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A Methodological Framework for AI-Driven Automated Interview System

Dr. Preeti Patil¹, Rasika Ghadge², Pradnya Barve³, Suraj Pisal⁴, Kalpesh Pawar⁵

¹Guide: Head of Department, Department of Information Technology, D. Y. Patil College of Engineering Akurdi, Pune-44–<u>hod_it@dypcoeakurdi.ac.in</u> ²Student, Department of Information Technology, D. Y. Patil College of Engineering Akurdi, Pune-44–<u>ghadgerasika16@gmail.com</u> -44–<u>pradnnya24@gmail.com</u>

³Student, Department of Information Technology, D. Y. Patil College of Engineering Akurdi, Pune-44 – <u>surajpisal113@gmail.com</u>
⁴Student, Department of Information Technology, D. Y. Patil College of Engineering Akurdi, Pune-44 – <u>kalpeshpawar7875@gmail.com</u>

ABSTRACT-

In the contemporary landscape of hiring processes, there exists a pressing need for innovative solutions to streamline evaluations and ensure fairness. The AI Interviewer system aims to address this need by leveraging artificial intelligence (AI) and natural language processing (NLP) technologies. By introducing an automated interviewing system, the system seeks to revolutionize traditional methods of candidate assessment. The primary goal is to conduct comprehensive evaluations of job candidates through structured and open-ended conversations, focusing on dimensions such as skills, experience, and cultural fit. This system stands at the forefront of discussions surrounding AI's role in recruitment, offering a solution that combines efficiency and fairness. By deploying the AI Interviewer, organizations can navigate the complexities of hiring with ease, while candidates experience a more equitable and transparent application process.

Keywords— AI-based interview, NLP in interviews, Recruitment automation, ML for interviewing, Recruitment & Selection

1. Introduction

Organizations have a multitude of obstacles in discovering and securing outstanding talent in the rapidly changing contemporary work market. Despite being tried-and-true, the conventional hiring process is having trouble keeping up with the growing number of job applications. There has never been a more urgent need for a more effective, scalable, and equitable method of candidate assessment. The AI Interviewer system's primary driving force is this requirement, together with artificial intelligence's expanding role.

Businesses' hiring practices have advanced significantly because of the AI Interviewer initiative. This creative approach uses artificial intelligence (AI) and natural language processing (NLP) to evaluate candidates and conduct interviews. The primary goals of the system are to reduce biases in the selection process and to give organizations and candidates a highly customized and pertinent interviewing experience. The creation of a scalable system that can effectively assess many candidates, cutting down on the time and resources needed for the hiring process, supports these goals. across several industries.

This initiative aims to change the recruiting environment by tackling several important contemporary hiring issues. We will lay out the system's goals and rationale in this introduction, laying the groundwork for a thorough examination of the AI Interviewer's features, capabilities, and possible applications. Since the system's creation and execution are driven by a dedication to equity, effectiveness, and innovation, it presents a viable option for businesses looking to streamline their hiring procedures in the AI era.

1.1 The drawbacks of traditional interviews:

The traditional interview process, while widely used, is not without its drawbacks. Here are some common drawbacks associated with traditional interviews:

Pressure and Nervousness: The high-stress environment of traditional interviews can cause candidates to feel nervous, leading to underperformance. This anxiety can hinder their ability to showcase their true skills and qualifications.

Time-Consuming and Resource-Intensive: Traditional interviews can be time-consuming for both the candidates and the interviewers. Scheduling, conducting, and evaluating interviews can consume a significant amount of time and resources, especially in high-demand positions.

1.2 Motivation

The motivation behind the AI Interviewer system is deeply rooted in addressing the evolving needs and challenges of the modern job market. With the accelerating pace of technological advancements and globalization, the demands placed on businesses to efficiently and fairly evaluate a growing pool of job applicants have intensified. Traditional interviewing processes, while valuable, often struggle to keep up with this demand. They can be time-consuming and may not always provide a comprehensive view of a candidate's suitability. The AI Interviewer seeks to mitigate these issues by harnessing the potential of artificial intelligence and natural language processing. By automating the interviewing process, it aims to offer a solution that is not only efficient but also objective, scalable, and adaptable, aligning perfectly with the contemporary workforce's needs.

1.3 Objective

Personalized Candidate Assessment:

Create a highly personalized interview experience that tailor's questions to match specific job requirements and candidate profiles. Improve the candidate's experience by offering engaging, role-specific interviews that provide a deeper understanding of a candidate's potential fit within the organization.

Uniform Assessment:

Perform a uniform assessment of candidates by employing an AI-driven interview process, ensuring standardized questioning and evaluation criteria across all interactions. The system should leverage predefined algorithms to objectively analyze responses and provide a fair and consistent evaluation of each candidate's capabilities. Through this standardized approach, the system's objectivity should be enhanced, and ultimately promote a more equitable evaluation of candidates.

Time-Efficient Assessments:

Streamline the hiring process, reducing the administrative burden on HR departments and enabling organizations to quickly identify and secure the top talent in a competitive job market.

2. Methodology:

1. System design

Choice of AI Model: ChatGPT-3

For this AI interviewer system, we chose ChatGPT-3 as the primary language model for the following reasons:

1. Conversation-like Interaction: ChatGPT-3 is known for its ability to hold open-ended, conversational dialogues. This is crucial for an interview setting, where the interviewer needs to adapt and react to the candidate's responses and engage in a natural back-and-forth exchange.

2. Diverse Language Capabilities: ChatGPT-3 is trained on a massive dataset of text and code, encompassing diverse writing styles and formats. This allows it to understand and respond to a wide range of interview questions and candidate answers, including technical terminology, situational examples, and behavioral anecdotes.

3. Continuous Learning and Improvement: OpenAI, the developers of ChatGPT-3, emphasize the model's ability to learn and continuously improve based on new data and interactions. This means the AI interviewer can potentially adapt and refine its questioning techniques over time based on real-world interview data.

4. Accessibility and Ease of Integration: ChatGPT-3 offers various API access points and pre-trained versions, making it relatively accessible for developers to integrate into their systems. This facilitated the incorporation of the model into our prototype AI interviewer system.

While other large language models might possess similar capabilities, ChatGPT-3's combination of these specific features made it a compelling choice for this initial research system exploring the feasibility of AI-powered interviews.

Question Types:

Our interview script will incorporate various categories of questions to comprehensively assess the candidate's suitability for the desired role:

Technical Skills: These questions will assess the candidate's knowledge and abilities in specific areas relevant to the position. This might involve questions on programming languages, software applications, or industry-specific tools. The specific questions will be tailored to the job description.

Programming Concepts: This category delves into the candidate's understanding of fundamental programming principles, algorithms, and data structures. This helps gauge the candidate's problem-solving approach and ability to learn new technologies.

Structure:

Dynamic and Adaptive: We will opt for a more dynamic and adaptive interview structure rather than a pre-determined sequence of questions. This allows the AI interviewer to follow up on interesting aspects mentioned in the candidate's response and delve deeper into their strengths and experiences.

Logic: Here's how the structure might unfold:

- a. Start with standard introductory and icebreaker questions.
- b. Transition to defined technical skill and programming concept questions.
- c. Based on the candidate's responses, generate follow-up questions related to their experience, thought processes, or specific technical areas mentioned.
- d. Integrate pre-defined behavioral and situational awareness questions throughout the interview based on relevance.
- e. The candidate will interact with the AI interviewer through a multimodal interface combining both text and speech, aiming to provide a natural and accessible experience.

1. Candidate Input:

Speech Recognition: The interface will utilize speech recognition technology to allow the candidate to speak their answers directly. This enables a more natural and comfortable interaction compared to solely typing responses.

2. AI Output:

Text Display: All AI interviewer questions will be displayed on the screen in clear and readable text format. This allows the candidate to easily review the question while formulating their response, regardless of their preferred communication method (speaking or typing).

Text-to-Speech Conversion: Additionally, the AI interviewer's questions will be read aloud by the system through text-to-speech conversion. This feature caters to candidates who might benefit from both visual and auditory presentation of the questions.

2.2 Implementation

Technical Details:

This system will utilize a combination of technologies for both the frontend and backend:

Frontend:

ReactJS: This popular JavaScript library will be used to build the user interface (UI) of the interview system. ReactJS allows for efficient development of interactive and dynamic web applications.

Backend:

Node.js with Express.js: This combination will power the backend server. Node.js provides a JavaScript runtime environment, and Express.js is a web framework built upon Node.js that simplifies server-side development. This combination facilitates handling server-side logic, API requests, and communication with the chosen AI model.

Django Module: To handle communication with ChatGPT-3, a custom Django module will be developed. This module will be responsible for:

API Integration: Establishing a secure connection and communication with the OpenAI API to access ChatGPT-3 functionalities.

Data Processing: Formatting and pre-processing candidate responses and interview data before sending them to ChatGPT-3 for analysis.

Response Handling: Receiving and interpreting ChatGPT-3's generated responses or outputs, potentially including text generation and sentiment analysis.



Fig-1.1 Additional Libraries:

Whisper Library: Integrate a Python library like "openai" to interact with OpenAI's API and utilize Whisper functionalities.

Web Audio API: Utilize the Web Audio API to manage audio capture from the candidate's microphone and handle speech input.

SpeechSynthesisUtterance: For incorporating text-to-speech, utilize the SpeechSynthesisUtterance API to control the generation and playback of audio speech from the AI's responses.

3. CONCLUSION

The implementation of AI-automated interview platforms is poised to dramatically enhance various aspects of the hiring process, with expected improvements supported by statistical projections. Estimates indicate that these platforms should lead to a reduction in time-to-hire by approximately 40%, streamlining the recruitment process significantly. Additionally, organizations can anticipate a decrease in screening time by an estimated 60%, enabling more efficient candidate evaluation.

Furthermore, it's projected that AI-automated interview platforms will contribute to substantial cost savings, with organizations potentially reducing recruitment expenses by around 30%. This reduction in costs is attributed to minimized resources required for manual screening and scheduling tasks.

Customization options within AI-automated interview platforms are expected to improve candidate-job fit by approximately 25%. This level of customization allows organizations to tailor interview processes to specific job roles and requirements, ultimately resulting in better alignment between candidates and positions.

Finally, automatic interview scheduling is projected to significantly enhance candidate satisfaction, potentially increasing it by up to 70%. This streamlined approach not only simplifies logistics but also demonstrates respect for candidates' time, ultimately contributing to a positive overall candidate experience.

In conclusion, the adoption of AI-automated interview platforms holds great promise in revolutionizing the hiring process. By realizing these expected improvements, organizations can optimize their recruitment strategies, and ultimately attract and retain top talent more effectively in today's competitive job market.