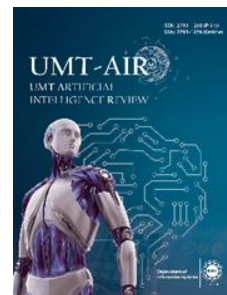
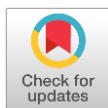


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Title: Streamlining Recruitment with AI: Design and Implementation of a Web-based Smart Hiring System

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Streamlining Recruitment with AI: Design and Implementation of a Web-based Smart Hiring System

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ABSTRACT With the technological advancement, the traditional recruitment processes have become considerably dependable on manual labour and prone to bias, which is quite time consuming and challenging. Since the competition is getting tough with each passing day and the new talent is emerging, it is necessary to address such problems and find a solution that may automate such work with precision. The current study aimed to discuss HireForge: A Smart Hiring System that presents a web-based AI-assisted solution. This is specifically designed to aid and streamline the job-seeking and recruitment processes by smartly analysing the HireForge resumes and matching the candidate's data according to the job openings and their requirements. Job seekers submit their professional information through a structured form, eliminating the requirement of file uploads. The system stores this information in the Firestore Database, and the AI logic then evaluates the job seeker's information against the specific requirements of the job. This provides a clean and quick list of shortlisted resumes along with the details of score matching (0-100%) against the job specification. After the selection of accepted resumes, the candidate is evaluated by an AI-generated test according to the job role. It supports both the recruiters and the job seekers by providing in-depth details of skills, experiences, and role stability. This project also aimed to demonstrate the integration of AI with the web technologies. Moreover, the potential of smart systems was also highlighted to help and automate human resource (HR) processes as well as reduce recruitment biases.

INDEX TERMS AI-based candidate evaluation, Applicant Tracking System (ATS), Artificial Intelligence (AI), recruitment automation, resume screening, Smart Hiring System

I. INTRODUCTION

For both, the seasoned recruiters handling multiple applications and the eager job seekers struggling for their next opportunity, the current recruitment system is often characterised by the inefficiency and uncertainty [1]. Finding the right talent is a difficult and challenging task, frequently stuck down by manual screening of CVs of job seekers which is time consuming, prone to the human error, and may inadvertently introduce some biases of the system [2]. To directly meet such

general problems and challenges, the current study introduced the web-based AI-powered platform. This platform is designed to update and enhance both job seeking as well as the recruitment processes of the organizations. This allows users to submit their CVs through the specific and structured data in the web form, the given data of which is then stored in the secure database. This is a step which eliminates the need to upload the documents while ensuring the consistent data format.

HireForge web-based platform is an AI-

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driven evaluation system that matches job details of the job seeker with the job requirement based on their skills, experiences, and other specified criteria. The result is a smart shortlisting mechanism that not only significantly reduces the manual effort required by recruiters but also makes the overall hiring process speedy. Furthermore, it also provides actionable data insights into each candidate's suitability for the given role. The mentioned system offers dual benefits, allowing recruiters to recognise ideal talent, and enabling job seekers to gain transparent understanding of how their profiles align with the job openings.

After resumes are submitted and evaluated by the AI-evaluation process of the designed system, the next step is the evaluation test that is also generated and evaluated by the AI through the use of an API. This test is MCQs-based, which is totally handled and generated by recruiters, specifying the limit of the questions being generated, the time for the test, and the minimum score for the evaluation to pass the test. The applicants are then made to have the test and information of the score is given in real time. Whereas, other details are visible only to the recruiter by the system. This designed system helps further authenticate skills and knowledge of applicant.

This project shows the practical integration of AI techniques with the web technologies, showing automation, accuracy, and a user-friendly design. It also draws attention towards the possibility of further intelligent systems to refine the Human Resource Management (HRM) while also promoting more data-driven and fairer decision-making systems by combining efficiency, analytical power, and accessibilities features. This project also aims to represent a step forward in the thinking perspective in

order to make the modern recruitment challenges achievable.

II. LITERATURE REVIEW

The evolution of talent acquisition, from the old manual processes to sophisticated AI-driven systems, forms foundational landscape upon which HireForge is designed. The literature review helped in building the foundations and the basic vision for this project by exploring what the other developers and researchers have already achieved in this field of AI pertaining to recruitment systems. By better understanding and analysing the previous researches, it became easier to identify the strengths, limitations, and gaps in the existing solutions. This literature review discussed how AI has been used in the HR technologies. Moreover, it was also explored what challenges still exist in making the recruitment more efficient, transparent, and unbiased.

A. *TRADITIONAL HIRING PRACTICES*

The recruitment processes have always relied on manually recruiting the candidates. Moreover, these processes have also remained subjective to the human judgment. This often involves the difficult task of manually-screening many resumes, which is quite a time-consuming work vulnerable to the human errors and unconscious biases. After the employers announce a job vacancy, they start receiving a large number of resumes. Afterwards, human recruiters manually scrutinise these applications, a process which takes weeks or even months to complete, especially for high volume positions being announced [3]. This traditional approach involves many steps including the screening of resumes, shortlisting the candidates through a bulk of resumes, conducting interviews, and then

making the final hiring decisions [4]. This problematic and time-consuming method often leads towards longer hiring cycles, with increased operational expenses, and the potential exclusion of the highly-qualified candidates due to the oversights, which is also one major issue in the system.

B. EMERGING TECHNOLOGIES IN RECRUITMENT PROCESSES

In order to address the limitations of the traditional manual recruitment processes, the industry has significantly changed with the rise of the new digital technologies. This is shifting towards smarter and more intelligent systems which can be beneficial for the entire mankind. The organisations which are facing an increasing competition for the top talent, the introduction of such modern AI tools has become crucial for streamlining recruitment processes and improving the hiring results [5]. The perceptions of job applicants regarding AI-powered recruitment tools were examined in [6], with an emphasis on elements, such as efficacy, fairness, transparency, and trust. To thoroughly investigate these perceptions, a descriptive research design was used.

These increasingly-used AI-powered tools focus on the reduction of human workload while helping in data-driven decision-making. Nowadays, Artificial Intelligence (AI) and Machine Learning (ML) systems have emerged as key technologies in automating various recruitment stages, from the candidate screening to interview processes, thus reducing the burden on HR professionals [7]. AI technologies, including ML and Natural Language Processing (NLP), have revolutionized recruitment processes by automating difficult and time-consuming tasks as well as optimizing resource utilization [8].

It can be challenging for candidates to determine whether they have encountered a human or an AI action as well as to appropriately reflect this in an interview or survey. This is because AI tools are being developed to mimic intelligent human actions, such as visual perception, speech recognition, or even phone conversations including AI-driven chatbots [9]. Organizations that have a successful recruitment strategy are capable to hire qualified candidates in order to handle the evolving business environment and the digital world [10]. AI is increasingly being used in the hiring sector to use massive amounts of data in order to find applications [11].

AI appears to be helpful in saving time and has the effect of lowering expenses and decision-making errors in hiring procedures [12]. Globally, the use of AI is expanding, raising additional ethical concerns. Chatbots and facial recognition software are the examples of AI tools that many businesses have used in recent years to meet their hiring needs [13]. There is very less research regarding recruiters' perceptions of AI, and limited understanding of the motivations or factors that drive the implementation of AI in their workplaces. Therefore, there is a need to use AI systems in recruitment and hiring processes so that this system of hiring can be efficient [14], [15].

C. GAPS IN EXISTING SOLUTIONS

Despite all advancements in the digital tools for the recruitment processes, many existing solutions, web-based and others, still face some challenges. One of the significant issues is the reliance of the file uploading of traditional resumes, which often introduces inconsistencies in data format and makes automated processing difficult [5]. This often leads towards

inconsistent formats or a variety of formats and varied data forms. Another challenge that was noticed was the in-depth and comprehensive analysis of the applicants' skills as well as their experiences and other requirements, which many current systems face to compare as they are dependent on keywords [16]. This highlights the need for a more sophisticated system which can also understand the requirements instead of merely relying and focusing on the keywords matching through the uploaded file [17]–[19].

III. METHODOLOGY

The methodology section describes the systematic approach employed to develop the HireForge, especially addressing how it overcomes these limitations through the AI-driven techniques and frameworks. Moreover, this section also describes how it integrates these techniques to offer comprehensive and an efficient solution for the challenges in the modern recruitment processes. The methodology was planned to ensure clarity, fairness, and efficiency in the hiring processes as well as to maintain a simple and user-friendly workflow.

A. SYSTEM DESIGN AND ARCHITECTURE

The designed system, that is, Smart Hiring System, is a web-based application which supports mainly two user roles: job seekers (candidates) and companies (recruiters). This unique feature in the architecture allows for tailored delivery of the features and information relevant to each user group, increasing the overall user experience and system's efficiency. The frontend of the system handles the user interactions and the backend manages the data storage tasks, AI evaluation, and the system logic. A structural data-driven approach is used, ensuring all the information given, from job applications to

candidates, is accurately organized and easily retrievable for both the job seekers and recruiters.

HireForge removes traditional resume uploading system. Instead, it collects all the necessary applicant and job-related information through a structured web form. This foundational choice of design ensures the standardised input data, improving the reliability of AI-based analysis and promoting a more reasonable, comprehensive, and unbiased evaluation of candidates.

B. TECHNOLOGIES USED

1) FRONTEND SUBSYSTEM

The frontend system of the project is the visual and interactive environment of HireForge that is accessed and used by end users. This system is designed using the component-based architecture via React.js to provide dynamic and much more responsive user interface for both the candidate and the company portals.

2) BACKEND SUBSYSTEM

The backend system of the project's platform is developed using a cloud-based service that improves backend functionality of the system. The architecture enables scalable data management, AI model deployment, and a secure API communication between the frontend and numerous services, ensuring the robust performance and the data integrity.

- *Firebase Authentication*: This service is used to manage the user authentication which includes login, sign up, and the session management. Its robust security features safeguard user data and ensure that only authorised users can access their data.
- *Firebase Database*: Real-time database is used by means of NoSQL.

The data is stored in the form of collections, such as JSON files. This enables synchronization through client devices and supports the efficient, real-time data retrieval and manipulation for both job seeker profiles and job postings.

- *Storage of Firebase System:* This kind of service is used for storing large files, such as users uploading resumes, CVs, and personal data.

3) AI MATCHING

This system is the main part of HireForge that contains the intelligence and a real power of the system. It is responsible for processing candidate's applications, then matching them with suitable job openings available at the portal. Moreover, it also generates insightful analytics to aid hiring decisions. It is also helpful in significantly enhancing the efficiency and effectiveness of the hiring process. This subsystem is responsible for:

- Fetching the applicant's profile and job criteria from the database of Firestore.
- Executing the AI-based matching algorithm. This is responsible for scoring candidates based on their experiences, skills, education, and other parameters.
- Generating a human readable explanation for the match score.
- Saving the evaluation results back to the database.

4) AI-BASED EVALUATION PROCESS

Once the candidate submits their profile by the web form, the AI matching engine compares the candidate's data with the job requirements, as mentioned above. For further assessment, recruiters can generate an AI-based MCQs test which is

specifically customised according to the job specifications and role. The system records the test attempts and evaluates the scores in real-time and the candidate's status automatically.



FIGURE 1. Flowchart showing the workflow of the HireForge's overall system

The overall workflow of the system follows a strict and clear sequence: user registration, job postings by the companies after registering themselves, application submission through a structured web form, AI-based scoring and evaluation of the applicant's information with the job requirements, a test assessment for further authentication, and the final shortlisting by updating the candidate's status.

IV. RESULTS AND DISCUSSION

HireForge strives to address the issues discussed above. It aims to provide an easier and efficient solution to tackle the problems discussed earlier. Moreover, it focuses mainly on improving the recruitment system in that area. This section aims to cover the results and analysis of the work done in order to make the system a suitable platform in the recruitment field. This section presents a detailed performance analysis of the proposed project, along with a comparative evaluation against existing work. The discussion primarily focuses on the key challenges and issues identified and examined in the preceding section.

A. PERFORMANCE ANALYSIS OF HIREFORGE

This section provides details of the effectiveness, accuracy, efficiency, and the user experience across the stakeholder roles

including the applicants and the company's HR. The system mentioned in this study has also attempted to achieve the above-mentioned functions. The platform, HireForge, empowers users with fast data retrievals, seamless real-time synchronisation, and an intuitively-clear, user-friendly interface. Leveraging robust technologies, such as React, Firebase, and Vite, the study ensured effortless navigation and minimal response time across the dashboards, job openings and listings, as well as application views, creating a fluid user journey. The AI requirements matching system show accuracy in evaluating the applicants. The mechanism weighs four key components: experience (30%), required skills (40%), preferred skills (20%), and education (10%). This removes the need for manually shifting through resumes, promising a fairer evaluation by relying on the structure and more standardised data instead of the inconsistent CV formats.

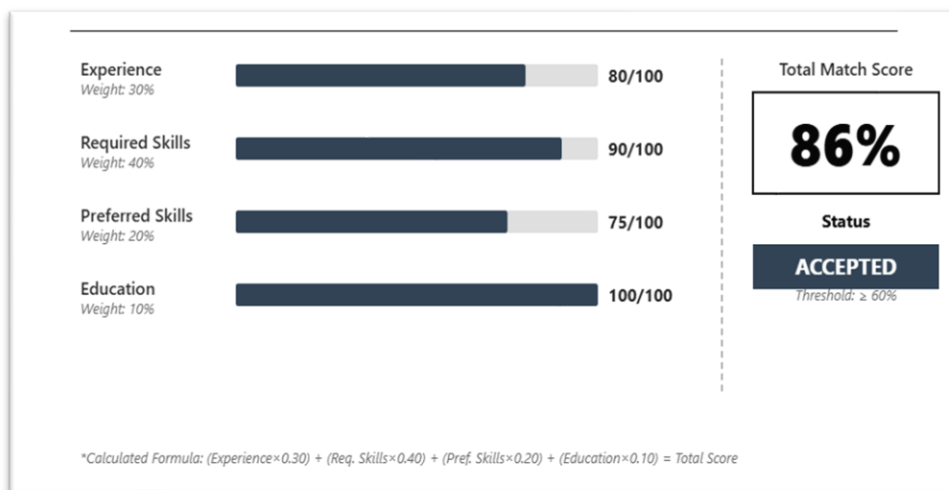


FIGURE 2. Visualisation of the weighted scoring mechanism (experience, skills, education) and threshold-based classification

In order to conduct the assessment of our system, 20 users were included in the

testing. A total of 10 of them were the HR managers, while the other 10 posed as users

or job seekers. All the participants were then requested to perform some predetermined tasks on the platform. In the meantime, they were also being meticulously recorded and analysed in terms of the system and user interaction, as well as the overall performance of the system. The test was conducted in two key sections; functionality testing to make sure that the system stayed stable, and user feedback to assess the usability and interactive feedback.

1) FUNCTIONALITY TESTING

In order to guarantee and evaluate the reliability and stability of HireForge, total 45 test cases were taken out by the group of testing users, involving all the primary functions from registration to carrying out AI-based assessments. The findings are summarised in the following table, depicting the degree of the system's robustness.

TABLE I
SUMMARY OF FUNCTIONALITY
TEST RESULTS

Metric	Value
Total Cases Executed	45
Total Cases Passed	42
Test Cases Failed	3
Test Cases Pass Rate	93.3%

The overall passing rate indicates that the system's core functionalities are operating as intended. The three failed cases were due to minor issues in handling edge-case input validation within the test creation form. These have been identified and will be addressed in future improvements. All in all, the system was found to be stable and reliable under ordinary user activities.

2) USER FEEDBACK

This feedback was collected through a post-use survey to evaluate users' experiences while interacting with the system's features and its user interface design. The testers evaluated the systems on the scale of 1 to 5 (*1=Very Poor, 5=Excellent*) in a number of aspects, such as ease of navigation, clarity of interface, and overall satisfaction.

- Ease of Navigation: 4.5 / 5.0
- Clarity of Interface: 4.6 / 5.0
- Usefulness of AI: 4.2 / 5.0
- Overall Satisfaction: 4.4 / 5.0

The feedback was greatly affirmative. The users responded that the system is intuitive and easy to navigate. The interface was especially praised for its simplicity and not using complex icons and navigations through the functions. The AI was praised for immediate feedback yet some suggestions were made to make the AI-based functions more useful and conventional in some aspects. The overall ratings showed that the basic functionality was embraced; it can improve a lot more in future.

A manual flow was also integrated for the companies to opt for the way they want to carry out their further process after the evaluation. The built-in test module enables companies to dynamically create timed MCQ-based assessments tailored to specific job requirements. It operates efficiently and reliably, accurately recording attempts, scores, and statuses in real time. The end-to-end workflow (sign up → Apply → Track → interview/Test) worked consistently and produced expected outcomes, confirming goals of automation, transparency, and speed.

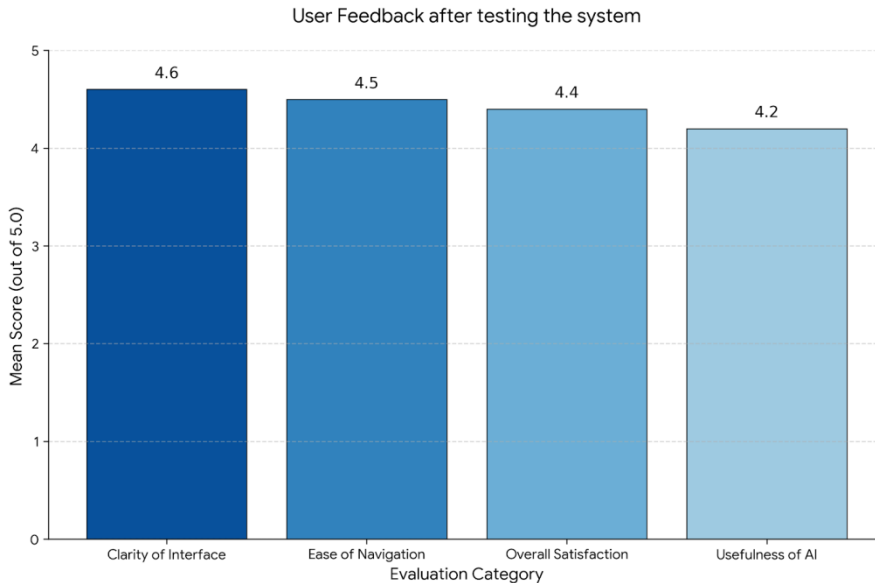


FIGURE 3. User feedback ratings for HireForge

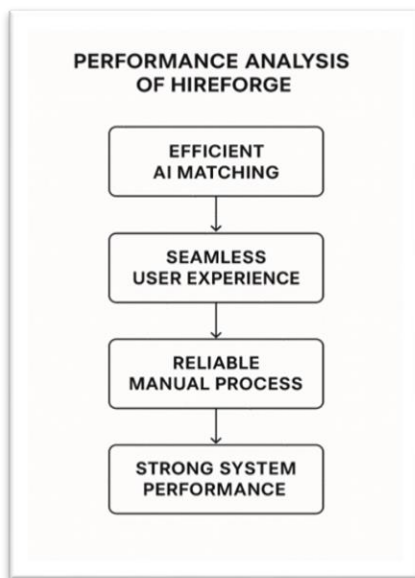


FIGURE 4. Chart of the main features of the performance analysis of the system

After going through the obtained results and ratings, it was concluded that

HireForge functioned well. The success rate of the functionality testing of the overall system including the AI-based functions, though on not a very large scale, proves that the system is a stable and reliable tool which can be used in real life environment. The objective of designing a simple, intuitive, and user-friendly platform is confirmed by the positive user feedback. The results suggest that the system is effective in minimising the level of complication in the recruitment processes by both HR managers and applicants.

B. COMPARATIVE ANALYSIS WITH EXISTING SYSTEMS

Compared to the traditional systems and commercially-available recruitment tools, HireForge introduces many improvements. One of them is the submission of CVs. Most of the conventional systems rely on CV file uploads, which introduces variability and inconsistency in extracting the data [17]. HireForge streamlines this

entirely by using environment of form-based structured data collection for both applicants and companies for a clean and consistent schema. Unlike standard solutions that simply store candidate information and rely on simple keyword matching, HireForge integrates a true AI-driven matching engine. The matching score (0-100%), was evaluated using fuzzy skills matching, experience mapping, and the multi criteria weighting. The transparency also improved by listing each scoring category and how applicants performed. The dashboard for applicants and companies also provides smoother experience than other systems with separate tools across multiple platforms. A key feature for HireForge is its ability to provide transparent, human readable explanations for match scores, providing details exactly how and why candidates align with the job requirements. This feature enhances trust and empowers recruiters with correct decision-making [16]. HireForge eliminates the need for manual resume screening, a difficult and time-consuming task, that traditional Applicant Tracking System (ATS) only partially subsidizes, by standardising the input/candidate's data and providing the recruiters with an AI evaluation [20], [21].

C. SUMMARY OF KEY FINDINGS

The results demonstrate that HireForge successfully met the objectives mentioned as follows:

- *Efficient AI-based Screening:* The mechanism consistently performed across the test cases, and generated accurate and transparent scores. The multi criteria scoring model improved accuracy and removed inconsistencies that were normally seen in the traditional manual evaluation system.
- *Improved User Experience:* Applicants received smooth application data flow, instant AI-evaluated results, and updates in real-time. On the other hand, the companies managed job posting in an easier way. There were structured applicant profiles, integrated test evaluation features, as well as application management environment was simplified through centralised access to the statistics, pending requests, and interview lists.
- *Enhanced Transparency and Fairness:* HireForge actively eliminates systematic biases by providing a detailed, structured breakdown of criteria used for the evaluation and screening. This approach reduces the deceptive formatting bias inherit in traditional CVs, and ensures a fairer assessment through its form-based data collection system.
- *Reliable Performance under Testing:* The system consistently delivered expected results throughout the entire testing phase. Firestore database handled continuous read/write operations without delays. The test creation and result tracking module also functioned without failures.
- *Improvement over Traditional Recruitment:* The system eliminated and reduced the manual workload, minimised the human bias and error, and improved transparency in the overall recruitment process.

D. CONCLUSION

The study concluded with the summary of main objectives that were focused as the foundations of the project and future improvements that can be made for a better system. This project mainly aimed to

modernise and refine the recruitment processes by combining the traditional flow with the intelligent AI-assisted evaluation. The development and testing of the project depict how the structured data, automated scoring, and real-time processing can significantly enhance efficiency and fairness in talent acquisition. This section highlights the potential future improvements that can be implemented to strengthen the performance and scope of HireForge.

E. FUTURE WORK

While efforts were made to develop a system that performs well, several enhancements and improvements can further strengthen its overall capabilities and prepare the platform for a large-scale deployment, such as integrating advanced NLP models, video interview intelligence with speech-to-text and text-to-speech technology, and mobile application version. These improvements would uplift HireForge into a complete intelligent recruitment ecosystem which is capable of handling and supporting large organisations.

Author Contribution

Aqsa Owais: Syed Sohail Ahmed Shah: Syeda Rabiya Iftikhar: Areeba Jawaid: Dua Abid:

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

Data supporting the findings of this study will be made available by the corresponding author upon request.

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Generative AI Disclosure Statement

The authors did not use any type of generative artificial intelligence software for this research.

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