

Cogniview AI Interviews: AI and NLP Based Automated Candidate Interview Screening System

Vivek Jadhav¹

Undergraduate Student (B.Tech in IT)

Dept. of Information Technology

G. H. Rasoni College of Engineering and Management
Pune, India

vivekjadhav7057@gmail.com

Prof. Yogesh Gite²

Assit. Professor

Dept. of Information Technology

G. H. Rasoni College of Engineering and Management
Pune, India

yogesh.gite@raisoni.net

Tejaswi Shinde³

Undergraduate Student (B.Tech in IT)

Dept. of Information Technology

G. H. Rasoni College of Engineering and Management
Pune, India

tejaswishinde2005@gmail.com

Vedant Pathak⁴

Undergraduate Student (B.Tech in IT)

Dept. of Information Technology

G. H. Rasoni College of Engineering and Management
Pune, India

vedantpathak1706@gmail.com

Abstract—The purpose of this research article is to present a new artificial intelligence-based system that enhances the search for and hiring of job applicants. The two model framework for this system employs very powerful models (Llama 3.370B) to analyze candidate resumes using a software product called PyMuPDF to determine the best candidates and lightweight models to rapidly create interview questions of the candidate. The system also employs conversational AI to allow the hiring manager and candidate to communicate almost instantly with each other in a conversational manner. The two models of this system work in conjunction with each other to provide greater insight by being able to ask questions that gain further insight into candidate thinking and behaviour and being able to engage in two-way communication/reciprocal dialogue with the candidate. Testing of the system indicates it is very effective at determining the best candidates and makes the hiring process less biased and more transparent. This represents a potential resolution for businesses seeking to improve their processes for hiring employees.

Index Terms—AI, NLP, Automated Recruitment System, Resume Screening, Candidate Evaluation, Speech-to-Text, Machine Learning (ML), Interview Analysis.

I. INTRODUCTION

The success of an organization can directly relate to its recruitment process. The right hire leads to improved productivity, innovation, and long-term growth. Now, however, recruitment is difficult due to a large volume of applicants, diversity of required skills and quick decision making. In many cases, recruiters spend a lot of time manually screening hundreds and thousands of resumes. This can lead to inefficiencies in the process and errant bias from a recruiter.

A key drawback to today's hiring systems is the prevalence of legacy Applicant Tracking Systems (ATS). Legacy ATS use a keyword filtering process that evaluates resumes based only on the presence of certain keywords and does not evaluate resumes in light of their contextual relevance. This means that very qualified applicants will often be overlooked simply because their resume doesn't match the predefined keywords associated with the job description, while applying to the job description with "keyword stuffing" will enable less qualified applicants to pass through the initial screening. This lack of understanding of context greatly decreases the effectiveness of candidate shortlisting.

Along with reviewing resumes, interviewing candidates is also time-consuming in terms of staffing. Scheduling, evaluating, and ensuring interview consistency take a tremendous amount of human resources. Moreover, basic, automated recruiting tools tend to be less adaptable and less conformed to suit the individual needs of candidates, making the questions very similar and less able to accurately reflect the capabilities of the candidate. The lack of immediate feedback and interaction with a person further diminishes both the level of engagement by the candidate and the experience the candidate has during the interview process.

The need for organizations to rapidly process large numbers of recruits without sacrificing quality is compounded by the challenges associated with high-pressure recruiting environments. A marked gap in the ability of current recruitment technologies can be seen through the absence of intelligent systems that can integrate deep candidate understanding, real-time interaction with candidates and explainable decision-

making from artificial intelligence (AI) into an efficient recruitment approach.

Recent innovations in artificial intelligence (AI) through large language models (LLM) hold tremendous potential for addressing these challenges. LLMs can provide a deep understanding of context and generate text responses that are similar to those of a human being while providing advanced reasoning capabilities. With the emergence of high-performance inference engines such as Groq, candidates and hiring companies will be able to have real-time AI-based interactions via technology that processes information with ultra-low latency. This evolution of technology through AI opens the door to intelligent recruitment systems that incorporate more than basic keyword matching and produce deeper insights into candidate abilities.

Most of today's software solutions are developed to perform stand-alone tasks like resume parsing or technical interviews with candidates through chatbots or basic score generation. There is no single solution that effectively assembles all of the elements of intelligent candidate screening, seamlessly generating adaptable interviews, evaluating the performance of candidates, and allowing recruiters to interact with applicants in real-time without delay.

To address this problem, this paper introduces AI Interview as an integrated Artificial Intelligence recruitment platform that automates and adds value to the entire hiring process. The platform uses a dual model architecture combining high capacity models that allow for deep evaluations of candidates with low capacity, fast acting models to quickly generate questions and conduct interviews at lightning speed. The platform includes resume parsing, semantic screening, real-time interviewing and intelligent, explainable scoring systems for providing recruiters with accurate and actionable insights. Overall, the new system is designed to provide a fully automated recruitment experience by using structured data processing, advanced AI reasoning, and high-speed inference in order to improve productivity, minimize bias, and provide an easy to understand and effective recruitment experience.

Objective of the study

1. A website based AI (Artificial Intelligence) hiring platform has been created that allows the user to configure a multi-phase hiring pipeline consisting of resume submission, assessment and interviews.
2. Through intelligent means, the platform is able to screen candidates based on how well the candidate matches the job description provided by the employer based on the candidate's resumes, assessment results, and interviews.
3. The platform provides a structured evaluation method to help support informed selection of candidates by providing analysis of the candidate's performance.

II. LITERATURE REVIEW

Using NLP methods, the creators created a system for analyzing video interviews through AI support (J. Smith, A. Kumar, 2022). The creators are focusing their work on analyzing the content of candidates' speech, language quality, and

relevance of responses, which will allow interview assessments to become more automated in the future. [1].

M. Chen created a real time communication network specialized for remote interviewing. They have researched solutions to increase the speed of video /audio transmission as fast as possible, improve the quality of virtual interviews and provide the best possible connection between the interviewer and interviewee. [2].

R. Patel and S. Gupta provided a summary of all of the machine learning methodologies that have been created to evaluate applicants. Their research examines how utilize predictive models, to score the overall performance, to assess skill sets of the applicants how to rank them automatically based on multiple criteria. [3].

K. Lee and T. Wilson developed an automated method of scheduling and managing interview processes utilizing cloud computing technology. They developed tools to assist in the optimized use of interview slots through coordination of interviewers and notification of candidates. [4].

L. Johnson researched techniques to reduce the impact of bias on AI based hiring systems. They are investigating the development of ways to improve fairness of AI based decision-making processes and to reduce the impact of algorithmic bias against the evaluation of applicants. [5].

H. Zhang, along with Y. Liu, conducted a study using natural language understanding methods to generate responses to interview questions and evaluate candidate responses. In this research they have made an important contribution by providing a more accurate means of analyzing the meaning of candidate answers (i.e., better semantic analysis) through an understanding of the context of each candidate response (i.e., better contextual understanding). [6].

In their work D. Brown and E. Martinez provided video analysis techniques for evaluating non-verbal communication such as facial expressions, eye gaze, and body movements in order to assess confidence level and professionalism of the individual being evaluated. [7].

A new way of developing software systems with "enterprise level" capability is happening now at A Thompson with the creation of "scalable web applications" as part of their enterprise Human Resources systems, but what they do so well is build large-scale recruitment platforms, developing a platform where you could interview people using multiple simultaneous interviewing sessions. [8].

S. Park and J. Kim are creating a real-time speech-to-text transcription system that will allow you to have all of your interview response information converted to text so they may then be analyzed later on by NLP for scoring. [9].

R. White and M. Anderson have researched HR technology security and privacy using a Cloud platform. They looked at how to secure data in cloud storage, how to secure data about candidates, and how to meet the legal requirements of protecting information. [10].

S. V. Golande, P.Dandage, A.Jadhav and P.Mohite developed an AI Mock interview evaluator that uses speech analysis,

emotion detection and automatic feedback generation to help prepare candidates for interviews. [11].

Using artificial intelligence and natural language processing methods, an interview mock-up platform was created by A. Kumar, R. Sharma, and D. Patel. Their responsibilities are overseeing the evaluation of responses as well as conducting keyword matching and contextual analysis of each response. [12].

P. Singh et al. developed a system that provides AI guided assistance to reduce the amount of time spent manually creating questions for interviews and evaluating applicants during the recruitment process. [13].

The proposed automatic interview evaluation by K.Mehta, H.Joshi, and A.Kulkarni utilizes speech and emotion analysis to create an automated process that uses voice modulation, confidence and emotional expression analysis as part of the evaluation process. [14].

A team made up of V. Reddy, S.Nair, and J. Thomas developed an automated interview assistant that has artificial intelligence capabilities to provide tailored feedback and assistance in preparation for interviews. [15].

In their study, N. Gupta and others developed SmartPrep, which is a type of Adaptive Learning tool that utilizes Machine Learning to generate a customized line of questioning for preparing for Interviews and monitoring progress. [16].

J. Lee, S. Park, H. Kim also developed a Real-time AI Interview Simulator that utilizes the use of Facial Expression and Voice Analysis to assess candidate performance from multiple modalities. [17].

According to T. Brown, D. Wilson, and E. Clark in 2020, an intelligent virtual interview has been developed that will automatically generate the interview questions for a candidate using Natural Language Processing (NLP) and the answers given by the candidate will be automatically evaluated against the predefined scoring system. [18].

In 2021, S. Ahmed, F. Khan and M. Ali introduced a new idea of using Artificial Intelligence (AI) based Resume Assessment and Mock Interview Review Systems to determine how prepared a jobseeker is for an interview. [19].

In 2022, Y. Zhao, L. Chen, and X. Wang described a simulated interview training platform that dynamically generates questions using Large Language Models (LLM) and provides feedback based on the context of the situation. [20].

III. PROPOSED SYSTEM

The proposed solution is an AI-powered Candidate screening and Smart Interviewing system aimed at helping companies hire quicker, smarter, and more accurately. The traditional recruitment methods that use keywords alone have failed to identify how candidates actually possess the qualifications or experience necessary to perform well on the job. Thus resulting in many qualified candidates being rejected and unqualified candidates being selected. The proposed solution will use artificial intelligence, LLMs, and RAG to provide an intelligent approach to screening and conducting interviews.

A. System Architecture

The AI Interview system has a modular and service-based design allowing it to interface with and work in conjunction with other systems. As such, the candidate screening, resume evaluation, and real-time interaction aspects of the interviews will perform together in one system. This layer has been designed with scalability and low latency in mind. Each of the components is able to work independently of each other when interpreting the information as well as collectively contribute to interpreting it at the overall system level. Regardless of the size or type of organization, the design of the system allows for responsible behavior on behalf of the components. The components also communicate via clear, definable interfaces for seamless integration, independent scaling, and for future extensibility, ensuring that a change within one of the modules (model upgrade/UI change) does not cause a total failure of the entire system.

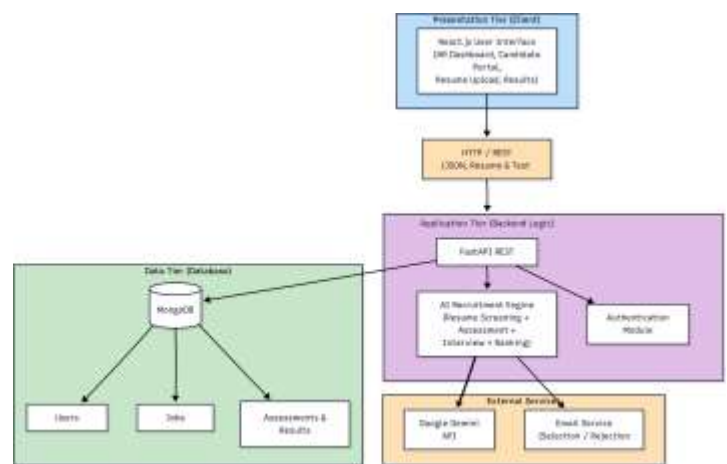


Fig. 1. System Architecture

B. Architecture Primary layers

User Interaction Layer: Candidates, recruiters, and the system interface will all interact with one another via this layer. Upload resume (PDF/DOC) Show candidate score/evaluation information. Hold live interview sessions using the AI video function. Combine virtual interview summary/feedback through the use of a user-friendly and dynamic UI in a high-stress virtual interview environment that supports natural human-like, real-time communication for an achievable interaction/communication between the candidate and AI Interviewer in an environment of conversational

Back End Service Layer: The back end layer organizes all activities associated with the operation of the system by having: API interaction and routing activities; Front end and AI interactions during interview sessions with the candidate; Candidate scoring and decision paths; and serving as the infrastructure to provide data and components consistency and reliability to allow for consistent and efficient interaction between the data and components of the system.

Additionally, it holds all business logic for determining how shortlist thresholds would be evaluated, etc., that will permit

recruiting personnel to make informed placement decisions, through the availability of defined rules through a step-by-step pipeline process.

The Data Processing and Storing Layer's Purpose: The Data Processing and Storing Layer processes both structured and unstructured data (e.g., extracting text from resumes with PyMuPDF, using organized candidate information to develop candidate describing skills, experience, and education; storing candidate data and scores; recording logs of candidate interviews). Additionally, by converting data from resumes into useful sources of information for AI systems quickly, this layer helps improve the performance and speed of AI systems.

The Purpose of the Artificial Intelligence Layer: The Artificial Intelligence layer contains the parts that enable an intelligent decision-making process and intelligent interaction with the user. This layer is based on a two-model product architecture (LLaMA 70B for evaluating candidates in-depth and understanding candidates contextually; LLaMA 8B for generating intelligent, rapid, and adaptive questions).

The layer leverages high-speed inference technology (e.g., Groq) to deliver exceptional throughput and ultra-low latency, resulting in near real-time performance and enabling the AI Interview to provide fast answers at every phase of the interview experience in real-time while providing the user an enjoyable and engaging interview experience.

IV. METHODOLOGY

The design and development of the AI Interview system use a methodology that combines elements such as data pre-processing, large language models (LLMs), semantic analysis, and real-time conversational AI to create a comprehensive end-to-end solution for intelligent recruitment. The AI Interview system analyses resumes from candidates, along with job requirements and associated contextual information, to automatically screen candidates and create interviews for them. Input data will primarily consist of unstructured resume formats (PDF/DOC) and structured job role datasets that contain required skills, experience levels and evaluation criteria.

As part of the preprocessing phase, resumes are parsed and cleaned using tools such as PyMuPDF to extract text from resumes in an effective manner. Once the data is extracted from resumes, it will be processed as follows:

- Text normalization and cleaning (removal of noise, formatting artifacts)
- Entity extraction (skills, education, experience)
- Feature structuring for downstream AI models

This ensures unstructured resume data is transformed into meaningful representations suitable for intelligent evaluation.

A. Candidate Ranking using AI Models

The use of Semantic scoring tools to evaluate candidates instead of traditional machine learning tools will give businesses the ability to use LLMs or Large Language Models, which will assist in understanding the relationship between candidate profiles and the requirements of jobs.

B. Resume Processing Pipeline

Document parsing is part of how the resume processing pipeline works by extracting text from various types of documents (e.g., PDFs) via the tools developed for that purpose. Subsequently, during the segmentation stage, the resume processing pipeline is responsible for determining and separating different areas or sections of a given resume, e.g., skills, projects, work experience, etc. Next up is organizing the extracted information into a structured and machine-readable format. Unlike the traditional methods, the resume processing pipeline can also understand the meaning and context of the content; therefore, this allows for more precision (and therefore more meaning) in the analysis that's then performed later.

C. Retrieval-Augmented Generation (RAG) Pipeline

To create smarter and more relevant interactions, the system utilizes the Retrieval-Augmented Generation (RAG) method. When users submit queries or candidates provide data, the system creates an embedding for the respective query and candidate data point and matches that embedding to a database of job-related data. From this matching process, the system identifies the most relevant pieces of information to provide to the model so that it can generate accurate answers. This process helps keep users from receiving incorrect answers and allows the system to generate custom interview questions, ask better follow-up questions, and provide meaningful, constructive feedback.

D. Real-Time Interview Generation

This dual model system employs LLaMA 3.3 (70B) to support complex logic/rationale reasoning and performs the evaluations of these processes while also using LLaMA 3.1 (8B) to generate questions quickly. This enables the low latency and high speed of processing through the use of fast processing infrastructure, such as Groq, and ultra-low latency to achieve high throughput (approximately 480 tokens/second).

E. Cogniview Ai Interviews Classification

As per evaluation of system performance, the system utilizes a curated dataset, which includes candidate resumes and job role descriptions; when used to evaluate the system, multiple factors can be measured, such as ranking accuracy of candidates, resume parsing accuracy, response latency, and conversational quality. The model of the proposed system is considered a multi-stage intelligent recruitment pipeline.

Define the set of candidates as follows:

$$C = \{c_1, c_2, c_3, \dots, c_n\} \quad (1)$$

where n represents the total number of candidates applying for a particular job role.

F. Resume Screening Model

Each candidate submits a resume denoted by:

$$R_i \quad (2)$$

For each candidate c_i , the system extracts feature vectors as:

$$F_i = \{s_i, e_i, p_i, q_i\} \quad (3)$$

where:

- s_i : skill match score
- e_i : experience score
- p_i : project relevance score
- q_i : qualification score

The resume screening score is computed as:

$$RS_i = \alpha_1 s_i + \alpha_2 e_i + \alpha_3 p_i + \alpha_4 q_i \quad (4)$$

subject to:

$$\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 1 \quad (5)$$

G. Assessment Evaluation Model

Let A_i denote the assessment response vector of candidate c_i .

The assessment score is calculated as:

$$AS_i = \frac{M_i}{M_{max}} \times 100 \quad (6)$$

where:

- M_i : marks obtained by candidate
- M_{max} : maximum possible marks

H. Interview Evaluation Model

Let:

$$V_i \quad (7)$$

be the vector embedding of candidate response and

$$E_i \quad (8)$$

be the expected answer embedding.

The semantic similarity score is computed using cosine similarity:

$$IS_i = \cos(V_i, E_i) \quad (9)$$

$$IS_i = \frac{V_i \cdot E_i}{|V_i| |E_i|} \quad (10)$$

where:

$$0 \leq IS_i \leq 1 \quad (11)$$

I. Final Candidate Ranking Model

The final recruitment score is computed as:

$$FS_i = w_1 RS_i + w_2 AS_i + w_3 IS_i \quad (12)$$

subject to:

$$w_1 + w_2 + w_3 = 1 \quad (13)$$

where:

- w_1 : weight for resume score
- w_2 : weight for assessment score
- w_3 : weight for interview score

J. Selection Decision Function

The candidate is shortlisted if:

$$FS_i \geq T \quad (14)$$

where T is the predefined threshold score.

The decision function is given as:

$$D(c_i) = \begin{cases} 1, & FS_i \geq T \\ 0, & FS_i < T \end{cases} \quad (15)$$

where:

- 1: Selected
- 0: Rejected

K. Flow Evaluation

The overall recruitment process flow of the proposed system

is represented as:

$$c_i \rightarrow RS_i \rightarrow AS_i \rightarrow IS_i \rightarrow FS_i \rightarrow D(c_i) \quad (16)$$

V. RESULTS AND DISCUSSION

Using a Candidate Screening Mechanism developed with Large Language Models, employees can use candidate scoring (using Contextual Relevance) as opposed to keyword matching to evaluate candidates and the system will be able to differentiate between low and high-quality candidates based on how well they meet the Shortlist Thresholds defined by the Employer; resultantly allowing the application of Candidate Filtering before applying.

The results of this study demonstrate that the (Candidate Screening Mechanism) will aid in improving the Recruiter Experience to support more informed and data-driven Recruiting decisions than ever before.

A. System Workflow and Interface

The CogniView system follows a structured workflow starting from candidate registration and ending with the final hiring decision report. The candidate will start the process by uploading their CV through the Resume Processing Module. The system will use a parser to extract a candidate's information into a structured format, including the following data types: skills, education, experience and projects. The candidate's structured data will be used for matching them to job openings as well as to generate questions to ask during interviews.

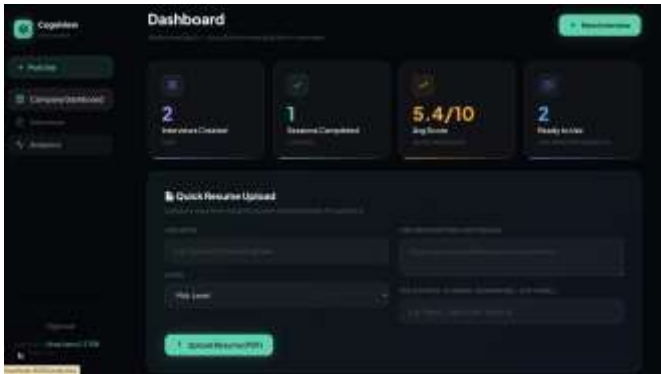


Fig. 2. Home interface showing job application and interview entry

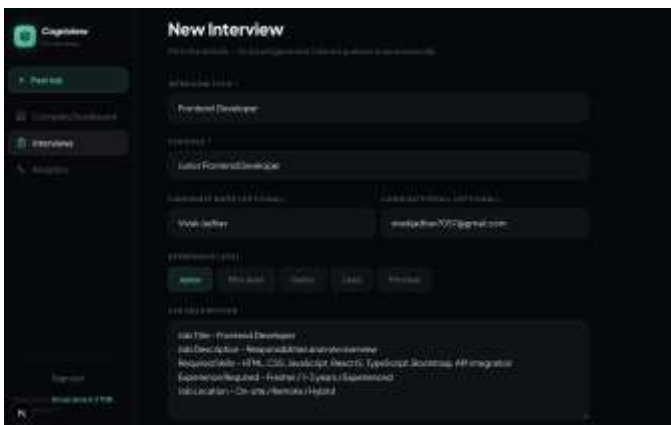


Fig. 3. Cogniview Interface for create Job Interview

B. Resume Analysis Results

The resume parsing pipeline converts unstructured resume documents into structured candidate profiles.

The system successfully extracts:

- Technical skills
- Academic qualifications
- Project experience
- Work history
- Certifications

This structured information is further used for candidate-job matching and intelligent interview question generation.

The semantic parsing mechanism improves extraction accuracy compared to traditional keyword-based systems.

C. AI Interview Assessment Results

The AI interview module dynamically generates role-specific interview questions using the dual-model architecture.

The system generates:

- Technical questions
- HR questions
- Project-based questions
- Context-aware follow-up questions

The use of **LLaMA 3.3 (70B)** enables deep evaluation of candidate responses, while **LLaMA 3.1 (8B)** supports fast real-time question generation.

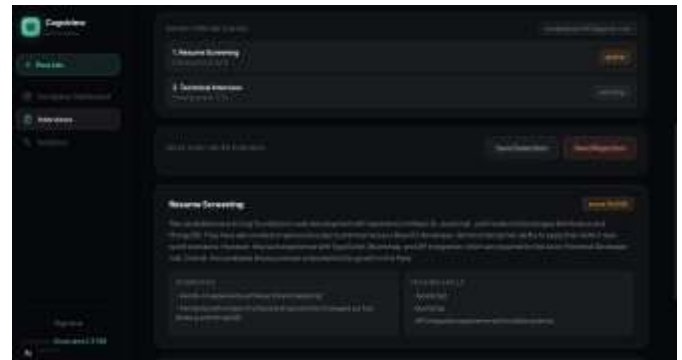


Fig. 4. Resume analysis output showing extracted candidate information



Fig. 5. AI interview interface showing live question-response interaction

This enables a smooth and human-like interview experience with minimal response latency.

D. Personalized Feedback and Recommendations

Unlike traditional recruitment systems, CogniView provides personalized feedback after each assessment stage.

The feedback includes:

- Strong skill areas
- Improvement suggestions
- Missing technical concepts
- Communication enhancement points

This transforms the platform from a simple screening tool into an intelligent career improvement assistant.

E. Hiring Decision Results

After completion of all custom hiring stages, the system automatically sends:

- Selection mail
- Rejection mail
- Next-round invitation mail

based on stage-wise performance percentage.

This automation significantly reduces recruiter workload.

VI. APPLICATIONS

The proposed system can be used in: The proposed system can be used in:

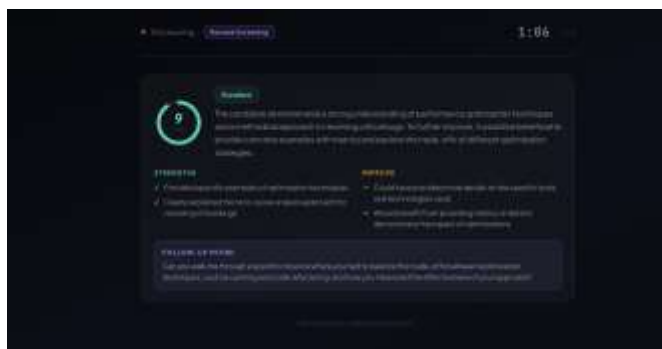


Fig. 6. AI-generated feedback report



Fig. 7. final decision report

- **Corporate recruitment and talent acquisition :** The suggested software will help HR departments automate all steps in their hiring processes by supporting them with the pre-screening of candidates, evaluating assessments, as well as assessing interview responses. Currently, the amount of time and energy most companies use for those processes is extensive, and using this system will allow them to cut down on that usage.
- **Campus placement and educational institutions :** Colleges, universities and vocational training institutions can use this system for automated campus recruiting. The system helps institutions manage multiple student applicants by facilitating resume screening, administering aptitude tests and creating technical tests along with conducting AI interviews of job applicants.
- **Staffing agencies and HR consultancy firms :** This system could be beneficial to both staffing companies and HR consultants as they work with many clients at one time to hire employees. The system automates candidate profile information, skill-matching assessments, and ranking of applicants by job-specific standards.
- **Remote and large-scale hiring processes :** The proposed set of tools is a perfect match for remote hiring and mass recruiting efforts that lead to large numbers of applicants. These tools support multiple forms of online assessment, interview and real-time processing of results; hence, they

are ideally suited to support mass hiring efforts and recruit through geographically distributed campaigns.

- **Research and AI-based HR analytics :** The proposed solution may also be used to conduct research in the areas of Artificial Intelligence, machine learning and HR analytics i.e. it will provide an excellent avenue for exploring automated decision making, candidate ranking algorithms, intelligent evaluation systems for interviews etc. All of these would enhance innovation around smart recruitment technologies.

VII. CONCLUSION AND FUTURE SCOPE

A. Conclusion

In this article, we present the AI Interview, a cutting-edge recruitment system that utilizes advanced artificial intelligence technology for automating and enhancing the screening of candidates and conducting candidate interviews. AI Interview provides an all-encompassing, intelligent decision support system to assist with modern hiring by including LLM-based candidate evaluation and resume parsing as well as conversational interactions enhanced by retrieval-augmented methods.

AI Interview addresses key weaknesses in traditional recruitment methods, especially around keyword-based filtering and lack of personalized interactions. By utilizing contextually aware and adaptive questions when assessing candidates, AI Interview provides both more accurate candidate assessments and a more engaging candidate interview experience.

The system's modular design allows for scalability and flexibility, which will allow the system to continue to develop as new technologies become available and new recruitment needs arise. Additionally, the system's use of retrieval grounding improves the reliability of its factual information, and its low-latency infrastructure makes the interaction in real-time practical for deployment in actual recruitment situations.

AI Interview demonstrates that it has considerable potential to improve hiring efficiency, reduce bias, provide greater transparency, and increase recruiters' confidence in their hiring decisions. As recruitment continues to rapidly evolve as the result of artificial intelligence, systems such as AI Interview will be essential to allow for smarter, faster, and more human-centric ways to hire.

B. Future Scope

The AI-powered hiring automation solution has made numerous strides towards enhancing candidate screening and hiring processes through the use of automation technologies in an effort to create a more intelligent hiring process. There are plenty of ways to optimize the AI hiring technology in order to become even more efficient, scalable, and capable of making effective and informed decisions.

The integration of more sophisticated multimodal AI systems (e.g. visual, auditory, etc.) into the automated hiring and screening system would enhance the assessment of interview candidates by evaluating their facial expressions, tone of voice, levels of confidence, and communication skills during video

interviews. This gives the company the ability to rate a candidate's overall qualification because they will have more in-depth insight into the candidate's behaviors.

The automation solution may also add capability to modify the level of difficulty of questions based on the candidate's prior performance and responses during assessments. This would provide the candidate with a more tailored and precise assessment process.

Another area for system improvement would be to incorporate predictive analytics into the hiring and screening system to provide additional insight about long-term retention of workers and their aptitude for success within the specific roles that they are applied to. The system would analyze candidate resumes and applications, historical data from past hires, and trends of how candidates have performed post-hire to predict candidates success within the company over time.

Future automated screening and hiring solutions may also contain automated candidate sourcing capabilities through the integration of external employees and employee mobilization platforms (e.g., LinkedIn and online job and recruiting websites and job boards). This would further reduce the amount of man-hours spent on recruiting top talent for a company.

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