FREELANCE JOB MATCHING AND SECURITY ENHANCEMENT USING AI RECOMMENDATIONS

Dr.R.Saravanan Ph.D 1st
Professor
Department of Computer Science and Engineering
Vel Tech Multi Tech Dr.Rangarajan Dr.Sakunthala Engineering College
Email: rsaravanan@veltechmultitech.org

Gopi Krishna K 2nd
UG Scholar
Department of Computer Science and Engineering
Vel Tech Multi Tech Dr.Rangarajan Dr. Sakunthala Engineering College
Email: kumarasandevi@gmail.com

Harish Raagaventra R 3rd
UG Scholar
Department of Computer Science and Engineering
Vel Tech Multi Tech Dr.Rangarajan Dr. Sakunthala Engineering College
Email: harishraagavendra2003@gmail.com

Vimal Raj R 4th
UG Scholar
Department of Computer Science and Engineering
Vel Tech Multi Tech Dr.Rangarajan Dr. Sakunthala Engineering College
Email: vimalrj505@gmail.com

Abstract –Freelancer job matching security enhancement by way of Artificial Intelligence (AI) is experiencing rapid growth, which has led to the development of cost-effective and efficient platforms for connecting freelancers with job opportunities. In this scenario, the technologies furnished by AI-driven recommendation systems and data analytics are the ultimate factors leading towards the development of software architectures that offer a smooth blend of AI and secure payment systems. The subsequent advancements have on one side enabled the exploration of massive user data combined with job matching optimization, freelancer-employer interaction enhancement, and other improved security of transactions. This shift in scholarly path is leading to respective advances by pushing for the need of infrastructures that offer scalability and security to house escalating user bases as well as data-driven functionalities. AI-driven recommendation models appraise user profiles alongside job preferences and market trends in order to fine-tune job suggestions to maximize job contentment and earning chances. The technology offers a myriad of other applications, from personalizing job suggestions to creating a secure freelance ecosystem by using escrow-based payment mechanisms.

Keywords: Artificial Intelligence (AI), freelance job matching, AI-driver recommendations, secure payment systems, data analytics

1. INTRODUCTION

The communication orientation of technology is felt as a conduit in the gaps and solutions to real-world problems in it. The gig-economy stands out as a dynamic and transformative field, in which millions enjoyed the luxury of flexible work opportunities on diverse projects. However, there have been considerable obstacles, such as inefficient job matching, ambiguous visibility, and security liabilities for payments that need to be dealt with to bring freelance ecosystems to their full potential.

The innovations in AI and other digital platforms are playing a vital role in transforming the business landscape of e-commerce, finance, and healthcare.Currently researched are some of the most challenging issues in this freelance world, including the necessary job fitting and the question of whether consignment into the hands of the best companies will steer us toward safe transactions.

The platforms work on the algorithm-driven recommendation systems conducting a comprehensive analysis based on user profiles, job preferences, skills, and other job profiles, all to match freelancers against specific job posts. The AI-operated algorithms constantly learn and adapt, thus enhancing the efficiency of the platform. At the same time, these platforms also solve the problem of security to the best of their abilities to effectuate the escrow payment systems securely holding unto these funds until the project is approved by all associated parties.Biometric and behavioural data analytics are being utilized for advanced user verification and fraud prevention. These technologies with AI analytics will create a very simple yet secure freelance universe. With all kinds of matching, jobs, payments, and transparent communication, energy inside this system will only spell more dividends and evolve.

2. RELATED WORKS

Authors finally suggested that an interdisciplinary approach is of supreme importance for coping with frauds in freelancer job matching and payment security within the frame of artificial intelligence, data science, and software engineering. This would necessitate the development and research of new tools and platforms that would greatly enhance job marketplace operations to make their processes more efficient and certain; thereupon increasing satisfaction for the job for the freelancers, and trust in the client-freelancer relationships. [1] The authors have put emphasis on the integration of AI-based recommendation systems with advanced analytics tools for perfect matchmaking between the freelancers and opportunities (jobs), and the combination of this system calls for cognitive algorithms able to analyze user profile information, skill sets, and job requirements to generate recommendations with great acuity for freelancers and clients. [2]

The authors in the present article focus on the technical nuances of AI-based crowdsourcing platforms vis-a-vis realization of machine learning models and natural language processing (NLP) for employment profile descriptions and user preferences. Conversations conducted

in the article include data pre-processing, extractor features, recommendation algorithms, and evaluation metrics for performance measurement. [3]

The authors describe a new payment system in the freelance marketplace that they inadvertently build upon an escrow system, an avenue of achieving payment security, and one that ensures the holding of funds until the mutual obligations of both the freelancers and the employer have been met. This multi-part topic delved deep into how the payment system was constructed and implemented and what it did toward lessening fraud and aiding with secure financial transactions. This improvement offers a great solution against one of the most commonly faced problems, coming from within the digital marketplaces for freelancers and employers. [4] The authors introduce a novel AI- enabled system for managing large-scale data on freelance platforms with an emphasis on making the software scalable and more efficient. Cloud computing is used to distribute job and user data to recommendation algorithms and cluster resolutions in a processing environment that equally leverages storage and calculations. Within these cloud-development arrangements, a series of well-vested recommendations for dashboards are made to bring out the job of following infographics to the freelancer performance metrics. The system backend relies on hybrid pioneers with distributed computing and artificial intelligence compiled for efficacy in scalable platform flow. By focusing on this pipeline's generic nature, the authors hint at the change role for other applications than freelance platforms. [5]

3. PROPOSED METHODOLOGY

The methodology employed presents the elevation of modern technology that features an Artificial Intelligence (AI) recommendation system, the MERN (MongoDB, Express.js, React, Node.js) stack-based platform, escrow payment gateway, and a secure authentication module for users. This implies that implicit algorithms are used for analyzing user profiles, job requirements, and market trends for catering a highly satisfactory job matching. MERN demonstrates support for the development of an interactive, scalable, and user-friendly platform with the business of letting freelancers and employers to connect.The escrow takes care of payments making sure deals are safe and tying user identity checks to how much people trust the system. The project wants to make job matching more effective, create better bonds between freelancers and employers, and provide a secure place for freelance agreements. These aims zero in on two key areas: AI-powered data handling and review team up with strong coding tricks to keep public info and transactions safe from outside meddling.All our essential processes are run on clouds so that the system and the person can benefit from the possible increased capacity, customization, and longevity. Our proposed system for the Web App for Freelancing Developers & Designers is a userfriendly as well as comprehensive platform, allowing freelancers to work projects together with clients without any unwanted hindrance. This system was developed by using the MERN stack comprising MongoDB, Express.js, React.js, and Node.js. The system has a user authentication module that permits users to select their profile as a freelancer or a client. The profile management module lets freelancers create and manage the profile highlighting their skills and experiences for the betterment of potential clients. The project management module on the other hand lets clients create and manage their profiles describing their businesses or projects. React.js is in use on the front end that provides possible features for great and responsive user experience. Data routing has its Node.js with Express.js behind the scene which separates from the frontend application and providing fast and efficient API for data transport. MongoDB forms the database system solely because of its flexibility and enforced speed to handle large data loads.

AI engine is capable of making recommendations based largely on the preferences of a user in job selection. One can present the matches for freelancers and the matches for employers based on their choices and later re-recommend themselves. This essentially combined the AI, cloud technology, and elan of the strong transaction potentials hanging on to one large promise.

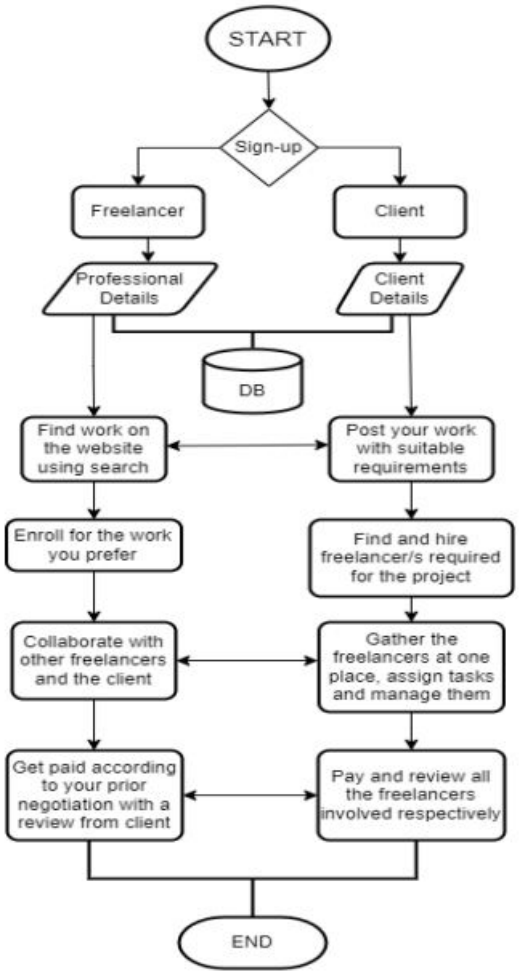

Figure 1: Flow Chart

In Fig. 1 the series of steps provides guidance to both freelancers and clients using the site. The very first input is the login, giving relevant personal information and then selecting either of the groups, i.e., "freelancer" or "client". Freelancers are instructed to specify their educational and professional details, demonstrating their worked areas, whereas clients must reveal the business details from their backgrounds. At this level, before the approval and hiring of a freelancer there is a statement about several more details that they, as freelancers, are to present: the period for the particular project, hourly rates, and previous assignments executed. Clients can conformity hire several freelancers to form a team for a bigger project. Freelancers, upon successful appointment, can commence with their work and using the collaboration with other freelancers and the client(s) guarantee the successful termination of the project. Freelancers could then communicate with the client through the chat feature in the system, keeping them appraised on the course of their project. Clients should then pay their Freelancer after the project is concluded through the secure payment system established by the platform. Clients are, also given a chance to review the work as well as compose ratings for the reviewed Freelancer; providing applicants with a fair mixture of experiences when hiring their desired freelancer.

3.1 AI Recommendation Module:

A machine-learning AI Recommendation Module merges natural language processing in algorithms to explore user profiles, skills, job descriptions, and employer preferences. This module stands as the job market for freelancers and suggests employees through filters, collaboration and content-based filtering. A cloud-based database logs all user interactions and is put to refined and improved use through the recommendation engine.

3.2 Secure Payment Module:

The Secure Payment Module provides an escrow mechanism wherein employers process or receive 100% payment for a freelancer's completed projects. Funds are placed into an escrow account until completion and approval of a project by the employer after completing a job. In addition, using encryption protocols and blockchain technology secures and makes purifies transactions. Payment status updates and transaction receipts are sent automatically by email or an in-platform notification to freelancers and employers.

3.3 User Authentication and Privacy Module:

The User Authentication and Privacy Module is a secure mechanism that enables the users to create accounts, register, and log in by using their unique credentials. A host of security features is implemented with multi-factor authentication (MFA) to stiffen security terms. The module ensures that sensitive data such as bank details, personal identification, and project files are encrypted and stored securely in the cloud. Strict access controls prevent unauthorized viewing of user information.

3.4 Notification and Reporting Module:

The Notification and Reporting Module updates the users about the most important things that happen in the system and the most frequent actions. Both freelancers and employers receive notifications on the completion of the job proposal, application statuses, and the making of the next payment. Furthermore, users can create reports on their earnings, job performance, and hiring history. Automated alerts notify users of pending tasks, deadlines, and payment releases, making the workflow management process smooth.

4. IMPLEMENTATION

Initially, the system consists of a freelancer-matching platform plus a security-enhancement functionality. An AI-based recommendation system is marked for being installed. This system requires user inputs to learn trends in machine learning, so that it would provide matches for the freelancers. The system has been relatively solid too, having a number of pitfalls along the way designing. Everything is structured around developing with the MERN stack (Mongo-Express-React-Node) for scalability and extensions. The backend for the app is built around setting up MongoDB to store profiles of freelancers, job descriptions, and any transactional records related to any freelancers.Node.js is utilized as server-side runtime, whereas Express.js is used to construct RESTful APIs for smooth front-to-back communication. Front-end on React offers an attractive interface, which is responsive, interactive.

Hands-on TensorFlow.js has been integrated in the recommendation engine to perform real-time analysis on user preferences and job description and gradually improve the state of accuracy of job matchmaking through continuous learning from user activities and feedback. Moreover, the matching engine also happens to integrate secure tap-to-bid payments through an escrow system that interacts with the platform-now users may rest assured knowing payments have been bonded within escrow until the job work is completed and both the freelancer and client verify its satisfaction, conveying much-needed trust to the other party while sealing all risks off the table with first-leg security. What is preceded by snapshots is the login screen to the freelance platform, the job match results, and the payment-escrow interface; these were developed with React for the front-end for integration of the payment gateway.

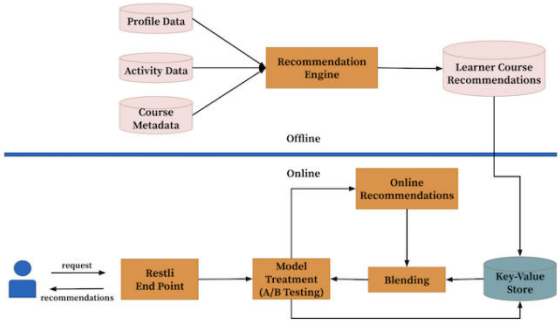

Figure-2: Architecture of MERN Stack and AI Recommendation Engine

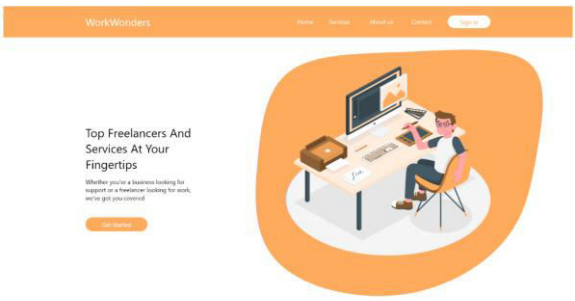

Figure-3: Home Page of Freelance Platform

5. CONCLUSION

In conclusion, the aim of this project is to develop a web application that connects businesses with freelancers using modern web development technologies. The author took the time to study each modern technology and learned the implementation process. The stack used for development is the MERNstack, all the concepts and implementation details used in each technology have been explained in detail in this paper. This documentation consists of all the essential information needed for implementing a MERN stack application. The implementation of the requirements has been accomplished in the process of development. A completely functional website has been developed end to end. The application features the implementation of collaborating businesses and freelancers. When the business posts its requirements for development, they get a list of recommended freelancers who perfectly match its requirements. There are other features implemented such as interested freelancers, communication through email, freelancer profiles, ratings for freelancers based on their skills, and a dashboard for users. This application has unique features implemented that divide it from other similar applications. Freelancing helps to many people who want to become a self-employment and want to work as a part time employee type in their life. Where according to many online sources freelancer earns more money compare to employee in an office While this is important for hiring of any kind, it is even more important to do freelancing where your name and reputation are a job to bring business.

6. FUTURE ENHANCEMENTS

The Future AI featured freelance job matching and security, using AI recommendations that will, in fact, radically change the (gig) economy. New AI algorithms will be developed for accurate job matching based on user interests, work history, and current markets. A real-time skill analysis would carefully map freelancers' current expertise so that the recommendations would be made according to their current capabilities. Global scalability will be provided with multilingual job postings and multi-currency payment systems that will cater to the broader user base. More security measures, such as blockchain technology (to secure and authenticate transparent and tamper-proof transactions) and biometric authentication (for account protection), will considerably enhance trust in the platform. Discuss the operation according to how the planning or communication application would help in making it more productive with the flow of tasks and good cooperation between the freelances and clients. Further, data segregators and big data experts allow deep metrics on freelancing markets, payment history and performance using which users can take informed decisions. Efficient AI-powered dispute mechanisms can deal with all complaints and conflicts between freelancers and clients and enhance user-experience. In addition, for freelancers in specific sectors like the creative arts or fieldwork, wearable technology could be the new opportunity opening to integration. These advances have been aimed at enhancing the freelancing ecosystem and offering a safe, efficient platform that revolves around the user.

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