An AI-Based Personalized Interview Preparation and Candidate Evaluation System Using Natural Language Processing and Machine Learning

Mrs. Anjali Dandekar(Assistant Professor),Ms. **Sufera Kunni**
MES "D.G Ruparel College of Arts, Science and Commerce"
Matunga West
suferakunhi@gmail.com
anjali.dandekar@ruparel.edu

Abstract: Artificial Intelligence (AI) is changing the way candidates prepare for job interviews. Traditional interview preparation often depends on general question lists, books, online videos, and guidance from other people. However, candidates may not receive personalized feedback about their answers or know which skills they need to improve. This research paper explores an AI-based personalized interview preparation and candidate evaluation system that uses Natural Language Processing (NLP) and Machine Learning (ML) to support interview practice.

The proposed system provides role-based interview questions, answer evaluation, instant feedback, and performance tracking. NLP techniques can help analyze written answers, identify important concepts, and estimate how relevant a response is to a question. Machine Learning can support response classification and performance analysis. The system may also include voice-based interview practice and coding questions.

This study discusses the benefits of personalized preparation, immediate feedback, and improved accessibility, along with challenges such as privacy, bias, and incorrect automated evaluation. It proposes a framework for evaluating the usefulness of AI-assisted interview preparation. The paper concludes that AI can help candidates prepare more effectively when the system provides transparent feedback and is used as a support tool rather than a replacement for human judgement.

Keywords — Artificial Intelligence, Natural Language Processing, Machine Learning, Interview Preparation, Candidate Evaluation, Personalized Learning, Speech Recognition, Automated Feedback, Performance Analysis.

Introduction

Job interviews play an important role in the recruitment process. They help employers understand a candidate's technical knowledge, communication skills, problem-solving ability, and suitability for a particular job. However, many students and fresh graduates find interviews difficult because they lack practice, confidence, or access to professional guidance.

Traditional interview preparation methods include reading interview questions, watching online tutorials, attending mock interviews, and practising with friends. Although these methods are useful, they may not provide immediate and personalized feedback. Candidates may find it difficult to identify their mistakes or understand how to improve their answers.

Artificial Intelligence provides new opportunities to improve interview preparation. AI-based systems can generate

questions according to a selected job role, analyze candidate responses, and provide suggestions for improvement. Natural Language Processing can be used to process written answers and identify relevant concepts. Machine Learning techniques can help classify responses and analyze performance patterns.

The proposed AI-based personalized interview preparation system aims to provide candidates with an interactive platform where they can practise technical, HR, behavioural, and coding questions. It can evaluate responses using defined criteria and provide feedback on answer relevance, completeness, and structure. Voice-based practice may also help candidates prepare for spoken interviews.

This research examines the potential usefulness, limitations, and future possibilities of AI-assisted interview preparation. It also highlights the importance of privacy, fairness, and human judgement when using AI to evaluate candidate responses.

OBJECTIVES

The main objectives of this research paper are:

- To examine the role of Artificial Intelligence in improving interview preparation.
- To explore the use of NLP for analyzing candidate answers and identifying relevant information.
- To study how Machine Learning can support response classification and performance tracking.
- To propose a system that provides personalized interview questions according to a selected job role.
- To understand how automated feedback can help candidates identify strengths and weaknesses.
- To explore voice-based interview practice and coding-question support.
- To identify challenges related to privacy, fairness, accuracy, and over-dependence on AI.
- To recommend responsible ways to use AI as a support tool for interview preparation.

LITERATURE REVIEW

Research on Artificial Intelligence in recruitment and interview preparation has explored automated answer analysis, candidate evaluation, conversational AI, and algorithmic fairness. These areas provide a foundation for developing personalized interview preparation systems.

Natural Language Processing and Answer Evaluation

Natural Language Processing enables computers to process and analyze human language. In interview preparation, NLP can be used to identify important concepts in an answer, compare a response with expected topics, and estimate semantic similarity. A recent study on an NLP-based intelligent recruitment system examined the use of semantic similarity to analyze open-ended candidate responses. This demonstrates the potential of NLP for supporting answer analysis, although automated scores should not be treated as complete measures of a candidate's ability.

Artificial Intelligence in Recruitment

AI is increasingly being explored for recruitment activities such as candidate screening, job matching, and evaluating application information. These technologies can help process large amounts of data, but their usefulness depends on how the system is designed, what data it uses, and what it is expected to measure. A 2025 International Labour Organization working paper highlights concerns about biased data, unclear objectives, and non-transparent AI systems in human resource management.

Personalized Interview Preparation

Personalized interview preparation focuses on the individual needs of each candidate. Instead of presenting the same questions to everyone, an AI-based system can select questions according to the candidate's target job role,

experience, and difficulty level. It can also provide feedback based on the answer and recommend topics for further practice. Such features may help candidates identify knowledge gaps and prepare in a more organized manner.

Machine Learning and Performance Tracking

Machine Learning techniques can identify patterns in data and classify information according to defined features. In an interview preparation system, ML may support answer categorization and the analysis of practice performance across sessions. However, the quality of the results depends on the training data, evaluation criteria, and suitability of the model for the intended task.

Fairness, Privacy, and Responsible AI

AI-based evaluation may produce unfair results when its data or design does not adequately represent different candidates. The National Institute of Standards and Technology (NIST) identifies reliability, transparency, privacy, accountability, and fairness as important characteristics of trustworthy AI systems. These principles are relevant when designing tools that analyze interview answers or provide candidate feedback.

Overall, the literature indicates that NLP and ML can support interview preparation and answer analysis. However, an effective system should provide understandable feedback, protect user information, and avoid treating automated evaluations as final judgements of a candidate.

HYPOTHESIS

It is hypothesized that an AI-based personalized interview preparation system can help candidates improve their interview readiness by providing role-specific questions, immediate feedback, and regular practice opportunities.

It is also hypothesized that candidates who use feedback to identify weaknesses and revise their answers may improve their answer relevance, structure, and understanding of important concepts.

However, the effectiveness of AI-assisted preparation may depend on the accuracy of the feedback, the quality of the evaluation criteria, and how regularly candidates practise. Incorrect suggestions or unfair evaluation may negatively affect a candidate's preparation.

The central hypothesis is that personalized AI-assisted interview practice can support interview readiness when the system provides relevant, transparent, and useful feedback. This hypothesis should be tested through actual user feedback and practical system evaluation rather than assumed to be proven.

RESEARCH METHODOLOGY

This research adopts a descriptive research approach to examine the potential role of Artificial Intelligence in personalized interview preparation. It considers the proposed system's features, possible benefits, and limitations.

1. Research Design

The study focuses on understanding how AI-based tools may support interview practice. It examines features such as question generation, answer evaluation, personalized feedback, and performance tracking.

If a working prototype is tested, candidates' responses before and after practice may be compared using clearly defined evaluation criteria.

2. Data Collection Methods

Data may be collected through the following methods:

- Survey: A structured questionnaire can be distributed among students, fresh graduates, and job seekers to

understand their interview preparation methods and opinions about AI-based tools.

- System Testing: Users can practise answering questions through the proposed system and provide feedback on its usefulness.
- Observation: Practice sessions can be reviewed to identify common difficulties in answering questions and understanding feedback.
- Literature Review: Existing research on NLP, ML, AI-assisted recruitment, and responsible AI can be examined to understand the topic.

3. Sample Size

A target sample of 100 respondents may be considered for the survey, provided that 100 participants are actually recruited and their responses are collected. The final paper should mention the actual number of respondents, their relevant background, and the method used to select them.

4. Research Tools

The following tools may be used for developing and evaluating the proposed system:

- Questionnaire for collecting user opinions.
- NLP techniques for processing and analyzing text responses.
- Machine Learning methods for supported classification tasks.
- Speech-to-text technology for optional voice-based practice.
- Statistical methods, such as frequency counts and percentages, for analyzing survey results.

5. Data Analysis

Survey responses can be summarized using tables, percentages, and charts. User feedback can be grouped into categories such as usefulness, preferred features, ease of use, and privacy concerns.

If the prototype is tested, its feedback can be compared with a human-reviewed evaluation rubric. The system's limitations should also be documented.

6. Ethical Considerations

Participation should be voluntary, and respondents should understand the purpose of the research. Personal information, audio recordings, and interview responses should be handled securely. The system should explain how data are used and avoid presenting automated scores as guaranteed predictions of job success.

RESULT, ANALYSIS AND DISCUSSION

Result

The proposed AI-based personalized interview preparation system uses Artificial Intelligence, Natural Language Processing (NLP), and Machine Learning (ML) to help candidates prepare for job interviews. It provides role-specific questions, evaluates answers, and offers personalized feedback to improve interview performance.

Table 1: AI Technologies and Their Applications

AI Technology	Application in the System
Natural Language Processing (NLP)	Analyses answers and checks their relevance to questions.
Machine Learning (ML) areas.	Supports performance analysis and identifies improvement
Cosine Similarity	Measures the similarity between candidate answers and reference answers.
Speech-to-Text Feedback	Converts spoken answers into text for evaluation. Automated Provides scores and suggestions for improvement.

Analysis

The table shows how different AI technologies contribute to interview preparation. NLP helps analyse candidate responses, while Cosine Similarity estimates how closely an answer matches a reference answer. Machine Learning can support performance analysis, and Speech-to-Text enables voice-based practice. Automated feedback helps candidates identify weaknesses and improve their responses.

However, the accuracy of automated evaluation depends on the quality of the reference answers, the evaluation criteria, and the performance of the AI models. Therefore, the system should be tested to ensure that its feedback is relevant, consistent, and fair.

Discussion

The proposed system can make interview preparation more personalized and accessible. Candidates can practise questions related to their selected job roles, receive immediate feedback, and identify areas that require further improvement. Repeated practice may help them improve their answer structure and confidence.

However, AI-generated scores may not fully represent a candidate's knowledge, communication abilities, or practical skills. The system should therefore be used as a preparation assistant rather than a replacement for human interviewers. Actual user testing is required to measure its effectiveness and determine whether it improves interview performance.

DISCUSSION ON EFFECTIVENESS

The effectiveness of an AI-based interview preparation system depends on the quality of its questions, the relevance of its feedback, and the candidate's use of the recommendations.

1. Personalized Learning

The system can provide questions based on the selected job role and difficulty level. This may help candidates focus on relevant skills instead of practising only general questions.

2. Immediate Feedback

Automated feedback can help candidates identify missing concepts and improve answer structure without waiting for a separate mock interview session. However, feedback should be checked for accuracy and should explain the basis of its suggestions.

3. Communication Practice

Voice-based practice can help candidates review their spoken answers. Speech-to-text may support answer analysis,

but recognition errors can occur because of accents, background noise, and differences in pronunciation. Any speech-related feedback should therefore be treated as guidance rather than a definitive measure of communication ability.

4. Progress Tracking

The system can maintain a history of practice sessions and display changes in performance over time. This may help candidates identify areas that require further attention.

5. Fairness and Reliability

The system should evaluate answers using clear and relevant criteria. It should not automatically assume that candidates with different accents, writing styles, or ways of expressing ideas have lower ability. Transparent evaluation and human review can help identify possible errors and unfair outcomes.

Overall, the system has the potential to support interview preparation. However, its actual effectiveness must be established through practical testing and real user feedback.

FUTURE RESEARCH DIRECTIONS

The Future research can explore the following areas to improve AI-based interview preparation systems.

1. Personalized Question Generation

Future systems can provide more detailed personalization based on a candidate's chosen role, experience, skill level, and previous practice performance.

2. Improved Answer Evaluation

Further research can explore semantic analysis and structured evaluation rubrics to assess the meaning and completeness of answers instead of depending mainly on keywords.

3. Voice-Based Interview Practice

Future versions can improve speech recognition and provide useful feedback on answer clarity, pacing, and organization while accounting for differences in accents and speaking styles.

4. Coding Interview Support

The system can be extended to include coding questions, test cases, code execution, and feedback on correctness and problem-solving approaches.

5. Fairness and Bias Testing

Future studies should examine whether evaluation quality differs across languages, accents, educational backgrounds, and communication styles. Appropriate testing and human review can help identify potential problems.

6. Privacy and Data Security

Future development should focus on secure storage, informed consent, limited data collection, and clear options for deleting interview responses and recordings.

7. Long-Term User Studies

Researchers can study whether regular use of personalized AI interview practice improves candidates' confidence, answer quality, and interview readiness over time.

8. Human and AI Collaboration

Future systems can combine automated feedback with guidance from teachers, mentors, or interview professionals. This approach may provide a more balanced evaluation of technical knowledge and communication skills.

CONCLUSION

Artificial Intelligence offers new opportunities to improve interview preparation through personalized questions, automated answer analysis, immediate feedback, and performance tracking. By combining Natural Language Processing (NLP) and Machine Learning (ML), the proposed system aims to provide candidates with an organized, interactive, and personalized environment for practising job interviews.

The proposed system can help students, fresh graduates, and job seekers prepare for interviews according to their selected job roles. It can generate relevant interview questions, analyse candidate responses, identify areas requiring improvement, and provide feedback to support further practice. This approach may reduce the difficulties candidates face when preparing independently and help them develop a more structured interview preparation routine.

Natural Language Processing plays an important role in analysing the relevance and meaning of answers. Techniques such as Cosine Similarity can be used to estimate the similarity between candidate responses and reference answers. Machine Learning can further support performance analysis by identifying patterns in practice results and highlighting areas where candidates may need additional preparation. These technologies can contribute to a more personalized learning experience by helping candidates focus on their individual weaknesses.

The system may also provide features such as voice-based interview practice, speech-to-text conversion, coding questions, and performance reports. Voice-based practice can allow candidates to rehearse spoken responses, while coding questions can support preparation for technical positions. Performance reports can help users monitor their progress across multiple practice sessions and understand whether their answers are becoming more relevant, clear, and well-structured.

Another important benefit of the proposed system is accessibility. Candidates can practise at their own pace, repeat questions, and review feedback without depending entirely on the availability of a human interviewer. This may be particularly useful for students and fresh graduates who have limited opportunities to participate in formal mock interviews. However, the actual benefits will depend on the system's design, usability, and the quality of its evaluation methods.

Despite its potential advantages, AI-based interview evaluation has certain limitations. Automated feedback may be inaccurate when reference answers are incomplete or when candidates express correct information in different words. Machine Learning models may also produce biased or inconsistent results if the training data or evaluation criteria are unsuitable. In addition, collecting and storing personal information, interview responses, and voice recordings may create privacy and security concerns.

Therefore, the proposed system should be developed with appropriate attention to transparency, fairness, reliability, and data protection. Candidates should be able to understand the basis of their evaluation, and their personal information should be handled securely. Human judgement should complement automated evaluation, particularly when assessing complex responses, practical knowledge, communication abilities, and other qualities that cannot be measured accurately through automated scores alone.

Furthermore, the effectiveness of the proposed system should be examined through prototype testing and feedback from actual users. Future evaluation can consider answer relevance, consistency of scores, user satisfaction, ease of use, and improvements in interview readiness after repeated practice. Such testing would help identify the strengths and limitations of the system and provide opportunities for further development.

In conclusion, an AI-based personalized interview preparation and candidate evaluation system can be a useful support tool for improving interview practice when designed responsibly and evaluated using actual user feedback.

By combining AI technologies with structured practice and meaningful feedback, the system aims to help candidates strengthen their knowledge, improve their answer quality, and develop confidence. Its primary purpose should be to support continuous learning and interview readiness rather than replace human judgement or guarantee employment outcomes.

REFERENCES

1. Permana, S. D. H., Lastiati, A., and Faruq, U. A. "An NLP-Based Intelligent Recruitment System Using Semantic Similarity for Ranking Interview Candidates." Journal of Applied Science, Engineering, Technology, and Education. Available at: https://doi.org/10.35877/454RI.asci4868.

2. Tabassi, E. Artificial Intelligence Risk Management Framework (AI RMF 1.0). National Institute of Standards and Technology (NIST), 2023. Available at: https://doi.org/10.6028/NIST.AI.100-1.

3. Berg, J., and Johnston, H. AI in Human Resource Management: The Limits of Empiricism. International Labour Organization, 2025. Available at: https://doi.org/10.54394/NMSH7611.

4. Saldivar, J., Zuiderveen Borgesius, F., and Biega, A. J. "Fairness and Bias in Algorithmic Hiring: A Multidisciplinary Survey." ACM Transactions on Intelligent Systems and Technology, 2025. Available at: https://doi.org/10.1145/3696457.

5. International Labour Organization and International Organization for Migration. Promoting Fair and Ethical Recruitment in a Digital World. 2021. Available at: https://www.ilo.org/publications/promoting-fair-and-ethical-recruitment-digital-world