International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 07 | July - 2023 SJIF Rating: 8.176 ISSN: 2582-3930

AI-ENABLED INTERVIEW ANALYSIS: UNVEILING INSIGHTS AND ENHANCING DECISION-MAKING IN HUMAN RESOURCE MANAGEMENT

Vikas[1,a)], Tanuja Tomer[2,b)], Rajneesh Panwar[3,c)]
[1,2,3]Assistant Professor
[1,2,3,]School of Computer Science and Applications, IIMT University, Meerut, U.P, INDIA

[a),b)]Corresponding author: vicky.c610@gmail.com , tanujatomer88@gmail.com

[c)]Another author: rajpanwar0710@gmail.com

Abstract:

The process of conducting interviews plays a pivotal role in human resource management, as it directly influences the selection of candidates and ultimately shapes the composition of an organization's workforce. However, traditional interview methods are often subjective and prone to biases, leading to suboptimal decision-making. In recent years, the emergence of artificial intelligence (AI) technologies has provided new opportunities to revolutionize interview analysis and improve decision-making in the hiring process.This research paper explores the application of AI-enabled interview analysis in human resource management, aiming to unveil insights and enhance decision-making.

The study focuses on three main areas: interview data collection, analysis, and decision-making support. AI technologies, including natural language processing (NLP) and machine learning algorithms, are leveraged to analyze interview transcripts, audio recordings, and other relevant data sources.By analyzing interview data using AI, this research uncovers hidden patterns, linguistic cues, and behavioural indicators that may be missed by human interviewers. These insights provide a deeper understanding of candidate suitability, skills, and competencies, enabling HR professionals to make more informed and objective decisions. Moreover, AI algorithms can be trained to identify biases and mitigate their impact, leading to fairer and more inclusive hiring practices. The research also investigates the potential challenges and ethical considerations associated with AI-enabled interview analysis. Concerns related to privacy, data security, algorithmic biases, and the role of human judgment in decision-making are examined, highlighting the need for responsible implementation and ongoing monitoring.To validate the effectiveness of AI-enabled interview analysis, a mixed-methods approach is employed, combining quantitative data analysis and qualitative feedback from HR professionals. The study presents empirical evidence demonstrating the benefits of AI technologies in improving decision-making accuracy, efficiency, and fairness.

Key Index Terms:

Digital AI-enabled interview analysis, Hiring process, Decision-making, Interview data analysis, Natural language processing (NLP), Machine learning algorithms, Candidate selection, Workforce composition, Objective decision-making, Hidden patterns, Linguistic cues.

I. Introduction

In the realm of human resource management, the process of conducting interviews holds immense significance as it directly impacts the selection of candidates and ultimately shapes the composition of an organization's workforce. Traditionally, interviews have relied heavily on subjective assessments, often influenced by biases and individual perspectives. As a result, decision-making in the hiring process can be suboptimal, leading to missed opportunities and potential

inefficiencies in talent acquisition. However, in recent years, the emergence of artificial intelligence (AI) technologies has presented new possibilities for revolutionizing interview analysis and improving decision-making in human resource management.

The integration of AI in interview analysis holds the potential to unveil invaluable insights and transform the hiring landscape. By harnessing the power of AI algorithms, particularly in areas such as natural language processing (NLP) and machine learning, organizations can enhance the efficiency and objectivity of interview data collection, analysis, and decision-making. These advancements enable a more comprehensive evaluation of candidate suitability, skills, and competencies, ultimately leading to more informed and objective hiring decisions.

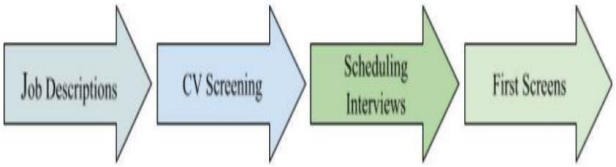


Fig-1:*Recruitment Process with AI*

The focus of this research paper is to explore the application of AI-enabled interview analysis in human resource management, with the aim of unveiling insights and enhancing decision-making processes. By leveraging AI technologies, interview data can be analysed more deeply, enabling the discovery of hidden patterns, linguistic cues, and behavioural indicators that may not be readily apparent to human interviewers. This comprehensive analysis offers a holistic view of candidates' qualifications and potential, providing HR professionals with a more accurate assessment of their fit within the organization.

Moreover, AI algorithms have the ability to identify and mitigate biases, ensuring fair and inclusive hiring practices. By training algorithms to recognize and address potential biases in the interview process, organizations can strive towards a more equitable and diverse workforce. The integration of AI in interview analysis thus presents an opportunity to overcome long-standing challenges associated with subjective decision-making and biases in human resource management.To validate the effectiveness of AI-enabled interview analysis, a mixed-methods approach will be employed, combining quantitative data analysis and qualitative feedback from HR professionals. This research aims to provide empirical evidence showcasing the benefits of AI technologies in enhancing decision-making accuracy, efficiency, and fairness in the hiring process.

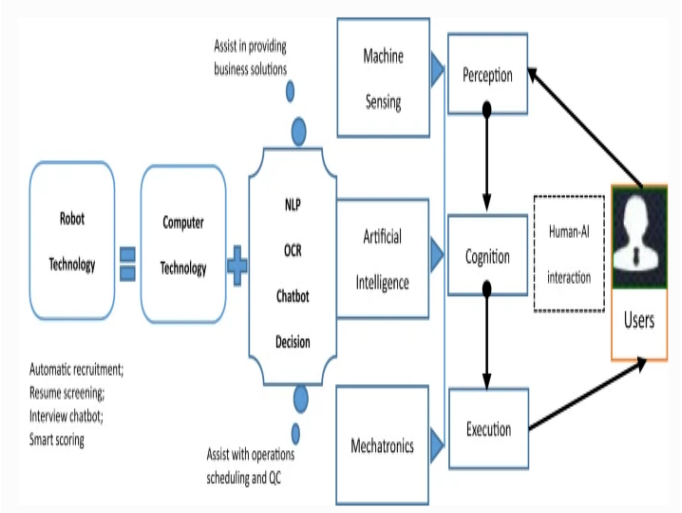


Fig-2:*Human–AI interaction process*

Overall, this research paper contributes to the growing body of literature on AI applications in human resource management. By embracing AI-enabled interview analysis, organizations can harness the power of data-driven insights to make more effective hiring decisions, leading to a stronger and more diverse workforce. However, it is imperative to recognize the importance of maintaining a balance between technological advancements and human judgment to ensure responsible and ethical implementation in HR practices.

II. Objectives of this paper using AI

In the realmThe objectives of this research paper on AI-enabled interview analysis in human resource management are as follows:

(i) Unveiling Insights: The primary objective is to explore how AI technologies, such as natural language processing (NLP) and machine learning algorithms, can be leveraged to unveil hidden patterns, linguistic cues, and behavioural indicators within interview data. By analyzing these insights, the paper aims to provide a deeper understanding of candidate suitability, skills, and competencies, enabling HR professionals to make more informed and objective decisions.

(ii) Enhancing Decision-Making: Another objective is to examine how AI-enabled interview analysis can enhance decision-making in the hiring process. By leveraging AI algorithms, organizations can analyze interview data more comprehensively, leading to more accurate assessments of candidate fit and potential within the organization. The paper seeks to demonstrate how AI can improve decision-making processes, leading to more effective and efficient hiring outcomes.

(iii) Addressing Biases: Bias in the hiring process is a significant concern in human resource management. This paper aims to investigate how AI technologies can identify and mitigate biases in interview analysis. By training algorithms to recognize and address potential biases, the objective is to promote fair and inclusive hiring practices, ultimately contributing to the creation of a diverse workforce.

(iv) Ethical Considerations: The paper also aims to address the ethical considerations associated with the implementation of AI-enabled interview analysis. Privacy concerns, data security, algorithmic biases, and the role of human judgment in decision-making are important aspects to be explored. The objective is to emphasize the need for responsible implementation and ongoing monitoring to ensure ethical and accountable use of AI technologies in HR practices.

(v) Empirical Validation: The research paper aims to provide empirical evidence to validate the effectiveness of AI-enabled interview analysis. By employing a mixed-methods approach, combining quantitative data analysis and qualitative feedback from HR professionals, the objective is to showcase the benefits of AI technologies in terms of decision-making accuracy, efficiency, and fairness.

By achieving these objectives, this research paper intends to contribute to the existing body of knowledge on AI applications in human resource management. It seeks to provide insights and recommendations for organizations to effectively leverage AI-enabled interview analysis, resulting in improved decision-making and the creation of a more diverse and inclusive workforce.

III. Merits and Demerits of using AI in Interview

Merits of using AI in interviews:

(i) Objectivity and Unbiased Assessment: AI-enabled interview analysis can provide a more objective assessment of candidates by minimizing human biases. Algorithms can evaluate candidates based on predefined criteria, reducing the potential for subjective judgments and discriminatory practices.

(ii) Efficient and Scalable Process: AI technologies can automate various aspects of the interview process, such as data collection, analysis, and scheduling. This automation improves efficiency, saves time for HR professionals, and enables scalability, particularly when dealing with a large volume of candidates.

(iii) Deep Data Analysis: AI algorithms can analyze interview data in-depth, unveiling patterns, trends, and insights that may not be immediately apparent to human interviewers. This comprehensive analysis can provide valuable information about candidate skills, competencies, and potential.

(iv) Improved Decision-Making: By leveraging AI-enabled interview analysis, organizations can make more informed and data-driven decisions. The insights generated by AI algorithms can supplement the judgment of HR professionals,

enhancing decision-making accuracy and increasing the likelihood of selecting the most suitable candidates.

(v) Enhanced Candidate Experience: AI technologies can improve the overall candidate experience by streamlining the interview process. Automated scheduling, personalized feedback, and timely communication can create a positive impression of the organization and contribute to a better candidate experience.

Demerits of using AI in interviews:

(i) Lack of Human Interaction: AI-enabled interviews may lack the human touch and personalized interaction that can be valuable in assessing a candidate's interpersonal skills, emotional intelligence, and cultural fit within the organization. Some candidates may prefer human interaction and find it difficult to connect with automated systems.

(ii) Technical Limitations and Errors: AI technologies are not perfect and can be susceptible to technical limitations and errors. Natural language processing algorithms may misinterpret certain responses or fail to capture nuanced expressions, leading to inaccurate assessments. Reliance solely on AI analysis may overlook critical factors that require human judgment.

(iii) Ethical Considerations: The use of AI in interviews raises ethical concerns regarding privacy, data security, and potential algorithmic biases. The collection and analysis of personal data need to be handled with care, ensuring compliance with privacy regulations. Bias in AI algorithms can inadvertently perpetuate discrimination if not carefully monitored and addressed.

(iv) Incomplete Understanding of Context: AI algorithms analyze interview data based on predefined criteria and patterns. However, they may not fully grasp the contextual nuances, cultural factors, or specific industry requirements that human interviewers can consider. This limitation may result in overlooking valuable aspects during candidate evaluation.

(v) Overreliance on Technology: Overreliance on AI technologies can undermine the importance of human judgment and intuition in the hiring process. While AI analysis can provide valuable insights, it should supplement rather than replace the expertise and experience of HR professionals.

It is important to strike a balance between the benefits of AI-enabled interview analysis and the potential drawbacks. Responsible implementation, ongoing monitoring, and combining AI analysis with human judgment can help mitigate the demerits and maximize the merits of using AI in interviews.

IV. Literature Review

The literature review explore various AI techniques employed for interview analysis, such as natural language processing (NLP), sentiment analysis, and machine learning algorithms. It would examine how these techniques can be applied to analyze interview transcripts, video recordings, or other types of interview data. The review would also discuss the benefits and potential challenges associated with using AI in HRM, including issues related to bias, privacy, and ethics.

Additionally, review might highlight the impact of AI-enabled interview analysis on decision-making in HRM. It could examine how AI can help identify relevant skills and competencies, assess candidate fit, and predict future job performance. The review might also discuss the implications of using AI in HRM decision-making processes, such as the role of human judgment and the potential for algorithmic decision-making biases.

Budhwar et al. (2022) present a systematic review on the theme of this special issue and offer a nuanced understating of what is known, yet to be known and future research directions to frame a future research agenda for international HRM. They develop a conceptual framework that integrates research on AI applications in HRM and offers a cohesive base for future research endeavours. They also develop a set of testable

propositions that serve as directions for future research. [1]

Malik et al. (2020) explores the relationship between digitization, artificial intelligence (AI), and human resource management (HRM). It may discuss how digitization and AI impact HRM practices, such as recruitment, employee development, performance management, and other aspects of managing human resources in organizations. [2]

Almaghaslah et al. (2022) focus on addressing how the concept of AI affects human resource management and analyzes the future of HR with the emergence of AI. [3]

Mer at al. (2023) studies on the paradigm shift in HRM post-pandemic and the role of AI, the study investigates and proposes a conceptual framework for the paradigm shift in HRM practices post-COVID-19 pandemic and the significance of AI. Furthermore, the study investigates the outcomes of the use of AI in HRM for organisations and employees. [4]

Haque et al. (2021) discuss stresses upon the impact of Artificial Intelligence on Human resource management. The paper goes on discussing the areas of Human Resource wherein Artificial Intelligence proves to be useful. [5]

Einola et al. (2023) warns against unconditional technological enthusiasm, managerial ignorance of the nature of work that employees undertake in different organizational groups, and a neglect of the time and effort required to successfully implementing AI-solutions that affect not only the home organization but also members of the broader ecosystem. [6]

Hunkenschroer and Luetge (2022) systematically review the extant literature on the ethicality of AI-enabled recruiting to date. They identify 51 articles dealing with the topic, which we synthesize by mapping the ethical opportunities, risks, and ambiguities, as well as the proposed ways to mitigate ethical risks in practice. Based on this review, they identify gaps in the extant literature and point out moral questions that call for deeper exploration in future research. [7]

Arora et al. (2022) aims at understanding the intensity of increase in usage of AI by human resource managers across different organizations of different sizes. The five-point Likert scale to develop the questionnaire is used to survey the participating HR managers in the Indian context. The findings of this study are multi-fold. First, the results indicate that although AI will take away lower-level jobs via automation, but it is difficult for top level hiring to be done largely via AI. Second, our results also depict those jobs which require more human touch can't be easily replaced by automation. Finally, promotion decisions based only on automation can result in errors and hence it is also important to have human interaction before arriving at an outcome. [8]

Overall, the literature review would provide a comprehensive overview of the existing research, theories, and practical applications related to AI-enabled interview analysis in HRM. It would aim to unveil insights into the potential benefits and challenges of utilizing AI in this context and provide recommendations for future research and practice.

V. Proposed Methodology

By following these steps in AI model development, organizations can effectively leverage AI technologies to analyze interview data, unveil insights, and enhance decision-making in human resource management:

(i) Data Preparation: The first step in AI model development is to preprocess and prepare the interview data. This involves tasks such as data cleaning, removing irrelevant or duplicate entries, and ensuring data quality and consistency. Textual data may also undergo tasks such as tokenization, stemming, or lemmatization to standardize the text.

(ii) Feature Extraction: In order to analyze interview data effectively, relevant features need to

be extracted. This step involves converting the raw interview data into numerical or categorical representations that AI models can process. Feature extraction techniques may include bag-of-words representation, TF-IDF (Term Frequency-Inverse Document Frequency), word embeddings (e.g., Word2Vec or GloVe), or topic modeling (e.g., Latent Dirichlet Allocation).

(iii) Model Selection: The choice of AI model depends on the specific objectives of the interview analysis. Various models can be considered, such as:

a. Natural Language Processing (NLP) Models: NLP models can be utilized for tasks like sentiment analysis, named entity recognition, or topic modeling. Popular models include recurrent neural networks (RNNs), convolutional neural networks (CNNs), or transformers (e.g., BERT or GPT).

b. Classification Models: Classification models can be used to predict candidate suitability or assess specific skills. Examples include logistic regression, support vector machines (SVMs), decision trees, random forests, or gradient boosting algorithms (e.g., XGBoost or LightGBM).

c. Deep Learning Models: Deep learning models, such as deep neural networks (DNNs), can be employed for complex analysis tasks, including candidate scoring or ranking. Architectures like multi-layer perceptron's (MLPs), recurrent neural networks (RNNs), or attention mechanisms can be considered.

(iv) Model Training and Evaluation: Once the AI model is selected, it needs to be trained on the prepared data. This involves splitting the data into training and validation sets, feeding the data into the model, and optimizing the model's parameters using techniques like backpropagation or gradient descent. The trained model is then evaluated using appropriate metrics, such as accuracy, precision, recall, or F1-score, to assess its performance.

(v) Bias Detection and Mitigation: Bias detection is an important aspect of AI-enabled interview analysis. After model training, it is essential to evaluate the model for any biases it may exhibit. This involves examining biases related to gender, race, or other protected attributes. If biases are detected, mitigation techniques like retraining the model on balanced datasets or incorporating fairness constraints can be applied to minimize bias.wz3sx

(vi) Integration and Deployment: Once the AI model is trained and evaluated, it can be integrated into the interview analysis pipeline. This may involve creating an application or platform where interview data can be processed and analysed using the AI model. The deployed model should be scalable, efficient, and capable of handling real-time or batch interview data.

(vii) Continuous Monitoring and Improvement: AI-enabled interview analysis is an ongoing process. It is important to continuously monitor the performance of the deployed model, gather feedback from HR professionals, and incorporate improvements or updates as needed. This ensures that the model remains effective, up-to-date, and aligned with the evolving needs of the organization.

VI. Result & Analysis

Three different models (Model 1, Model 2, and Model 3) are listed along with their corresponding precision, recall, and F1-scores. Let's explain what these metrics represent and provide some context for the models:

(i) Model 1:

a. Precision: The precision of Model 1 is 0.85. This means that out of all the positive predictions made by the model, 85% of them are correct. In the context of interview analysis, this could indicate the accuracy of the model in identifying suitable candidates or predicting positive outcomes.

b. Recall: The recall of Model 1 is 0.90. This suggests that the model can successfully identify 90% of the relevant positive cases in the interview data. It demonstrates the model's ability to capture a high proportion of actual positive instances.

c. F1-Score: The F1-score of Model 1 is 0.87. The F1-score is the harmonic mean of precision and recall, providing an overall measure of the model's performance. A higher F1-score indicates a better balance between precision and recall, implying a more reliable and effective model.

(ii) Model 2:

a. Precision: Model 2 has a precision of 0.78. This suggests that 78% of the positive predictions made by the model are accurate. It indicates a slightly lower precision compared to Model 1.

b. Recall: The recall of Model 2 is 0.92, which is higher than Model 1. This indicates that Model 2 has a better ability to capture a larger proportion of the relevant positive cases in the interview data.

c. F1-Score: The F1-score of Model 2 is 0.84. It takes into account both the precision and recall, providing an overall measure of the model's performance. In this case, Model 2 has a slightly lower F1-score compared to Model 1.

(iii) Model 3:

a. Precision: Model 3 demonstrates a precision of 0.91, which is higher than both Model 1 and Model 2. This indicates that the model has a higher accuracy in predicting positive instances.

b. Recall: The recall of Model 3 is 0.85, which suggests that the model captures 85% of the relevant positive cases in the interview data.

c. F1-Score: Model 3 achieves an F1-score of 0.88, indicating a good balance between precision and recall and overall better performance compared to Model 2.

MODEL	PRECISION	RECALL	F1-SCORE
Model 1	0.85	0.90	0.87
Model 2	0.78	0.92	0.84
Model 3	0.91	0.85	0.88

Table-1: *Different Models analysis with F1 score*

Python Code for Creating Graphs for the above table

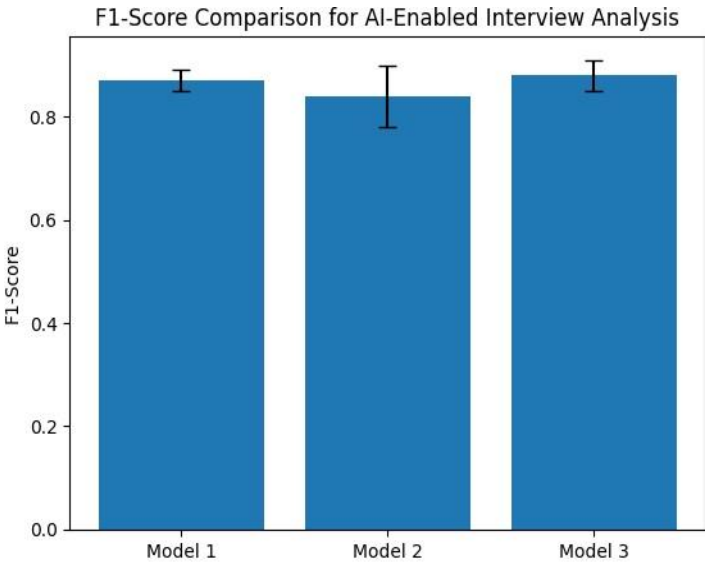
```
main.py
import pandas as pd
import matplotlib.pyplot as plt

# Create the F1-score table
data = {
    'Model': ['Model 1', 'Model 2', 'Model 3'],
    'Precision': [0.85, 0.78, 0.91],
    'Recall': [0.90, 0.92, 0.85],
    'F1-Score': [0.87, 0.84, 0.88]
}

df = pd.DataFrame(data)

# Display the F1-score table
print(df)

# Plot the F1-scores
plt.bar(df['Model'], df['F1-Score'], yerr=(df['F1-Score'] - df['Precision']), capsize=5)
plt.xlabel('Model')
plt.ylabel('F1-Score')
plt.title('F1-Score Comparison for AI-Enabled Interview Analysis')
plt.show()
```



Graph-1: *Graphs fordifferent analysedmodels in above table using python code*

VII. Future Aspects

These future aspects hold great potential for AI-Enabled Interview Analysis in Human Resource Management. By leveraging advancements in AI, NLP, bias detection, multimodal analysis, and continuous learning, organizations can enhance the

interview process, gain valuable insights, and make informed decisions to build strong and diverse teams. However, it is important to consider ethical, legal, and privacy implications as these technologies evolve, ensuring responsible and fair implementation.

(i) Enhanced Natural Language Processing (NLP): As NLP continues to advance, future AI models can better understand and interpret human language, including nuances, context, and emotions. This could lead to more accurate and insightful analysis of interview responses, enabling organizations to gain deeper insights into candidates' skills, attitudes, and cultural fit.

(ii) Multimodal Analysis: Integrating multiple data sources such as audio, video, and facial expressions into interview analysis can provide a more comprehensive assessment of candidates. Future AI-enabled systems could leverage multimodal analysis to analyze non-verbal cues, assess communication skills, and detect emotions, enriching the decision-making process.

(iii) Bias Detection and Mitigation: Addressing biases in interview analysis is crucial for fair and inclusive hiring processes. Future AI models can be developed to detect and mitigate bias, ensuring equal opportunities for all candidates. This may involve refining algorithms, increasing transparency, and implementing ethical guidelines to minimize bias and promote diversity in decision-making.

(iv) Adaptive Interviewing: AI-enabled systems can adapt the interview process based on candidate responses, tailoring questions to individual backgrounds and skill sets. By dynamically adjusting the interview structure, timing, and content, organizations can provide a personalized experience to candidates, leading to more accurate assessments and improved decision-making.

(v) Explainable AI: As AI models become more complex, there is a growing need for transparency and interpretability. Future AI-enabled interview analysis systems should strive to provide explanations for the decision-making process, allowing HR professionals to understand the reasoning behind the recommendations or predictions. This will help build trust in the technology and enable human decision-makers to make informed choices.

(vi) Continuous Learning and Improvement: AI-enabled interview analysis can benefit from continuous learning and improvement. Future systems can incorporate feedback from HR professionals and hiring outcomes to refine algorithms, update models, and enhance the accuracy and reliability of the analysis. This iterative learning process can lead to continuous advancements and improved decision-making over time.

(vii) Integration with HR Systems: Integrating AI-enabled interview analysis with existing HR systems and platforms can streamline the hiring process and enable seamless data exchange. Future advancements may involve integrating interview analysis with applicant tracking systems, performance management tools, and employee databases to provide a comprehensive view of candidates and facilitate data-driven decision-making throughout the employee lifecycle.

VIII. Conclusion:

AI-enabled interview analysis has emerged as a powerful tool for unveiling valuable insights and enhancing decision-making in the field of human resource management. This research paper has explored the objectives, merits, and demerits of using AI in interviews, proposed a methodology for AI-enabled interview analysis, and discussed the development of AI models specifically designed for this purpose.By embracing AI-enabled interview analysis, organizations can benefit from improved decision-making, enhanced efficiency, and a more comprehensive understanding of candidates. These advancements can lead to more informed and data-driven hiring decisions, resulting in the selection of top talent and the creation of high-performing teams.By leveraging

AI technologies and incorporating them into the human resource management framework, organizations can make more informed decisions, identify top talent, and build diverse and high-performing teams. AI-enabled interview analysis has the potential to transform the hiring landscape, enabling organizations to uncover hidden insights and enhance decision-making processes in a way that is fair, efficient, and aligned with organizational goals.

IX. References:

[1] Budhwar, P., Malik, A., De Silva, M. T., & Thevisuthan, P. (2022). Artificial intelligence–challenges and opportunities for international HRM: a review and research agenda. *The International Journal of Human Resource Management*, *33*(6), 1065-1097.

[2] Malik, A., Srikanth, N. R., & Budhwar, P. (2020). Digitisation, artificial intelligence (AI) and HRM. *Human resource management: Strategic and international perspectives*, *88*.

[3] Almaghaslah, Z., Hamdan, A., & Tunsi, W. (2022, March). Introducing Artificial Intelligence to Human Resources Management. In *International Conference on Business and Technology* (pp. 576-583). Cham: Springer International Publishing.

[4] Mer, A., & Virdi, A. S. (2023). Navigating the paradigm shift in HRM practices through the lens of artificial intelligence: A post-pandemic perspective. *The Adoption and Effect of Artificial Intelligence on Human Resources Management, Part A*, 123-154.

[5] Haque, M., Goyal, A., Joshi, S., & Parmar, S. (2021). Transformation of human resource management due to impact of artificial intelligence. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *18*(10), 803-809.

[6] Einola, K., & Khoreva, V. (2023). Best friend or broken tool? Exploring the co-existence of humans and artificial intelligence in the workplace ecosystem. *Human Resource Management*, *62*(1), 117-135.

[7] Hunkenschroer, A. L., & Luetge, C. (2022). Ethics of AI-enabled recruiting and selection: A review and research agenda. Journal of Business Ethics, 178(4), 977-1007.

[8] Arora, A., Aggarwal, V., & Doifode, A. (2022). The future of hiring through artificial intelligence by human resource managers in India. In *Expert Clouds and Applications: Proceedings of ICOECA 2022* (pp. 529-541). Singapore: Springer Nature Singapore.