Prepgenie: A Voice-Interactive AI System for Mock Interviews and Automated Candidate Feedback

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***Abstract*—Abstract-Practice Interview preparation takes much practice, communicating, and feedback, and in many cases, students and young workers do not have a chance to practice on a real interview. This paper suggests coming up with a voice interactive AI based interview practice tool named "PrepGenie", which will be competent. of simulating interviewing and feed-backing. The tool will be made in such a way that the interviewee can tailor the interview, type of interview, job position, the technology stack, and the quantity of interview questions. The interview the speech-to-text feature of the tool will be used to start the completion of will. the interviewee will speak out the answers that will be followed. interview questions are being made by the large language model. regarding the stance of the interviewee. The tool will also be able to have feedback towards the end of the interview. session. The tool will be in a position to offer evaluations which are applicable, and emphasizing the strengths, weaknesses, of the interviewee. opportunities, and threats. The tool will also be capable of saving. the history of the interview session, therefore, assisting the interviewee to follow. the interview develops with time. The tool's architecture will contain a web client, a server powered by node.js/express, WebSocket, AI, and database. The creation of the tool will be in a position to demonstrate. the feasibility of voice based conversational AI systems.**

***Index Terms*—Mock Interviews, Voice Interaction, Large Language Models, Speech-to-Text, Structured Feedback, WebSocket, Natural Language Processing, Prompt Engineering.**

I. INTRODUCTION

Interviews are a deal in getting a job and growing in your career. Interviews are a deal in getting a job and moving forward in your career. They are not just about knowing your stuff; you also need to be able to talk think on your feet and stay calm under pressure. Many people prepare by looking at lists of questions watching online tutorials or doing mock interviews with friends.

Nevertheless, these means are limited. They are not that flexible do not feel like an interview and do not provide you with good feedback. Because of this it may be difficult to know what you need to practice. Further into the future with all the development in the field of intelligence and speech technology, you can now have a chat with machines that can carry out a conversation and respond to you just like it would in a real interview. The speech-to-Text and Text-to-Speech technologies allow you to chat with them using speech. The technologies can be applied to provide you with platforms to prepare to an interview in a realistic manner. All these advances in place most of the interview preparation tools remain very basic.

Most of these interview tools are text-based. They ask you a set of questions. The set of questions is not very flexible or realistic. Some platforms will give you feedback on your interview. The feedback is not very helpful to you. Another problem, with these interview tools is that you cannot go back and review your interviews. You want to see how you are doing with the interview tools over time. You want to see how the interview tools are helping you improve over time with the interview tools. This shows that we need a system that can ask you questions let you interact with it using your voice give you structured feedback and help you track your progress.

PrepGenie is an interview simulator, an AI, that uses your voice and talks to you in order to solve these problems. It is aimed at making you experience an interview and receiving organized feedback. The interview parameters, including the kind of interview the job role and the number of questions can be established. The interview involves talking to the system. It writes down your answers through a speech

recognition software. Depending on what you say and the dialogue you have gone through so far, the system poses the next question to you.

PrepGenie provides feedback at the conclusion of the session which reveals your areas of weaknesses, strengths and areas of improvement as well as the recommended steps. Prep- Genie also keeps your interview information and outcomes in place allowing you to revisit sessions and watch your progress as time goes on. This thing helps you learn. It assists you to enhance your technical explanation skills as well as your communication skills. PrepGenie is supposed to be scalable. It is able to expand with the user demands as well as the evolving industry demands.

This is achieved by integrating automation with the easy-to-use design which makes being ready in time to an interview easier and is a fair and objective method of assessing individuals through PrepGenie. It makes individuals improve their activities. In a manner, it makes them feel more confident.

II. RELATED WORK

Artificial Intelligence is also being extensively utilized within staffing of people and administration of resources to enable the processes more prolific as well as to assist in making better decisions as to whom to hire. One of the aspects that companies are relying on to help them in the process of filtering through the people who are seeking employment to go through their resumes and conduct the interviews is the Artificial Intelligence. This helps in automating repetitive elements of the hiring process and also helping the companies in coming up with data driven decisions [1], [2]. Thus, more people are becoming more worried about the use of Artificial Intelligence during the hiring process.

Individuals also possess the devices which may help them rehearse interview by simulating what an interview would be like. As an illustration, a system created by Adiani and several other people can help a person with autism prepare to be interviewed [3]. This system illustrates the fact that it is very convenient that there is a venue where people can practice on the interview under a controlled setting.

Reality is also being used to make people rehearse on in- terviews by others. Using Virtual Reality, one may experience the impression of being at an interview and therefore be able to practice an interview. Other studies analysed the impact of Virtual Reality on behavior and emotions of the people during interviews [4]. These are very promising systems and can prepare people to job interviews by providing them with real world experience and also make them more comfortable. We have to cover these gaps somehow. These systems have to be user friendly and web accessible. Such systems are also meant to allow the user to interact with them in voice. It must also be capable of generating real time questions based on the desire of the user. There should exist a system of availing sensible feedback to the users. Such systems support real-time communication and allow smooth exchange of data through the use of technologies like WebSocket communication and speech recognition frameworks among others [5], [6].

The numerous systems that can help people to prepare and take interviews are text based. The same questions are reiterated. They also fail to help in good feedback provision to the people using them. The other problem is that such systems are not able to trace the progress of the person over time to trace the degree of his/her improvement. The recent breakthroughs with the use of large language models have demonstrated a possibility of creating automatic and meaningful feedback, but they still need to be systemically incorporated to be evaluated regularly and consistently [9], [10].

PrepGenie will be a system that will do all these. It is a program capable of carrying conversational dialogues with persons, asking them questions, which are relevant to the job they are seeking, and even commenting on their progress. By utilizing the Artificial Intelligence and speech technologies, it is possible to use PrepGenie to have people rehearse more realistically and useful.

III. SYSTEM ARCHITECTURE

The PrepGenie system consists of a primary component: a client interface with which a user communicates with a server at the back side that performs much of the work AI services assisting in speech and generation and a database storing all the history of the interview indicates the general system architecture. Fig. 1.

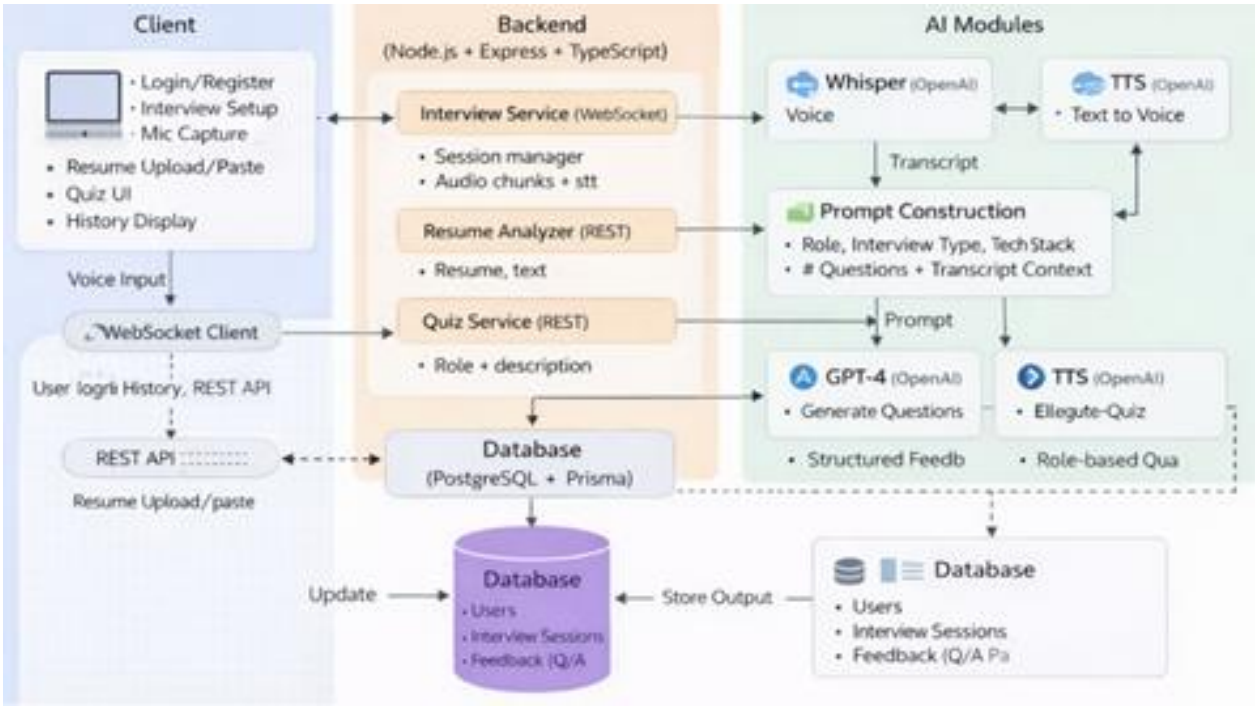

Fig. 1. PrepGenie System Architecture

A. Client Layer

The client interface is designed in a manner that assists individuals to prepare to be interviewed. It makes use of technologies such as Media Devices API to allow individuals to use their microphone in the web application without needing to install any additional software. The interface of the client interaction displays the way the interview is progressing presents the questions being asked and feedback is provided.

B. Backend Layer

The backend also examines the validity of the requests and manages the interview session and ensures that the ex- change between the client and the AI services is secure. It communicates with the help of WebSocket connections. The architecture offers interaction and makes the interview sessions to be reliable and scalable when a large number of sessions are occurring simultaneously.

C. AI Services

The speech to text tool, translates what you say into words, on the screen. The system is the one that composes questions on an interview to you based on the job that the user is interested in the kind of interview it is the technology involved and what you have already said. Text to speech also takes the place of speaking out questions in the system. The questions and prompts are heard by the user by voice output.

D. Persistence

The system retains only the interview details. It does not store the actions that you performed on the quizzes or the outcome of your resume screenings. The information captured in the interview process is the nature of how the interview was arranged when it was to take place, the queries and responses that were uttered sequentially and were recorded in writing the concluding remarks.

IV. METHODOLOGY

PrepGenie works with a systematic procedure of running the AI-based mock interviews in a conversational manner context and generating regular feedback. The algorithm of the interview presented in Fig. 2 demonstrates the process of interaction between the user and AI. The processing and feed- back synthesis communicate and interact to create a realistic interview setting. The system associates several elements such as interview setup, live communication, response typing and producing feedback. Questions will be generated dynamically depending on the job position and technology stack

and continue the conversation across a sequence of turns. This design will provide a consistent structure of each interview session, but will also manage to customize the questions based on the answers of the user.

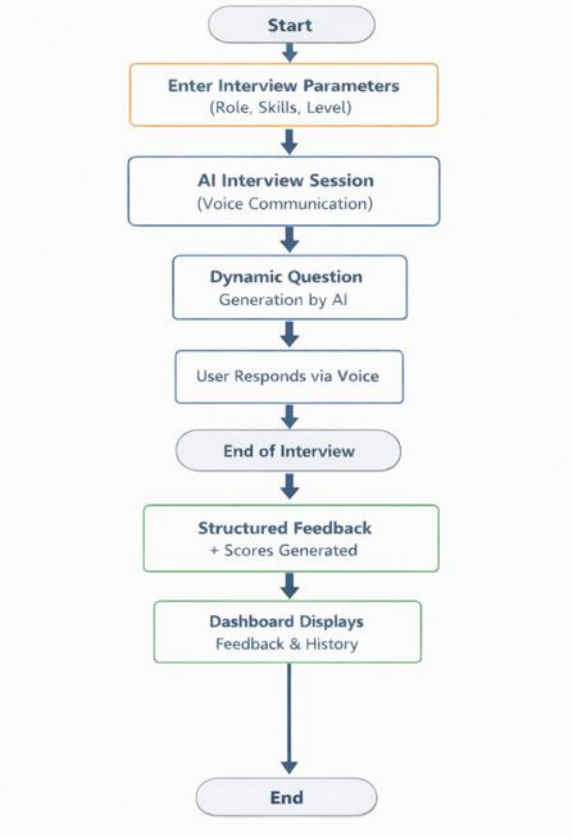

Fig. 2. PrepGenie Interview Workflow

A. Interview Configuration Model

Parameters including types of interviews (technical, behavioral or mixed), job role, technology stack, and questions are configured at the beginning of the interview session. These parameters are verified and utilized in setting up the interview context. Such set up permits the system to create role specific questions and replicate various interview scenarios. It also makes sure that the flow of the interview does not deviate out of user expectations and as industry special needs.

B. Real-Time Interaction Cycle

The communication itself is in the form of repetition cycle of the process of the interviews:

1) There is a role-based question in the system.
2) The question is both in written and oral form.
3) The user responds with the help of the microphone.
4) Speech- to-text alters textual reply orally.
5) The transcript is attached to the context of the session.
6) The follow up questions consist of the past responses.

This will go on until the predestined limit of questions is achieved and the context of the turns will operate.

C. AI Response Refinement

The initial testing showed that the uncooked AI outputs had unbalanced or generic feedback. To improve reliability, The refining pipeline available with PrepGenie has 2 steps:

- AI validation:

The checked questions and feedback on the generated questions and feedback should be justified on the relevancy on the role, meaning, and contexts.

- AI extraction:

The responses will be formalized by keeping the salient items such as the purpose of the question, cues of assessment and categorized touchpoints. Such refinement would guarantee an improved dimension of consistency of the questions generated and the manner in which the feedback would be organized in the interviews.

D. Structured Feedback Synthesis

Once the last response has been captured the system pro- duces systemic feedback recapping candidate performance. The feedback is grouped into four elements:

- Strengths
- Weaknesses
- Areas for Improvement
- Next Steps

The feedback reports and session details are saved in the database to enable the users to see past attempts and track improvement over time.

E. Resume Scoring Logic

PrepGenie has a resume analysis feature that would check the resume of the candidate against the job position being selected. The analyzer scores with a rubric based prompting as an overall Resume Score. The assessment is based on role relevance, skills match, description of projects and friendliness of ATS.

The end result is the creation of a combined sum of various assessment categories into a normalized score and brief feedback of strengths and areas of improvement.

F. Skill Assessment Quiz

Besides practice in interviews, PrepGenie also has a quiz module, which evaluates technical and analytical competencies. Questions in the quiz are generated depending on the choice of job role and technology stack. Once it is submit- ted, the system scores answers, shows the final result with correct answers, and records the results along with interview information to track the progress.

V. IMPLEMENTATION

PrepGenie is deployed as a web-based application, which combines real-time communication with an AI-based processing to imitate the interaction, which takes place during interviews. The system has a browser-based client interface, a backend server which deals with session management and external AI services which deal with speech processing and response generation.

A. Backend

Node.js, Express.js, and TypeScript are used to create the backend to have a modular and maintainable architecture. Authentication of the users is carried out through use of JSON Web Tokens (JWT) and password hashing. Prisma ORM is in charge of interactions with databases and linking the system to a PostgreSQL database where the session of interviews, transcripts, and feedback reports are stored. WS communication with ws library allows real-time communication during the interviewing session.

B. AI Orchestration

The AI orchestration layer is a service of speech processing and language generation. Audio input of the user is captured and forwarded to the speech-to - text to transcribe. The transcript will be verified and pegged to the context of the interview. According to this conversational context, the system provides prompts to make the large language model (LLM) respond by generating an interview question depending on the role and technology stack selected. The LLM generates formatted feedback at the end of the interview where the performance of the candidate is summed up.

C. User Interface

The client-side interface is also executed in the form of a web-based application that allows users to customize the parameters of the interview and attend voice-based sessions. The interface is equipped with microphone controls, the generated questions are displayed, and responses of the user are recorded in real time. Fig. 3 shows the live interview interface whereby the users will communicate with the AI interviewer. The end summary of the feedback is also shown on the interface and the history of the session is made.

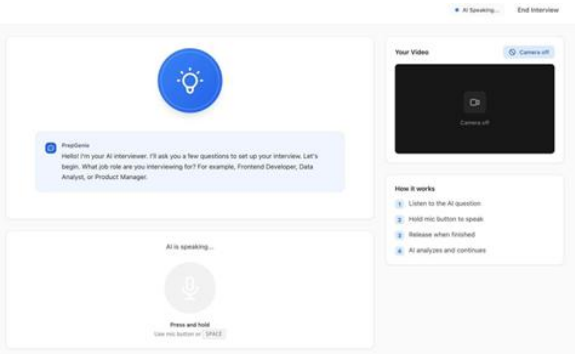

Fig. 3. Live Voice Interview Interface in PrepGenie

VI. OBSERVATIONS AND RESULTS

Testing with a variety of job roles and technology stack revealed that PrepGenie has a predictable flow of interviews, and it always provides the questions pertinent to the chosen set-up. The voice interaction offers a more realistic interview setting than the conventional text-based practice systems where the user is able to feel the interactive interview interaction which enhances the session as well as making the practice more engaging.

In the interview process, the system is able to capture the user response with the help of speech input and con- vert them Speech-to-text conversion to text. The transcript created is included into the context of the interview, which allows the incorporation of the transcript into the interview. language model to generate context based follow up questions that model the behavior of a real interview. Such dynamic interaction enhances continuity of the interview and enables the mechanism to modify

questions in accordance with prior answers.

The structured feedback module examines the user feed- back and determines important performance indicators that include strengths, weaknesses, areas that need improvement and recommended next actions. This feedback will help the users to know the gaps within their knowledge, enhance their communicational abilities and get better interview approaches to real interview situations. In addition, the system keeps records of interview sessions that have transcripts and feed- back summaries. This enables the users to review the past tries, the past responses and the progress due to successive practice sessions. Fig. 4 depicts the systematic feedback categories that are obtained at the end of analyzing the resume, which illustrates how the system summarizes the performance of the candidates and gives actionable information on the way to improve.

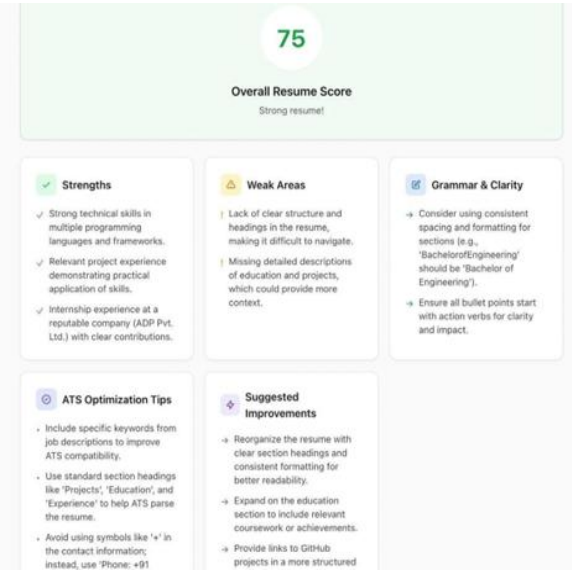

Fig. 4. Resume Feedback

V. DISCUSSION

As PrepGenie shows, a voice interview simulator based on the browser may be successfully employed when WebSocket communication is used in real time to combine it with the latest AI services provided speech processing and natural language generation. The system allows a two-way interview with questions being dynamically generated depending on the interview configuration parameters and past answers. This method offers a more lifelike simulation of an interview over text-based interview practice and question banks. It also enables the candidates to get to enjoy a more controlled but less rigid interview process that is close to the real-life situations.

The modular architecture is among the key advantages of the system as it isolates the client interface, backend services, modules of AI processing and database persistence. This isolation enhances scalability, maintainability and scalability of the platform. The speech recognition, language processing or feedback generation can be upgraded or replaced individually without any influence on the whole system. WebSocket-based communication also allows low-latency, multi-turn interaction, which is necessary to keep the flow of conversation going in the case of mock interviews. This is to guarantee that user reaction is done in close real time, which makes the communication seem natural and continuous.

The other significant feature of the system is the possibility to create systematic feedback in accordance with user feedback. Instead of merely assessing correctness, the system is able to evaluate the quality of responses, coherence and relevance and give feedback to a user on their strengths and aspects that need improvement. Nonetheless, there are still a number of limitations. It is based on the correctness of the speech-to-text transcription that can be impaired under noisy conditions or pronounced accents which can influence the quality of responses generated. Also, the large language model output can change between sessions, causing slight changes in the formulation of questions or the generation of feedback. Though such variability can make it look more real, it can also add inconsistency in the evaluation.

Moreover, reliance on third-party AI services can cause the problem of latency or reduce the efficiency by paying higher costs to the services during high-utilisation periods. Another key idea brought up in the system is the need to ensure that AI-created flexibility is enhanced by user-friendly design to increase both engagement and learning results. On-going optimization of the model performance and optimization of the systems can also increase the reliability and efficiency of the platform.

In general, AIdriven interview preparation is solidly based on the system, which is a combination of live communication, automatic question generation, and feedback. Regardless of some shortcomings, it manages to prove how the application of AI

technologies can be incorporated into an actual educational and training setting.

VI. CONCLUSION

In this paper, PrepGenie which is a voice-interactive AI system enabling realistic practice of interviews was presented and handing over of structured feedback and tracking interview history. The system will enable the user to set interview parameters such as role, type of interview and technology stack and be involved in a muti-turn interview session which can be viewed in real time. PrepGenie uses both speech processing and question generation based on AI to simulate a conversation between an interviewer and respondent and offer actionable feedback divided into strengths, Improvement areas, weaknesses and next steps.

A complete architecture that combines a browser-based customer interface and a Node.js/ Express served backend based on WebSockets. A PostgreSQL-based persistence, real- time communication, and AI services based on speech and language processing were introduced. The refinement mechanism proposed with the help of validation and structured extraction enhanced the generated feedback consistency and clarity. The system can also be used to look back into previous interviews and how they have progressed with time, as the interviews and results are stored in the system.

Preliminary results have shown that PrepGenie generates role-specific interview oil slices and systematised feedback and is a feasible and scalable interview preparation tool. The next step in work would be to enhance the assessment metrics, make speech processing more robust when applied to various conditions, and organize a large-scale user study to determine the results of learning and system success. The system proves the feasibility of AI-based solutions to the areas of education and skills development.

VII. FUTURE SCOPE

- Use cloud infrastructure to scale the platform to handle a large number of users at a time without any performance problems.
- Use adaptive AI interviews with the difficulty of questions changing dynamically depending on the answers of the candidate.
- Combine the high-level speech and NLP analysis to test the confidence, clarity, and communication skills.
- Implement online quiz contests whereby the participants can compare their abilities with other participants.
- Form community forums where group discussions and interview preparation and peer learning take place.
- Give individualized learning proposals based on interview performance and weaknesses.
- Expand the system to include other languages so that it can be more accessible.
- Create an app that allows users to rehearse interviews on any place or any time.
- Connect the system to job portals to come up with actual job description-based interview questions.
- Use AI-based panel interviews and multiple virtual interviewers in order to recreate the real-world interview scenarios.

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