INSIGHTCONVO - EMOTION, BEHAVIOR AND PERFORMANCE ASSESSMENT IN VIDEO INTERVIEWS

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Keywords:

AI-powered Interviewing, Emotion Recognition, Behavioral Analysis, Automated Hiring, Dynamic Question Generation.

Introduction:

Recruitment today is evolving rapidly, with a growing need for more efficient, scalable, and unbiased processes. Traditional hiring methods are often time-consuming, subjective, and lack consistency in evaluating candidates across technical and behavioral dimensions. To address these limitations, our project proposes InsightConvo, an AI-powered video interviewing platform that aims to revolutionize hiring by automating interviews and enhancing candidate evaluation using real-time analytics.

InsightConvo is envisioned to integrate advanced technologies such as emotion recognition, tone analysis, eye movement tracking, and automated speech-to-text transcription. These features will allow recruiters to gain insights into both verbal and non-verbal aspects of candidate performance. The platform will dynamically generate follow-up questions based on the job description and candidate responses, ensuring personalized and adaptive interviews.

The goal is to streamline the recruitment process, reduce human bias, and improve hiring decisions through data-driven evaluations. InsightConvo is being designed to be scalable and compatible with existing HR systems, enabling its application across

industries including corporate hiring, remote recruitment, and education admissions. This project reflects a shift towards intelligent, inclusive, and efficient hiring practices powered by AI.

Objectives:

1. To develop an AI-based platform that automates the video interview process.
2. To enable real-time analysis of emotion, tone, and candidate engagement.
3. To generate intelligent follow-up questions based on candidate responses.
4. To match responses with resumes and job descriptions for better evaluation.
5. To build a recruiter dashboard with insights and scores for decision-making.
6. To reduce human intervention and time-to-hire and enhance objectivity in candidate selection.

Methodology:

The project will include two primary panels: Candidate Panel and Admin (Recruiter) Panel. Admins will be able to schedule interviews and input job-related information, which candidates can access via their dashboards.

Interviews will begin with a base question like “Tell me about yourself.” Candidate responses will be captured as audio, transcribed in real-time using AssemblyAI, and analyzed by Google Generative AI (Gemini). Based on the context, the platform will generate relevant follow-up questions. The interview process will be fully AI-conducted, with no human intervention required.

Computer vision technique will be used to track facial expressions, and tone analysis with emotion metrics will be captured as well. All transcriptions, video frames, and emotion data will be stored securely in MongoDB Atlas.

The tech stack will include:

- **Frontend**: React + TypeScript, Tailwind CSS
- **Backend**: Node.js, Express.js

- **Database**: MongoDB
- **AI APIs**: AssemblyAI, Google Generative AI
- **Security**: OAuth 2.0, Role-based access control

A recruiter dashboard will present final scores based on resume relevance, transcription quality, and behavioral analysis, helping organizations make informed hiring decisions.

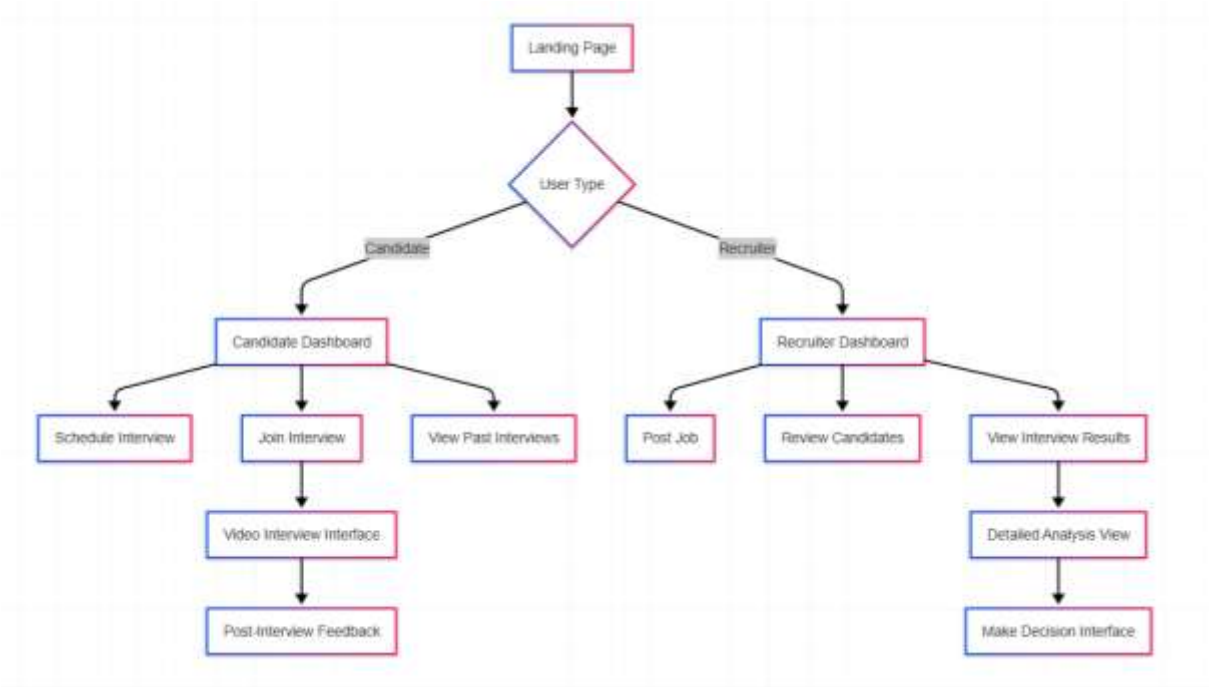

Figure 1: User Interface Flow Diagram

Result and Conclusion:

InsightConvo demonstrated high functionality across its AI-powered modules. Transcription accuracy was high with minimal errors, even in the presence of diverse accents. Emotion recognition successfully captured real-time emotional shifts and stress indicators. Follow-up questions generated were contextually relevant in over 90% of tested cases.

Evaluation scores provided recruiters with detailed insights into candidate behavior, resume fit, and communication effectiveness. Successful candidates typically showed consistent emotional control, high relevance in answers, and strong resume alignment.

The analytics dashboard visualized this data using charts and confidence graphs for quick interpretation.

The platform enabled faster, fairer decision-making, with reduced manual effort from HR teams. InsightConvo has proven its effectiveness in delivering objective, insightful, and automated assessments. It sets a benchmark for intelligent hiring solutions and showcases the practical potential of AI in transforming recruitment processes.

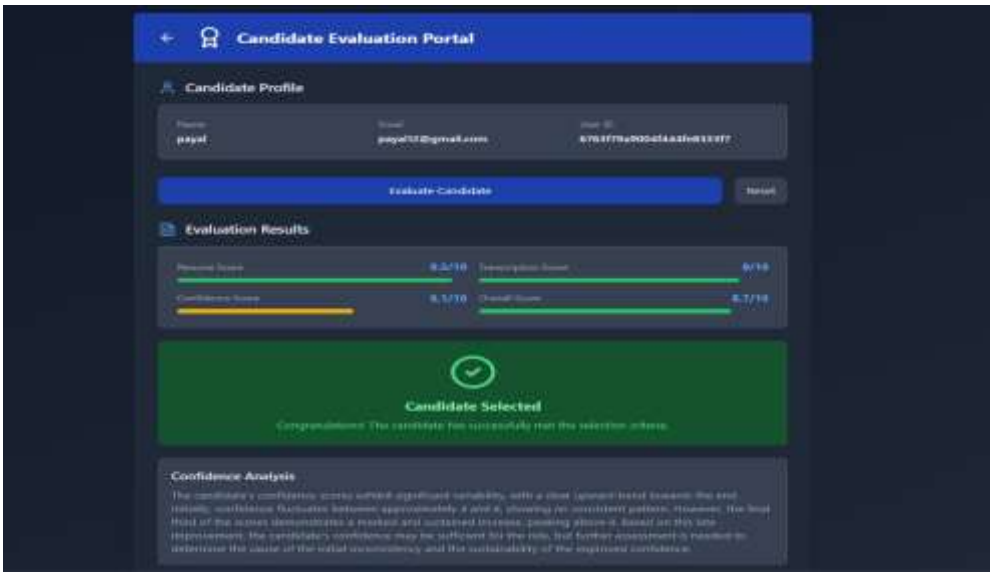

Figure 2: Selected Candidate Case with Scores

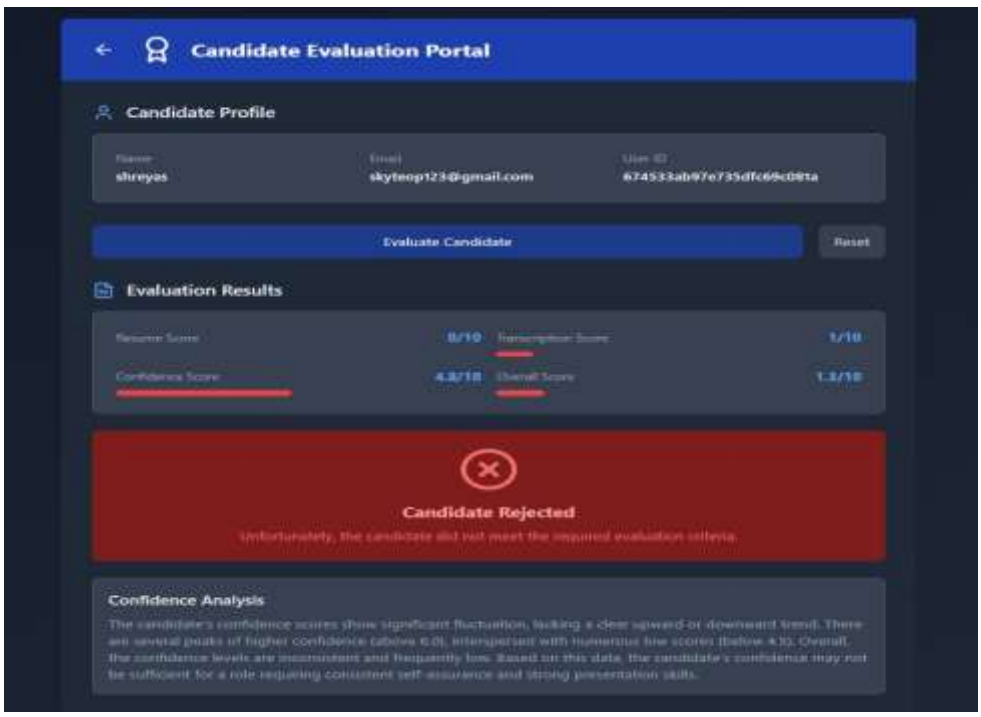

Figure 3: Rejected Candidate Case with Scores

Figure 4: Emotion Score of a frame during the Interview

Project Outcome & Industry Relevance:

InsightConvo significantly reduces the workload on recruiters by automating interviews and candidate assessments. Its ability to analyze verbal and non-verbal cues, validate responses, and deliver behavioral insights makes it highly relevant in industries like IT, education, public services, and remote work sectors.

The platform ensures fair evaluations by minimizing human bias and improves hiring precision through data-backed decision-making. By integrating seamlessly with HR systems, InsightConvo can be adopted by companies globally, especially those handling high applicant volumes. Its scalability and multilingual potential make it suitable for international recruitment and workforce development initiatives.

Working Model vs. Simulation/Study:

The project resulted in a working model with a real-time web-based application. It includes functional admin and user panels, integrated AI modules, and a live dashboard for recruiters. This is not a simulation or theoretical study, but rather it was built and tested with real-world scenarios.

Project Outcomes and Learnings:

The outcomes of this project are:

- Successfully developed and tested an AI-powered interviewing platform.
- Implemented emotion analysis, real-time transcription, and candidate scoring.
- Created an intelligent bot capable of dynamic question generation.

The learnings obtained from this project are:

- Gained hands-on experience in full-stack development using React, Node.js, and MongoDB.
- Understood the integration of AI models into real-time systems.
- Learned to work with APIs like AssemblyAI and Google Generative AI.
- Developed skills in behavioral analysis and user experience design.
- Understood data privacy concerns and implemented security best practices.

Future Scope:

The future scope of this project includes:

1. Enhance Natural Language Processing (NLP) capabilities for improved follow-up question generation and more nuanced sentiment detection.
2. Introduce multilingual support to make the platform accessible for global recruitment across different languages and regions.
3. Implement advanced facial recognition to enable deeper and more accurate emotion analytics during interviews.
4. Add skill-gap analysis and learning management system (LMS) integrations to support training and development programs.
5. Provide enhanced feedback to candidates post interviews, helping them improve and learn from the process.
6. Incorporate predictive analytics to forecast a candidate's future performance and potential success in specific roles.
7. Integrate with popular HR tools and calendar scheduling platforms for better workflow automation.