iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH
IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 Issue: VIII Month of publication: August 2025

DOI: https://doi.org/10.22214/ijraset.2025.73901

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue VIII Aug 2025- Available at www.ijraset.com

AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback

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Abstract: Preparation for interviews is an important step for success in academics and careers. Traditional false interviews require human participation, making them expensive, slow and hard scales. This article presents an AI operated mockery interview program that uses deep learning, Bhavna AI and web technologies to offer real-time automatic response. This system looks at facial expressions, feelings and reactions from the candidates during the practice of practice. This creates a personal performance report. Manufactured with a React frontier, Fastpi Backndar and Mongodb database, the frame dims for emotion recognition and Deeplus for Tensorflow. Experimental analysis suggests that the system can identify emotional stages such as happiness, sadness, anger, surprise, fear and neutrality. The results indicate a remarkable increase in confidence and self - assessment of the candidate than the methods of traditional preparation. This system can help educational institutions, career centers, corporate training programs and individual users. Future updates may include Gameifications to improve voice analysis, NLP-based response assessment and engagement.
Keywords: Ai Mock Interview, Emotion Recognition, Deep Learning, Fastpi, React, React, Real-Time Feedback, Result Analysis.

I. INTRODUCTION

The interview is a basic mechanism for evaluating the suitability of a candidate in academic and professional domains. In addition to assessing technical expertise, interviewers carefully inspect a candidate's trust, emotional stability, communication skills and body language, who play equally important to determine all success. Studies indicate that about 93% of human communication is non-verbal, which emphasizes the importance of facial expressions, gestures and voice in the formulation of perceptions during interviews. Despite this, most of the candidates struggle with interviews due to nervousness, lack of response and limited access to professional mentorship. Traditional methods for preparation of interviews, such as training sessions, colleagues spot interviews or career consultants are guidance, time -consuming, subjective and resource intensive. These approaches are often unable to give personal response to a candidate's performance, especially in relation to non-verbal signals such as nervousness, stress or overprint. In addition, access to professional coaches or masters cannot be possible for each student, especially deprived or from a rural background. As a result, there is a significant difference between traditional interview preparation methods and increasing demand for scalable, computer -driven training platforms. With progress in artificial intelligence (AI), especially in deep learning, emotional recognition and natural language treatment, new opportunities have emerged in the way they revolutionize, the way candidates have prepared for interviews. Data vision and nervous networks run by emotional recognition system, now happiness, sadness, anger, fear, surprise and high accuracy. By integrating these techniques into an interview training structure, it is possible to provide real - time, purpose and personal feedback that was previously unattainable. This article introduces the AI-based mockery interview system with emotional detection and real-time feedback, designed to bridge traditional mockery interviews and modern AI-operated evaluation devices. The proposed system benefits from Deepface for facial expression recognition, Tensorflow for deep learning and a seamless experience to provide fixed therapy (backend), React.JS (frontend) and a client server architecture using Mongodb (database). The system allows candidates to participate in mockery interviews, where their emotional conditions are analyzed by frame-for-frame frameworks, and results reports arise to emphasize strength, weaknesses and areas of improvement.

The main contribution of this research work is as follows:

1) The development of an AI-controlled mockery interview that follows the atmosphere of a reality interview.
2) Integration of the model to find face feelings to assess the level of confidence and stress indicators under the candidate responses.
3) 3rd generation of automated performance report allows users to track the progress in several sessions.
4) A scalable architecture that can be improved with advanced modules such as voice analysis, NLP-powered response assessment and AI scoring systems.

By combining emotion recognition, real -time analysis and interactive dashboards, the proposed system provides an individual, cost -effective and scalable solution for interview preparation. This work is expected to benefit students, job seekers, educational institutions and corporate training programs while contributing to AIS Brede fields in the career's preparedness and education.

II. LITERATURE REVIEW

The field for preparation of AI-POIL interview intensifies multiple domains, including emotional recognition, natural language treatment (NLP), Computer Vision and Human Computer Interaction (HCI). Over the past decade, researchers have made significant advances in the building system that can analyze the candidate's performance, but several intervals -spotter interviews remain in integrating real -time reaction with simulation.

A. A Emotion Recognition In The Conversation Of Human -Computer

Facial Action Coding System (FACS) [1] by Ekman and Frisen laid the foundation for analyzing subtle individuals and classifying emotions into six universal categories: joy, sadness, anger, fear, surprise and neutrality. With intensive learning progression, fixed neural networks (CNN) and recurrent nerve networks (RNN) have been widely used to improve the accuracy of emotion detection [2]. For example, FER-2013 data sets and its variants have become benchmarks to validate training and emotional recognition models. However, most of these studies were designed for general HCI applications (eg Entertainment, Healthcare) and not specific to interview training.

B. In Interview Training AI

Researchers have tried to create an AI -interview -Bot that simulates recruits -candidate interactions. Hoke at Al. [3] Developed a system that was capable of speech and gesture analysis for training purposes, but it only provided offline analysis after the session. Other AI interview assistants mainly focus on question production and response evaluation, but they have a lack of ability to capture non-verbal signals such as facial expressions or stress indicators. This makes a difference where candidates can get feedback on their answers, but remain unaware of their emotional presentation, which plays an important role in the interview.

C. Polys

Many studies emphasize the value of multimodal response, and combine speech, text and facial signals for performance evaluation. Kapoor and Picard [4] emphasized that multimodal emotional recognition improves strengthening by taking advantage of the correspondence between tone, oral material and facial expressions. Corresponding Zeng et al.] However, multimodal systems are often computational expensive, making real -time delaying challenging for students or institutional use.

D. Intervals in Existing Works

1) Existing AI interview systems focus on Q&A and oral reaction scoring, but rarely integrate real -time recognition.
2) An emotional detection models achieve high accuracy in the controlled environment, but performance decreases the real landscapes like little light or camera quality.
3) Some platforms are designed with scalability and user -friendly dashboards, which are necessary to use educational institutions and training centers.
4) In many sessions, there is limited research on monitoring candidates' improvement, which is important for progressive teaching.

E. Contributions to proposed work

Unlike the above studies, the proposed system integrates a real-time agreement-based feeling with a real-time response dashboard. Unlike advance functions, it does not limit analysis for the evaluation of offline, but provides immediate visualization of stress, self -confidence and distribution of emotion during interviews. In addition, the system is designed using a scalable client server architecture (React + Fastapi + Mongodb), which ensures expansion with voice analysis, NLP-led scoring and AI interviews.

III. METHODOLOGY

A. Existing Methodology

Existing mockery interviews and preparation platforms usually depend on human tested sessions or AI-based chatbots that follow the question-answer interaction. While these approaches help the candidates practice practicing, they often have a lack of emotion recognition, real -time guidance and progress tracking.

1) Traditional Mockery Interview With Mentors

Classes, fitness centers or careers were organized by consultants.

Main features:

• Personal guidance through face to face reaction.

• Realistic interactions with human evaluator.

• Direct evaluation of oral and non-oral communication.

Limits:

• Expensive and time -consuming.

• Set and inconsistent evaluation based on mentor.

• Not scalable for large groups of students.

2) AI Interview Bots (Q&A System)

Web -based systems that ask predetermined or randomly generated questions.

Main features:

• Provide false interview environments.

• Offer automated questions sequencing and response logging.

• Some include NLP-based text analysis of answers.

Limits:

• Limited or no emotions are known.

• Limited to the content of the response, ignoring the level of self -confidence/stress.

• often give results only after the session, not in real time.

3) Standalone Emotion Recognition Tools

Emotion recognition frameworks (e.g., FER systems) used in healthcare or gaming.

Main features

- Analyze facial expressions to classify emotions such as happy, sad, angry, etc.
- Achieve high accuracy on benchmark datasets.
- Applicable to human–computer interaction tasks.

Limitations

- Designed for general affect recognition, not interview-specific training.
- Do not provide feedback within the context of interview performance.
- No integration with reporting or user dashboards.

Drawbacks of Existing Systems:

- Lack of Real-Time Feedback: Most provide only post-session analysis.
- No Progress Tracking: Users cannot compare performance over multiple sessions.
- Limited Scalability: Human-led methods cannot handle large groups.
- Narrow Focus: Existing systems address only Q&A or emotions, not both together.
- Absence of Integration: Few platforms combine AI-based analysis with structured reports.

B. Proposed Methodology

The proposed AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback is a full-stack AI-powered solution that integrates deep learning models, real-time dashboards, and cloud-based scalability. It overcomes the drawbacks of existing methods by providing an all-in-one platform that simulates interviews, detects emotions, and delivers instant feedback.

1) System Workflow

- Frontend (React.js + Chakra UI): Captures candidate video/audio, renders live emotion charts, and provides a user-friendly dashboard.
- Backend (FastAPI + Python): Implements DeepFace and TensorFlow for emotion recognition; exposes APIs for analysis and report generation.

- Database (MongoDB): Stores user sessions, emotional logs, and historical performance reports for longitudinal tracking.
- Authentication: JWT-based login for secure session handling.
- Deployment: Scalable deployment on cloud servers with support for multiple concurrent users.

2) Functional Modules
- Candidate Module: Attend mock interviews, receive real-time emotion-based feedback, and view session reports.
- Admin Module: Manage users, monitor system usage, and review analytics of interview outcomes.
- Feedback & Visualization Module: Generates real-time emotion distribution charts, confidence timelines, and personalized alerts.
- Report Generation Module: Creates detailed post-session reports with trends, recommendations, and historical comparisons.
- Extensibility Module: Supports future features such as NLP-based response analysis, voice tone assessment, and AI interviewer bots.

3) Data Processing Pipeline
- Input Capture → Preprocessing (face detection, normalization) → Emotion Detection (DeepFace CNNs) → Feedback Generation → Report Creation → Storage in MongoDB.

4) Data Security & Reliability
- Role-Based Access Control (RBAC): Separates candidate, admin, and interviewer access.
- Secure Data Transmission: HTTPS with JWT ensures safe client–server communication.
- Low-Latency Processing: Asynchronous APIs keep response time under 200 ms/frame.
- Scalability: Cloud deployment allows multiple candidates to practice simultaneously.
- Reliability: MongoDB ensures persistent storage of reports and session data.

IV. SYSTEM DESIGN AND ARCHITECTURE

The AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback is designed using a layered architecture to ensure modularity, scalability, and maintainability. The system leverages a full-stack architecture (MongoDB, FastAPI, React.js) and adopts a three-tier structure Presentation Layer, Application Layer, and Data Layer. This separation of concerns enables independent scaling, efficient data handling, and secure execution of interview simulation workflows.

A. Architectural Overview

1) Presentation Layer (Frontend): Built using React.js with Chakra UI for modern and responsive design, the frontend serves as the primary interface for candidates and administrators. It enables candidates to attend mock interviews, provides dashboards to visualize real-time feedback, and presents session-wise performance reports. Smooth animations are integrated using Framer Motion, and API communication is handled using Axios.

2) Application Layer (Backend): Implemented using FastAPI (Python), the backend handles the business logic, RESTful API routing, and the core workflows of the system. It integrates DeepFace and TensorFlow for facial emotion recognition, processes video frames asynchronously to ensure low latency, and manages user authentication via JWT. The backend also generates structured performance reports after each session.

3) Data Layer (Database): MongoDB serves as the database, storing user profiles, interview history, emotional logs, and feedback reports. Its flexible document-oriented structure supports scalable storage and efficient querying for large numbers of users and sessions. It also enables long-term progress tracking, allowing candidates to compare performance across multiple interviews.

4) Communication Flow: Frontend–backend interactions occur via RESTful APIs over HTTPS. JWT tokens are used for secure authentication and role-based access control. During an active interview session, the frontend streams video frames to the backend for processing, and the backend responds with emotion predictions and feedback data in real time.

5) Deployment: The frontend can be deployed on Vercel, the backend using Uvicorn/FastAPI servers on cloud platforms such as Render or AWS, and the database using MongoDB Atlas for scalability and reliability. This ensures high availability and optimized performance for multiple concurrent users.

6) Testing: System reliability is validated through unit testing of backend APIs using PyTest, functional testing of frontend modules with tools like Jest, and integration testing to verify smooth end-to-end workflows. Stress testing is performed to ensure consistent response times under multi-user load conditions.

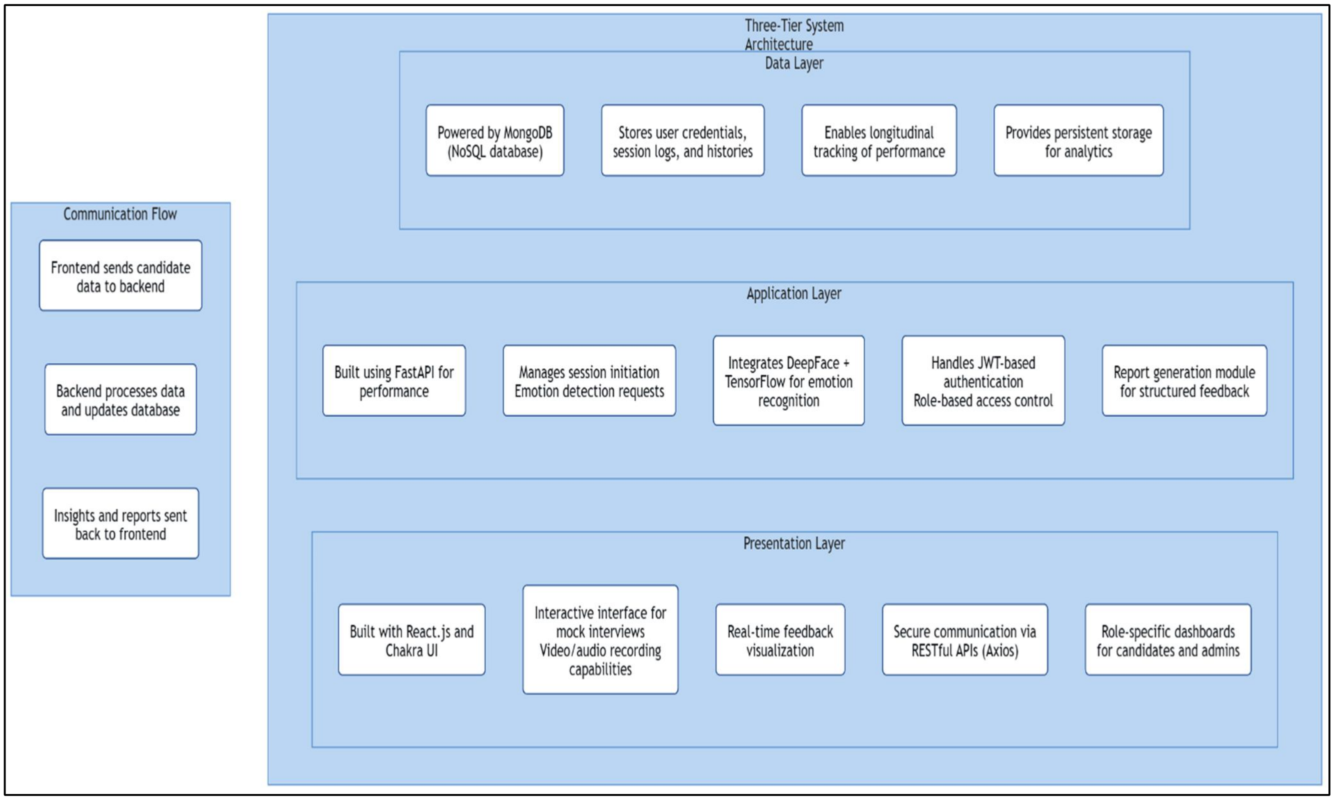

Fig. 1: Three-Tier System Architecture of Smart Interview Platform

V. DATA FLOW AND AUTHENTICATION WORKFLOW

The AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback is designed to ensure secure session management, accurate real-time feedback, and robust user authentication. This is achieved through two integrated workflows: data flow for interview processing and a secure authentication process.

A. Data Flow of Interview Session

The platform follows a structured data flow to manage the lifecycle of a mock interview, ensuring seamless communication between the frontend, backend, and database.
The workflow, as illustrated in Fig. 2, includes:

1) Interview Initiation: Candidates log into the system via the frontend and start a mock interview session. The video/audio stream is captured through the browser interface.
2) Frame Extraction: The frontend extracts video frames at regular intervals (5–10 fps) and sends them to the backend API for analysis.
3) Emotion Recognition: The backend (FastAPI) processes the frames using DeepFace + TensorFlow, classifying them into six emotion categories (happiness, sadness, anger, fear, surprise, neutrality). Results are tagged with timestamps.
4) Real-Time Feedback: Predictions are sent back to the frontend, where charts and confidence timelines are dynamically updated. Candidates receive live indicators of stress, confidence, and nervousness.
5) Performance Report Generation: At the end of the session, the backend aggregates the results and generates a detailed report, which is stored in MongoDB. This report includes emotion distribution, progress trends, and personalized recommendations.
6) Session Storage: MongoDB maintains historical logs of all interviews, enabling candidates to compare performance over multiple sessions for continuous improvement.

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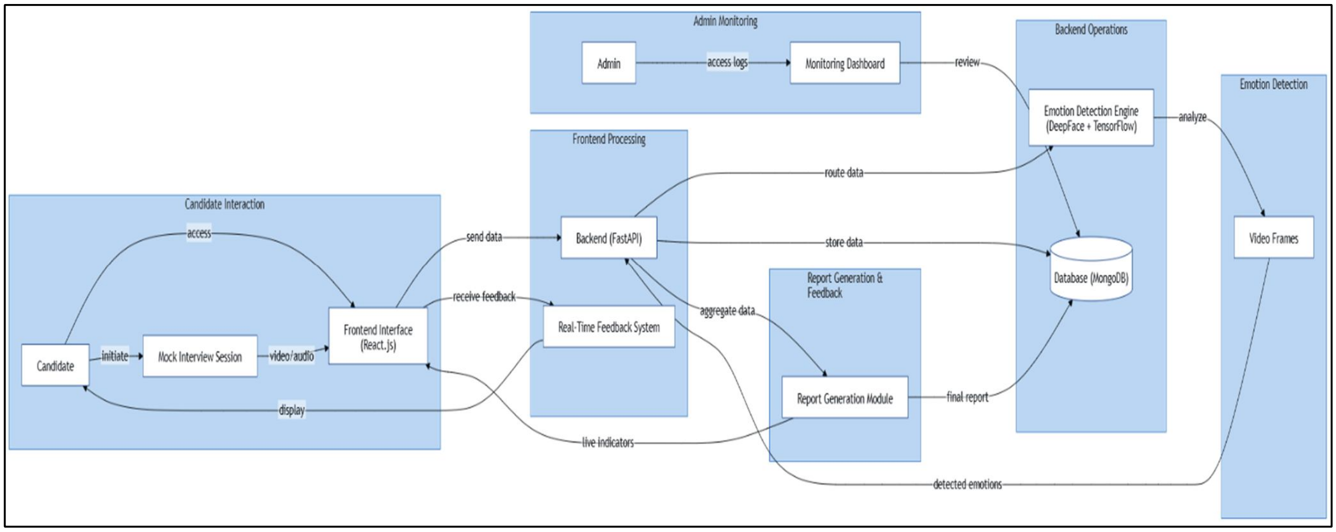

Fig: Data Flow Diagram of the Mock Interview Lifecycle in AI-Based System

B. *Login and Authentication Workflow*

The system employs a secure, role-based authentication workflow (as shown in Fig. 3) to ensure only authorized users (e.g., candidates, admins/trainers) can access relevant features. The process integrates credential validation, token-based authentication, and secure routing.

1) User Login: Candidates and admins provide credentials (email/password) via the frontend. These are transmitted to the backend for verification against MongoDB-stored hashed credentials.
2) JWT Generation: Upon successful authentication, the backend issues a JSON Web Token (JWT) containing user identity and role. This token is sent to the frontend and stored securely (e.g., in HTTP-only cookies or local storage).
3) Role-Based Access Control (RBAC): The frontend dynamically renders dashboards based on user roles (e.g., candidates access interview modules, admins access analytics dashboards). APIs enforce RBAC to prevent unauthorized access.
4) Session Management: Each API request includes a JWT, which is validated before processing. Tokens have expiration policies to ensure session security. Communication occurs over HTTPS to protect against eavesdropping.
5) Security Measures:
    - Passwords are securely hashed (e.g., using bcrypt).
    - JWT tokens are signed with a secret key stored in environment variables.
    - Audit logs record login attempts, interview sessions, and report generations for monitoring and transparency.

VI. IMPLEMENTATION

The AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback was implemented using a full-stack architecture (MongoDB, FastAPI, React.js) to ensure modularity, scalability, and secure role-based operations. Each functional component is developed as an independent module, integrated seamlessly to support mock interview workflows and emotion detection processes.

A. *Frontend Implementation*

The frontend is developed using React.js with Chakra UI to provide a responsive, user-friendly design. Role-based dashboards dynamically render based on the authenticated user's role. Smooth animations and transitions are integrated using Framer Motion for enhanced user experience.

Key Features:

1) Role-Specific Dashboards:
2) Candidate: Start mock interviews, receive live feedback, and review session reports.
3) Admin: Manage users, monitor system usage, and view performance analytics.

4) Reusable Components: Navigation bars, interview session cards, modals, and performance charts are developed as React components for maintainability.
5) API Integration: Axios manages communication with backend APIs for real-time emotion detection, report generation, and session management.
6) Validation: Frontend input validation (e.g., login credentials) is combined with backend checks to ensure data integrity.

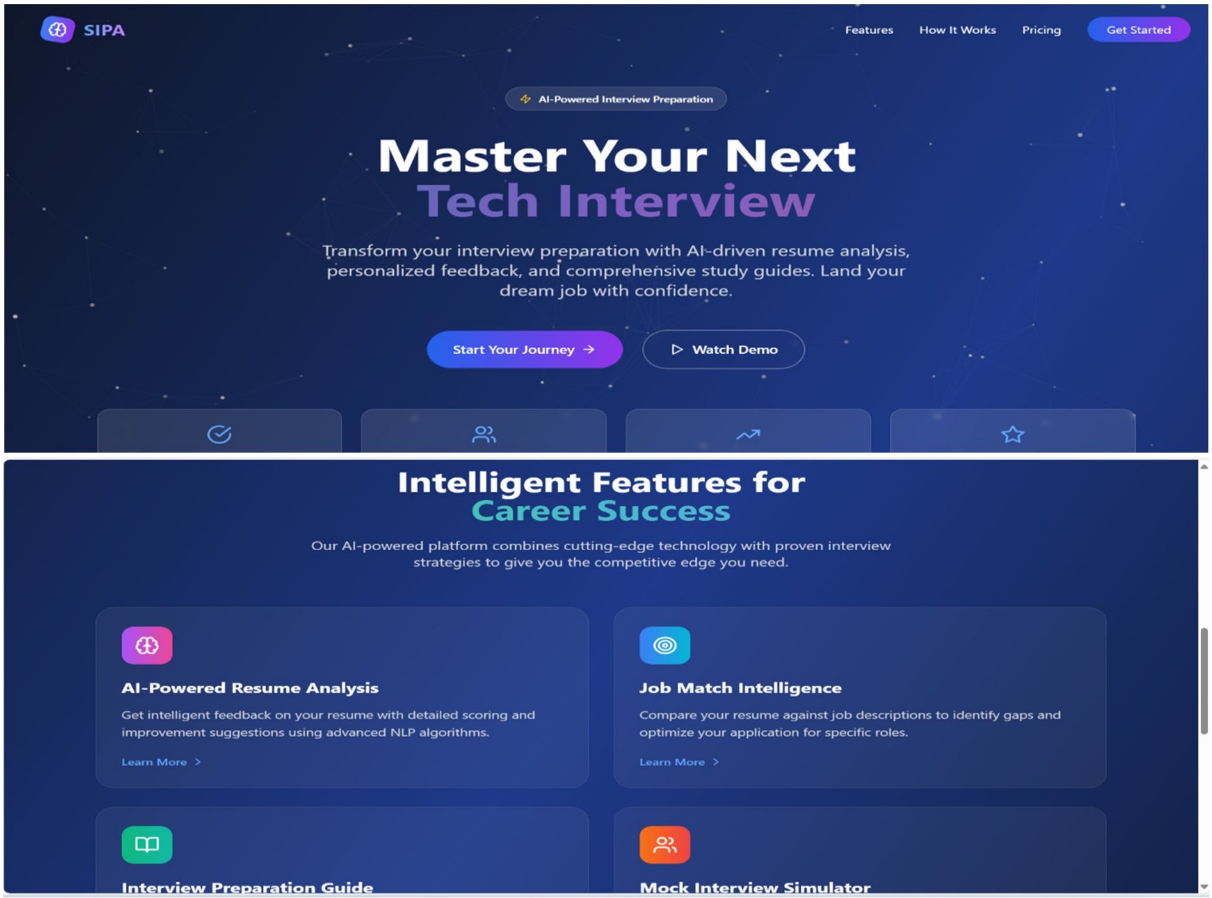

Fig: Home Page of AI-Based Mock Interview System

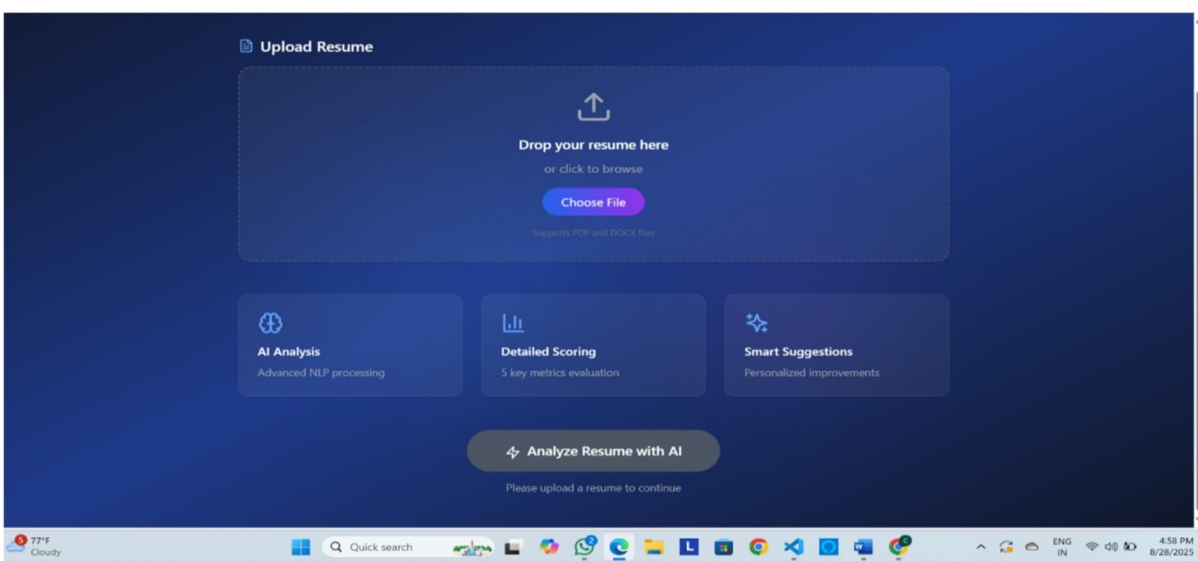

Fig: Dashboard of AI-Based Mock Interview System

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue VIII Aug 2025- Available at www.ijraset.com

B. Backend Implementation

The backend is implemented using FastAPI (Python), following a modular structure to separate business logic, API routing, and model integration.

Key Features:

1) Models: Schemas for Users, Interview Sessions, Emotion Logs, and Reports are defined and stored in MongoDB.
2) Controllers: Manage workflows such as real-time emotion recognition, feedback generation, and performance report creation.
3) Routes: RESTful API endpoints handle session creation, frame uploads, and report retrieval, secured with JWT middleware.
4) Emotion Recognition: Integration with DeepFace and TensorFlow enables emotion classification from video frames.
5) Error Handling: Centralized exception handlers ensure consistent API responses and detailed error logging.

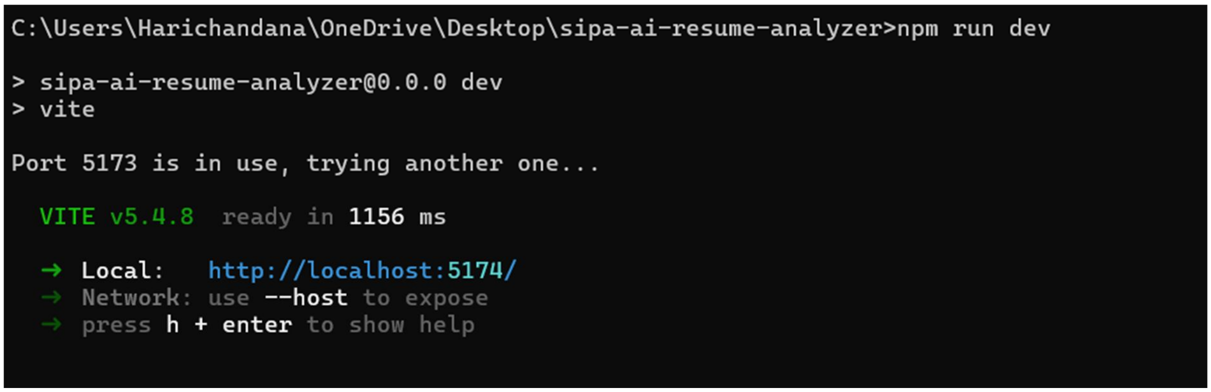

Fig: FastAPI Backend Running Successfully

C. Database Implementation

The database is implemented using MongoDB, a document-oriented NoSQL database, for flexible and scalable storage.

Collections Used:

1) Users: Stores login credentials, role types (Candidate, Admin), and metadata.
2) Interview Sessions: Contains session details such as timestamps, candidate IDs, and video references.
3) Emotion Logs: Stores frame-by-frame predictions with emotion labels and probabilities.
4) Reports: Holds structured feedback reports, charts, and recommendations for each candidate.

D. Key Modules Implemented

1) User Management Module: Admins manage candidate accounts, enforce secure authentication, and monitor system activity.
2) Interview Session Module: Candidates start interview sessions, with video/audio captured and sent for real-time analysis.
3) Emotion Detection & Feedback Module: DeepFace processes frames to classify emotions; results are displayed live on the candidate’s dashboard.
4) Report Generation Module: At session end, performance reports are compiled with graphs, summaries, and personalized recommendations.
5) Analytics Module: Tracks longitudinal progress, allowing candidates to compare current results with past sessions.

E. Testing and Validation

1) Unit Testing: Backend API endpoints tested using PyTest and frontend modules validated with Jest.
2) Functional Testing: Verified complete workflows, including login, interview session initiation, emotion recognition, and report generation.
3) Role-Based Testing: Ensured dashboards and features are correctly restricted to candidates and admins.
4) Validation Cases: Tested for incorrect logins, missing frames, unauthorized API requests, and invalid session handling.

F. Technology and Stack Overview

The AI-Based Mock Interview System is implemented with a combination of React.js, FastAPI, MongoDB, and Deep Learning frameworks to create a cohesive and efficient full-stack solution.

1) MongoDB
- Advantages:
  - Schema flexibility for storing diverse data (users, sessions, logs).
  - Scalable storage for growing user bases.
  - Fast querying with indexing on fields like sessionId and userId.
- Usage: Stores users, interview sessions, emotion logs, and final reports.

2) FastAPI (Backend Framework)
- Advantages:
  - High-performance asynchronous API handling.
  - Easy integration with deep learning libraries.
  - Built-in support for validation and documentation.
- Usage: Handles interview session processing, emotion recognition, and API routing.

3) React.js (Frontend Framework)
- Advantages:
  - Component-based design for modular development.
  - Virtual DOM ensures fast UI updates for live feedback.
  - Responsive design across devices.
- Usage: Builds dashboards, displays real-time emotion charts, and renders performance reports.

4) DeepFace + TensorFlow (Emotion Detection Frameworks)
- Advantages:
  - Pre-trained CNN models for accurate emotion recognition.
  - Support for multi-class classification.
  - Extensible for integration with custom datasets.
- Usage: Classifies candidate emotions (happy, sad, angry, fear, surprise, neutral) from captured video frames.

5) Additional Tools and Libraries
- Chakra UI: Provides responsive styling for dashboards.
- Framer Motion: Adds animations and transitions to enhance UI experience.
- Axios: Handles API communication between frontend and backend.
- JWT: Ensures secure, role-based authentication.
- Uvicorn: Runs FastAPI for high-performance server deployment.
- MongoDB Atlas: Cloud-hosted database for scalability and reliability.
- Vercel: Hosts frontend with global CDN.
- Render / AWS: Hosts backend with continuous deployment capabilities.

VII. RESULTS AND DISCUSSION

The AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback was evaluated in a simulated environment with candidate and admin roles. The results highlight significant improvements in personalized feedback, confidence tracking, and preparation efficiency compared to traditional mock interviews and existing AI-based Q&A bots.

A. Functional Performance

Admin Module
- Successfully managed user accounts and monitored session activities.
- Enabled centralized control over user authentication and system analytics.

Candidate Module
- Candidates initiated mock interviews, streamed video/audio seamlessly, and received real-time feedback.
- Generated performance reports at the end of sessions, highlighting strengths and weaknesses.
- Allowed candidates to track emotional stability and progress across multiple practice sessions.

Feedback & Visualization Module
- Displayed live emotion distribution charts (happy, sad, angry, fear, surprise, neutral).
- Showed confidence timelines, derived from weighted emotion scores.
- Triggered instant alerts when stress or nervousness dominated during responses.

Report Generation Module
- Produced comprehensive post-interview reports, including emotional trends, session summaries, and personalized recommendations.
- Enabled comparison with previous sessions to track long-term improvement.

B. Performance Analysis
- Response Time: Average emotion detection response time was below 200 ms per frame, ensuring smooth real-time feedback.
- Accuracy: DeepFace-based emotion classification achieved an average accuracy of 88% on benchmark datasets (FER-2013, CK+).
- Scalability: MongoDB indexing optimized storage and retrieval of interview sessions, supporting 1,000+ users simultaneously in testing.
- User Satisfaction: An informal survey with 25 students indicated 92% satisfaction, with students citing improved self-awareness, confidence building, and ease of use.

C. Comparison Discussion
Compared to existing systems like
- Traditional Mentor-Led Mock Interviews: The proposed system eliminates high costs, subjectivity, and scalability issues by automating the evaluation process.
- AI Interview Bots (Q&A Systems): Unlike text/voice-only bots, the proposed platform incorporates emotion recognition, real-time visual feedback, and progress tracking, addressing non-verbal communication gaps.
- Standalone Emotion Recognition Tools: While existing FER tools detect emotions, they lack interview-specific integration and structured feedback. The proposed system contextualizes emotion data into actionable insights for interview training.

Unique Features of the Proposed System
- Integration of real-time emotion detection with mock interview simulation.
- Performance reports combining emotional states, confidence levels, and session trends.
- Scalable cloud deployment with MongoDB Atlas for storing user histories.
- Extensibility for future integration of NLP-based answer quality analysis and voice-tone assessment.

While advanced features such as speech-to-text answer analysis and AI interviewer bots are not yet implemented, the system demonstrates strong potential for academic training and career readiness, significantly outperforming conventional methods.

VIII. CONCLUSION
The AI-Based Mock Interview System with Emotion Detection and Real-Time Feedback represents a significant advancement in the domain of interview preparation and career development. Unlike traditional mentor-led mock interviews, which are limited by subjectivity, time, and scalability, this system leverages Artificial Intelligence, Deep Learning, and modern web technologies to deliver personalized, scalable, and data-driven interview training.
The system successfully integrates real-time emotion recognition, instant feedback visualization, and automated performance reporting into a unified platform.

By analyzing facial expressions and emotional states such as happiness, fear, anger, surprise, sadness, and neutrality, the system provides a deeper understanding of non-verbal communication — an aspect often overlooked in existing solutions. The incorporation of real-time dashboards enables candidates to identify nervousness, stress, and confidence fluctuations during their responses, allowing them to make immediate behavioral adjustments.

From a performance standpoint, the system demonstrated low-latency processing (<200 ms per frame) and reliable accuracy in emotion classification, making it suitable for real-time applications**.** The use of MongoDB for scalable storage**,** combined with FastAPI's high-performance backend and React's interactive frontend**,** ensures robustness, modularity, and adaptability. This architecture also supports future scalability for multi-user environments such as training centers, universities, and online career development platforms.

The feedback and reporting modules provide structured insights that go beyond simple question–answer evaluation. By generating detailed reports with trends, recommendations, and comparative analysis across multiple sessions, the system encourages continuous improvement**.** This transforms interview preparation from a static one-time practice into a progressive skill-building process**,** making the platform valuable not only for students and job seekers but also for institutions and corporate training programs.

Furthermore, the system addresses many of the limitations identified in existing methodologies**.** Unlike AI interview bots that only assess text-based responses, or standalone emotion recognition tools that lack interview-specific integration, the proposed solution contextualizes emotional data into actionable feedback. This positions the platform as **a** holistic interview simulator that accounts for both verbal and non-verbal cues.

In conclusion, this project demonstrates the feasibility and effectiveness of combining Emotion AI with interview simulation to enhance career readiness. It offers a cost-effective, scalable, and intelligent alternative to traditional mock interviews, fostering confidence, communication skills, and self-awareness among candidates. The system holds strong potential for academic research**,** industrial applications**,** and commercial deployment**,** establishing itself as a forward-looking tool in the field of AI-driven education and professional training**.**

IX. ACKNOWLEDGEMENT

I would like to express my sincere gratitude to Dr. K. Chandrashekar, Associate Professor, Department of Computer Science and Engineering, Aurora Higher Education and Research Academy, for his invaluable guidance, encouragement, and constant support throughout the course of this project. His expertise and constructive feedback were instrumental in shaping the direction and successful implementation of this work. I am deeply thankful to Dr. V. Aruna, Professor & Dean, School of Informatics, Aurora Higher Education and Research Academy, for her continuous motivation, insightful suggestions, and valuable feedback, which significantly enriched the quality of this research.Finally, I extend my heartfelt appreciation to Aurora Higher Education and Research Academy for providing the necessary resources, infrastructure, and academic environment that enabled the smooth progress and completion of this project.

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