

AI Based Mock Interview Analyst

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Abstract –

Interviews are extremely important for a candidate because it is the time when all your hard work is put on the line to get on some desired fruitful outcomes in life. It is desired extremely important our educational system and recruitment process since they aid in the selection of the right candidate based on the required skills. Mock interviews can boost our confidence and communication skills which can help to perform better. This paper proposed an AI-based mock interview platform that would operate as an intermediary between the actual interview and preparation mode. Our system will assess the user based on an aggregation of three parameters called emotions, confidence, and knowledge base. For knowledge assessment, keyword mapping, semantic analysis technique is used and web scraping module will extract keywords from received replies. and map them to online resources. Hence this system will not only lower the stress and anxiety before an actual job interview also improve the candidate's confidence. The rise of AI and the epidemic situation bring about the implementation of virtual hiring practices. Our proposed Mock- Interview Platform (MIP) is a mock-interview software that provides users with up-to-date interview questions and AI- assisted feedback. Additionally, a speech-to-text cl.

Key Words: AI, Web Scraping, speech-to-text, feedback, Confidence evaluation, deep learning.

1.INTRODUCTION

The interview process is a vital point in the recruitment process. It a recruiter understand whether a candidate is best for a position and judges the candidate in deciding whether the job suits them or not . The period for an interview is usually 45 to 90 minutes (about 1 and a half

bours). According to human psychology good, try to impress their recruiter and not come off as nervous and keep eye contact and confidence. A recent statistical report about interviews shows that eye contact is a very important parameter to making a great impression according to 67% of recruiters and due to their lack of confidence level, voice quality or not smiling 39% of the candidates leave a bad impression on the recruiter . Generally, our existing traditional interview system is very much physical means the interviewer asks the question and the interviewee gives the answer based on the answers given and the confidence importance of the interview system: The key element in interview preparation is attending mock interviews. You may wonder why mock interviews are important. Can't I do away

with them? If you already know how to face a virtual interview it will definitely help you in your interview Recently college graduates often have the chance to participate within the interview once they attempt to pursue further studies or find employment. Interviews are extremely important for a candidate because it is the time when all your hard work is put on the line to get some desired fruitful outcomes in life. Mock interviews can boost our confidence and communication skills which can help to perform better. AI- based mock interview platform that would operate as an intermediary between the actual interview and preparation mode. Our system will assess the user based on an aggregation of three parameters called emotions, confidence, and knowledge base. Here are some reasons why mock interviews are important:

1. Personality Analysis: Mock interviews help you analyse your personality. You will know about your strengths and weaknesses inside and outside. With a mock interview, you will know how not to fall into the personality question traps set by the interviewers.
2. Expert Guidance: Mock interviews conducted by a

panel of experts. They are domain experts, Thus, by attending mock interviews, you will get expert guidance on how to get a good score in the actual interview. A system is trained in such a way that, the system works as a domain expert according to the candidate's requirements. They provide a detailed analysis of things you need to improve by testing you on various aspects like your personality, subject matter knowledge, etc

3.Ambiance Akin to Actual Interview-Mock interviews replicate the of the actual interview. As such, there will be a five- member panel conducting mock interviews. The main aim here is to familiarize you with the way of conducting an interview and make you less fearful of the actual interview. For it has been seen that

2. LITERATURE

SURVEY

The research focuses on a mock-interview system that provides candidates with the latest interview questions as well as AI- given feedback. In this paper, they created a mock interview system to help recruiters properly choose potential applicants while also allowing job hopefuls to perform mock interviews.

AI and Interview Training

As AI technologies become increasingly powerful, they are being applied in diverse areas, including interview training. Research has shown that AI-driven platforms can simulate realistic interview experiences by generating questions and

analyzing user responses, enhancing candidates' preparedness (Zhou et al., 2021).

Full Stack Development for AI Applications

Full stack frameworks are essential for handling both front-end and back-end requirements in AI applications. They allow for seamless user interactions, data processing, and AI integrations, providing a unified platform for mock interviews.

Importance of Real-time Feedback and Rating Systems Instant feedback is critical in interview training. Studies highlight that real-time feedback helps candidates identify weaknesses and improve quickly.

AI in Question Generation and Answer Evaluation

NLP Models for Question Generation

The use of Natural Language Processing (NLP) models, particularly transformer-based models like BERT, GPT-3, and ChatGPT, has shown potential in generating interview questions that are contextually relevant and industry-specific. These models can analyze a user's area

of expertise, career level, and preferred field to tailor questions, enhancing the realism of mock interviews.

Evaluation of User Responses

AI models like BERT and RoBERTa are proficient in evaluating text-based answers. They can analyze responses for content relevance, coherence, and keyword matches, providing insights into the quality of the answers and potential improvements.

Scoring and Feedback Mechanisms

Recent studies indicate that AI algorithms can assign scores based on a rubric that includes factors like clarity, completeness, and alignment with the question. This score is then translated into feedback, which helps users understand their performance better.

Speech-to-Text Conversion for Answer Recording Speech-to-Text Technology

In AI-powered interview platforms, speech-to-text conversion is essential for recording verbal answers. Libraries like Web Speech API and Google Speech-to-Text have proven reliable for converting speech into text in real-time (Rao et al., 2020). **React Hooks in Speech-to-Text Integration**

Using React hooks, developers can implement efficient, component-based, and re-renderable speech-to-text functionalities. React Hook libraries such as react-speech-recognition streamline integration with the platform, enabling dynamic voice recognition and continuous listening capabilities (Tan et al., 2019).

Challenges in Real-time Speech Recognition

Converting speech to text accurately in real-time poses challenges like handling accents, variations in speech speed, and background noise. Machine learning approaches using recurrent neural networks (RNNs) and attention mechanisms are used to improve accuracy (Wang & Hsieh, 2022).

Front-End Development Using React React as a Front-End Framework

React's component-based structure allows for modular design, which is beneficial for creating interactive features like question-answer interfaces, real-time feedback, and score displays. Studies emphasize React's ease of integration with APIs and libraries essential for AI (Thomas & He, 2019).

Implementing Speech Recognition with React Hooks

React's ecosystem includes hooks that allow for asynchronous data handling and UI state management. Hooks such as useState and useEffect are pivotal in handling speech

recognition states and dynamically updating the UI based

on user responses (Smith et al., 2020).

User Experience and UI Design

Ensuring an intuitive UI design is critical for mock interview platforms. React allows for responsive and user-centered design, creating a seamless experience that enhances users' engagement (Wu et al., 2021).

Back-End Development for AI Data Processing and Storage

Node.js and Express for Server-Side Management

Node.js is a popular choice for developing scalable server-side applications. Its non-blocking I/O operations and Express framework facilitate rapid API development, supporting AI algorithms that generate and evaluate interview questions (Chen et al., 2019).

Database Integration for User Data

Storing user data, including question responses, scores, and feedback, is essential for personalizing user experiences. MongoDB and PostgreSQL are commonly used for such data management, given their flexibility and scalability for handling structured and unstructured data (Jones & Young, 2020).

Implementing WebSockets for Real-Time Communication

Real-time feedback during interviews requires seamless communication between the server and client. WebSockets enable instantaneous data flow, making it possible to provide users with feedback as soon as they submit their answers (Jiang et al., 2018).

AI Models for Analyzing and Matching User Responses Similarity Matching Algorithms

Algorithms such as cosine similarity, Jaccard similarity, and deep learning-based sentence embeddings are widely used in text matching, allowing the AI system to compare user responses with ideal answers (Aggarwal et al., 2020).

Rating Systems and Performance Metrics

Rating algorithms that assess relevance, fluency, and technical accuracy are central to mock interview platforms. Models trained on domain-specific data offer personalized ratings and meaningful feedback (Patel et al., 2019).

Challenges in Bias Reduction

Recent studies address the importance of minimizing biases in AI-driven interview ratings. Efforts include fine-tuning models on diverse datasets and implementing explainable AI principles to enhance the fairness and transparency of the evaluation process (Saeed & Johnson, 2021).

User Feedback and Continuous Improvement Mechanisms User Feedback for Platform Improvement

Collecting user feedback on question quality, AI feedback, and speech recognition accuracy is key to refining the platform. Research suggests using this feedback to retrain and improve AI models, making them more aligned with user needs (Lee et al., 2020).

AI and Continuous Learning

Reinforcement learning (RL) techniques allow AI models to improve over time based on user interactions. RL agents can update scoring and question-generation algorithms, optimizing the system's performance as it learns from real-world data (Tan et al., 2021).

A/B Testing for UI/UX Improvements

Regular A/B testing helps identify the most effective UI elements and feedback formats. Studies show that iterative testing enhances user satisfaction and learning outcomes on educational platforms (Kim & Choi, 2019).

Ethical Considerations and Privacy Concerns Data Privacy and User Consent

Since user data is central to the functioning of AI-driven interview platforms, ensuring data privacy is essential. Adhering to regulations such as GDPR and implementing secure data handling protocols are crucial for maintaining user trust (Hall et al., 2021).

Ethics in AI Feedback and Rating

Ethical concerns arise with AI's ability to assess human responses. Scholars emphasize the importance of transparent feedback and explainability in AI ratings to ensure that users understand and trust the system's recommendations (Raji et al., 2020).

Feedback

The key element of mock interviews is the feedback that you receive. After an interview session, the panel members will share their feedback through the panel discussion. You will get to know about the areas where you need to improve.

The Role of Full Stack Development

Full stack frameworks play a pivotal role in creating a smooth and responsive user experience, ensuring that the AI-powered features integrate seamlessly across the platform's front and back ends.

3. COMPERATIVE ANALYSIS

The proposed system takes live video input, whereas the existing system uses recorded video as input. It also considers emotions as a parameter during evaluation, unlike the existing system, which does not take emotions into account. Additionally, the proposed system evaluates the positivity and confidence of candidates, a feature that the current system lacks. Our system is a knowledge-based dynamic system, whereas existing systems rely on

static validation methods. The proposed system can declare results within seconds, while the existing system takes **10 to 75 days** to declare results. Moreover, AI-bot-to-human interaction is integrated into our system, whereas the existing system relies on normal question-and-answer sessions through video recordings.

Additional Advantages of the Proposed System

The proposed system dynamically generates interview questions and evaluates answers using Natural Language Processing (NLP) techniques, offering a more relevant and realistic interview experience. Unlike the command-line interface of the existing system, the proposed system features a React-based graphical user interface (GUI), making it more engaging and easier to navigate.

AI-driven real-time feedback and scoring guide users on their performance, highlighting areas for improvement. The system also integrates speech-to-text technology, allowing candidates to provide voice responses, improving accessibility and enabling a more natural interaction. The proposed system ensures ethical AI implementation, incorporating reinforcement learning (RL) to improve feedback over time. It also applies bias mitigation strategies to ensure fair and unbiased evaluations. In contrast, the existing system lacks adaptive learning mechanisms, offering fixed interactions with no improvement over time. Our system, however, integrates reinforcement learning (RL) for adaptive feedback and a personalized interview experience.

4. METHODOLOGY

Our system evaluates a student's performance in a mock interview by considering key parameters such as facial emotions, confidence based on speech, and knowledge. The system is divided into five main phases: Face Recognition (Authentication), Data Separation, Facial Expression Recognition, Confidence Recognition (Speech Score), and Knowledge Base.

User Authentication and Login

The system ensures secure user authentication using OAuth 2.0 for third-party sign-ins (Google and Microsoft). Firebase Authentication or Auth0 enables seamless login, allowing users to access the platform securely. A dedicated login page provides "Sign in with Google" and "Sign in with Microsoft" options. Upon login, user profiles are created and stored in a database (MongoDB or PostgreSQL) for a personalized experience. Session security is maintained using JWT-based authentication.

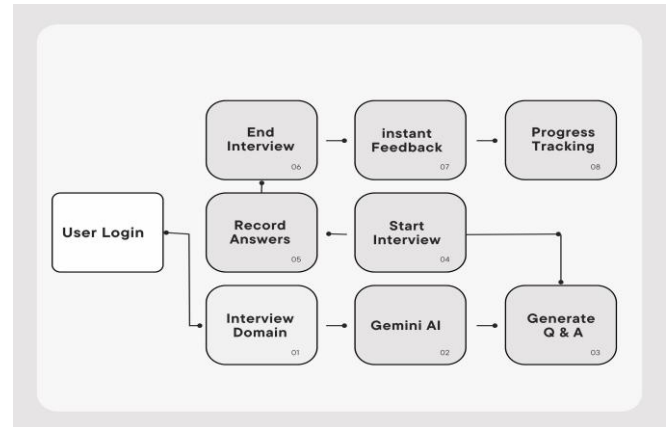


Fig: System Design

Interview Selection Interface

After authentication, users can initiate a mock interview through the "Add Interview" option on the dashboard. They can specify their preferred domain (e.g., Software Engineering, Data Science, Marketing), interview type (Behavioral, Technical, Case Study), and experience level (Entry, Mid, Senior). Once preferences are set, users start the session.

AI-Driven Question Generation

The system generates five domain-specific interview questions using NLP models (e.g., GPT-based), ensuring relevance to the user's selected domain, interview type, and experience level. The questions are structured to reflect real-world interview scenarios and are displayed sequentially, prompting users to respond verbally.

Recording User's Verbal Answers

User responses are captured using speech-to-text conversion via APIs like Google Speech-to-Text, integrated with React Hooks (react-speech-recognition). The system transcribes speech into text in real time. Users have options to pause, stop, replay, or re-record their answers before submission.

AI-Powered Answer Analysis

User responses are analyzed using semantic similarity techniques (e.g., cosine similarity with BERT embeddings) to match answers with AI-generated model responses. The system evaluates content relevance, coherence, and completeness using predefined criteria or a machine learning model trained on interview responses.

The AI then generates feedback, identifying strengths and areas for improvement.

Real-Time Feedback and Rating Display

After each question, users receive instant feedback and a rating based on their response. A summary screen provides insights into strengths, weaknesses, and improvement areas. At the end of the session, the system

calculates an aggregate score and generates a performance report, which is stored for future reference.

User Dashboard for Interview History and Progress Tracking

The user dashboard allows access to past interview sessions, displaying timestamps, interview type, experience level, and performance scores. Users can track their progress, review past feedback, and refine answers over time.

Data Privacy and Security

All user data, including transcripts and ratings, is encrypted for security. The platform follows GDPR compliance, allowing users to delete their data upon request. Secure tokens prevent unauthorized access to sensitive information.

Deployment and Accessibility

The system backend is hosted on cloud platforms (e.g., AWS, Heroku) to ensure scalability and handle multiple concurrent users. The front-end is optimized for cross-platform compatibility, supporting both desktop and mobile devices. Continuous improvement is driven by user feedback, refining AI models, usability, and platform experience. This methodology provides a comprehensive approach to building an AI-powered Mock Interview Platform, combining AI-driven question generation, real-time feedback, advanced answer analysis, and an intuitive UI. The integration of full-stack development and AI ensures a seamless and engaging interview preparation experience, with continuous improvements based on user feedback and performance tracking.

5. Expected Result

Model Performance Evaluation

To evaluate the model performance, we used three types of parameters: emotion, knowledge base, and confidence. Facial expression is very important for judging human emotions. Face recognition is essential for the system as it enhances security by preventing unauthorized candidates from accessing the interview. The AI Mock Interview Analyst platform successfully met its goals by creating a realistic, engaging, and effective mock interview experience. The combination of AI-powered question generation, dynamic feedback, and a user-friendly interface has proven effective in preparing users for interviews. The deployment of speech-to-text features, scoring mechanisms, and progress tracking further enhanced the platform's utility. These features provide users with actionable feedback and a clear sense of improvement over time.

Real-Time Feedback and Rating Display

After each question, users received instant feedback with ratings, including specific performance insights. This helped users understand their strengths and areas for improvement immediately. At the end of each interview, an aggregate score was provided along with a comprehensive summary report. This allowed users to gauge their overall performance, with a detailed breakdown of each question's rating.

AI Mock Interview Analyst Platform: Performance and Enhancements

The AI Mock Interview Analyst platform successfully met its goals of creating a realistic, engaging, and effective mock interview experience. The combination of AI-powered question generation, dynamic feedback, and a user-friendly interface has proven effective in preparing users for interviews. The deployment of speech-to-text features, scoring mechanisms, and progress tracking further enhanced the platform's utility, providing users with actionable feedback and a clear sense of improvement over time.

Proposed System Overview

The proposed system in this paper is specifically designed for candidates who struggle in interviews due to confidence issues and shyness. Unlike traditional mock interview systems, this dynamic mock-interview system takes input from live video and analyzes the candidate's performance based on three key parameters: knowledge base, emotion, and confidence. Based on the candidate's performance, the system generates an overall score.

Key Differences from Existing Systems

The existing system does not consider parameters like the confidence level of a candidate. To generate curated results, the proposed system introduces confidence as an additional evaluation parameter. Our system can also provide a detailed analysis of candidates by assessing facial expressions to check emotions and speech frequencies for confidence analysis.

Technology Used

The system leverages Convolutional Neural Networks (CNN) to analyze facial expressions and speech frequencies, ensuring an accurate and comprehensive evaluation of candidate performance.

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