

Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis

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Abstract: The “Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis”, developed under the platform name Career Mock, is an advanced artificial intelligence-driven system designed to automate and enhance the recruitment and evaluation process through speech-based interactions. This project introduces an innovative approach to conducting interviews by integrating AI voice technology, speech recognition, and automated performance evaluation within a unified web-based platform. The system allows candidates to participate in mock or real interviews conducted by an AI interviewer that communicates naturally using voice. By utilizing Groq AI for intelligent question generation and feedback analysis, and VAPI AI for real-time voice interaction, the platform replicates the dynamics of human interviews. It evaluates a candidate’s communication skills, confidence, technical knowledge, and behavioural traits based on speech input. Built using Next.js for the user interface and Supabase for secure data management and authentication, the platform ensures a seamless and reliable user experience. Deployment through Vercel provides scalability and accessibility for both recruiters and candidates. The system supports multiple user roles — including candidates, recruiters, and administrators — each provided with personalized dashboards, interview analytics, and automated scoring reports. The Career Mock platform effectively reduces human bias, eliminates repetitive manual assessment, and saves valuable recruitment time. By merging conversational AI with modern web technologies, the Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis establishes a fair, consistent, and data-driven framework for evaluating interview performance. This innovation represents a significant step forward in transforming conventional interview methods into intelligent, voice-interactive experiences suitable for modern hiring and professional skill development.

Keywords: Adaptive AI-Based Interaction Framework

I. INTRODUCTION

The *Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis*, developed under the platform name Career Mock, is an innovative AI-powered web system designed to automate and enhance the interview and candidate evaluation process. Built using Next.js, Supabase, Groq AI, and VAPI AI, the platform conducts real-time voice-based interviews where an AI interviewer generates domain-specific questions, interacts naturally with candidates, analyses their spoken responses using NLP, and produces instant, unbiased performance reports. Career Mock addresses major problems in traditional recruitment such as human bias, inconsistent evaluation, time constraints, operational costs, and lack of actionable feedback. It enables recruiters to efficiently pre-screen large applicant pools while giving candidates a realistic mock interview experience with detailed insights on communication, fluency, confidence, and technical understanding. The system supports secure authentication, role-based dashboards, automated question generation, and structured feedback reporting, making it suitable for recruitment, training, and academic environments. With scalability through Vercel and data management via Supabase, the platform ensures accessibility



and reliability, with future potential for enhancements such as multi-language interviews, emotional tone analysis, and video-based assessments.

The Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis, presented through the Career Mock platform, represents a significant advancement in the fusion of artificial intelligence, speech technologies, and automated evaluation to modernize the interview ecosystem. Unlike conventional screening processes that rely heavily on human judgment and manual evaluation, this framework introduces an intelligent, self-operating assessment model capable of conducting voice-based interviews, interpreting candidate responses, and generating structured insights without human intervention. The system capitalizes on cutting-edge tools such as Groq's high-speed language processing for generating context-aware questions and VAPI's natural speech interaction to simulate a realistic conversational environment that adapts dynamically to each candidate's performance. Integrated with Supabase for secure data storage, real-time syncing, and user authentication, the platform ensures a seamless, privacy-focused experience while maintaining reliability at scale. Beyond simply asking and analysing responses, the system evaluates behavioural indicators like pacing, tone modulation, clarity, fluency, and reasoning patterns, offering a multidimensional understanding of a candidate's readiness. Deployed on Vercel for global accessibility, the platform addresses major recruitment pain points like interviewer fatigue, inconsistent scoring, scheduling conflicts, and geographic barriers. For students and job seekers, it serves as a personalized skill-development tool, providing meaningful feedback that accelerates growth and confidence for real-world interviews. For organizations, it functions as an efficient, unbiased pre-screening mechanism capable of reducing costs, optimizing hiring pipelines, and ensuring fairness across diverse candidate pools. The extensible architecture of the system opens opportunities for future innovation such as adaptive difficulty levels, integration with corporate ATS systems, cognitive load analysis, multilingual support, emotional intelligence scoring, and even fully immersive AR/VR-based interview simulations—positioning it as a next-generation assessment solution suited for evolving workforce demands.

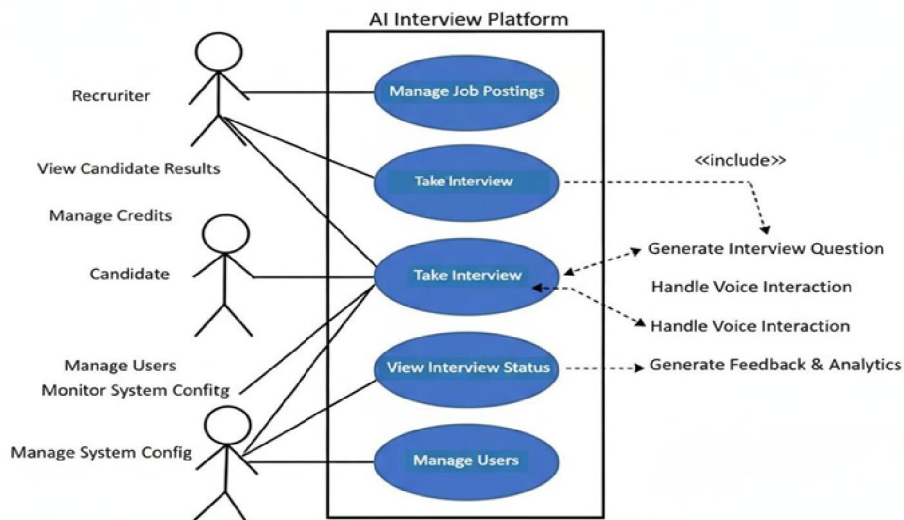


Fig.1: Functional Use Case Model for the AI-Based Interview System

Fig 1 says Recruiters, candidates, and administrators interact with the AI Interview Platform through role-specific functionalities that support automated, intelligent interview processing. Recruiters create and manage job postings, initiate interviews, review candidate performance, and track their credit usage, while candidates participate in AI-driven voice interviews and monitor their interview status. Administrators handle user management and system configuration to maintain the platform's stability and security. Whenever an interview is conducted, the system automatically triggers intelligent internal operations such as generating domain-specific questions, managing real-time voice interactions, and producing detailed feedback and analytics. This structure ensures that while users engage with the system at a high



level, the underlying AI components continuously perform complex tasks in the background, enabling a seamless, unbiased, and highly efficient interview experience.

Recruiters: Recruiters can create job-specific interviews by defining roles, descriptions, and expected skills to guide AI-generated questions. They schedule interviews and share secure links with candidates, enabling flexible participation. Throughout the process, recruiters track interview progress, monitor completion status, and manage their candidate lists. Once interviews are completed, they can view AI-generated reports that summarize scores, performance insights, and detailed transcripts. The system allows recruiters to compare candidates, shortlist top performers, and export interview results for internal review. Overall, the recruiter workflow is streamlined, efficient, and designed to reduce manual effort in early-stage screening.

Candidate: Candidates receive secure access to their scheduled interviews and can join them at any time using a simple link. They interact with an AI interviewer through natural voice conversation, responding to personalized, domain-specific questions. The system listens, analyses, and adapts based on their responses, creating a realistic interview experience. After completion, candidates receive structured AI-generated feedback that highlights strengths, weaknesses, and improvement areas. They can revisit their past interview attempts and track progress over time. This experience helps candidates practice communication, build confidence, and prepare for real-world job interviews.

Manage Config: Administrators manage the platform's backend settings, including user roles, authentication, and access permissions. They configure AI models, voice settings, system limits, and scoring parameters to ensure accurate performance. The admin panel also handles database management, storage organization, and monitoring of system activity through logs and analytics. Admins oversee billing, interview credit allocation, and overall platform health. They maintain security policies, update global configurations, and ensure that recruiters and candidates experience smooth, uninterrupted operations. This configuration module keeps the platform scalable, secure, and optimized for continuous use.

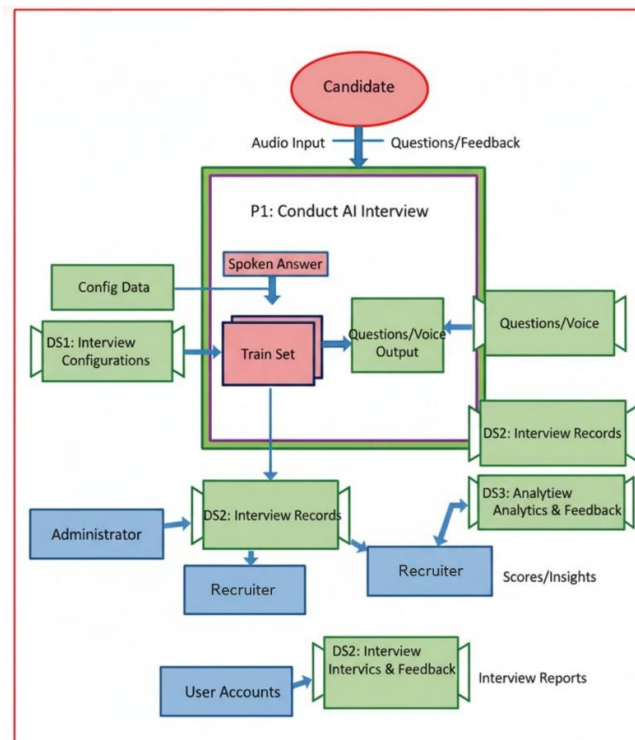


Fig.2: Integrated System Flow for AI Interview Interaction and Result Processing



Fig 2 says The diagram illustrates the complete operational flow of the AI-powered interview system, showing how candidate input, system configurations, AI processing, and recruiter evaluation are connected. When a candidate provides spoken responses, the system captures the audio input and processes it using the trained AI model. Interview configurations stored in the system determine the type and difficulty of questions generated. The AI engine uses its training set to analyze the candidate's spoken answers and produce meaningful feedback and next questions. All interview interactions, including voice output and candidate responses, are stored in the Interview Records database for future analysis. Recruiters access these stored records to review performance and obtain analytical insights generated by the analytics module. Administrators manage configurations and oversee system-level data, ensuring that interviews run according to predefined parameters.

Conduct AI Interview: This module handles the live AI-based interview, processing the candidate's voice and generating follow-up questions or feedback. It integrates configuration parameters, trained datasets, and decision logic to keep the interview structured. The engine converts spoken answers into analyzable text and sends outputs to both the candidate and the database. It ensures smooth communication by producing questions or prompts based on real-time evaluation. This process effectively creates a natural, adaptive interview environment. The P1 module acts as the operational core, linking all other components in the system.

Interview Configurations: This component stores predefined interview rules, question sets, difficulty levels, and technical configurations required for the AI flow. The system retrieves this data whenever an interview begins, ensuring consistency and alignment with recruiter requirements. Configuration data influences how questions are selected, how assessments are performed, and how the system reacts to candidate responses. Administrators update and maintain these configurations to meet changing job requirements. This dataset ensures that each interview runs with standardized settings and controlled parameters. DS1 acts as the structural foundation for interview logic.

Interview Records: This dataset stores all interactions between the candidate and the AI system, including spoken answers, generated questions, timestamps, and evaluation outputs. Every interview attempt is logged here, enabling future review and audit trails. Recruiters access this stored information to understand candidate performance in detail. The records also serve as input for analytics and scoring modules. Long-term storage ensures data availability for comparison, verification, and future analytics. DS2 acts as the historical memory of the system.

Analytical Analytics & Feedback: This module processes the stored interview records to generate insights, scores, feedback summaries, and performance recommendations. It evaluates parameters such as communication skills, technical depth, fluency, confidence, and accuracy. The generated analytics help recruiters understand strengths and weaknesses quickly. This feedback module ensures that results are objective and consistent across all candidates. The system produces structured reports that can be downloaded or reviewed within dashboards. DS3 acts as the evaluation brain of the platform.

II. METHODOLOGY

The Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis follows a modular approach consisting of multiple integrated components:

User Authentication and Role Management: Users access the system through secure Supabase login using email or Google OAuth, ensuring safe and verified entry. The platform assigns roles such as Candidate, Recruiter, or Administrator, enabling controlled access to features based on permissions. This ensures data security and personalized user experiences.

Interview Creation: Recruiters set up interviews by defining job roles, duration, and skill requirements, after which Groq AI generates domain-specific questions automatically. The process ensures that each interview is relevant, standardized, and tailored to the job description. Created interviews are saved and reused for multiple candidates.

Voice-Based Interview Process: The VAPI AI agent conducts the interview in real time using natural speech, asking questions and listening to the candidate's spoken responses. Speech-to-text and NLP technologies analyze the content instantly. This creates an interactive and human-like interview environment.



Response Analysis and Feedback: AI evaluates each response for clarity, accuracy, fluency, and relevance, producing objective analytics. The system generates structured feedback, including scores and improvement suggestions. This provides unbiased assessment and valuable insights for both candidates and recruiters.

Dashboard and Analytics: Recruiters use dashboards to monitor interview activity, review candidate performances, and export reports. Candidates can track their progress and access detailed feedback. These analytics help improve decision-making and overall evaluation efficiency.

Deployment: The platform is deployed on Vercel, providing fast performance, scalability, and global accessibility. Updates are deployed instantly with minimal downtime. Cloud-based hosting ensures a smooth and reliable user experience.

III. LITERATURE REVIEW

AI-driven interviewing systems have gained significant attention in recent years as organizations seek faster, fairer, and more scalable assessment methods. Researchers have explored how automation, voice interfaces, NLP, and fairness frameworks can enhance or influence candidate evaluation processes. These studies collectively highlight the strengths of AI interviewers in reducing operational workload while also shedding light on challenges related to bias, user trust, and interaction design. The literature shows a clear shift toward adaptive, voice-based assessment tools capable of analysing communication, reasoning, and behavioural cues. The following works represent key contributions that shape the design and development of modern AI interview platforms.

1. Jabarian & Henkel (2025) – Voice AI in Firms

Jabarian and Henkel conducted one of the largest real-world studies on AI-mediated recruitment, involving over 70,000 applicants in an active hiring pipeline. Their findings showed that automated voice interviews significantly improved operational efficiency by reducing scheduling bottlenecks and enabling continuous, high-volume screening. They also discovered that candidate behaviour differed based on whether they interacted with a human or an AI interviewer, with some preferring AI for reduced pressure and convenience while others remained hesitant. Importantly, the results indicated that AI interviews can yield comparable hiring outcomes to human-led interviews, provided the system is transparent, logged, and used responsibly. This study provides strong evidence that AI voice agents can be safely integrated into early-stage screening when fairness and auditability are maintained.

2. Suen & Hung (2024) – AI Interface Influence on Candidate Behaviour

Suen and Hung's research explored how AI interviewer design—tone, personality, pacing, and interface—shapes candidates' communication patterns and honesty. They found that rigid or authoritative AI interfaces often push candidates toward overly formal, rehearsed responses, limiting natural communication. In contrast, conversational and friendly AI tones encourage authenticity, richer explanations, and more confident storytelling. Their study further revealed that candidates modify their behaviour based on perceived expectations of the AI, which can influence both truthful and deceptive impression management. The researchers concluded that AI interviewers should incorporate adaptive questioning, controlled randomness, and transparent scoring cues to reduce manipulation and promote genuine interactions.

3. Kim, Choi, Yoon, Yoo & Lee (2023) – Fairness-Aware Automated Assessment

Kim and colleagues focused on fairness challenges in automated interview scoring systems, emphasizing that AI models often inherit demographic biases present in historical datasets. Their fairness-regularized framework aimed to reduce disparities in evaluation across demographic groups by adjusting the learning process and monitoring threshold-level decision outcomes. They highlighted the need to audit transcription accuracy, especially for accents or speech variations, because STT errors directly impact scoring fairness. Their work underscored the importance of storing scoring logic versions, maintaining demographic transparency (where legally permissible), and using structured rubrics to avoid over-reliance on subjective or sensitive features. This research is crucial in affirming why modern AI interview platforms must prioritize fairness dashboards, version traceability, and bias-aware model design.



4. Anderson et al. (2019) – NLP and Speech Recognition in Interview Evaluation

Anderson and colleagues explored how speech recognition and NLP together enable automated systems to interpret both the linguistic content and the delivery style of candidate responses. Their findings demonstrated that advanced NLP models—such as BERT and early transformer architectures—could accurately assess grammar, coherence, context relevance, and semantic depth. They also noted that acoustic features such as fluency, filler usage, pitch variation, and speech rate provide additional insight into communication quality and confidence. Their work laid the foundation for integrating real-time voice interaction with intelligent scoring algorithms and supports the use of speech-based AI evaluators in mock and professional interviewing systems.

IV. RESULTS AND DISCUSSION

The Results section presents the functional outcomes and interface visuals of the Career Mock platform, demonstrating how each module operates within real-time user interactions. It highlights the system's core features, including authentication, dashboards, interview workflows, and recruiter tools, supported by AI-driven components. Each figure showcases a key part of the user journey, from logging in to managing interviews and purchasing credits. The results validate that the system is fully operational, user-friendly, and aligned with the intended project objectives. Overall, this section provides a comprehensive walkthrough of the platform's performance, usability, and interface design.

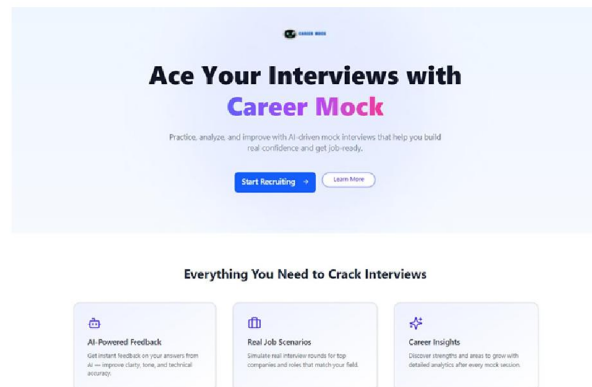


Fig.3: Home Page

Fig 3 says the homepage of “Career Mock”, an AI-driven interview preparation platform that helps users practice, analyze, and improve their interview performance. The main interface highlights the platform’s tagline “Ace Your Interviews with Career Mock,” representing its goal of building confidence and job readiness. It provides key navigation buttons like “Start Recruiting” and “Learn More” to guide users smoothly through the system. The homepage also features three major offerings — AI-Powered Feedback, Real Job Scenarios, and Career Insights — which together help candidates enhance their performance through instant evaluation, real-world simulations, and analytical insights. The overall layout, colour combination, and typography make the interface modern and professional, creating an impression.



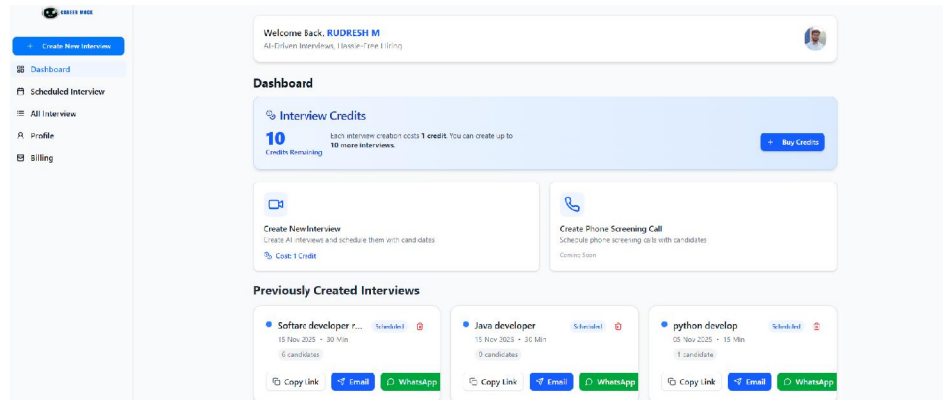


Fig:4 Recruiter Dashboard

Fig 4 says The Recruiter Dashboard provides a centralized workspace where recruiters can efficiently manage all AI-driven interviews. It displays available interview credits at the top, helping recruiters keep track of how many interviews they can still create. Key actions such as creating new AI interviews and scheduling phone screening calls are presented clearly for quick access. The dashboard also lists previously created interviews with details like job title, date, duration, and candidate count. Sharing options such as Copy Link, Email, and WhatsApp make it easy to send interview invites directly to applicants. Overall, the dashboard is designed to be clean, intuitive, and highly functional for seamless recruitment management.

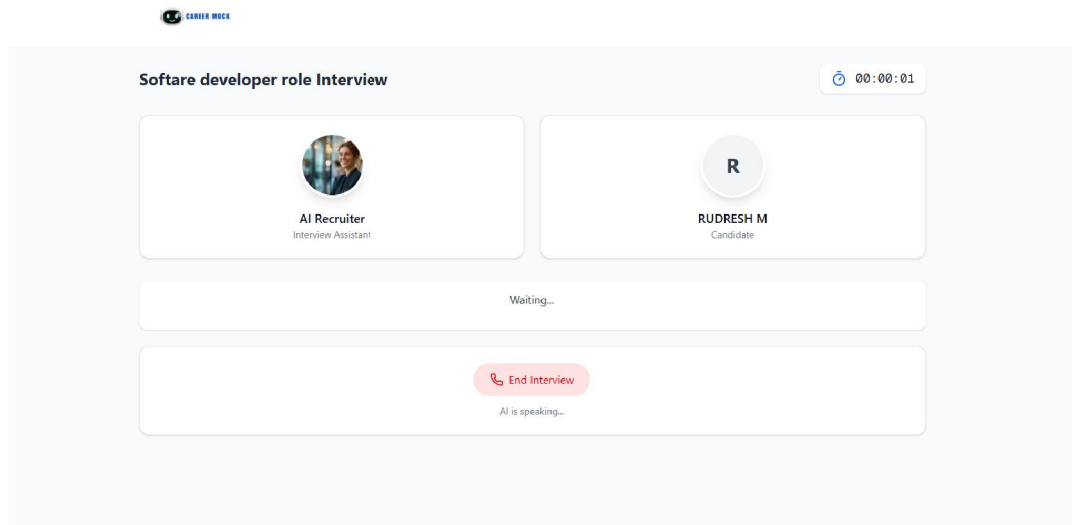


Fig 5: Interview Session

Fig 5 says The AI Interview Interface provides a real-time interaction screen where the candidate engages directly with the AI Recruiter. The page displays both participant cards—one for the AI Recruiter and one for the candidate—ensuring a professional and organized interview layout. A live timer at the top tracks the duration of the session, helping candidates stay aware of pacing. The center section shows dynamic subtitles or status messages such as “Waiting...” or “AI is speaking...”, giving the user clear feedback about the system’s current state. At the bottom, an easily accessible End Interview button allows candidates to stop the session at any point. Overall, the interface is minimal, distraction-free, and designed to mimic a structured virtual interview environment.



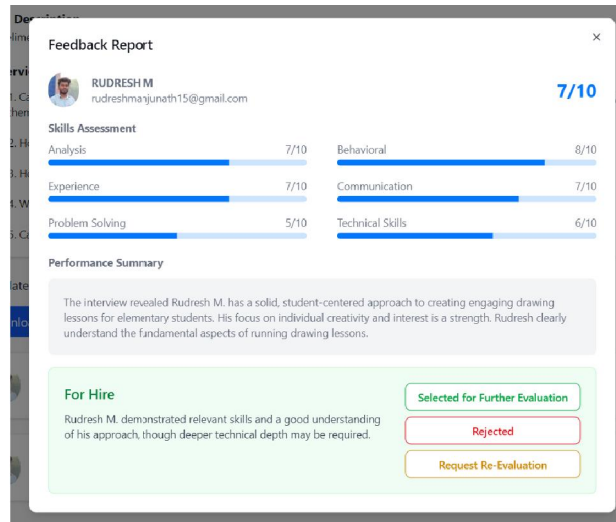


Fig 6: Interview Feedback Page

Fig 6 says The Feedback Report presents a detailed evaluation of the candidate's performance based on their AI-driven interview. It displays the candidate's name, email, and profile image, followed by a section-wise skills assessment that scores key areas such as analysis, communication, technical skills, experience, and problem-solving. A performance summary provides a concise, AI-generated narrative describing the candidate's strengths, approach, and overall interview impression.

V. CONCLUSION

The project "Adaptive AI-Based Interaction Framework for Smart Assessment and Response Analysis – Career Mock" successfully delivers an advanced and user-centric platform that transforms the traditional interview preparation experience through intelligent automation. By integrating Groq AI, the system generates dynamic, job-specific questions that adapt to the candidate's target role, ensuring a realistic and customized assessment every time. The use of VAPI AI for natural voice interaction further enhances authenticity by simulating real interviewer–candidate conversations, allowing users to improve fluency, clarity, and confidence in a practical environment. Its AI-driven evaluation engine provides detailed scoring, performance summaries, and improvement recommendations, enabling candidates to understand their strengths and address weaknesses effectively. The platform's architecture, powered by Next.js and supported by Supabase for secure data management and authentication, ensures fast performance, reliability, and user data protection. Recruiters benefit from a streamlined workflow through credit-based interview creation, real-time dashboards, and automated result tracking, making it easier to manage multiple interviews efficiently. The intuitive interface, combined with smart automation, offers accessibility to users of all backgrounds and reduces the need for manual intervention. Overall, the system accomplishes its goal of providing a scalable, modern, and AI-enhanced assessment environment that aligns with evolving recruitment trends while delivering meaningful value to both candidates and recruiters.

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