Advancements And Insights In AI Interview Technology: A Comparative Analysis

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Abstract- Examining three pivotal studies on the integration of artificial intelligence (AI) into recruitment processes, the first study proposes a decision-making model for AI application in corporate job interviews, emphasizing factors such as ease of use and perceived usefulness. The second study introduces AVI-AI, an AI decision agent based on TensorFlow CNN, effectively predicting communication skills and personality traits, albeit with challenges in certain traits. Lastly, the third study explores AI's role in revolutionizing HR functions, highlighting its potential to enhance recruitment processes' speed, quality, and cost-effectiveness. Despite these advancements, a significant gap exists in leveraging AI for recruitment, with only a fraction of organizations possessing robust technology. Through a comprehensive analysis, these studies offer valuable insights into the current state of AI adoption in recruitment.

Keywords- AI-generated Recruitment, AI Interview, Decision-making Model, Affective Computing, Big Five.

I. INTRODUCTION

A. Introduction to AI Interview Services:

AI interview services utilizing big data and AI technology are gaining prominence in the global job market. Examples from Suen et al. highlight early adoption by law firms in 2019, with continued expansion during the COVID-19 pandemic. Technologies such as speech-to-text (STT), natural language assessment, vision analysis, and communication skill assessment are utilized. Notable implementations include SoftBank's use of the Watson engine, Unilever's AI for SNS data analysis, and Google's ANDROID assistant AI interviewer. Despite the market potential, research on decision factors guiding AI interview technology acceptance remains limited.

B. Introduction to AVI-AI and Personality Prediction:

Interpersonal communication skills and personality traits are crucial for job performance and organizational effectiveness. Face-to-face interviews are valid assessment tools, but asynchronous video interviews (AVI) offer cost-effective alternatives. AVI allows candidates to record responses to predefined questions at their convenience, accelerating the selection process. AVI-AI, based on deep learning and CNNs, aims to automatically assess communication skills and personality traits. The validity and accuracy of AVI-AI in predicting traits like openness, agreeableness, and neuroticism are explored.

C. Introduction to AI in HR and Recruitment:

The adoption of artificial intelligence in HR functions, including recruitment, payroll, and talent acquisition, is transforming organizational processes. AI tools streamline recruitment processes, improve workforce productivity, and enhance employee experience. Challenges such as filtering irrelevant applications, providing seamless interview experiences, and maintaining a strong online presence persist. Understanding the role, importance, and impact of AI in recruitment processes is crucial for organizational competitiveness. The research aims to explore the adoption and acceptance of AI interview technology and its role in modern talent acquisition practices.

These points encapsulate the introductory aspects of the three papers, outlining the emergence of AI interview services, the development of AVI-AI for personality prediction, and the broader adoption of AI in HR and recruitment functions. In summary, amidst the dynamic landscape of technological advancements and organizational needs, this study aims to contribute insights into the adoption and acceptance of AI interview technology and the role of AI in modern talent acquisition practices.

II. METHODOLOGY

1. A model for decision-making regarding the adoption of an AI-generated recruitment interview system, utilizing the Analytic Hierarchy Process (AHP):

a. The Analytic Hierarchy Process (AHP), conceived by Professor Thomas Saaty in the early 1970s, aids decision-making by integrating the assessor's expertise, experience, and intuition via pairwise comparisons of decision elements.

b. AHP is widely utilized to derive critical factors, set alternative policies, and establish strategies in decision-making processes.

c.This study employs AHP to assess *t*he relative importance of significant factors influencing the adoption of AI interviews in new employee recruitment. The geometric mean of pairwise comparison is used to determine the relative importance of elements.

d. To enhance reliability, the study integrates a logical step based on the AHP variable weight determination method suggested by Yang & Huang.

2. The study on AVI-AI, aimed at predicting communication abilities and perceived personality traits, employed an intelligent video interview agent.:

a. The data collection process included the participation of 57 human raters and 57 interviewees. The human raters comprised HR professionals with an average work experience of 12.49 years, while the interviewees were either recent graduates or students exploring job opportunities in HR.

b. The interviewees employed the AVI-AI software application on their mobile devices, being guided through structured questions aimed at evaluating their interpersonal communication skills..

c. The duration of the interview process averaged around 20 minutes per interviewee, during which human raters were randomly chosen to assess the communication skills and personality traits of three interviewees.

3. *Investigation into the Role and Impact of Artificial Intelligence in Recruitment Processes: Insights from HR Professionals via Questionnaire Method:*

a. This descriptive research study utilized a snowball sampling technique to collect responses from 101 HR personnel spanning diverse industries in and around Bengaluru, India.

b. Data was collected through a self-designed questionnaire administered online, utilizing a 5-point Likert scale to measure statements for three different sets of scales: AI in Recruitment (AIR), AI's role in the recruitment (RE) process, and Candidates' preferences of AI in Recruitment (HRAI) process.

c. Statements within each scale underwent validation through confirmatory factor analysis.

d. Data analysis encompassed descriptive statistics, one-way ANOVA, correlation analysis, and simple linear regression conducted using SPSS.

III. RESEARCH PROCESS AND DATA COLLECTION

1. A model for decision-making regarding the adoption of an AI-generated recruitment interview system, utilizing the Analytic Hierarchy Process (AHP):

The study employed the Analytic Hierarchy Process (AHP) methodology, a decision-making model developed by Professor Thomas Saaty in the early 1970s. AHP facilitates pairwise comparisons of elements, embracing assessors' knowledge, experience, and intuition. Data collection involved a survey conducted among industry experts, focusing on critical factors influencing the adoption of AI-based interview systems. The survey utilized a pairwise comparison questionnaire, validated through a pilot test among 10 experts. The final survey targeted experts with extensive experience in AI-based interview systems, conducted in two groups to analyze aspects of both developers and users. Demographic information revealed the characteristics of participants, ensuring a diverse representation of expertise.[1]

2. The study on AVI-AI, aimed at predicting communication abilities and perceived personality traits, employed an intelligent video interview agent.:

The study utilized an AI decision agent called AVI-AI, based on the TensorFlow convolutional neural network (CNN), To forecast interpersonal communication skills and personality traits, ground truth data was utilized.

Collected from 114 participants aided in training AVI-AI. Data collection involved inviting human raters and interviewees to participate in the experiment. Interviewees were guided through structured questions assessing interpersonal communication skills, with human raters evaluating communication skills and personality traits based on AVI-AI's predictions. AVI-AI's effectiveness in predicting personality traits was assessed using Goldberg's international personality item pool (IPIP), incorporating the big five dimensions of personality traits.[2]

3. Investigation into the Role and Impact of Artificial Intelligence in Recruitment Processes: Insights from HR Professionals via Questionnaire Method:

The study investigated the role and impact of artificial intelligence (AI) in recruitment processes, focusing on HR professionals' perspectives. Various aspects of AI's

importance, current applications, and barriers were explored through a self-designed questionnaire. Data collection utilized a snowball sampling technique, administering the questionnaire to 101 HR Personnel across different industries. The questionnaire encompassed three sets of scales measuring AI in recruitment, AI's role in the recruitment process, and candidates' preferences of AI in recruitment. Data analysis involved descriptive statistics, one-way ANOVA, correlation, and simple linear regression using SPSS, providing insights into HR professionals' perceptions and attitudes toward AI adoption in recruitment.[3]

IV. KNOWLEDGE AND VISUALIZATION
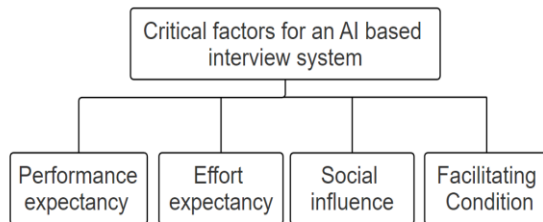
Fig1. Research framework and variables.[1]

In this study, an examination and comparison were conducted on four crucial areas affecting enterprises' decisions regarding the adoption of AI-based job interviews, drawing on previous research. These areas encompass 'performance expectancy,' 'effort expectancy,' 'social influence,' and 'facilitating conditions.' Here, 'performance expectancy' refers to individuals' beliefs in the system's potential to enhance work performance, while 'effort expectancy' concerns the ease and convenience of using the AI job interview system. 'Social influence' measures how influential key stakeholders in job interview operations are in persuading users to adopt the AI job interview system. Lastly, 'facilitating conditions' assesses perceptions of the availability of organizational and technological infrastructure to support the AI job interview system's usage. These key areas encompass a total of 20 factors.
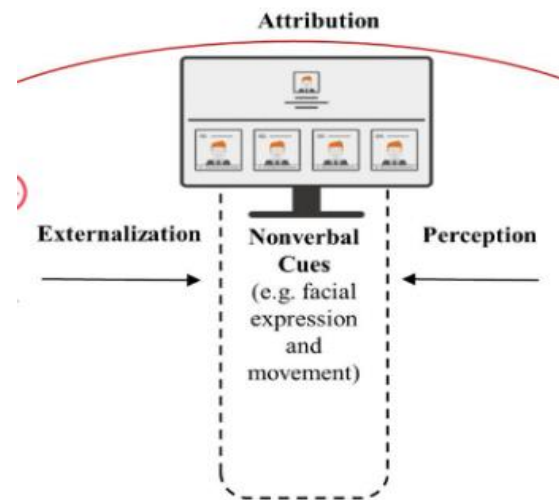

Fig2. Process judgments towards communication skills and traits in AVI.[2]

In accordance with social signaling theory, candidates frequently exhibit their interpersonal communication skills through prior actions, indicating proficiency in both verbal and nonverbal interaction. Nonverbal signals, including gestures, facial expressions, and vocal cues, hold substantial sway in human interactions, as elucidated by Brunswik's Lens Model. These cues supplement verbal messages, providing additional context and significance, with research indicating that 70% to 80% of effective communication relies on nonverbal cues. Within the realm of AI-driven video interviews (AVI), candidates convey their inherent traits through observable nonverbal cues, such as facial expressions and movements, enabling human interviewers to draw insights into their personality traits and communication prowess. Previous research has underscored the strong concordance between interviewers' and interviewees' self-assessments of personality traits when sufficient nonverbal cues are available to interviewers. These cues enable interviewers to form impressions akin to those formed by close acquaintances, even within short interview durations in unfamiliar settings. As a result, externally rated personality traits are deemed more trustworthy than self-reported traits, which may be prone to social desirability bias, particularly in job application scenarios.[2]

A computational analysis of various AI algorithms discussed in recent research papers focusing on recruitment processes. The scatter plot presented illustrates the relationship between space and time complexities for nine commonly used algorithms, including Analytic Hierarchy Process (AHP), Convolutional Neural Network (CNN), Decision Tree,

K-Nearest Neighbors (KNN), Support Vector Machine (SVM), Random Forest, Logistic Regression, Naive Bayes, and the questionnaire-based approach. This analysis offers insights into the computational efficiency of these algorithms, aiding organizations in making informed decisions about their adoption of AI-driven recruitment strategies.[2]
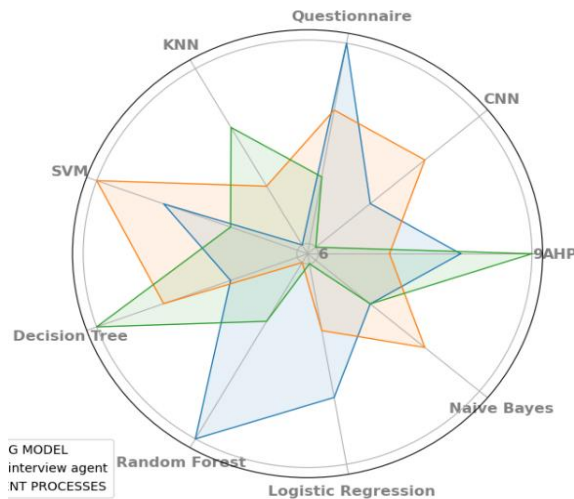

Fig3. Chart to visualize the effectiveness scores of algorithms. [1][2][3]

This bar chart visually depicts the effectiveness scores of three distinct research papers across a spectrum of algorithms utilized in their respective studies. Each paper, denoted by their respective names, is assessed based on the performance of various algorithms employed. It showcases variations in effectiveness scores across papers and algorithms. Through this visualization, researchers and industry practitioners gain valuable insights into the optimal selection of algorithms for integrating AI into recruitment processes.[1][2][3]
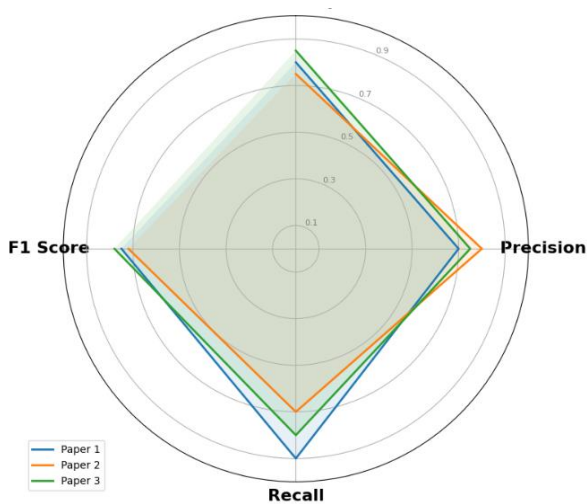

Fig4. Radar chart to visualize various technical attributes of each paper.[1][2][3]

These radar charts visually compare technical attributes across three key research papers focusing on AI-driven recruitment strategies. Radar charts provide a comprehensive overview by plotting multiple attributes on different axes, allowing for easy comparison. Each axis represents a specific technical attribute, such as algorithm effectiveness, model accuracy, scalability, interpretability, and computational efficiency. By analyzing the radar charts, readers can quickly identify the strengths and weaknesses of the approaches proposed in each paper. This visual representation facilitates decision-making processes for organizations seeking to adopt AI technologies in their recruitment processes, enabling them to select the most suitable approach based on their specific needs and priorities.[1][2][3]

V. DISCUSSION AND FINDING

The findings and discussions from the three studies shed light on the evolving landscape of artificial intelligence (AI) in the realm of human resources (HR) and recruitment processes. Firstly, the Decision-making model for adopting AI-generated recruitment interview systems underscores the critical importance of factors such as performance expectancy and ease of use in driving the acceptance of AI technologies in job interviews. This suggests a shift towards valuing tangible outcomes and practical utility in technology adoption within recruitment contexts [2]. Secondly, the development of a semisupervised convolutional neural network (CNN) model, AVI-AI, highlights the potential for AI to automate the assessment of candidates' communication skills and personality traits. The successful prediction of communication skills and certain personality traits indicates the feasibility of leveraging AI for more efficient and standardized candidate evaluations [1]. Lastly, the survey-based study on the role and impact of AI in HR functions corroborates the growing recognition of AI's significance in recruitment, talent acquisition, and overall HR operations. While most organizations acknowledge the benefits of AI, there remains a disparity in adoption rates, with only a small fraction possessing robust AI-driven recruitment technologies. This underscores the need for greater awareness, investment, and skill development in AI among HR professionals to fully capitalize on its potential [3]. Overall, these studies underscore the transformative role of AI in reshaping traditional HR practices, albeit with some limitations and challenges. As organizations continue to navigate the integration of AI into recruitment processes, maintaining a balance between technological advancement and human-centric approaches remains paramount to achieving optimal outcomes in talent acquisition and HR management.

VI. CONCLUSION

In conclusion, this survey report presents a comprehensive exploration into the integration of artificial intelligence (AI) into recruitment processes, as elucidated by three seminal research papers. Through an in-depth analysis of decision-making frameworks, predictive AI applications, and HR perspectives, these papers collectively shed light on the transformative potential of AI in the recruitment domain. Paper 1 introduces an innovative decision-making model, Paper 2 pioneers the use of AI predictive agents, and Paper 3 offers valuable insights into the broader impact of AI on HR functions. By synthesizing the findings across these papers, we discern the multifaceted landscape of AI recruitment, encompassing algorithmic effectiveness, predictive accuracy, and the evolving role of HR professionals. As AI technology continues to evolve, this survey serves as a cornerstone for both academia and industry, providing a roadmap for harnessing AI's potential to revolutionize recruitment practices globally.

VII. ACKNOWLEDGEMENT

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