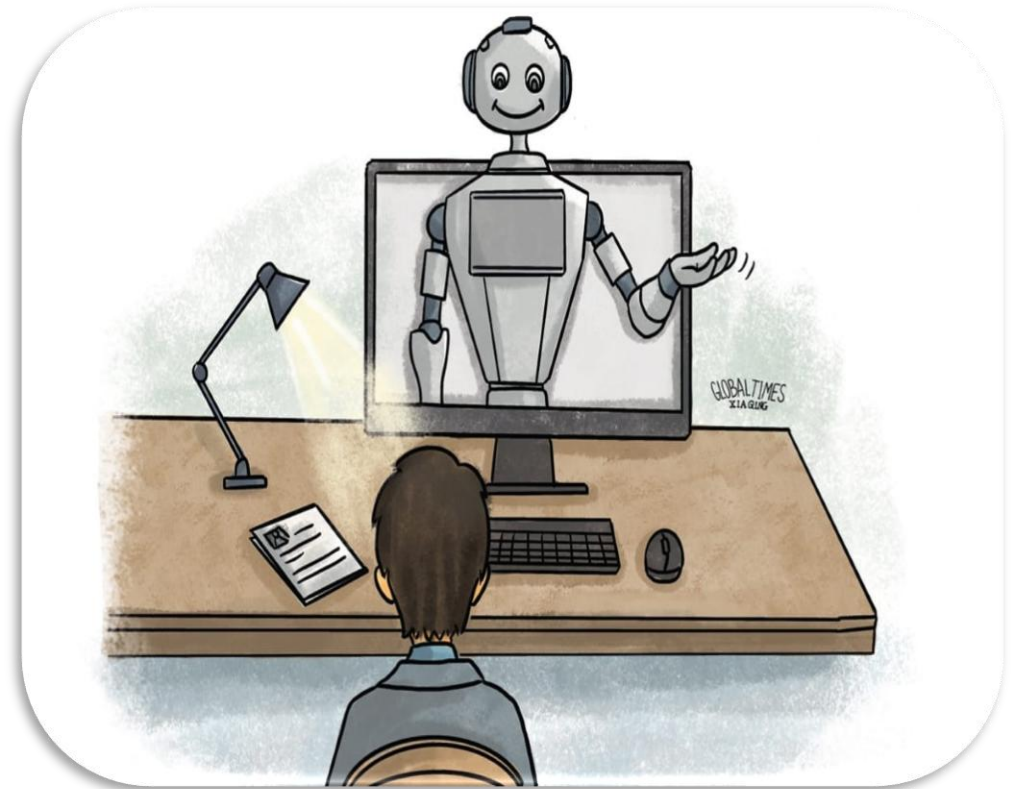


ASPIRA

AN AI-DRIVEN INTERVIEWER

Introduction

ASPIRA is a web-based platform for mock interviews, leveraging AI to simulate realistic interview scenarios. It evaluates users' skills, personality, and communication abilities, helping individuals, institutions, and organizations enhance interview readiness.



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Transforming the Interview Experience

Dynamic and Adaptive

- *ASPIRA adapts to candidates' responses in real-time, generating contextual follow-up questions and creating a truly personalized experience.*

Realistic Interactions

- *The platform uses AI avatars, TTS, STT, and virtual characters to create lifelike simulations that mirror real-world interview scenarios.*



Benefits for Users

Individuals

- *Candidates gain valuable interview experience, build confidence, and improve their skills for real-world job interviews.*

Academic Institutions

- *ASPIRA provides a valuable tool for students to practice interview skills and prepare for job searches.*

Organizations

- *Recruiters and HR professionals gain access to a platform that assesses candidates' skills and potential for success in their roles.*

Revolutionizing the Future of Interviewing

➤ Empowering Candidates

ASPIRA empowers candidates to excel in interviews by providing access to valuable experience and feedback.

➤ Enhancing Hiring Processes

The platform facilitates a more efficient and effective hiring process by streamlining candidate evaluation and assessment.

➤ Promoting Equal Opportunities

ASPIRA provides a level playing field for candidates, ensuring a fair and unbiased evaluation process



Literature Review

1) Tensor Flow-Based Automatic Personality Recognition Used in Asynchronous Video Interviews (2021)

Authors

- *Hung-Yue Suen*
- *Kuo-En Hung*
- *Chien-Liang Lin*

Methodology

The paper presents an AI-based Automatic Personality Recognition (APR) system leveraging:

- *Tensor Flow and CNNs for deep learning-based feature extraction and personality prediction.*
- *Data collected from asynchronous video interviews (AVI) of 120 real job applicants.*
- *Facial expressions analyzed using Open CV, Dlib, and a semi-supervised learning approach.*

Advantages

- *High accuracy (90.9% - 97.4%) in predicting personality traits.*
- *Eliminates biases present in human assessment.*
- *Cost-effective and scalable compared to manual personality evaluations.*
- *Integrates well with cloud-based platforms.*

Disadvantages

- *Limited dataset (only 120 participants) potentially reduces generalizability.*
- *Focuses on one specific professional group, restricting broader applicability.*
- *Non-diverse datasets might lead to biased predictions for other demographics.*
- *Results highly dependent on image quality and facial visibility.*

Future Scope

- *Incorporating multimodal features (audio and visual) to enhance accuracy.*
- *Expanding datasets for greater diversity and scalability.*
- *Improving the robustness of the model against varying interview environments (e.g., lighting, background noise).*
- *Applications beyond employment, such as education, mental health, and personalized marketing.*

2) Gaze and Head Rotation Analysis in a Triadic VR Job Interview Simulation (2023)

Author

- *Saygin Artiran*
- *Poorva S. Bedmutha*
- *Aaron Li, Pamela Cosman*

Methodology

- *Framework :Virtual Reality (VR)-based simulation for job interviews.*
- *Technology: Use of HTC Vive Pro Eye VR headset integrated with Unity and Vive*
- *Data Capturing: Eye tracking, head rotation monitoring, and voice activity*
SRanipal SDK.
- *detection Analysis: Social modulation of gaze and head orientation in triadic*

Advantages

- *Enables realistic and immersive job interview simulation.*
- *Provides inexpensive, solo practice without a human coach.*
- *Increases self-confidence and reduces anxiety through repeatable practice.*

Disadvantages

- *Limited by calibration challenges in eye-tracking technologies.*
- *Potential biases due to a small, male-dominated participant sample.*
- *Dependency on hardware, such as VR headsets, which might not be comfortable for all users.*

Future Scope

- *Expansion to diverse user groups to prevent behavioral biases.*
- *Development of varied question sets for broader training scenarios.*
- *Addition of emotional and conversational dynamics between virtual interviewers.*

3) You're Hired! Effect of Virtual Agents' Social Status and Social Attitudes on Stress Induction in Virtual Job Interviews(2024)

Authors

- *Celia Kessassi*
- *Cedric Dumas*
- *Caroline G. L. Cao*
- *Mathieu Chollet*

Methodology

- *Objective: Investigate the impact of virtual agents' social status and attitudes on stress induction during virtual job interviews.*
- *Virtual agents were controlled using the Wizard of Oz paradigm and equipped with meta-human models and pre-recorded voices.*
- *Participants' stress was measured using physiological sensors and subjective questionnaires before, during, and after the interviews.*

Advantages

- *Provides a controlled environment to study stress mechanisms in social evaluation scenarios.*
- *Incorporates virtual reality for immersive simulations, increasing ecological validity.*
- *Offers insights into how social status and feedback types influence anxiety, particularly in individuals with social anxiety.*

Disadvantages

- *Limited ability to generalize findings due to reliance on virtual avatars.*
- *No significant differentiation in stress levels based on virtual agents' status.*
- *Findings may not fully replicate real-world job interview dynamics.*

Future Scope

- *Explore ways to improve the realism and perceived status of virtual agents to better mimic real-world interactions.*
- *Study the impact of additional factors, such as cultural differences and non-verbal communication.*
- *Investigate personalized feedback mechanisms to enhance training effectiveness for socially anxious individuals.*

4)Intelligent Deception Detection Through Machine-Based Interviewing(2021)

Author

- *Jim O'Shea, Keeley Crockett,*
- *Wasiq Khan, Philippos Kindynis*
- *Athos Antoniadou,*
- *Georgios Bouladakis*

Methodology

- *The system uses an artificial neural network (ANN)-based framework to detect deception by analyzing non-verbal behavior, such as facial micro gestures*
- *Data is collected from interviews conducted by an avatar in border control scenarios. Participants were stratified into truthful and deceptive categories, and video data was analyzed.*
- *Silent Talker, a patented deception detection system, identifies micro gesture patterns to classify truthfulness or deception.*

Advantages

- *Effective in scenarios where large-scale interviews are necessary.*
- *Reduced reliance on human observers, minimizing fatigue and subjective bias.*
- *Demonstrated classification accuracy between 74% and 87%.*

Disadvantages

- *Limited to specific scenarios such as border control applications.*
- *Potential false positives due to varying emotional states of participants unrelated to deception.*

Future Scope

- *Enhancing avatar realism to improve human interaction.*
- *Expanding applications beyond border control, such as fraud detection in financial institutions.*
- *Integration with advanced sensors for richer behavioral data analysis.*

5) Fairness-Aware Multimodal Learning in Automatic Video Interview Assessment(2023)

Author

- *Changwoo Kim,*
- *Jinho Choi,*
- *Jongyeon Yoon,*
- *Daehun Yoo, Woojin Lee*

Methodology

- *A fairness-aware deep learning model was developed to predict interview scores using multimodal data (video, audio, text).*
- *Regularization terms based on the Wasserstein distance were introduced to balance fairness and accuracy.*
- *Adversarial training was employed to encode representations independent of sensitive attributes like gender.*

Advantages

- *Maintains fairness across groups by addressing sensitive attributes.*
- *Demonstrated superior performance in both fairness and accuracy over existing methods.*
- *Flexible trade-off adjustment between fairness and accuracy through hyper parameters.*

Disadvantages

- *Computationally expensive for large-scale multimodal datasets.*
- *Potential decrease in overall model accuracy when fairness is prioritized.*

Future Scope

- *Broader application in other domains like education*
- *Extending the fairness framework to include additional sensitive attributes.*
- *Further optimization to reduce computational overhead for real-world deployment.*

6)AI-based Behavioural Analyser for Interviews/Viva(2021)

Authors

- *Venuri Amalya*
- *Raveen Dissanayaka,*
- *Lahiru Lakshan*

Methodology

- *The system analyzes interviewees' non-verbal behaviors using deep learning and machine learning models. Key features include:-*
- *Smile detection and genuineness evaluation using CNN models.*
- *Eye gaze and blink detection using VGG16-based CNN and machine learning models.*
- *Head movement tracking using a CNN regression model (yaw, pitch, roll angles).*

Advantages

- *High accuracy (>85%) across models for detecting smiles, eye gaze, emotion, and head movements.*
- *Effective assessment of Big Five personality traits with RF models, ensuring unbiased evaluations.*
- *Provides comparative analysis (individual vs. group performance) and non-interview vs. interview contexts*

Disadvantages

- *Limited training data for certain features (e.g., smile genuineness), which required augmentation for higher accuracy.*
- *Challenges in handling real-time scenarios due to system complexity.*
- *Dependence on high-quality video inputs, which might be hindered by network issues in virtual interviews.*

Future Scope

- *Enhancing real-time capabilities for dynamic behavior analysis.*
- *Integrating question generation based on candidates' behavioral states.*
- *Customizing personality attribute assessments for specific job roles.*
- *Expanding the system to broader contexts like online education and general behavioral studies.*

7)Virtual Speech Anxiety Training - Effects of Simulation Fidelity on User Experience.(2023)

Authors

- *Sandra Poeschl,*
- *Nicola Doering.*

Methodology

- *The study used an experimental, cross-sectional 2×2 within-subject design. It tested two levels of simulation fidelity (static vs. animated audience) to observe effects on virtual presence, state anxiety, and perceived realism during a virtual speech anxiety training session. Participants completed semi-standardized questionnaires after exposure to each condition.*

Advantages

- *Animated audience led to significantly higher anxiety effects during public speaking, which is useful for realistic training in anxiety-inducing environments.*
- *Establishes that simulation fidelity has a measurable impact on anxiety levels, crucial for therapy applications.*

Disadvantages

- *No significant effect of simulation fidelity on virtual presence or perceived realism.*
- *The alpha-version application lacked realism due to limited audience models and nonverbal behaviors.*
- *The study did not include real performance measures, limiting its scope.*

Future Scope

- *Examine whether virtual presence is a necessary factor in VR therapy and training applications.*
- *Analyze interrelations between presence and performance*
- *Improve application realism with more diverse and realistic audience behaviors.*
- *Include performance metrics to better evaluate training effectiveness.*

8) Automated Analysis and Prediction of Job Interview Performance(2020)

Author

- *Iftekhar Naim*
- *M.Iftekhar Tanveer*
- *Daniel Gildea*
- *Mohammed (Ehsan) Hoque*

Methodology

- *The MIT Interview Dataset, consisting of 138 audio-visual recordings of mock interviews*

Features

- *Prosodic: Pitch, vocal intensity, pause duration, etc.*
- *Lexical: Linguistic Inquiry Word Count (LIWC) categories, speaking rates, and learned topics.*
- *Evaluation: Performance metrics include correlation coefficients and area under the ROC curve (AUC).*

Advantages

- *Provides quantitative insights into verbal and non-verbal behaviors in interviews.*
- *Supports real-time feedback via multimodal analysis.*
- *Predicts multiple traits with high accuracy (e.g., friendliness, engagement, excitement).*
- *Encourages data-driven improvements in social skills.*

Disadvantages

- *Dataset bias: Limited to MIT students, potentially lacking diversity.*
- *Ground truth ratings rely on Mechanical Turk workers, which may differ from expert evaluations.*
- *Absence of stress simulation in mock interviews.*
- *Limited modeling of temporal interactions or rare, impactful moments.*

Future Scope

- *Expanding datasets to include more diverse participants and real-world stress scenarios.*
- *Integrating temporal features to capture dynamic interactions*
- *Exploring anomaly detection for rare but impactful behaviors Enhancing feedback systems for real-time coaching, benefiting fields like customer service and telemedicine.*

ABSTRACT

- ❑ **Objective:** *Develop an AI-powered system for conducting mock interviews on a web-based platform.*
- ❑ **Technology Stack:** *Utilizes NLP, machine learning, and generative models like GPT-based architectures.*
- ❑ **AI Avatar Integration:** *Incorporates AI avatars, text-to-speech (TTS), and speech-to-text (STT) for lifelike interactions.*
- ❑ **Real-Time Adaptation:** *Adjusts questions dynamically based on candidate responses.*
- ❑ **Evaluation Capabilities:** *Assesses skills, personality traits, and communication abilities.*
- ❑ **User-Friendly Interface:** *Ensures ease of use for individuals, institutions, and organizations.*
- ❑ **Outcome:** *Enhances interview skills, boosts confidence, and prepares users for real-world opportunities.*

software Requirements specification

Features Overview

1. Adaptive Interviewing: 11-driven dynamic questions based on user responses.
2. Real-Time Interaction:-
3. Feedback and Analytics:
4. User Access : Support for individual Institutions, and Organizations

functional Requirements

1- User Authentication.

- Users can register and log in using email Social media, or Organizational Credentials.

2. Interview process

The system conducts adaptive Interviews based on user responses

- The virtual avatar displays realistic? body language and voice modulation.

3. Analytics and deed back

The system, provides feedback on communicating skills, confidence and body language.

Non-Functional Requirement

1. Performance Requirements

- The system should support up to 50 concurrent users*
- Response time for real-time Interactions must not exceed 500ms*

2. Security Requirements.

- Data encryption for users Information and recordings.*

3. Usability Requirements

- Intuitive and user-friendly Interface*
- Accessibility features such as screen readers and keyboard navigation*

Hardware Requirements



Processor: Quad-core (minimum),

- 2.5 GHz or higher (eg Intel Xeon or AMD EPYC)*
- RAM: minimum 16GB (32 GB recommended for large-scale use)*
- Storage: SSD with at least 500 GB (expandable for user data and logs)*

GPU: NVIDIA GPUS with CUDA supper (eg NVIDIA A100 model RT X 3090)for ai model processing.

- Network: High-speed Internet (1 gbps ar higher)*

software Requirements

➤ **Programming Languages**

- *Node js*
- *Python*

➤ **Speech to-Text (STT) and Text-to-Speech (TTS)**

- *Speech Recognition*
- *Pytesseract*

➤ **Machine Learning and Deep Learning**

- *Py Torch*

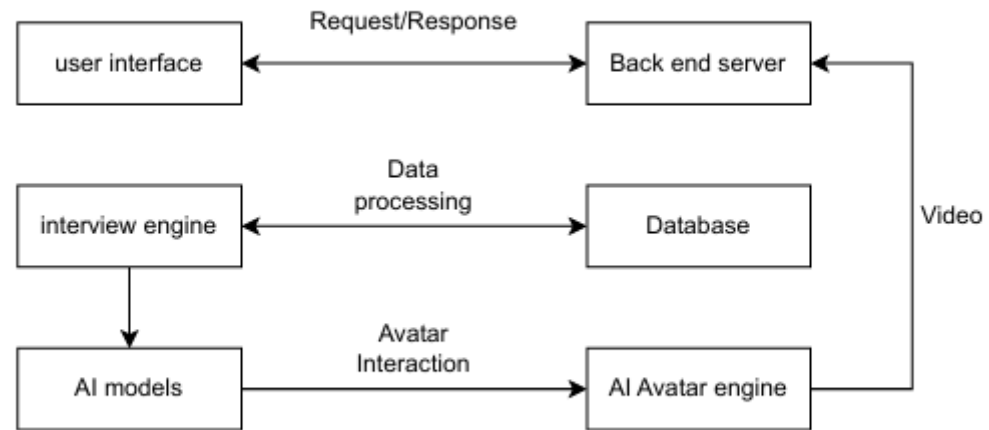
➤ **Visual Avatar and graphics**

- *Opencv-python*
- *Blender Python API*

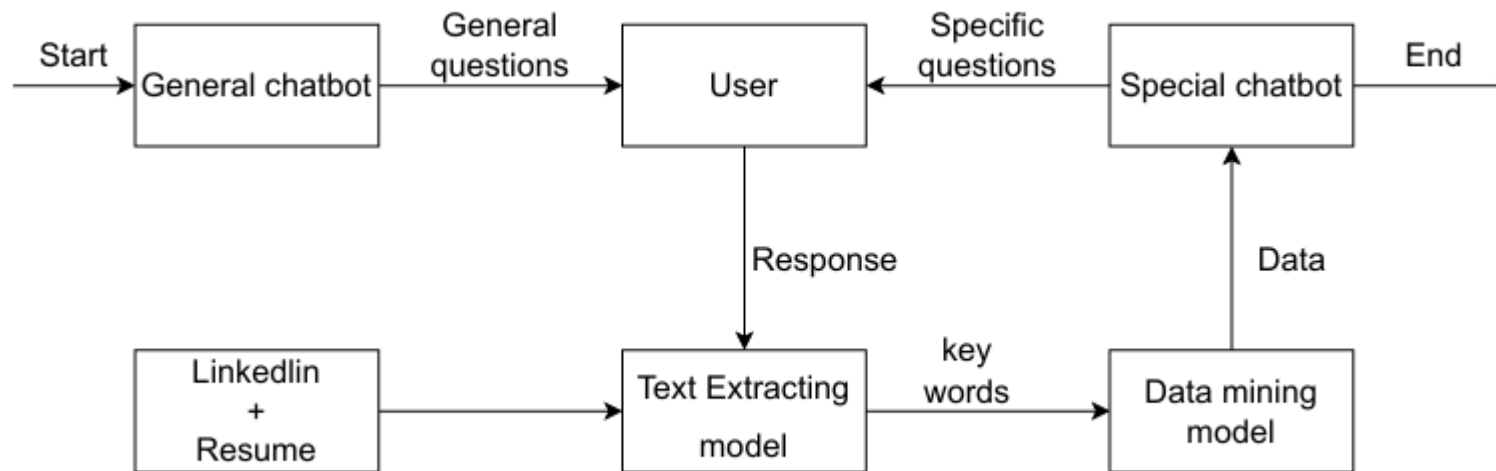
UseCase Diagram



System Design



Architecture Design



TRACEABILITY MATRICS

Requirement ID	Description	Test Case(s)	Status
R1	Generate AI-driven interview questions dynamically	TC1	Covered
R2	Implement speech-to-text (STT) conversion	TC2	Covered
R3	Integrate text-to-speech (TTS) for AI questions and feedback	TC3	Covered
R4	Use AI avatars for lifelike interview experiences	TC4	Covered
R5	Provide real-time evaluation and adaptive follow-up questions TC	TC5	Covered
R6	Store and retrieve previous interview data	TC6	Covered
R7	Ensure compatibility with desktop, tablet, and mobile platforms	TC7	Covered
R8	Secure user data and ensure privacy compliance	TC8	Covered

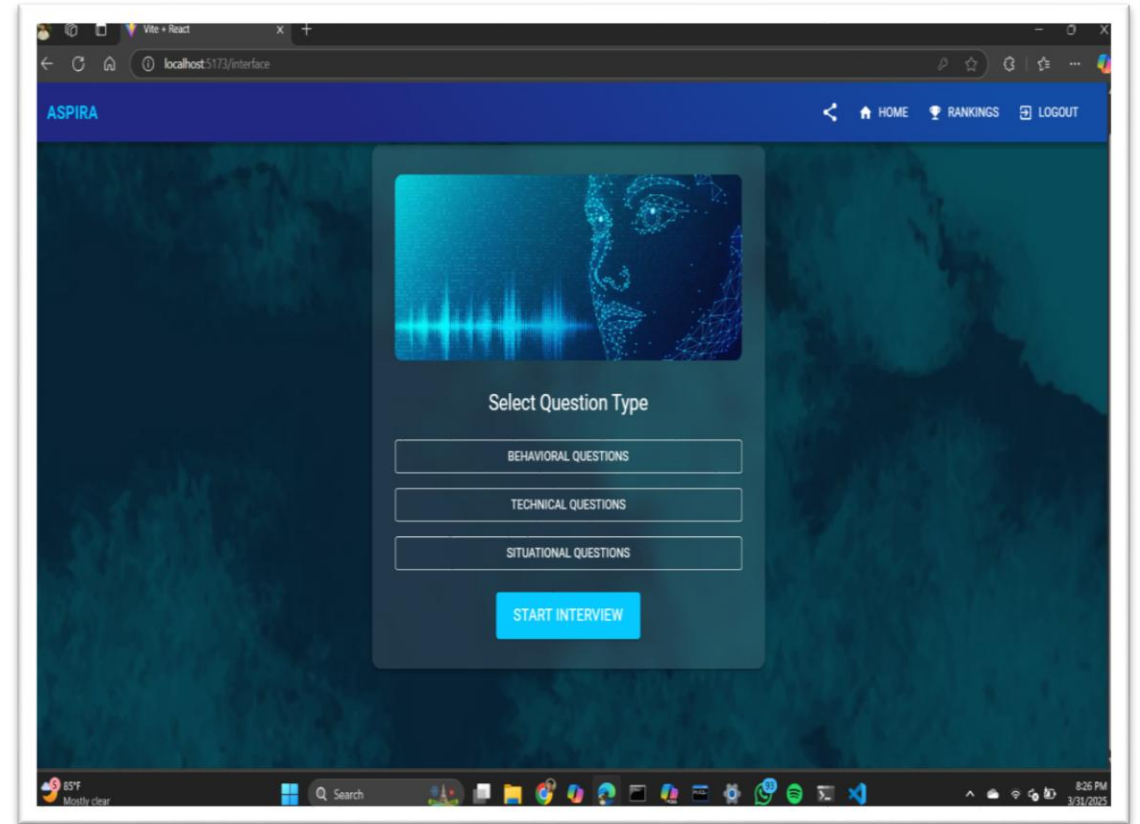
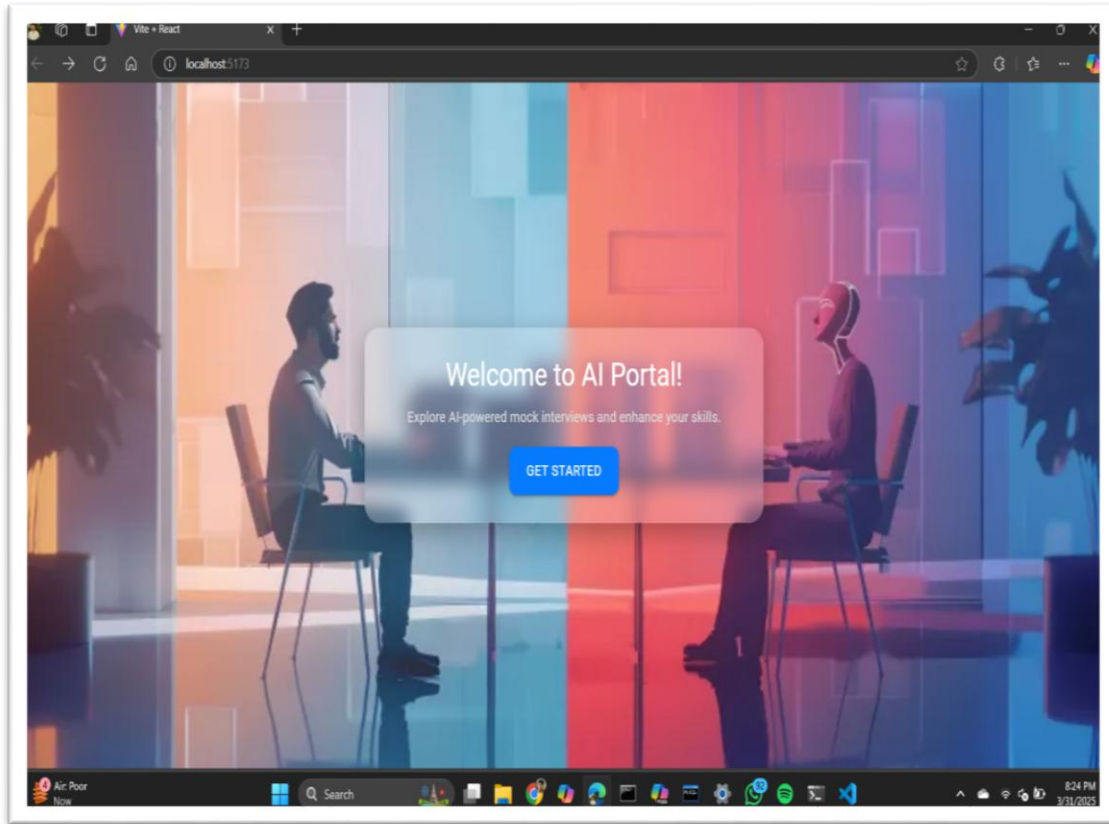
TEST CASE

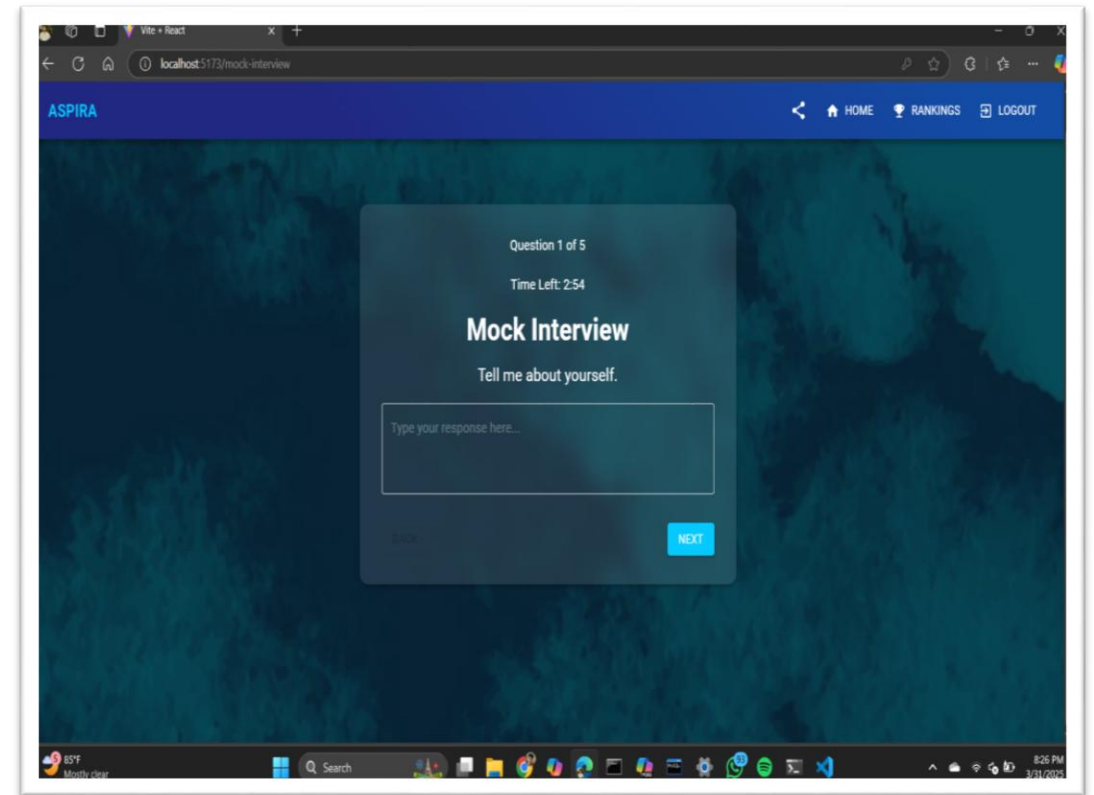
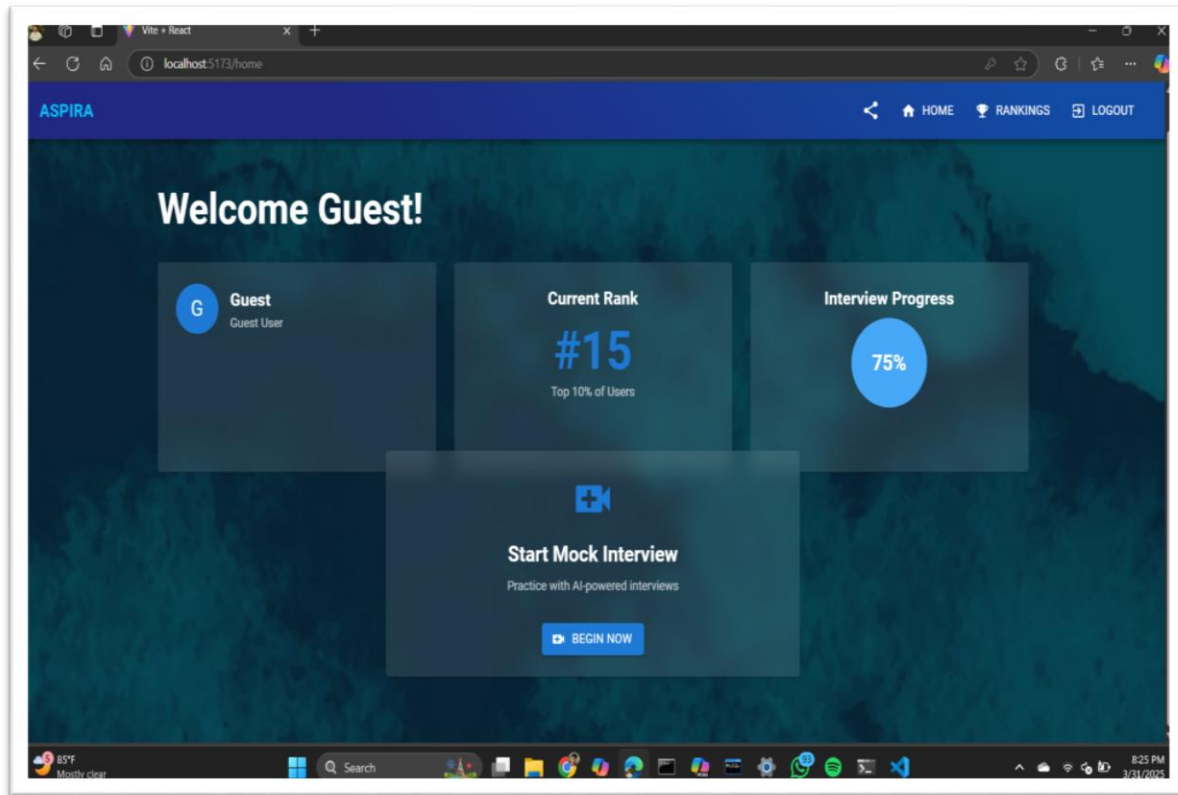
Test case ID	Test scenario	Test steps	Expected result
TC1	Verify AI generated question	Start an interview -> Provide responses	AI generates relevant questions dynamically
TC2	Validate speech-to text conversion	Speak into the microphone	System accurately converts speech to text
TC3	Check text-to-speech output	AI reads out questions	The voice output matches the displayed text
TC4	Test AI avatar interaction	Start AI interview	Virtual character responds appropriately
TC5	Evaluate real-time response analysis	Provide answers -> Expect follow-up	System adapts questions based on responses
TC6	Check past interview retrieval	Complete an interview -> Access history	Past interview records load correctly

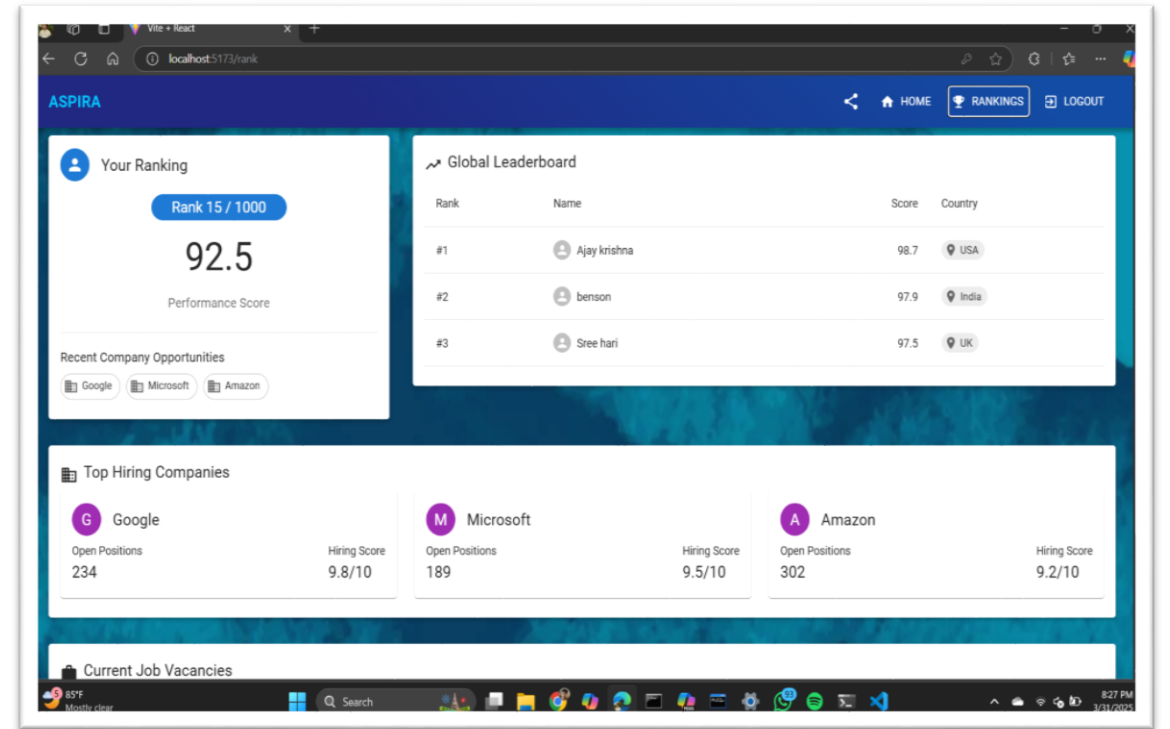
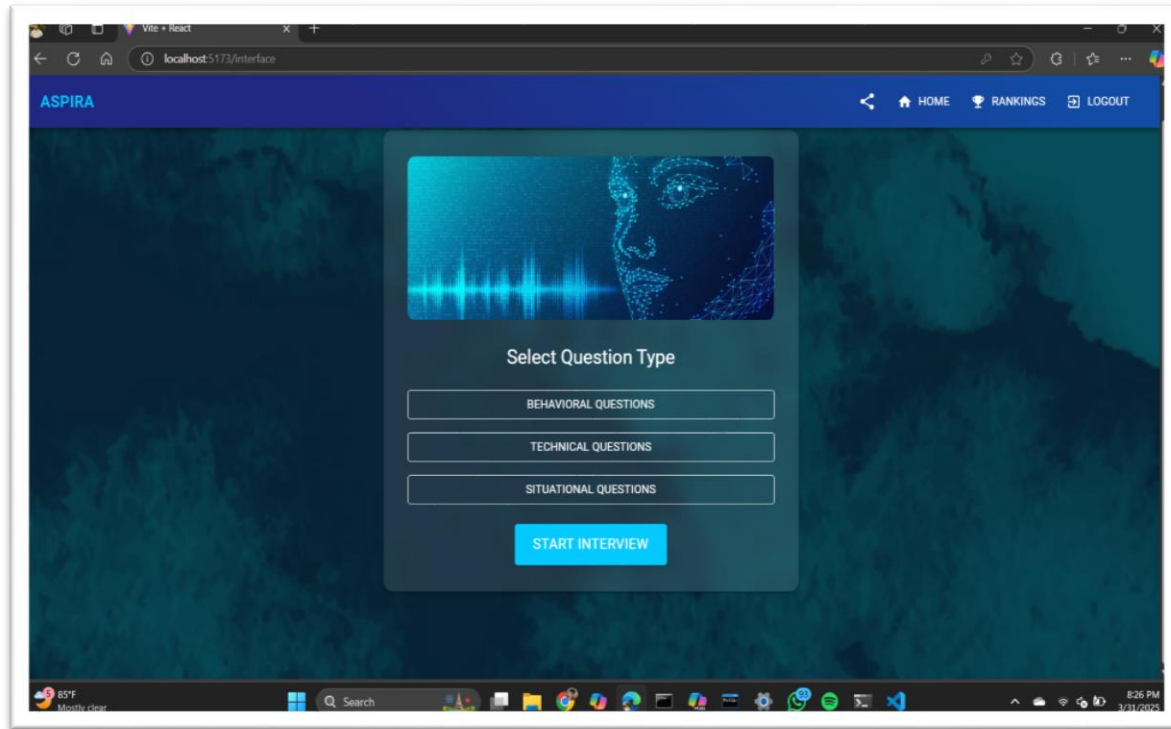
Project Plan

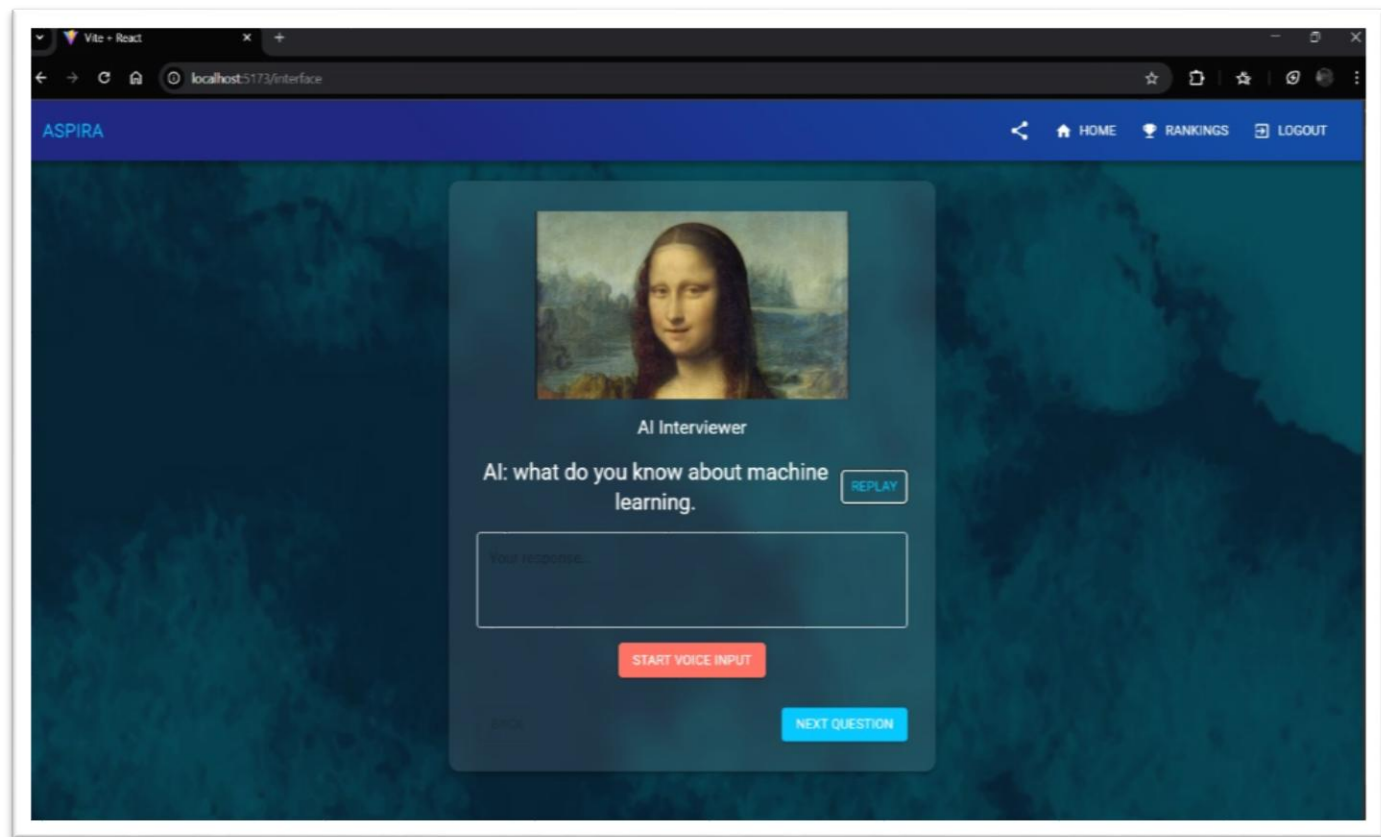
Sl.no	plan	Start date	End date	status
1.	Project area & topic selection	19-12-2024	19-12-2025	Completed
2.	Literature review	19-12-2024	19-12-2025	Completed
3.	Abstract	09-01-2025	09-01-2025	Completed
4.	Software requirement specification(SRS)	13-01-2025	13-01-2025	Completed
5.	System architecture design	23-01-2025	30-01-2025	Completed
6.	Initial design of special chatbot	23-01-2025	30-01-2025	completed
7.	Final design of special chatbot	30-01-2025		ongoing
8.	Initial design of keyword extraction	30-01-2025	06-02-2025	Completed
9.	Text to speech	30-01-2025	06-02-2025	Completed
10.	Test Plan	06-02-2025	20-02-2025	Completed

Result









THANKYOU

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