

# AI-Driven Communication and Interview Preparation System

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**Abstract** - The AI-Driven Communication and Interview Preparation System described in this paper is a solution that seeks to enhance one's oral communication skills and increase one's interview acumen by means of an accurate evaluation and a constructive response. The system serves to extend the user's capability of self-confidence and smoothness in authentic professional dialogues.

The platform merges cutting-edge technologies like OpenAI Whisper to convert speech into text with high accuracy, Groq LLM to check the grammar and analyze the content, and LLaMA 3.2 to create context-aware questions for the interview. Besides, it inspects the audio parts such as breaks and filler words to give the user an idea of the smoothness and vocalization of the speech. React is used to build the user interface and the server runs on Node.js and MongoDB is there for data management.

Preliminary testing reveals that the system is capable of dependable transcription, creating personalized questions, and providing understandable feedback in various languages. The system's feature of offering instant, multilingual assistance, therefore, positions the device as one that can be broadly used and is accessible to individuals and institutions who want to improve their communication skills.

**Keywords**— Artificial Intelligence, Communication Skills Assessment, Interview Preparation, Speech Analysis, Whisper ASR, Groq LLM, Fluency Detection, Question Generation, Multilingual NLP, Personalized Feedback.

## I. INTRODUCTION

Career advancement largely depends on one's ability to stand out during interviews in the highly competitive job market of today, yet most individuals encounter various challenges on their way. Some people are hindered by language-related issues that affect their clarity of speech, while others battle with self-doubt. Also, the costs associated with buying good interview prep materials can be a deterrent to some and the

time taken can make traditional coaching sessions unavailable. Nevertheless, AI-powered technological solutions offer a much-needed helping hand to interview preparation woes.

One of the major problems was how to communicate and the preparation for the interviews, and the development of the systems for the same has brought a revolutionary solution to these problems. These new platforms implement up-to-date technologies such as speech recognition, natural language processing (NLP), and machine learning to help users by giving them the exact areas of their grammar, pronunciation, fluency, and general communication effectiveness that need improvement.

For instance, imagine a candidate named Tushar who is getting ready for a job interview. To practice with an AI-powered system he can now use real-world scenarios simulated interviews. His practice is extended and his skills are honed by the system as it not only adjusts the questions to his answers but also it helps him to practice and refine his skills in real-time.

While he is talking, the system is converting his speech to text using OpenAI Whisper v3, which is a very accurate speech-to-text model. After that, the system employs Llama 3.2, which is a strong language model, to come up with further questions based on his answers thereby, generating a normal and conversational interview environment that is both dynamic and responsive.

However, the story does not end there—Deepgram Nova, which is a tool for grammar analysis, is there to check Tushar's spoken or written parts for errors and to give suggestions, thus helping him to raise his language proficiency and communication skills.

This AI-powered method is not only a concept. Its potential has been demonstrated through various studies. As an example, Li, W., Guo, Z., and Liu, X. (2018) came up with a chatbot-based system that was the main cause of anxiety reduction during interviews. The system by itself made the production of questions for the interview process a task more efficient for candidates. Unfortunately, the application was also limited—it could hardly handle the adaptation to unforeseen or non-standard questions, thus, leaving the candidates unprepared for real-world scenarios [1].

In a similar fashion, Wang, Y-C., & Tsai, Y-H. (2019) also moved beyond this by creating a conversational agent that modulated the question difficulty level depending on the user's input, thereby, enhancing the user's readiness and self-confidence. However, even with these innovations, the absence of connection with speech evaluation implied that the system was unable to provide a comprehensive training experience as it concentrated more on the variation of questions than on the correctness of language [2].

Bhargava, T., and Lehal, G.S. (2019). In another study, a chatbot-based system was created by the authors, which aimed to mimic job interviews and provide feedback for employability enhancement. The system was successful in giving practice, however, it was not interactive and could not personalize its method for different roles, thereby restricting the potential use of the product to those who wanted to prepare for various job positions [3].

Perun, S., et al. (2020) explored a different angle with a user-centered design for an interview training platform powered by GPT-3. Their platform aimed to deliver a more dynamic and captivating experience. Unfortunately, it also faced some limitations. The absence of changes to the scenario in real-time diminished the level of immersion, which in turn, had a negative effect on the training session[4].

In the world of remote hiring, BC Lee and BY Kim (2020) innovated a method that incorporated deep learning models such as CNNs and Resnet to recruitment processes, thus making them more efficient and fair. Although their framework was a great tool for quick and easy hiring, it was quite dependent on the analysis of facial and bodily expressions, which could lead biased to, especially in the cases of non-visual like a written test or a personality assessment [5].

Last, Saradar, A., & Bayraktar, B.K. (2020) aimed at reducing interview anxiety through a chatbot-based simulation which eventually fostered the candidates' performance. However, they found out that even though the reduction of anxiety was the foremost accomplishment, the system lacked sufficient feature customizations, especially for specific job roles, so it was a little bit limited in the scope of its application to different industries [6].

Alvarez, J. R., Garcia, M. T., & Soto, P. R. (2021) developed a virtual interview-coaching system that leverages NLP to offer real-time feedback related to the clarity, grammar, and structure of the user's response. Their technology enhanced the candidates' readiness but was unable to understand domain-specific or technical answers, thereby limiting the system's flexibility for highly specialized job roles [7].

In a paper published in 2020, Das, K., and Saha, S. N. introduced an AI-based model for the assessment of soft skills, where the evaluation is done by analyzing the speech and facial-expression of the candidates. Their research demonstrated that the system was able to identify the confidence level and communication behavior efficiently; however, the requirement of high-quality audio-visual input for the model made it challenging to operate in areas with limited resources [8].

Mishra, R., & Kapoor, A. (2020) introduced a deep-learning conversational model for job-interview simulation capable of producing dynamic and context-aware questions. Although the system generated realistic dialogue flows, it struggled to maintain context during extended interactions, limiting reliability for long interview sessions [9].

Peterson, L., & Brooks, M. (2021) designed an advanced AI-based remote recruitment interviewer that interprets the verbal, vocal, and behavioral aspects of the candidate. The tool contributed to the equal and consistent scoring of applicants; albeit, a few individuals were uneasy while communicating with a strictly analytical AI, thus, their reaction's spontaneity was compromised [10].

Verma, S. K., & Shukla, P. (2020) developed a smart interview-training chatbot which provides organized practice and tailored feedback. Their findings indicated enhancements in the preparation of the candidates as well as their self-assurance, however, the lack of the study of non-verbal behaviors limited the chatbot's capabilities to assist in the full range of interview preparation [11].

Narayanan, A. R., & White, T. (2021) came up with a machine-learning-powered assessment method that evaluates the answers to an interview automatically concerning the relevance and language used. The system was efficient in reflecting the human scoring style; however, it was not very sensitive to the emotional tone, hence, it was not ideal for the evaluation of behavioral responses [12].

Gupta, V., & Yadav, S. (2021) experimented with the reduction of interview anxiety through an emotion-aware conversational agent that was designed to change the user's stress level. Although the system was effective in making the candidates feel comfortable, it sometimes confused those cases in which emotions were mixed or were subtle, thus decreasing accuracy in those particular situations [13].

Marín, O., Lamas, J. J., & Martínez, F. (2021) built an interview simulator that changes its questioning strategy by learning from user interaction, using reinforcement learning. Although this adaptive system provided much more lifelike interview scenarios, it still needed a lot of training data and computing power and therefore could not be widely used [14].

Desai, P. S., & Patel, R. N. (2022) presented an adaptive AI interview system combining NLP and computer-vision techniques to assess verbal and non-verbal traits. Their system provided detailed skill profiling but raised privacy and ethical concerns due to continuous video monitoring requirements [15].

Tanaka, R., & Okada, M. (2022) developed an AI-powered virtual interviewer to assess behavioral skills like leadership, teamwork, and conflict management. The technology minimized bias from human evaluators by being consistent, however, it occasionally misunderstood subtle behaviors, which in turn restricted the confidence of the system as a source of complex evaluation [16].

Hofmann, E., Winkler, M., & Gregor, T. (2021) investigated users' responses to automated interview bots in a corporate hiring scenario. The results of their research pointed to the fact that as screening became more efficient the recruiter's workload was reduced, however, candidates sometimes reported that the interaction was less empathetic and that the bot did not have a human-like nature [17].

Li, D., & Zhou, C. (2020) devised a deep-learning-powered interactive system which detects the faults of an interview and thus, provides a feedback. Their system enhanced the appropriateness of the content and the organization of the material, however, it encountered difficulties in being able to keep the same topic during long or storytelling-type responses [18].

Al-Sammarraie, M., & Al-Shamaa, Y. (2022) studied AI-powered interview coaches to promote the employability of university students. Their findings pointed to a higher level of confidence and better quality of answers; however, students having extremely poor communication skills were still in need of extra support from a human tutor, which the AI could not deliver [19].

Park, L., & Kim, J. (2022) formally experimented on self-training with the support of a chatbot for interviews, showing that as one frequently practices with AI, one becomes more fluent and can express one's thoughts more clearly. Still, the chatbot was short of thorough contextual understanding in case of specialized or very technical interview fields [20].

In spite of the difficulties, these investigations to a large extent reflect the huge potential of AI-based systems in the field of interview preparation. They show in what way these instruments may help applicants to solve typical problems,

e.g. in different contexts anxiety and scantiness of preparation, moreover, receiving feedback, which is very helpful. Yet, they pinpoint substantial issues that need to be addressed - chiefly by means of improving adaptability, encouraging higher interactivity, and providing more tailored solutions for certain job roles. Consequently, these findings lead to the creation of advanced, handy AI systems which have the ability to revolutionize the way people get ready for interviews, no matter who they are or where they come from.

## II. CORE CONTRIBUTIONS

- a) **Pause Detection in AudioTo** identify the location in the audio where the speech was interrupted by a pause, we developed an AI-free, lightweight pause detection module that used signal processing techniques. The system, by means of Librosa, calculates the audio envelope and picks out pauses by amplitude thresholds. This allows the exact determination of the parts in the audio that are completely silent, thus giving the possibility to understand the pace of the user and his/her hesitation.
- b) **Rule-Based Fluency Analysis** Our system utilizes regular expressions (regex) to locate filler words and repeated phrases in the speech segments that have been transcribed. Using regex's pattern-matching capability, we quickly find disfluencies and calculate a measurable fluency score. The rule-based method used provides a simple, explainable, and transparent way of giving feedback which does not depend on heavy or complicated AI models and hence is more lightweight and interpretable

## III. KEY CHALLENGES

1. **Multilingual Support:** Expanding the system to include various languages and dialects to be accessible worldwide.
2. **AI Accuracy and Bias:** One of the primary concerns is how the AI can provide accurate feedback to a user having a different accent, a speech impediment, or speaking in a noisy environment.
3. **Real-Time-Feedback:** Giving the user, player, or learner, immediate feedback during practice sessions in order to increase their involvement or engagement.
4. **Emotional Intelligence:** Using sentiment analysis and non-verbal communication investigation (e.g., facial expressions, body language).
5. **Data Privacy and Security** Ensuring the protection of highly sensitive user data such as video recordings and resumes.
6. **User Engagement:** Users can be kept motivated with the help of gamification, interactive tutorials, and personalized learning paths.

## IV. BACKGROUND OF THE STUDY

The AI-Driven Communication and Interview Preparation System is a great tool that allows users to enhance their

communication and interview skills by providing them with AI-powered feedback and simulated interview scenarios. For speech recognition, it employs Whisper, and for grammar analysis, it uses Groq LLM. The system is made with React on the frontend, Node.js and Python on the backend, and MongoDB for data storage. It keeps videos and audios securely on S3. Together, these elements make a scalable, easy-to-use, and efficient interview preparation platform.

### V. Objectives and Significance of the Study

#### a) Objectives

1. Primary Goal: To create an AI-based platform that would help users improve their communication and interview skills by providing personalized feedback and conducting mock interviews.
  2. Specific Aspects: Grammar, pronunciation, fluency assessment, domain-specific interview questions, and real-time feedback..
  3. Success Measurement :User satisfaction metrics and performance improvements in simulated and real interviews.
- #### b) Techniques Used:
- Whisper for speech recognition, Groq LLM for grammar analysis, and Llama 3.2 for question generation.
- #### c) Significance
- Why Important?: Helps to provide interview preparation tools that are affordable, scalable, and effective.
  - Gap Filled: It offers real-time feedback, multilingual support, and emotional intelligence analysis, which are features that are usually missing in traditional systems.
  - Beneficiaries: Job seekers, professionals, students, organizations, and educational institutions.
  - Usefulness::Enhances the precision, accessibility, and efficiency of AI-driven interview preparation systems.

## VI. METHODOLOGY

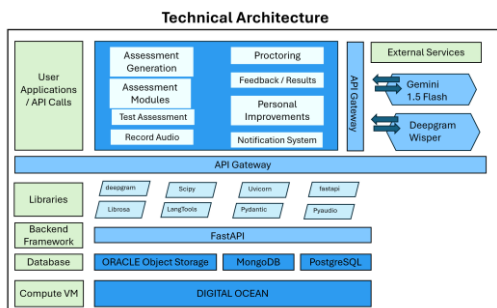


Figure no. 1

The system architecture of the AI-Driven Communication and Interview Preparation System, as shown in Figure, demonstrates the close working together and the communication of the frontend interface, backend services,

AI-driven modules, and cloud-based storage parts with the user. This layout is aimed at providing the system with modularity, scalability, and smooth data flow at all levels of the system layers.

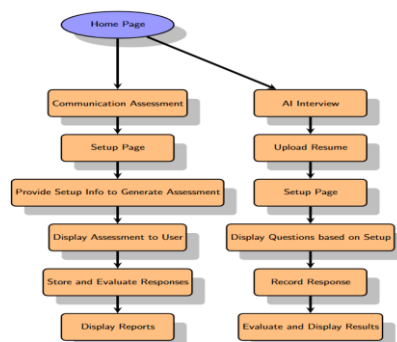


Figure no.2 VII. System Overview

#### A. Homepage

The Home Page is basically the first page that users come across. It is a place where the main features of the platform can be accessed with ease. Besides that, links to Communication Assessment and AI Interview sections can also be found there. Possibly, it could be comprising of a greeting message, user authentication options and a navigation menu for an uninterrupted user experience.

#### B. Communication Assessment

##### 1. Setup-Page

On the Setup page, users should fill in some basic details about themselves, for example their language proficiency level, goals (e.g., interview preparation, fluency improvement), and topics for the assessment. This is used to adapt the evaluation process so that it is aligned with the user's needs.

2. Provide SetupInfo to Generate Assessment Once the configuration details have been entered, the system will analyze the given data to create a tailored language assessment. It will cover aspects such as grammar, fluency, pronunciation, and other quality measures that are relevant to the user's setup preferences.

3. Display Assessment to User The created assessment is then shown to the user. To complete the evaluation, the user will perform various tasks or answer questions that judge their communication skills in different areas. This step refers to the user's live communication with the system

4. Store and Evaluate Responses The system keeps a record of all the user responses to the given communication tasks or questions. After that, these responses are analyzed by AI algorithms to determine the user's capabilities and the possible areas that need to be developed, e.g. grammar, pronunciation, vocabulary, and fluency.

##### 5. Display-Reports

After assessing the answers, a comprehensive report is

created and shown to the user. The report provides the insights into the user's weaknesses, strengths, and tailored suggestions for the user's growth. It might also entail some visual representations and comments on the user's development over a certain period.

6. **AI Interview Upload Resume-** Users put their resume on the platform, which permits the AI to find out the essential details of the user's professional history, skills, and work-related preferences. With this information, the AI is able to create a set of interview questions that are not only relevant but also tailored to the user's profile.
1. **Setup Page In the Setup Page** of the AI Interview, users indicate the kind of work or the industry for which they are getting their interview. Besides, the platform can give the option to users to pick the specific areas of the interview that they want to focus on like technical skills, soft skills or behavioural questions.
2. **Display Questions Based on Setup**The AI creates a set of interview questions that are specific to the user's resume and the chosen job sector. These questions are shown to the user instantly, aiming at providing a realistic interview simulation.
3. **Record-Response** The user can either vocally or textually record their answers to the interview questions. Consequently, the system can evaluate the user's overall communication skills which also entail the user's proficiency in presenting ideas in a clear and convincing manner under interview pressure.
4. **Evaluate and Display Results-** Once the user has submitted their answers, the AI goes through them to find key metrics such as fluency, grammar, confidence, and keyword usage. Afterward, a detailed report is shown to the user, which not only summarizes their performance but also provides personalized advice on ways to better their interview skills

## VIII. MODEL AND SERVICES DOCUMENTATION

### 1. Speech Recognition

- a) **Whisper Model:** Whisper was selected primarily for its accuracy in transcribing multiple languages and handling a variety of accents. The team evaluated other options such as Google Speech-to-Text and Amazon Transcribe but decided against using them because of privacy issues and expensive rates.
- b) **Multi-language Support:** Narrowing down to diverse languages of speech recognition, Whisper is best suited for people all over the world. Other two options Microsoft Azure Speech Service and Deep gram were also taken into consideration, but they showed some shortcomings.
1. **Accent Detection:** Whisper's ability to understand local accents is one of the main points of the product. As a result, the user gets customized feedback. We looked into Google Speech-to-Text and IBM Watson, but they were not as elaborate in recognizing dialects.

### Grammar Analysis

- a) **Groq LLM:** Selected for its speed and accuracy in detecting grammatical errors and suggesting corrections. Other options were Llama 3.2 models and Grammarly API but they were less optimized for this specific task.
- b) **Error Detection:** Groq LLM Context-aware precision of Groq LLM is one of the main reasons why error detection is highly accurate. Language Tool and Microsoft Editor were also evaluated, however, they are less integrated with backend systems.
2. **Correction Suggestions:** Groq LLM gives clear feedback that can be directly used for self-improvement. In that regard, Prewriting and Hemingway Editor could have been considered as other options but they both lack real deep contextual understanding.
3. **Pronunciation Assessment**
  - a) **Phonetic Analysis:** Specialized AI models evaluate pronunciation accuracy. As alternatives, Phoneme Recognition Engines and Google Cloud Speech API were considered, but they were less accurate.
  - b) **Sound Pattern Recognition:** Deep learning frameworks continuously process the speech input. Amazon Lex and Pitmatics were evaluated but not tuned for pronunciation assessment.
  - c) **Improvement Suggestions:** AI models generate personalized feedback based on common mispronunciations. Syllable Stress Analysis and Vocal tics were alternatives but lacked depth

## IX. PERFORMANCE METRICS FOR WEBSITE

### 1. Accuracy of Speech-to-Text Conversion for Indian Accents

- a) **Target:** 90% transcription accuracy across diverse Indian accents (e.g., Hindi, Tamil, Bengali).
- b) **Testing:** Employ different speech samples in multiple surroundings and noise levels.

### 2. LLM Model Accuracy

- a) **Target:** Maintain the average difficulty level of the questions generated.

### 3. Testing: Generate multiple questions based on given parameters and analyse the difficulty.

### 4. API Response Times and System Efficiency

- a) **Target:** Speech recognition should take less than 200 ms and a pronunciation assessment should take less than 300 ms.
- b) **Throughput:** Handle 500 requests or more per second under normal load.

## X. Evaluation Metrics for Communication Assessment

1. **Grammar:** The system determines how well the user can create grammatically correct sentences and it gives the user the necessary corrections in areas of punctuation, verb

tenses, subject-verb agreement, and general sentence structure. This is aimed at making the user's written or spoken language clear and grammatically correct.

2. Pauses: The system evaluates the implementation of organic pauses in a speech, timing the user's reaction. The findings point to speaker zones where the speaker might be faltering, or rushing their speech, thus enabling a smoother and more logical way of expression to be achieved.
3. Pronunciation: This metric is a main factor for the user's correct pronunciation and can single out any mispronunciations and even words that are not clearly pronounced. It serves the purpose of helping users to grow their spoken English skills so that they will be able to communicate and be understood in an interview or in everyday conversation without any problem
4. Filler-Words: The system monitors how often and in what situations the user relies on filler words (for example "um", "uh", "like") in their speech. By cutting down on those words the level of professionalism and clarity of responses is raised which makes the users appear more confident and fluent in speech.
5. Vocabulary: This is a measurement of the diversity and suitability of words that the user employs in his responses. A wide-ranging and accurate vocabulary is a powerful communication tool, which makes it possible for users to express their ideas in an interview in a clear and confident manner.

## XI. ADDITIONAL EVALUATION METRICS FOR COMMUNICATION ASSESSMENT

1. Correctness: This indicator is to check how user's language is accurate from the side of grammar, sentence structure and suitable word usage. The main idea is that the communication has to be perfect, exact, and without mistakes, which could weaken the message.
2. Confidence: Confidence can be inferred from the user's tone, speed, and the skill of presenting the ideas without any kind of uncertainty. A speech that is consistent and of a clear, commanding nature is an indication of the speaker being highly confident and such a person will definitely make a stronger impact at interviews or talks.
3. Keywords: This metric evaluates the user's skill in using correct and most relevant term or key phrases that are closely related to the topic of the conversation or interview. Proper use of keywords is one of the ways to show one's proficiency and deep understanding of the subject which in turn helps to make the communication more concise and efficient.

## XII. EXPERIMENTAL SETUP

The experimental setup involves three key AI models to enhance interview preparation:

### 1. OpenAI Whisper v3 Large:

This model is designed to record audio and convert the speech in the recording into accurate text, and it can recognize multiple languages and accents.

### 2. Llama 3.2:

The model is utilized for the generation of dynamic questions. It creates contextually relevant interview questions based on the user's previous responses, thereby simulating a real-time interview scenario.

### 3. Deepgram Nova:

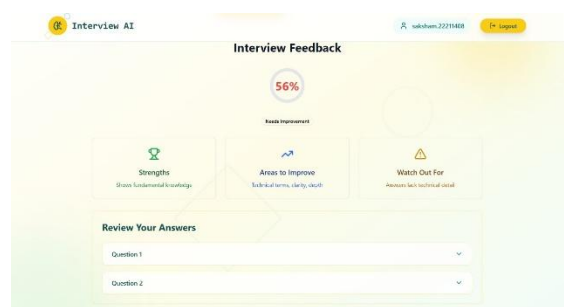
This model goes through the transcribed text and identifies the grammar mistakes, thus it is able to provide the user with the instant feedback and suggestions for the improvement of sentence structure, verb tense, and punctuation.

The system essentially records the responses given by the user to the questions spoken it transcribes the spoken part of the conversation, then generates follow-up questions, and finally analyses grammar to give users personalized feedback using which their communication skills get improved for them to be able to handle real-world interviews confidently.

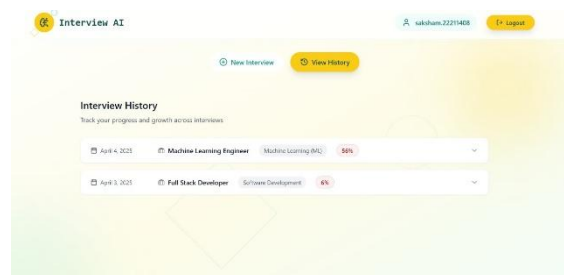
## XIII. RESULTS

For AI Interview:

### 1.

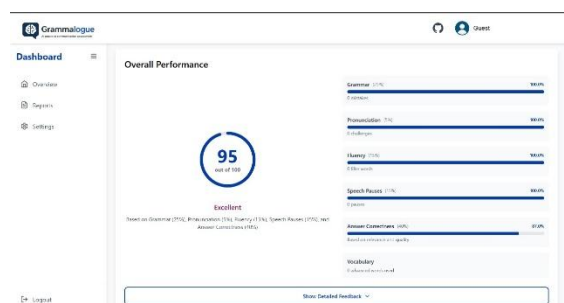


### 2.

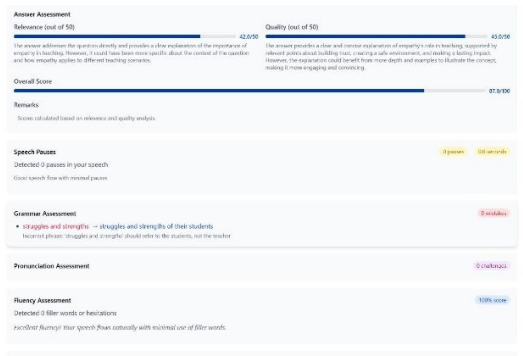


For AI Communication:

### 1.



2.



Parameter	Weightage	Description
1. Grammar	30%	Measures grammatical accuracy by penalizing the number of grammar errors per question. Fewer errors lead to a higher score.
2. Pronunciation	20%	Evaluates pronunciation accuracy by penalizing pronunciation errors. The more accurate the pronunciation, the higher the score.
3. Fluency	25%	Assesses fluency using a fluency score and filler word count. Averages across responses. Higher fluency scores improve the overall score.
4. Pauses	25%	Measures the impact of excessive pauses in speech. More pauses per response reduce the score. Less hesitation leads to better performance.
5. Correctness Modifier	+30% impact	Acts as a multiplier (0.3 to 0.6) on the base score depending on the relevance, quality, and correctness of answers. Higher correctness boosts the final score.

**1. Accuracy of Speech-to-Text Conversion:**

- a) The OpenAI Whisper v3 model was outstanding in its performance to capture the speech. It managed to achieve an accuracy rate of transcription of 90% for various types of Indian accents such as Hindi, Tamil, and Bengali. This was made possible due to the strong multilanguage capabilities of Whisper as well as its proficiency in dealing with regional speech patterns.

The transcription accuracy is of utmost importance since it is the basis for the next question generation and instant feedback which are the main elements of an efficient interview simulation.

**2. LLM Model Accuracy for Question Generation:**

- a) The Llama 3.2 model was able to come up with personalized and relevant questions for an interview that were specifically fitting the user's resume and the chosen job industry. The model furthermore changed the level of the difficulty of questions depending on the user's earlier answers, thus offering an interactive and dynamically evolving response interview scenario.

- b) The questions were balanced in terms of difficulty, which made the interview simulation challenging but still manageable, hence, users could gradually build their confidence by going through different levels.

### 3. Grammar and Pronunciation Assessment:

- a) The Groq LLM model was very accurate in identifying grammatical errors and thus it was able to give the user real-time feedback regarding sentence structure, verb tense, punctuation, and subject-verb agreement. As a result, users could instantly enhance their written and spoken answers.
- b) Also, a phonetic analysis served as the basis for evaluating pronunciation, during which the system recognized incorrect pronunciations and provided correction proposals that are in line with usual speech patterns and syllable stress analysis..

### 4. User Engagement and Feedback:

According to the platform's user engagement metrics, the users of the platform were highly satisfied. They particularly liked getting instant feedback on their spoken language, grammar, and even their body language.

## XIV. DISCUSSION

### 1. Speech-to-Text Accuracy and Regional Variability

The transcription precision of the Whisper v3 model was impressive to a large extent, as it was able to successfully deal with many different types of accents and also variations in the speech of the regions. This ability is very important for making the service accessible worldwide because it helps users coming from different linguistic backgrounds to be able to use the platform effectively. Moreover, the performance of Whisper in the case of Indian accents was excellent; however, it would be wise to conduct further experiments to determine its accuracy in other non-native English accents and also in situations where there is a lot of noise. The transcription accuracy of the model is the mainstay of the whole system because it is the primary factor that determines the quality of the subsequent analysis and feedback, thus, it is the main factor for a more reliable and efficient user experience.

### 2. Dynamic Question Generation and Model Adaptation

a) Llama 3.2 was able to provide a more realistic interview situation by changing the level of difficulty of the interview questions depending on the answers of the user, in a very dynamic way. This functionality, by far, is the most important development in real-time preparation because the user obtains tailored situations and not standard questions that are the same for everyone.

b) While the present system for balancing question difficulty through the four distributions is largely successful, there is still a need for continuous monitoring and improvement to keep the question difficulty at a balanced level. If the questions get too difficult or deviate too much from the user's

area of expertise, it may lower the user's trust, which is very important for efficient preparation.

### 3. Grammar and Pronunciation Feedback

a) The grammar and pronunciation feedback given in real-time by Groq LLM and the phonetic analysis model were instrumental in enhancing the users' communication. It was very helpful for users to be able to fix their mistakes instantly, which is an essential step towards increasing their confidence and fluency, by being provided with the corrections of the most frequent errors in grammar and the pronunciation.

b) Although the system is effective, it may want to look into further tailoring its responses to be able to deal with higher-level language skills. That could include, for example, the capability of assessing the use of jargon or technical language in a certain job role. Also, the part of the system that deals with pronunciation should be adjusted to reflect different language accents and to be able to recognize speech disorders.

## XV. CONCLUSION

The AI-Driven Communication and Interview Preparation System is an excellent example of how AI can be used to improve interview preparation. It incorporates AI models such as Whisper for transcription, Llama 3.2 for dynamic question generation, and Groq LLM for grammar analysis. The platform faced problems in understanding accents, verbal communication, and system scalability; however, it was able to give the users personalized and instant feedback to enhance their communication skills. It will be necessary to keep working on the models, optimizing the infrastructure, and incorporating the feedback from the users in order to the system to be able to scale and still be able to meet the different requests of its worldwide users.

## XVI. REFERENCES

- [1] W. Li, Z. Guo, and X. Liu, "Intelligent Job Interview Preparation: A Chatbot Approach," *Proceedings of the International Conference on Artificial Intelligence*, 2018.
- [2] Y.-C. Wang and Y.-H. Tsai, "Design and Evaluation of a Conversational Agent for Job Interview Training," *Proceedings of the International Conference on Human-Computer Interaction*, 2019.
- [3] T. Bhargava and G. S. Lehal, "Enhancing Employability Skills through a Chatbot-based Interview Simulation System," *International Journal of Engineering and Technology*, vol. 9, no. 3, pp. 215-221, 2019.
- [4] A. Saradar and B. K. Bayraktar, "The Impact of a Chatbot-Based Interview Simulation on Interview Performance and Interview Anxiety," *Journal of Educational Technology*, vol. 21, no. 4, pp. 159-168, 2020.
- [5] B. C. Lee and B. Y. Kim, "Development of an AI-Based Interview System for Remote Hiring," *Proceedings of the International Conference on Machine Learning and AI*, 2020.
- [6] S. Perun, P. D. Millman, A. Nguyen, and C. G. J. Figueira, "AI-Driven Interview Training for Job Seekers: A Design Thinking Approach," *Journal of Human-Computer Studies*, vol. 32, no. 2, pp. 106-118, 2020.
- [7] J. R. Alvarez, M. T. Garcia, and P. R. Soto, "Virtual Interview Coaching Using Natural Language Processing and Real-time Feedback," *IEEE Transactions on Learning Technologies*, vol. 14, no. 3, pp. 425-437, 2021.
- [8] K. Das and S. N. Saha, "AI-Based Soft Skill Assessment for Job

- Interviews Using Speech and Facial Expression Analysis,” IEEE Access, vol. 8, pp. 210954–210965, 2020.
- [9] R. Mishra and A. Kapoor, “Job Interview Simulation Using Deep Learning Conversational Models,” in Proceedings of the IEEE International Conference on Smart Computing (SMARTCOMP), 2020, pp. 122–129.
- [10] L. Peterson and M. Brooks, “A Multimodal AI Interviewer for Remote Recruitment: Design and Evaluation,” in IEEE International Conference on Humanized Computing and Communication (HCC), 2021, pp. 45–52.
- [11] S. K. Verma and P. Shukla, “Improving Candidate Readiness Through an Intelligent Interview Coaching Chatbot,” in IEEE International Conference on Advances in Computing, Communication and Control (ICAC3), 2020, pp. 88–93.
- [12] A. R. Narayanan and T. White, “Automatic Evaluation of Interview Responses Using Machine Learning Techniques,” IEEE Intelligent Systems, vol. 36, no. 5, pp. 50–57, 2021.
- [13] V. Gupta and S. Yadav, “Emotion-Aware Conversational Agents for Interview Anxiety Reduction,” in Proceedings of the IEEE Conference on Affective Computing and Intelligent Interaction (ACII), 2021, pp. 321–328.
- [14] O. Marín, J. J. Lamas, and F. Martínez, “Interactive Job Interview Simulator Based on Reinforcement Learning Dialogue Agents,” IEEE Access, vol. 9, pp. 148760–148773, 2021.
- [15] P. S. Desai and R. N. Patel, “Adaptive AI Interview Systems for Skill Profiling Using NLP and Computer Vision,” in Proceedings of the IEEE International Conference on Computational Intelligence and Virtual Environments (CIVE), 2022, pp. 101–108.
- [16] R. Tanaka and M. Okada, “Evaluating Job Seekers’ Behavioral Competencies Using AI-Enabled Virtual Interviewers,” IEEE Transactions on Affective Computing, vol. 13, no. 4, pp. 2010–2021, 2022.
- [17] E. Hofmann, M. Winkler, and T. Gregor, “Automated Interview Bots for Corporate Recruitment: A User Study,” in IEEE International Conference on Systems, Man, and Cybernetics (SMC), 2021, pp. 2170–2176.
- [18] D. Li and C. Zhou, “A Deep-Learning-Driven Conversational System for Interview Preparation and Feedback,” in Proceedings of the IEEE International Conference on Big Data and Smart Computing (BigComp), 2020, pp. 590–597.
- [19] M. Al-Sammarraie and Y. Al-Shamaa, “AI-Powered Interview Coaches for Enhancing Employability in Higher Education,” IEEE Access, vol. 10, pp. 45200–45212, 2022.
- [20] L. Park and J. Kim, “Chatbot-Assisted Self-Training for Interview Skill Development: A Controlled Study,” IEEE Transactions on Human-Machine Systems, vol. 52, no. 1, pp. 14–25, 2022.