AUTOMATED INTERVIEWER

By

Amar Sansil(12020002026006)

Surili Roshan(12020002001015)

Subhashni Kumari(12020002001122)

(B.Tech. CSE(AI-ML), 4th Year)

Under the Supervision of

Prof. Saurav Kumar

Dept. of Computer Science & Engineering

University of Engineering & Management, Jaipur

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Introduction

- Objective: Empower students in a competitive job market by creating a solution that enhances interview skills and builds confidence.
- Innovation: Introduce an intelligent system utilizing facial and speech emotion recognition for personality analysis in interviews.
- Gap Addressed: Recognize and address the current limitations in traditional interview processes, particularly in capturing candidates' personalities effectively.
- Efficiency: Streamline the hiring process by focusing on candidates who have passed resume screening, utilizing advanced technology for efficient and accurate personality trait assessments.
- Impact: Revolutionize the interview landscape by providing an insightful and time-effective solution, ultimately empowering students to navigate diverse job markets with confidence.

Literature Review

- Su, et.al [1]: Real-time AI-driven image processor predicting behavioral competencies via facial expressions using HOG-SVM and CNN in video interviews.
- Moldoveanu, et.al [2]: VR Job Interview Simulator enhances software engineers' skills through sensory, mental, and emotional immersion, incorporating computer vision and machine learning for tasks like facial detection and emotion analysis.
- Suen, et.al [3]: AVI-AI platform using TensorFlow CNN for asynchronous video interviews, displacing human raters in initial employment screening and predicting communication skills/personality traits.
- Katakwar, et.al [4]: CNN-based system for automatic personality recognition (APR) using personalized details, Python, and TensorFlow deep learning in job candidate assessment.
- Suen, et.al [5]: End-to-end AI interviewing system with AVI processing and TensorFlow for APR based on features extracted from asynchronous video interviews and true personality scores from facial expressions/self-reported questionnaires.

Objectives

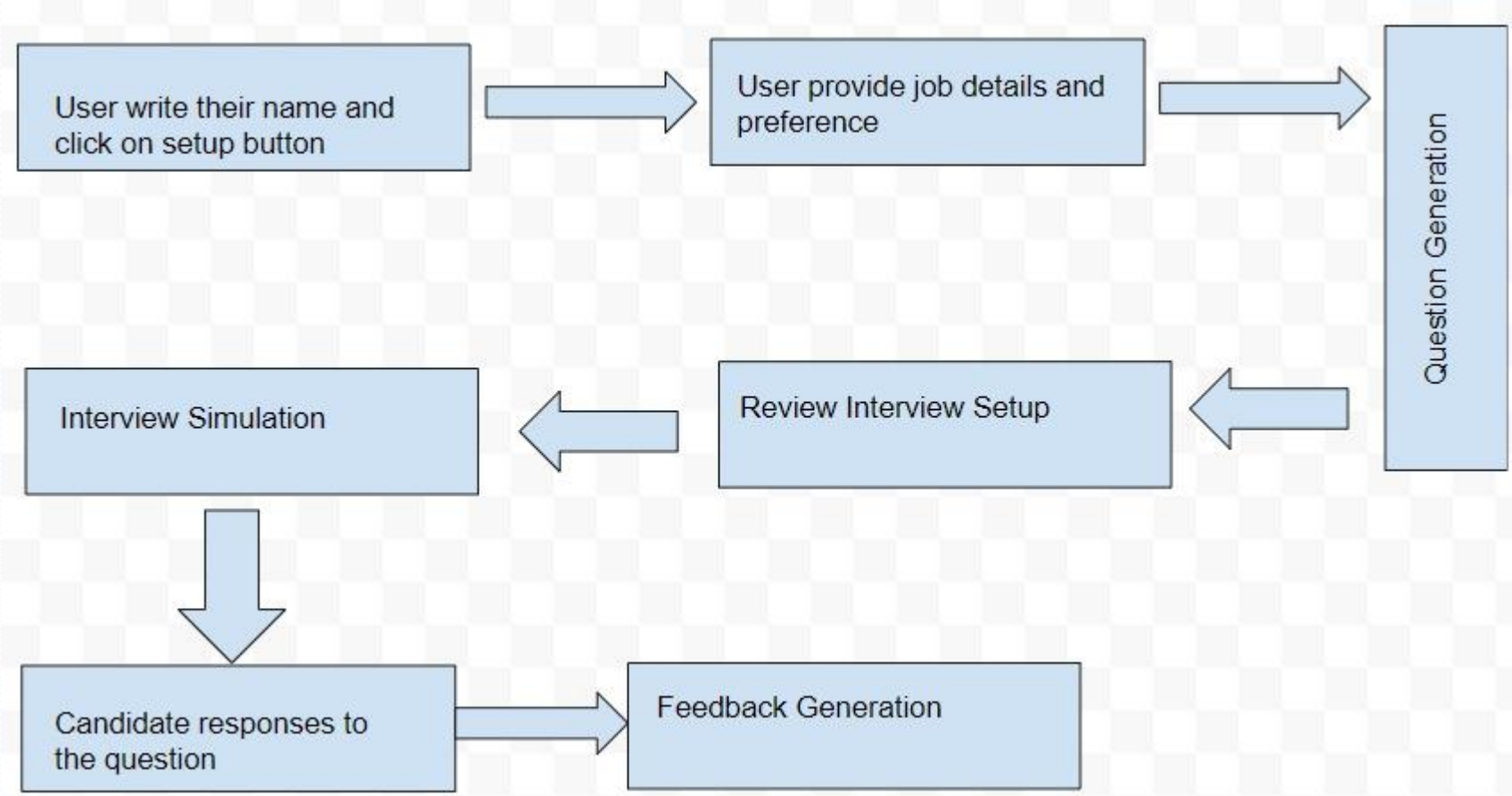
The primary objectives of this project are to:

- Develop an AI-powered interviewer system capable of conducting structured and engaging interviews with job candidates.
- Implement natural language processing (NLP) techniques to analyze candidate responses and extract relevant information.
- Utilize machine learning algorithms to assess candidate skills, experience, and cultural fit based on interview data.
- Generate comprehensive interview reports summarizing candidate strengths, weaknesses, and overall suitability for the role.

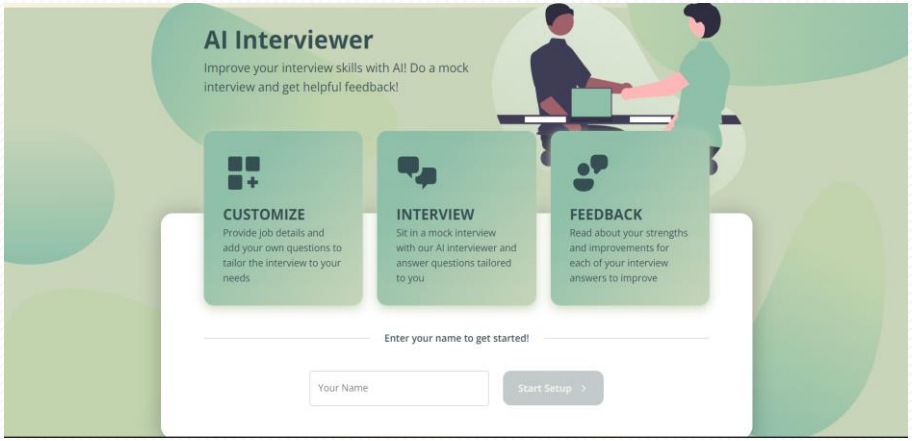
Proposed Model

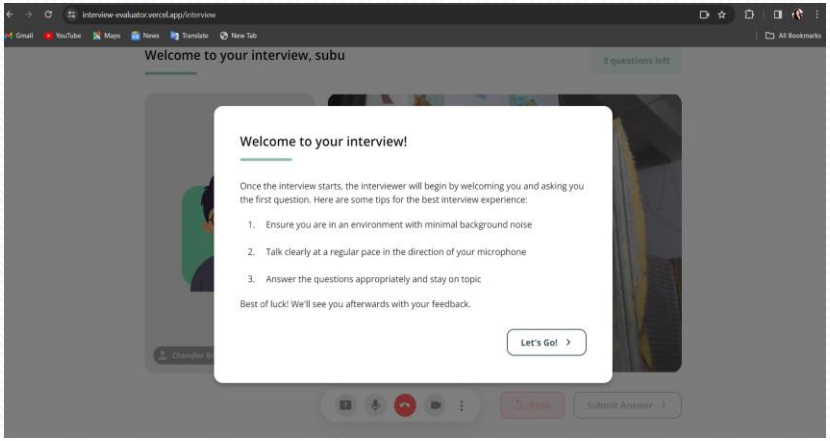
- Framework and Libraries:
  - Developed using Next.js for full-stack web development with React.js.
  - React.js used as the front-end JavaScript library.
  - Material UI library employed for clean and responsive UI components.
- Next.js Features:
  - Easy routing setup.
  - Implementation of server-side rendering for improved performance.
  - Streamlined HTTP requests from client to server.
- AI and NLP Capabilities:
  - Integration of OpenAI API and machine learning models for AI and NLP.
  - GPT-3.5 model utilized for question generation, interviewer's speech, and feedback.
  - Whisper and TTS-1 models from OpenAI for speech-to-text and text-to-speech.
- Additional Features:
  - Implementation of various React libraries for features like audio recording, camera functionalities, and minor components.
- Deployment Strategy:
  - Application deployment on Vercel for a seamless and scalable hosting environment.

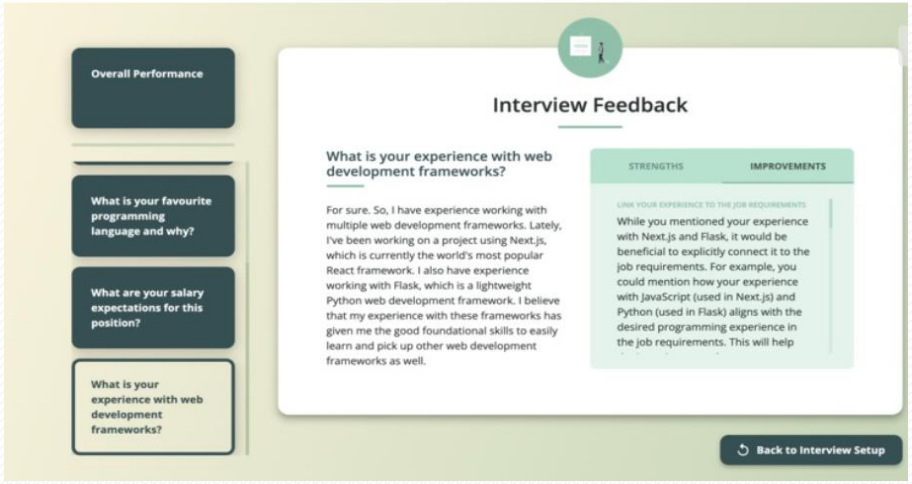
Work Flow

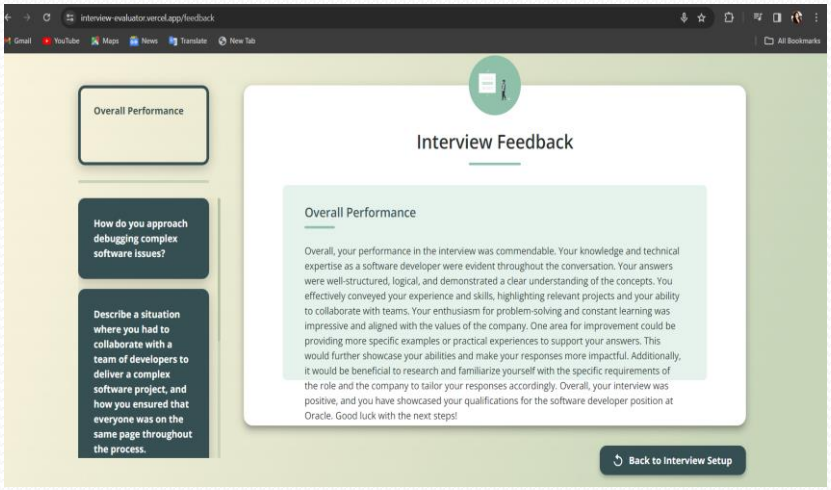

User write their name and click on setup button
User provide job details and preference
Question Generation
Review Interview Setup
Interview Simulation
Candidate responses to the question
Feedback Generation

Result: Example









Result Analysis

"In analyzing the results of our AI Interviewer web application, we focused on key aspects:

- User Performance: Assessed user responses for accuracy and coherence, and evaluated how well users utilized feedback.
- Question Generation: Examined the quality of AI-generated questions and the seamless interview experience, overcoming complexities in timing and feedback.
- User Satisfaction: Collected feedback on the visually appealing UI and assessed the effectiveness of accessibility features.
- Technical Challenges: Addressed slow OpenAI API responses through streaming, optimized prompts, and managed complexities in the interview simulation.
- Achievements: Developed a fully functional AI tool with a clean UI, effectively leveraging OpenAI's API in various ways.

Limitation

- Inadequacies in Current Systems: Recognized shortcomings in existing interview processes, characterized by manual data collection and outdated practices.
- Time-Consuming Procedures: Manual user information gathering and identifier assignment are labor-intensive, hindering efficiency in today's fast-paced environment.
- Personality Recognition Gap: Current systems lack efficiency in assessing interviewee personalities, a crucial factor in employee effectiveness, particularly in diverse participant pools.
- Refined Approach with AI: 'AI Interviewer' project aims to overcome limitations by integrating natural language processing and machine learning for a more comprehensive and insightful interview experience.
- Effective Candidate Evaluation: The project seeks to streamline interviews, addressing traditional system shortcomings and ushering in a more nuanced and effective approach to evaluating candidates.

Conclusions

- Transformative Approach: The system revolutionizes resume classification and personality analysis via video interviews, employing AI technologies such as facial expression analysis and speech emotion recognition.

- Holistic Assessment: Utilizing advanced AI, the system conducts a comprehensive evaluation of candidates, surpassing human capabilities and mitigating biases inherent in traditional recruitment processes.

- Efficiency Boost: Integration of AI expedites recruitment, enhancing accuracy and delivering optimal results in a significantly reduced timeframe.

- Comprehensive Understanding: The system analyzes multiple parameters, ensuring a thorough understanding of a candidate's personality and contributing to a fairer hiring process.

- AI Interviewer Impact: The virtual AI interviewer system signifies a significant advancement in talent acquisition, streamlining processes, enhancing objectivity, and revolutionizing how organizations identify top talent.

Future Scope

- Adding user authentication so users can check their interview simulation history and save interview templates
- Making the interview experience quicker and reducing latency
- Reducing the wait time for getting feedback for questions (currently takes around 30 seconds)

References

- **Facial Expression-Based Competency Prediction:** Y. Sue, H. Suen, K. Hung. "Predicting Behavioral Competencies Automatically from Facial Expressions in Real-Time Video-Recorded Interviews," Journal of Real-Time Image Processing, 2021.
- **VR Job Interview Simulator:** I. Stanica, M. Dascula, C. Bodea, A. Moldoveam. "VR Job Interview Simulator: Where Virtual Reality Meets Artificial Intelligence for Education," 2018 Zooming Innovation in Consumer Technologies Conference (ZINC), 2018.
- **Voice-Based Emotion Recognition:** E. Frant, I. Ispas, V. Dragomir, M. Dascalu, E. Zoltan, I. Stoica. "Voice-Based Emotion Recognition with Convolutional Neural Networks," Romanian Journal of Information Science and Technology, 2017.
- **Speech Emotion Recognition with Deep Learning:** R. Burger, M. Dutta. "Speech Emotion Recognition with Deep Learning," 4th International Conference on Signal Processing and Integrated Networks (SPIN), 2017.

- **TensorFlow-based Automatic Personality Recognition:** H. Suen, K. Hung, C. Lin. "TensorFlow-based Automatic Personality Recognition Used in Asynchronous Video Interviews," IEEE Access, 2019.
- **Deep Learning for Emotion Detection:** D. Shin, K. Chung, R. Park. "Detection of Emotion Using Multi-Block Deep Learning in a Self-Management Interview App," Applied Sciences, 2019.
- **GMM Supervector Based SVM for Speech Emotion Recognition:** H. Hu, M. Xu, W. Wu. "GMM Supervector Based SVM with Spectral Features for Speech Emotion Recognition," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2007), 2007.
- **Emotion and Personality Analysis with TensorFlow:** S. Katakwar, O. Mahamuni, N. Inamdar, S. Sadanand. "Emotion and Personality Analysis in Recorded Video Interview Using TensorFlow," International Research Journal of Engineering and Technology (IRJET), 2021.

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Amar Sansil,

Surili Roshan &

Subhashni Kumari

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