

JobMate-AI: A Explainable Artificial Intelligence Framework for Transparent Recruitment and Career Guidance

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Abstract: *Artificial intelligence is really changing the way people look for jobs and the way companies find employees. It is making things a lot easier for people to find jobs that're a good fit for them. Artificial intelligence is also helping companies find the person for the job. This means that people do not have to do much work to find a job or to find someone to hire. The whole hiring process is getting faster because of intelligence. Artificial intelligence is making a difference, in this area. People have studied this for a time but most of the work is just ideas and there are not many systems that actually work in the real world .We made a system called JobMate - AI. JobMate-AI is a website that helps people find jobs. It uses intelligence to understand people and to find the right job for them. It is different, from job websites because it does not just list jobs. JobMate - AI looks at the persons skills and experience. It compares them to the requirements of the job. Then it gives the person feedback that's easy to understand .The goal of JobMate - AI is to make it easier for people to find jobs and for companies to find the person. We think that using intelligence in that way can make the process of hiring people better. Artificial intelligence can make hiring people more reliable and easier to use. This is a way to make recruitment platforms that actually work for the people who use recruitment platforms and the companies that need to hire people. Recruitment platforms that use intelligence can be very useful, for hiring people. It can make it more reliable and easier to use. This is a way to make recruitment platforms that actually work.*

Keywords: Explainable Artificial Intelligence, Recruitment Systems, Conversational AI, Job Matching, Skill Gap Analysis, Career Trajectory Modelling, Natural Language Interaction, Machine Learning, Human-Centred AI, Employment Technology

I. INTRODUCTION

Recruitment has changed a lot over time. We used to look for jobs in newspapers and companies would pick the best people. Now we have websites that can look at a lot of information at the time. These new systems are faster. Can handle more people but they do not explain how they make decisions. It is like they are a box. People who apply for jobs often get turned down. They do not know the reason. People who apply for jobs do not know if it is because they do not have the skills or if they just do not fit the job they applied for. This makes it really tough, for people who apply for jobs to trust the job system and get better at applying for jobs.

The recruitment system we are talking about is different. Recruitment system is a way of doing things. It is a computer program that uses conversations to help people find jobs. Recruitment system is based on an idea that looks at how people can get better at their jobs and move up in their careers. It also explains why certain decisions are made.



Recruitment system tells people what skills they are missing and what experience they need. It is easy to use and understand. We tested Recruitment system. It works well. It is better, than job websites that just look for keywords. These websites do not really understand what people are looking for. They also do not explain why they make decisions. This makes people unhappy. They do not think the system is fair. Recruitment system is a way of doing things. Recruitment system is what people need.

II. LITERATURE REVIEW

Research in recruitment that uses artificial intelligence has mostly looked at techniques like parsing resumes and scoring similarities using methods such as TF-IDF and cosine similarity [1] [2] These approaches help systems match candidates with job descriptions by finding patterns and keywords that are alike

While these approaches make matching more accurate they often do not explain why a particular decision was made [3] For people using these systems this lack of clarity makes them hard to trust as candidates do not get feedback on how their profiles were evaluated Also most systems are designed to make matching efficient not to help users understand which creates a gap between what the system says and what users expect [4]

Other work on career recommendation systems has used methods like filtering and rule-based suggestions [5] Though these approaches can give recommendations they often do not work with recruitment platforms so they rarely provide career paths or think about how a candidate's skills will change over time or how different career choices will affect long-term growth [6] Another problem is that they do not allow conversational interaction which limits how much users can engage with the system [7]

In the last few years people have started paying more attention to ethical issues in artificial intelligence-based hiring systems Researchers have highlighted the importance of transparency fairness and reducing bias in automated decision-making especially in employment contexts [8] [9] However much of this work is still theoretical and does not always include real systems to support these ideas [10]

Overall even though there has been progress in areas like matching algorithms recommendation systems and ethical artificial intelligence there is still a need for recruitment platforms that are more integrated and focused on users [11] Many current systems focus heavily on technical performance and not enough on user experience including how people interact with the platform and understand its outputs Candidates prefer systems that not only give results but also help them improve their profiles and career prospects [12]

Also scalability and adaptability remain major challenges Many recruitment platforms struggle to keep up with the changing job market and evolving skill requirements Models that do not update and fixed rules often result in recommendations that are outdated or less relevant over time [13] Furthermore limited use of learning from user interaction reduces the system's ability to personalise and improve To address these challenges there is a need for systems that can learn from real-time data and provide up-to-date insights Recruitment platforms need to be more flexible adaptive and user-focused to better support candidates and recruiters [14]. Another area that people are talking about in recruitment research is using chat-based assistants and natural language interaction [15]

Modern systems are now including chat-based assistants that can help users search for jobs and answer questions quickly .This makes it easier for people to use the platform and improves accessibility

However these systems are still new and often do not work well with recruitment analytics [16] They usually give general answers instead of personalised insights based on a candidate's profile [16]

If these systems can be better integrated with recruitment platforms they can become more helpful and interactive .This would allow users to understand their strengths weaknesses and opportunities in a more natural and engaging way

Also using data to make decisions in recruitment is becoming very important [17] Organisations are using data analytics to find hiring trends predict candidate success and improve recruitment strategies.

The quality of these decisions depends on the data used and how the models are designed If the data is poor or biased it can lead to unfair outcomes and reduce the effectiveness of the system [18].



Therefore it is important to develop recruitment platforms that use data effectively while ensuring fairness transparency and continuous improvement through proper evaluation and feedback mechanisms .

III. COMPARATIVE ANALYSIS OF RECRUITMENT SYSTEMS

TABLE I

| ASPECTS | Appearance (in Time New Roman or Times) | | |
|----------------------------|--|--|--|
| | Tradional Recruitment Systems | AI-Based Recruitment Systems | Proposed Intelligent System(JobMate-AI) |
| 1. Working Approach | Manual screening and basic job listingsb | Automated matching using algorithms | Combines AI, explainability, and user interaction |
| 2. Matching Accuracy | Low and time-consuming | Improved accuracy using data-driven techniques | High accuracy with contextual and profile-based analysis |
| 3. Transparency | Based on human decisions but can be inconsistent | Low due to black-box algorithms | High with explainable AI and clear feedback |
| 4. User Feedback | No structured feedback | Minimal or no explanation of decisions | Provides clear and understandable feedback |
| 5. User Experience | Basic and manual | Functional but not very user -friendly | Interactive, conversational, and user-focused |
| 6. Career Guidance | Not available | Limited recommendations | Provides career paths and guidance |
| 7. Adaptability | Requires manual updates | Moderate, depends on model updates | High with real-time learning |
| 8. Use of Data | Limited data usage | Uses profile and historical data | Uses real-time data with continuous improvement |
| 9. Ethical Considerations | Depends on human judgement | Risk of bias and lack of fairness | Focus on fairness, transparency, and bias reduction |
| 10. Scalability | Limited scalability | High scalability | High with scalable architecture |
| 11. Integration | Standalone systems | Limited integration with tools | Fully integrated system (analytics, recommendation, interaction) |
| 12. Decision Understanding | Possible but inconsistent | Not easily understandable | Easy to understand with explainable outputs |



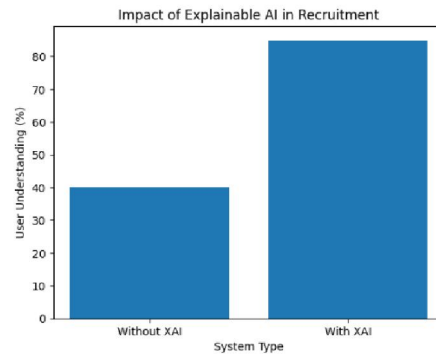
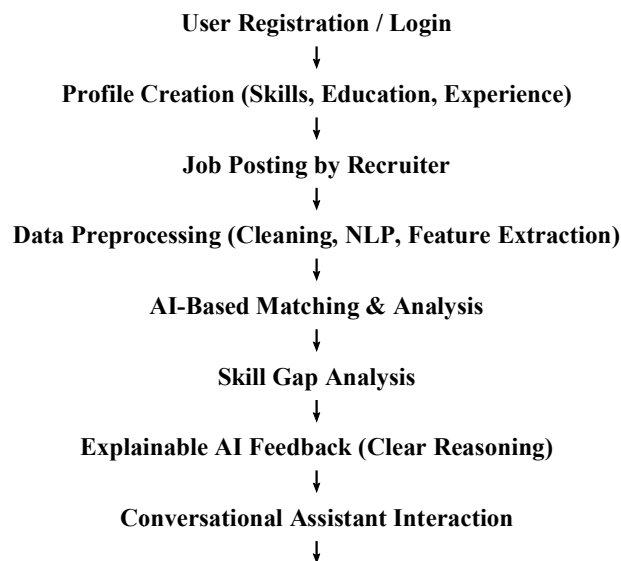


FIG 1: IMPACT OF EXPLAINABLE AI IN RECRUITMENT

IV. METHODOLOGY

The JobMate-AI system aims to make hiring easier by using intelligence in a way that is easy to understand. The approach focuses on how data's gathered, handled, examined and shown to both job seekers and hiring managers in a clear and helpful manner. The process starts with people signing up and creating profiles. Job seekers enter their info, education, skills and work experience. This info is used for examination. At the time hiring managers upload job descriptions, including required skills, qualifications and experience levels. The system then. Structures the data. Resumes and job descriptions are changed into a format that can be examined using techniques that understand language. Important details such as keywords, skills and experience are pulled out to ensure matching. JobMate-AI uses intelligence to compare candidate profiles with job requirements. Of just matching keywords the system considers context and relevance to improve accuracy. The system also finds areas where a candidate may need improvement. One of the features of JobMate-AI is the explainable AI module. This makes sure that the results are not just correct but easy to understand. The system gives users feedback that explains why a particular job was suggested or why a particular candidate may not be a match for the job. The system tells users why it thinks a certain job is a fit for them and why a certain candidate is not right, for the job.

FLOW DIAGRAM



Job Recommendation / Career Guidance



Continuous Learning & System Improvement

FIG 2: THE FLOW DIAGRAM OF END-TO-END PROCESS FLOW OF JOBMATE-AI PLATFORM

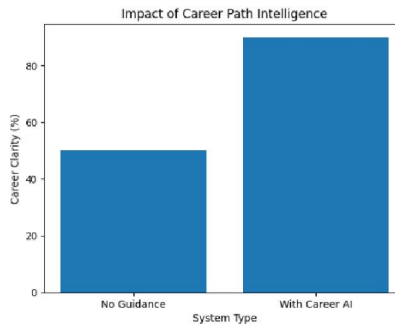


FIG 3: IMPACT OF CARRER PATH INTELLIGENCE

V. TECHNOLOGY USED

The heading The JobMate-AI system is built using a mix of web technologies, artificial intelligence techniques and a system design that can handle a lot of users to make sure it works well and is easy to use. The system is made using a full-stack approach, where the end and back-end work together to give users a smooth experience.

For the end they use HTML, CSS and JavaScript to make a user-friendly interface that works well on different devices. They can use a framework like React.js to make the application more interactive so users can easily look at job listings, profile sections and recommendations. The interface is designed to be simple so users can use the system without any problems. On the back-end they use technologies like Node.js or Java to handle things like user authentication, data processing and API management. The back-end makes sure that the user interface and the database talk to each other efficiently and securely. For storing data they use databases like MySQL, PostgreSQL or MongoDB to store user profiles, job descriptions and system data. These databases help manage a lot of information and make it easy to get data when matching users with jobs. The main thing that makes the JobMate-AI system work is intelligence and machine learning. They use natural language processing to look at resumes and job descriptions and find things like skills, keywords and experience. They use methods like TF-IDF and cosine similarity to see how well a users profile matches a job. They also use machine learning models to make recommendations better over time.

The JobMate-AI system also has something called Explainable AI, which helps give users understandable feedback. Of just giving results the system explains why it made certain decisions, which makes it more trustworthy.

To make it easier for users to interact with the system they included an AI module, which is like a chatbot. This can be built using APIs or frameworks that support language so users can ask questions and get help in a simple way.

Finally the JobMate-AI system is designed to handle a lot of users and keep their data safe. They use technologies like REST APIs, cloud deployment and secure authentication to make sure the platform works well and is secure. The JobMate-AI system uses things, like AWS or Firebase to deploy the system and JWT or OAuth to keep user data safe.

VI. CONCLUSIONS

So this work is really about how artificial intelligence can make the recruitment process better for everyone. It can make it more efficient and easier to use. The old systems were okay at doing things like looking at resumes and matching jobs. They were not very good at explaining things to people and they did not have all the features in one place. The new system, JobMate-AI is different because it uses matching and it can explain things to people in a way that makes sense. It also has an interface, which means people can talk to it and get answers.



The platform is designed to help people who are looking for jobs and the people who are doing the hiring. It gives them feedback and it helps them figure out what skills they need to work on. It also gives them advice on their careers. The platform is easy to use because it has interactive features and it can handle a lot of users. Overall this study shows that if we make recruitment systems that're easy to understand and focused on the user then people will trust them more and they will be more useful. This is a way to make recruitment platforms that are smarter and better in the future. The JobMate-AI system is an example of this and it can help us make even better systems. The recruitment process will be better, for everyone if we use intelligence in a way that is helpful and easy to understand.

REFERENCES

- [1] G. Salton and C. Buckley wrote a paper called "Term-weighting approaches in text retrieval" that was published in Information Processing & Management in **1988**. This paper by G. Salton and C. Buckley is really important for understanding how to find the words when searching for information.
- [2] R. Ramos talked about using TF-IDF to figure out which words are most relevant in a document at the Instructional Conf. Machine Learning in **2003**. The work by R. Ramos on TF-IDF is very useful for determining word relevance in document queries.
- [3] D. Gunning wrote about Explainable Artificial Intelligence, which is also known as XAI for the Defense Advanced Research Projects Agency or DARPA in **2017**. D. Gunning's work on Explainable Artificial Intelligence is helpful for understanding intelligence systems.
- [4] B. Shneiderman wrote an article called "Bridging the gap between ethics and practice in AI systems" for ACM Interactions in **2020**. The article by B. Shneiderman is important for understanding how to make artificial intelligence systems more ethical.
- [5] J. Bobadilla, F. Ortega A. Hernando and A. Gutiérrez did a survey on recommender systems that was published in Knowledge-Based Systems in **2013**. This survey by J. Bobadilla, F. Ortega, A. Hernando and A. Gutiérrez is very useful for understanding how recommender systems work.
- [6] X. Liu, Y. Zhang and Z. Chen wrote a paper on career path recommendation based on machine learning that was presented at the IEEE Int. Conf. Data Mining Workshops in **2016**. The paper by X. Liu, Y. Zhang and Z. Chen is helpful for understanding how machine learning can be used for career path recommendation.
- [7] T. Brown and his colleagues wrote a paper called "Language models are few-shot learners" that was published in Advances in Neural Information Processing Systems in **2020**. The work by T. Brown and his colleagues on language models is very important for understanding how language models learn.
- [8] S. Barocas and A. D. Selbst wrote an article called "Big datas impact" for California Law Review in **2016**. The article by S. Barocas and A. D. Selbst is important for understanding how big data can affect groups of people.
- [9] F. Pasquale wrote a book called The Black Box Society: The Secret Algorithms That Control Money and Information that was published by Harvard University Press in 2015. The book by F. Pasquale is very helpful for understanding how algorithms can affect our lives.
- [10] R. Guidotti and his colleagues did a survey on methods for explaining black box models that was published in ACM Computing Surveys in **2018**. This survey by R. Guidotti and his colleagues is very useful for understanding how to explain box models.
- [11] J. Heer wrote an article called "Agency plus automation: Designing intelligence into interactive systems" for Communications of the ACM in **2019**. The article by J. Heer is important for understanding how to design intelligence systems that work well with people.
- [12] LinkedIn Talent Solutions published a report called "Global recruiting trends report" in 2022. The report by LinkedIn Talent Solutions is helpful for understanding the trends in recruiting.
- [13] I. Goodfellow, Y. Bengio and A. Courville wrote a book called Deep Learning that was published by MIT Press in 2016. The book by I. Goodfellow, Y. Bengio and A. Courville is very useful for understanding learning.



[14] T. M. Mitchell wrote a book called Machine Learning that was published by McGraw-Hill in 1997. The book by T. M. Mitchell is important for understanding the basics of machine learning.

[15] A. Radford and his colleagues wrote a paper called "Improving language understanding by pre-training" that was published by OpenAI in 2018. The paper by A. Radford and his colleagues is helpful for understanding how to improve language understanding.

[16] J. Gao, M. Galley and L. Li wrote a paper called " approaches to conversational AI" that was published in Foundations and Trends in Information Retrieval in 2019. The paper by J. Gao, M. Galley and L. Li is very useful for understanding how to build AI systems.

[17] T. Davenport, J. Harris and R. Morison wrote a book called Analytics at Work: Smarter Decisions, Better Results that was published by Harvard Business Press in 2010. The book by T. Davenport, J. Harris and R. Morison is important for understanding how to use analytics to make decisions.

[18] S. Mehrabi and his colleagues did a survey on bias and fairness in machine learning that was published in ACM Computing Surveys in 2021. The survey by S. Mehrabi and his colleagues is very helpful, for understanding how to make machine learning systems more fair

