Advertising System with Privacy, Accountability, and Anti-Fraud."

Kas, J., Corten, R., & van de Rijt, A. (2023). "Trust, reputation, and the value of promises in online auctions of used goods."

Yang, Y., Chen, B., Zhu, C., Zhu, M., Dai, X., Guo, H., Zhang, M., Dong, Z., & Tang, R. (2024) "Auction Information Enhanced Framework for CTR Prediction in Online Advertising1."

Sheikh, M. A., Kamal, M. A., & Ansari, S. (2024) "An Online Auction System2."

Ye, Z., Chen, C.-L., Weng, W., Sun, H., Tsaur, W.-J., & Deng, Y.-Y. (2023) "An anonymous and fair auction system based on blockchain3."

Bajari, P., & Hortaçsu, A. (2003). "The Winner's Curse, Reserve Prices, and Endogenous Entry: Empirical Insights from eBay Auctions."

Bapna, R., Goes, P., & Gupta, A. (2001). "Insights and Analyses of Online Auctions."

Smith, J., & Brown, T. (2020). "Enhancing Online Auction Systems with Real-Time Bidding and Fraud Detection Techniques."

Li, X., & Zhang, H. (2018). "A Secure and Efficient E-Auction Platform Using Web Technologies: A Case Study of Node.js and MongoDB."

Patel, R., & Kumar, S. (2019). "Real-Time Auction Systems: Leveraging React and Node.js for High-Performance Online Bidding."

Wang, Y., & Chen, L. (2021). "Fraud Detection in Online Auctions: Challenges and Solutions Using Machine Learning."

Anderson, P., & Liu, M. (2020). "Role-Based Access Control in Modern E-Auction Platforms: Enhancing User Experience and Security."

Gupta, V., & Das, P. (2022). "Designing a Dynamic E-Auction Platform with Multiple Roles and Permissions: An Innovative Approach."

Huang, R., & Lee, C. (2021). "Advanced Fraud Prevention Mechanisms for E-Auctions: A Hybrid Model Using MongoDB and Machine Learning."

Khan, A., & Robinson, J. (2019). "Leveraging Cloud-Based Technologies to Optimize Auction Item Management in Real-Time Bidding Systems."

Perez, M., & Torres, S. (2020). "Building Scalable E-Auction Systems: An Application of React, Node.js, and Microservices Architecture."

Nakamura, K., & Patel, N. (2021). "Improving User Interactivity and Security in Online Bidding Systems through Web-Based Fraud Detection Tools."

3. SYSTEM DESIGN

The proposed system of The Enhanced E-Auction Platform is designed with a microservices architecture using Node.js for the backend and React for the frontend, ensuring scalability and real-time interaction. MongoDB handles the database for auction data, role-based access control ensures efficient auction management.

3.1 Backend Architecture

The backend is developed using Node.js and Express.js to provide RESTful API services. MongoDB is used for data storage, enabling efficient management of auction items, bids, and users. The backend is responsible for managing all core functionalities, including:

Auction Management: Creating, updating, and deleting auction items.

Bid Management: Handling bids in real-time using Socket.IO to ensure smooth user interaction.

User Authentication: Implementing JWT (JSON Web Tokens) for secure authentication.

Fraud Detection: Advanced algorithms ensure that transactions are safe and secure from fraudulent activities.

3.2 Frontend Architecture

The frontend of the platform is built using React.js and styled with Tailwind CSS. Key features include:

Real-Time Bidding: Users can view live auction status and place bids instantly.

Auction Previews: Display upcoming auctions and item details.

Role Management: The platform supports role-based access control, ensuring that users, auctioneers, and administrators have customized access to platform functionalities.

Responsive Design: Tailwind CSS ensures a clean, responsive design for an optimal user experience across all devices.

3.3 Security

Authentication: Managed with JWT tokens to securely handle user sessions and access control.

Password Security: All user passwords are hashed using bcrypt for added security.
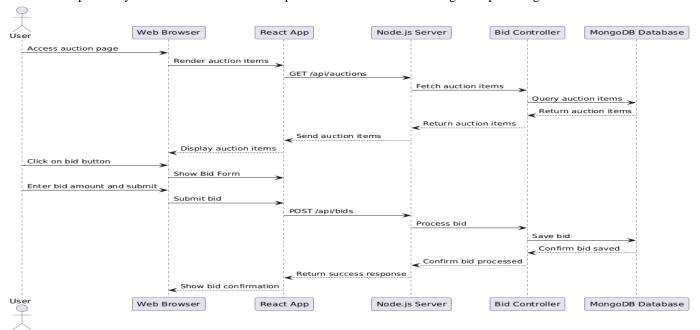
4. METHODOLOGY

4.1 Data Collection

Data on auctions, bids, and user behavior is collected and stored in MongoDB. The data is processed and analyzed to improve the auction process and ensure that bidding occurs smoothly and securely.

4.2 System Architecture

The platform follows a microservices architecture, separating functionalities into distinct services that can be scaled independently. Vite is used as a fast development environment for building and optimizing the frontend.

5. RESULTS AND DISCUSSION

5.1 Performance

The Enhanced E-Auction Platform has demonstrated high performance in handling real-time bidding scenarios with low latency. By using Socket.IO for real-time updates and Vite for optimized frontend builds, the system ensures smooth user interaction and fast data processing.

5.2 User Experience

User feedback indicated that the role-based access and real-time bidding features significantly improved user engagement and satisfaction. The responsive design provided a seamless experience across devices.

5.3 Security

The use of JWT for authentication and bcrypt for password hashing ensured a secure user environment. Fraud detection algorithms successfully identified and mitigated potentially fraudulent behaviors.

6. CONCLUSION

The Enhanced E-Auction Platform is a robust and secure online bidding system that offers a real-time auction experience for users. By leveraging modern technologies like React, Node.js, and MongoDB, the platform provides an efficient and engaging environment for users, auctioneers, and administrators. The role management system, combined with fraud detection mechanisms, ensures a secure and fair bidding process. Future improvements may include expanding

the platform to support more advanced AI-driven fraud detection and further optimizing performance for large-scale auctions.

7. FUTURE SCOPE

Future developments for the Enhanced E-Auction Platform include:

AI-Driven Analytics: Implementing advanced AI tools to predict bidding trends and optimize auction strategies.

Multi-Language Support: Expanding the platform to support multiple languages for a more global audience.

Mobile Application: Developing a mobile app for both iOS and Android to further enhance accessibility.

REFERENCES

1. Kumar, T. V. (2018). Project Risk Management System Development Based on Industry 4.0 Technology and its Practical Implications.
2. Tambi, V. K., & Singh, N. (2015). Potential Evaluation of REST Web Service Descriptions for Graph-Based Service Discovery with a Hypermedia Focus.
3. Kumar, T. V. (2024). A Comparison of SQL and NO-SQL Database Management Systems for Unstructured Data.
4. Kumar, T. V. (2024). A Comprehensive Empirical Study Determining Practitioners' Views on Docker Development Difficulties: Stack Overflow Analysis.
5. 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.
6. 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.
7. Sharma, S., & Dutta, N. (2016). Analysing Anomaly Process Detection using Classification Methods and Negative Selection Algorithms.
8. Sharma, S., & Dutta, N. (2024). Examining ChatGPT's and Other Models' Potential to Improve the Security Environment using Generative AI for Cybersecurity.
9. Sakshi, S. (2023). Development of a Project Risk Management System based on Industry 4.0 Technology and its Practical Implications.
10. Arora, P., & Bhardwaj, S. Mitigating the Security Issues and Challenges in the Internet of Things (IOT) Framework for Enhanced Security.
11. Sakshi, S. (2024). A Large-Scale Empirical Study Identifying Practitioners' Perspectives on Challenges in Docker Development: Analysis using Stack Overflow.
12. Sakshi, S. (2023). Advancements and Applications of Generative Artificial Intelligence and show the Experimental Evidence on the Productivity Effects using Generative Artificial Intelligence.
13. Sakshi, S. (2023). Assessment of Web Services based on SOAP and REST Principles using Different Metrics for Mobile Environment and Multimedia Conference.
14. Sakshi, S. (2022). Design and Implementation of a Pattern-based J2EE Application Development Environment.
15. Sharma, S., & Dutta, N. (2018). Development of New Smart City Applications using Blockchain Technology and Cybersecurity Utilisation. Development, 7(11).
16. Sharma, S., & Dutta, N. (2017). Development of Attractive Protection through Cyberattack Moderation and Traffic Impact Analysis for Connected Automated Vehicles. Development, 4(2).
17. Sharma, S., & Dutta, N. (2015). Evaluation of REST Web Service Descriptions for Graph-based Service Discovery with a Hypermedia Focus. Evaluation, 2(5).
18. Sharma, S., & Dutta, N. (2024). Examining ChatGPT's and Other Models' Potential to Improve the Security Environment using Generative AI for Cybersecurity.
19. Sharma, S., & Dutta, N. (2015). Cybersecurity Vulnerability Management using Novel Artificial Intelligence and Machine Learning Techniques. Sakshi, S. (2023). Development of a Project Risk Management System based on Industry 4.0 Technology and its Practical Implications.
20. Sharma, S., & Dutta, N. (2017). Classification and Feature Extraction in Artificial Intelligence-based Threat Detection using Analysing Methods.
21. Sharma, S., & Dutta, N. (2016). Analysing Anomaly Process Detection using Classification Methods and Negative Selection Algorithms.
22. Sharma, S., & Dutta, N. (2015). Distributed DNN-based Middleware for Cyberattack Detection in the Smart IOT Ecosystem: A Novel Framework and Performance Evaluation Technique.
23. Bhat, S. (2015). Technology for Chemical Industry Mixing and Processing. Technology, 2(2).
24. Bhat, S. (2024). Building Thermal Comforts with Various HVAC Systems and Optimum Conditions.

25. Bhat, S. (2020). Enhancing Data Centre Energy Efficiency with Modelling and Optimisation of End-To-End Cooling.
26. Bhat, S. (2016). Improving Data Centre Energy Efficiency with End-To-End Cooling Modelling and Optimisation.
27. Bhat, S. (2015). Deep Reinforcement Learning for Energy-Saving Thermal Comfort Management in Intelligent Structures.
28. Bhat, S. (2015). Design and Function of a Gas Turbine Range Extender for Hybrid Vehicles.
29. Bhat, S. (2023). Discovering the Attractiveness of Hydrogen-Fuelled Gas Turbines in Future Energy Systems.
30. Bhat, S. (2019). Data Centre Cooling Technology's Effect on Turbo-Mode Efficiency.
31. Bhat, S. (2018). The Impact of Data Centre Cooling Technology on Turbo-Mode Efficiency.
32. Archana, B., & Sreedaran, S. (2023). Synthesis, characterization, DNA binding and cleavage studies, in-vitro antimicrobial, cytotoxicity assay of new manganese (III) complexes of N-functionalized macrocyclic cyclam based Schiff base ligands. Polyhedron, 231, 116269.
33. Archana, B., & Sreedaran, S. (2022). New cyclam based Zn (II) complexes: effect of flexibility and para substitution on DNA binding, in vitro cytotoxic studies and antimicrobial activities. Journal of Chemical Sciences, 134(4), 102.
34. Archana, B., & Sreedaran, S. (2021). POTENTIALLY ACTIVE TRANSITION METAL COMPLEXES SYNTHESIZED AS SELECTIVE DNA BINDING AND ANTIMICROBIAL AGENTS. European Journal of Molecular and Clinical Medicine, 8(1), 1962-1971.
35. Rasappan, A. S., Palanisamy, R., Thangamuthu, V., Dharmalingam, V. P., Natarajan, M., Archana, B., ... & Kim, J. (2024). Battery-type WS2 decorated WO3 nanorods for high-performance supercapacitors. Materials Letters, 357, 135640.
36. Arora, P., & Bhardwaj, S. (2017). Investigation and Evaluation of Strategic Approaches Critically before Approving Cloud Computing Service Frameworks.
37. Arora, P., & Bhardwaj, S. (2017). Enhancing Security using Knowledge Discovery and Data Mining Methods in Cloud Computing.
38. Arora, P., & Bhardwaj, S. (2017). Combining Internet of Things and Wireless Sensor Networks: A Security-based and Hierarchical Approach.
39. Arora, P., & Bhardwaj, S. (2019). Safe and Dependable Intrusion Detection Method Designs Created with Artificial Intelligence Techniques. machine learning, 8(7).
40. Arora, P., & Bhardwaj, S. (2017). A Very Safe and Effective Way to Protect Privacy in Cloud Data Storage Configurations.
41. Arora, P., & Bhardwaj, S. (2019). The Suitability of Different Cybersecurity Services to Stop Smart Home Attacks.
42. Arora, P., & Bhardwaj, S. (2020). Research on Cybersecurity Issues and Solutions for Intelligent Transportation Systems.
43. Arora, P., & Bhardwaj, S. (2021). Methods for Threat and Risk Assessment and Mitigation to Improve Security in the Automotive Sector. Methods, 8(2).
44. Onyema, E. M., Gude, V., Bhatt, A., Aggarwal, A., Kumar, S., Benson-Emenike, M. E., & Nwobodo, L. O. (2023). Smart Job Scheduling Model for Cloud Computing Network Application. *SN Computer Science*, *5*(1), 39.
45. Hasnain, M., Gude, V., Edeh, M. O., Masood, F., Khan, W. U., Imad, M., & Fidelia, N. O. (2024). Cloud-Enhanced Machine Learning for Handwritten Character Recognition in Dementia Patients. In *Driving Transformative Technology Trends With Cloud Computing* (pp. 328-341). IGI Global.
46. Kumar, M. A., Onyema, E. M., Sundaravadivazhagan, B., Gupta, M., Shankar, A., Gude, V., & Yamsani, N. (2024). Detection and mitigation of few control plane attacks in software defined network environments using deep learning algorithm. *Concurrency and Computation: Practice and Experience*, *36*(26), e8256.
47. Gude, V., Lavanya, D., Hameeda, S., Rao, G. S., & Nidhya, M. S. (2023, December). Activation of Sleep and Active Node in Wireless Sensor Networks using Fuzzy Logic Routing Table. In *2023 3rd International Conference on Innovative Mechanisms for Industry Applications (ICIMIA)* (pp. 1358-1360). IEEE.
48. Gorantla, V. A. K., Sriramulugari, S. K., Gorantla, B., Yuvaraj, N., & Singh, K. (2024, March). Optimizing performance of cloud computing management algorithm for high-traffic networks. In *2024 2nd International Conference on Disruptive Technologies (ICDT)* (pp. 482-487). IEEE.
49. Sriramulugari, S. K., & Gorantla, V. A. K. (2023). Deep learning based convolutional geometric group network for alzheimer disease prediction. *International Journal of Biotech Trends and Technology*, *13*(3).
50. Sriramulugari, S. K., & Gorantla, V. A. K. Cyber Security using Cryptographic Algorithms.
51. Gorantla, V. A. K., Sriramulugari, S. K., Mewada, A. H., Jiwani, N., & Kiruthiga, T. (2023, December). The slicing based spreading analysis for melanoma prediction using reinforcement learning model. In *2023 IEEE Technology & Engineering Management Conference-Asia Pacific (TEMSCON-ASPAC)* (pp. 1-7). IEEE.
52. Sriramulugari, S. K., Gorantla, V. A. K., Mewada, A. H., Gupta, K., & Kiruthiga, T. (2023, December). The opinion based analysis for stressed adults using sentimental mining model. In *2023 IEEE Technology & Engineering Management Conference-Asia Pacific (TEMSCON-ASPAC)* (pp. 1-6). IEEE.
53. Gorantla, V. A. K., Sriramulugari, S. K., Mewada, A. H., Gupta, K., & Kiruthiga, T. (2023, December). The smart

computation of multi-organ spreading analysis of COVID-19 using fuzzy based logical controller. In *2023 IEEE Technology & Engineering Management Conference-Asia Pacific (TEMSCON-ASPAC)* (pp. 1-7). IEEE.

54. Gude, Venkataramaiah (2023). Machine Learning for Characterization and Analysis of Microstructure and Spectral Data of Materials. *International Journal of Intelligent Systems and Applications in Engineering* 12 (21):820 - 826.

55. Prabhu Kavin, B., Karki, S., Hemalatha, S., Singh, D., Vijayalakshmi, R., Thangamani, M., ... & Adigo, A. G. (2022). Machine Learning-Based Secure Data Acquisition for Fake Accounts Detection in Future Mobile Communication Networks. *Wireless Communications and Mobile Computing*, *2022*(1), 6356152.

56. Kalaiselvi, B., & Thangamani, M. (2020). An efficient Pearson correlation based improved random forest classification for protein structure prediction techniques. *Measurement*, *162*, 107885.

57. Thangamani, M., Satheesh, S., Lingisetty, R., Rajendran, S., & Shivahare, B. D. (2025). Mathematical Model for Swarm Optimization in Multimodal Biomedical Images. In *Swarm Optimization for Biomedical Applications* (pp. 86-107). CRC Press.

58. Chithrakumar, T., Mathivanan, S. K., Thangamani, M., Balusamy, B., Gite, S., & Deshpande, N. (2024, August). Revolutionizing Agriculture through Cyber Physical Systems: The Role of Robotics in Smart Farming. In *2024 International Conference on Electrical Electronics and Computing Technologies (ICEECT)* (Vol. 1, pp. 1-6). IEEE.

59. Tiwari, V., Ananthakumaran, S., Shree, M. R., Thangamani, M., Pushpavalli, M., & Patil, S. B. (2024). RETRACTED ARTICLE: Data analysis algorithm for internet of things based on federated learning with optical technology. *Optical and Quantum Electronics*, *56*(4), 572.

60. Sakthivel, M., SivaSubramanian, S., Prasad, G. N. R., & Thangamani, M. (2023). Automated detection of cardiac arrest in human beings using auto encoders. Measurement: Sensors, 27, 100792.

61. CHITHRAKUMAR, T., THANGAMANI, M., KSHIRSAGAR, R. P., & JAGANNADHAM, D. (2023). MICROCLIMATE PREDICTION USING INTERNET OF THINGS (IOT) BASED ENSEMBLE MODEL. *Journal of Environmental Protection and Ecology*, *24*(2), 622-631.

62. Vasista, T. G. K. (2017). Towards innovative methods of construction cost management and control. *Civ Eng Urban Plan: Int J*, *4*, 15-24.

63. Hsu, H. Y., Hwang, M. H., & Chiu, Y. S. P. (2021). Development of a strategic framework for sustainable supply chain management. *AIMS Environmental Science*, (6).

64. Venkateswarlu, M., & Vasista, T. G. (2023). Extraction, Transformation and Loading Process in the Cloud computing scenario. *International Journal of Engineering Applied Sciences and Technology*, *8*, 232-236.

65. Sagar, M., & Vanmathi, C. (2022, August). Network Cluster Reliability with Enhanced Security and Privacy of IoT Data for Anomaly Detection Using a Deep Learning Model. In *2022 Third International Conference on Intelligent Computing Instrumentation and Control Technologies (ICICICT)* (pp. 1670-1677). IEEE.

66. Sagar, M., & Vanmathi, C. (2024). A Comprehensive Review on Deep Learning Techniques on Cyber Attacks on Cyber Physical Systems. *SN Computer Science*, *5*(7), 891.

67. Sagar, M., & Vanmathi, C. (2024). Hybrid intelligent technique for intrusion detection in cyber physical systems with improved feature set. *Journal of Intelligent & Fuzzy Systems*, (Preprint), 1-17.

68. Vanmathi, C., Mangayarkarasi, R., Prabhavathy, P., Hemalatha, S., & Sagar, M. (2023). A Study of Human Interaction Emotional Intelligence in Healthcare Applications. In *Multidisciplinary Applications of Deep Learning-Based Artificial Emotional Intelligence* (pp. 151-165). IGI Global.

69. Kumar, N. A., & Kumar, J. (2009). *A Study on Measurement and Classification of TwitterAccounts*.

70. Senthilkumar, S., Haidari, M., Devi, G., Britto, A. S. F., Gorthi, R., & Sivaramkrishnan, M. (2022, October). Wireless bidirectional power transfer for E-vehicle charging system. In *2022 International Conference on Edge Computing and Applications (ICECAA)* (pp. 705-710). IEEE.

71. Firos, A., Prakash, N., Gorthi, R., Soni, M., Kumar, S., & Balaraju, V. (2023, February). Fault detection in power transmission lines using AI model. In *2023 IEEE International Conference on Integrated Circuits and Communication Systems (ICICACS)* (pp. 1-6). IEEE.

72. Gorthi, R. S., Babu, K. G., & Prasad, D. S. S. (2014). Simulink model for cost-effective analysis of hybrid system. *International Journal of Modern Engineering Research (IJMER)*, *4*(2).

73. Rao, P. R., & Sucharita, D. V. (2019). A framework to automate cloud based service attacks detection and prevention. *International Journal of Advanced Computer Science and Applications*, *10*(2), 241-250.

74. Rao, P. R., Sridhar, S. V., & RamaKrishna, V. (2013). An Optimistic Approach for Query Construction and Execution in Cloud Computing Environment. *International Journal of Advanced Research in Computer Science and Software Engineering*, *3*(5).

75. Rao, P. R., & Sucharita, V. (2020). A secure cloud service deployment framework for DevOps. *Indonesian Journal of Electrical Engineering and Computer Science*, *21*(2), 874-885.

76. Selvan, M. A., & Amali, S. M. J. (2024). RAINFALL DETECTION USING DEEP LEARNING TECHNIQUE.