

## **Creating an AI-driven interview platform tailored for remote hiring.**

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### **ABSTRACT**

Recently, there has been a global proliferation of applicant information services and interview-assistance services harnessing big data and AI technology. These services strive to introduce interview systems that ensure efficiency and impartiality in the job market. Consequently, this research presents an AI-driven interview system developed using deep-learning technology. It drew upon over 100,000 evaluation datasets from a pool of 400,000 interview image datasets. The resultant AI interview system has been deployed across various enterprises, achieving a reliability score of 0.88 Pearson. This paper specifically examines the application of this system to five major public enterprises in Korea. The results indicate a high level of satisfaction, with 85% expressing contentment regarding fairness and efficiency in evaluation processes, job suitability, and organizational fit. As AI-based solutions continue to penetrate personnel management, their efficiency in time and cost, coupled with recognized reliability and fairness, suggest broader applicability. The proposed deep learning-based job interview solution in this study hints at broader implementation, encompassing written examinations, personality assessments, and aptitude tests.

### **Keywords :**

Interview system powered by AI, AI-driven interview platform, Remote recruitment, AI-powered solution, Large-scale data analytics.

## INTRODUCTION

As the 4th Industrial Revolution progresses and society undergoes rapid changes, the significance of talented individuals is increasingly emphasized. The growth and success of societies, organizations, or enterprises hinge on the development and acquisition of talented individuals. The recruitment of talented employees is a crucial HR strategy compared to any other aspect of employment. The aim of the employment system is to attract and select skilled human resources and assign them to suitable positions through fair and rational procedures. To secure exceptional human resources, enterprises must strategize and manage the selection and placement process effectively. The initial step in employment involves selecting the most suitable candidates through various screenings, such as examinations. Interviews play a pivotal role in assessing individuals' capabilities, including document-based interviews, face-to-face interviews, and debate-style interviews.

In recent times, applicant information services and interview-assistance services leveraging big data and AI technology have rapidly proliferated worldwide to introduce interview systems that ensure efficiency and fairness in the job market. A survey conducted by Mercer, a human resource consulting firm in the U.S., in 2018 among 7,300 business leaders and chief personnel managers of global enterprises, revealed that 36% of the participating enterprises utilized AI in the hiring process to identify applicants with potential for superior performance and long-term retention. Additionally, AI-based hiring platforms have been widely adopted in countries such as the U.S., Japan, and China. Each applicant undergoes various tests in a gamified format through a dedicated mobile app downloaded online. For applicants who consent to save their competency profiles and information related to job fitness and the enterprises and positions they apply for, recruiting enterprises access the database to conduct interviews and the hiring process. Big data analysis is employed to understand why applicants choose one enterprise over its competitors.

This study investigates the technical trends associated with the proliferation of AI-based interview services, presenting the outcomes of AI-based interview system development and its application to the hiring process. Based on these findings, the study elucidates the current landscape of AI-based job interview techniques and offers insights into successfully establishing an AI-based system within enterprises.

## **AI BASED EMPLOYMENT TYPES AND TREND**

The widespread adoption of big data and AI has brought about significant shifts in employment dynamics, particularly in trend analysis and future forecasting. According to Midas IT, an agency specializing in AI analysis, the accuracy of identifying talented applicants through AI interviews reaches an impressive 82%, as confirmed by an enterprise official. This level of precision is noteworthy, especially when contrasted with the validity rates of personality/aptitude tests, typically ranging from 30-40%, and non-structural interviews, which can be as low as 10%.

The objective of employment processes is to select the most suitable workforce for an organization, precisely when and where they are needed. This encompasses both informing potential applicants about the enterprise during the recruitment phase and selecting the optimal candidates from among the applicants during the selection phase. With the integration of AI technology into recruiting systems, various efforts are undertaken to enhance efficiency and fairness across multiple processes, including talent recommendation, application screening, job allocation, and employment assessments.

AI-based recruiting primarily finds application in several key areas: pre-employment assessments, documentation management, interview-based evaluations, and job allocation. In pre-employment assessment, applicants' problem-solving abilities are compared with extensive data analysis results to evaluate interpersonal skills, collaboration, teamwork, motivation, and decision-making capabilities even before interviews. Moreover, applicants' aptitudes, problem-solving skills, capacity to comprehend and apply information, as well as their ability to learn new skills and engage in critical thinking, are assessed to gauge their cognitive aptitude.

## OBJECTIVES

- **Boost Efficiency:** Deploy AI-powered algorithms to automate various interview process components like candidate screening, scheduling, and assessment, streamlining and expediting hiring procedures.
- **Enhance Candidate Experience:** Develop AI-driven chatbots or virtual assistants to offer tailored support and guidance to candidates throughout their interview journey, elevating their overall experience and involvement.
- **Ensure Accuracy and Fairness:** Utilize AI-based assessment tools to objectively evaluate candidates' qualifications, skills, and suitability for the role, minimizing biases and ensuring equitable decision-making.
- **Trim Time and Cost:** Harness AI technologies to reduce recruitment time and resources by automating repetitive tasks, refining candidate sourcing, and facilitating quicker decision-making.
- **Enable Data-Driven Choices:** Implement AI analytics to scrutinize interview data, monitor performance indicators, and spot trends and patterns to guide strategic decisions and optimize recruitment tactics.
- **Improve Predictive Hiring:** Employ AI algorithms to analyze candidate data and forecast future performance and job compatibility, empowering organizations to make more informed hiring choices and lessen employee turnover.
- **Facilitate Remote Recruitment:** Develop AI-driven virtual interview platforms with advanced features such as natural language processing

(NLP) and sentiment analysis to enable seamless remote interviewing and collaboration.

- **Ensure Compliance and Security:** Integrate AI-powered tools to guarantee adherence to data protection regulations and uphold candidate privacy and confidentiality throughout the interview process.
- **Foster Diversity and Inclusion:** Utilize AI technologies to eliminate biases from job descriptions, interview queries, and candidate assessments, fostering a more diverse and inclusive hiring environment.
- **Support Ongoing Learning and Enhancement:** Implement AI-powered feedback mechanisms to collect insights from candidates and interviewers, identify areas for improvement, and refine the interview process for enhanced efficacy over time.

## TECHNOLOGY UTILIZATION & PRINCIPLES

As for major AI technologies used in job interviews, domestic interviewers' evaluations on applicants answering given questions as shown in are collected, significant features are extracted, and then exemplary interviewers' judgment mechanisms are learned by way of machine learning

Classification	Technology	Technology applicable	AI evaluation technology
Visual	Technology to recognize video information	Imitation of human vision	The facial expression, emotional expression, eye movement, facial movement
Vocal	Technology to recognize voice information	Imitation of human auditory sense	Voice tone, volume change, speed, pause, pronunciation, and the like.
Verbal	Technology to recognize linguistic information	Imitation of human linguistic functions	Speech to Text (STT), word semantics, vocabulary, and the like.
Vital	Biological data analysis technology	Application of video information processing technology	Delicate changes of facial muscles and complexions are detected to estimate the pulse.

Each applicant's competencies are evaluated based on the results, including performance competency, relationship competency, organizational fitness, fitness to the official position, communication ability, emotional expression ability, and favorability.

Second, As V4 learns experts' senses and know-how, applicants' real-time reactions are analyzed and judged. As for auditory and vocal technology, the vocal method extracts applicants' vocal waves to analyze vocal factors such as utterance time, speed, and volume. In addition, each applicant's answers are analyzed in terms of temporal change to collect vocal spectrum data in real-time. As for verbal technology, voice data are extracted just as in the case of vocal technology. Each applicant's linguistic habits, times of using a particular word, and the like are analyzed to grasp his/her linguistic behaviors and tendencies.

## **AI BASED INTERVIEW SOLUTION DEVELOPMENT**

- Architecture and Development Environment:

The platform for AI-based interview systems utilizes a natural language processing engine. Voice data from videos is transcribed into text format using the Google Speech-to-Text API. The transcribed self-introduction data undergo analysis in terms of morphemes, phrases, and semantics through our proprietary natural language processing engine. These analyzed self-introduction data are then compared against reference data, including exemplary self-introductions and competency dictionaries, to generate final results.

Regarding the development environment, it can be primarily categorized into the Web Application Server (WAS) area and the Deep Learning area. Data exchange between the WAS area and Deep Learning area occurs systematically using the JSON protocol. Subsequently, the analysis results are provided to users via a RESTful API or through API services accessible to other solutions.

- Deep-learning Process:

The AI interviewer assesses applicants' biological signals and responses during online communication, assigning tasks to evaluate the competencies needed for specific roles. In this process, a method is employed to assess both external and internal elements of applicants. Initially, the applicant's facial expressions, voice, vocabulary, and pulse are measured to ascertain emotions and sincerity. Utilizing the 68 muscle points on the applicant's face, the AI interviewer interprets facial expressions and emotions. Additionally, the tone and timing between responses serve as indicators for evaluation. Answers are promptly transcribed into text for real-time analysis of the language used.

### **AI-BASED INTERVIEW SOLUTION SIMULATION**

To effectively implement the proposed solution within organizations, five prominent public enterprises in Korea were selected: SR, Mine Reclamation Corp. (MIRECO), Korea South-East Power Co. Ltd., Credit Guarantee Foundation (SCGF), and Korea Expressway Corporation. The AI-based job interview model utilized a classification algorithm to assess the accuracy of predicting successful and disqualified applicants.

#### **Application Results:**

Satisfaction with the evaluation process when applying the suggested solution was compared with satisfaction when evaluating successful applicants (5-point scale survey results were converted into percentage scores). On average, the satisfaction level was 85.5%, with the highest score (92) awarded to the efficiency in the evaluation process. See the figure below for reference.

Company	Successful applicants	Satisfaction with the evaluation process		Satisfaction with the evaluation result		Average
		Fairness	Efficiency	Job fitness	Organizational fitness	
SR	74	84	89	85	80	84.5
Mine Reclamation Corp	27	88	92	82	82	86
Korea South-East Power Co., Ltd.	890	85	93	86	85	87.25
Credit Guarantee Foundation	45	82	95	80	84	85.25
Korea Expressway Corporation	690	82	91	84	81	84.5
Total of Satisfaction Scores		84.2	92	83.4	82.4	85.5

### Evaluation items for AI-based interviews

Classification	AI-based interview	Personal interview (by human interviewers)
Evaluation step	1st: AI-based interview	2nd: Personal interview
Evaluation method	Facial expression analysis, voice analysis, language analysis, STT analysis, vital information. Deep-learning model for recommendation	Q&A-based evaluation
Evaluation system	Consisting of computers, microphones, and webcams	Personal interview
Evaluation questions	AI development	Corporate development and commission to external organizations
Evaluation details	Performance competency index, relationship competency index, organizational fitness index, index of fitness to the official position, strategic thinking, growth competency	Basic vocational ability, work performance, performance creating, interpersonal relationship, communication, fitness to the organization, ethics for civil service
Comparison items*	Performance competency, relationship competency, organizational fitness, fitness to the official position,	Performance creating, interpersonal relationship, organizational fitness, ethics for civil service
Evaluation time	50 minutes (online)	40 minutes (personal)
Evaluator (interviewer)	AI	3 professional interviewers + 2 managers at an institution concerned
Applicant	1	1



## CONCLUSION

The current study investigates the evolving technical trends associated with AI-based interview services and offers insights into the development and application of AI-driven interview systems in the recruitment process. This research holds significance as it contributes to enterprises, job seekers, and society at large. Specifically, from each of these perspectives:

For enterprises, this study introduces a highly valid approach that addresses the limitations of traditional employment methods. By leveraging AI-based interview services, enterprises can streamline their recruitment processes, saving time and expenses typically associated with offline interviews. Additionally, it expands interview opportunities to a larger pool of applicants, enhancing the effectiveness of interviews while reducing bias.

From the standpoint of job seekers, this research ensures equitable opportunities for all individuals seeking employment, thereby addressing any feelings of relative deprivation. Online interviews conducted via video conference formats offer flexibility in terms of timing and location, eliminating constraints imposed by traditional in-person interviews. Moreover, they save time and expenses for job seekers, allowing them to focus on showcasing their competencies rather than logistical concerns.

Overall, this study contributes to the advancement of recruitment practices, benefiting enterprises by improving the efficiency and effectiveness of their hiring processes, while providing job seekers with fair and accessible opportunities to demonstrate their qualifications and skills. Additionally, by promoting a more inclusive and streamlined approach to employment, this research has broader implications for societal well-being and economic growth

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