

# Multimodal AI for Automated Hiring: An AI-Driven Platform for Recruitment and Interview Assessment

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**Abstract**—Modern recruitment processes face challenges in balancing efficiency, fairness, and candidate experience. While AI techniques are increasingly adopted to streamline hiring, concerns over bias and lack of transparency remain. This paper presents *AssessMe.AI*, an AI-driven recruitment and assessment platform designed to enhance hiring through automated interview sessions, personalized question generation, and detailed feedback analytics. The system offers two modes: a *Candidate Self-Preparation* mode, allowing job seekers to practice with AI-driven mock interviews and receive constructive feedback, and a *Recruiter Assessment* mode, enabling organizations to conduct scalable AI-assisted interviews and obtain data-driven evaluations. We describe the platform’s design and architecture, including the integration of natural language processing (NLP) for question generation and answer analysis, as well as speech recognition and synthesis for a realistic interview experience. A preliminary evaluation suggests that *AssessMe.AI* can improve hiring efficiency and consistency in candidate scoring, while empowering candidates with actionable insights to improve their performance. We discuss technical implementation details and examine how the system addresses common issues like interviewer bias and the lack of feedback in traditional hiring. The results indicate that AI-driven interview platforms such as *AssessMe.AI* can provide a fairer and more transparent recruitment experience for both candidates and recruiters.

**Index Terms**—Artificial intelligence, recruitment, automated interview, candidate assessment, feedback analytics, virtual interviewer.

## I. INTRODUCTION

The use of Artificial Intelligence (AI) in recruitment has grown dramatically in recent years, driven by the promise of increased efficiency and objectivity [1]. Surveys indicate that 87% of companies are utilizing some form of AI in their hiring processes, including almost all Fortune 500 firms [1]. Recruiters report that AI tools help *save time* (67%) and *reduce human bias* (43%) in hiring, while also improving candidate matching [2]. These advantages are critical as traditional hiring is often labor-intensive and prone to subjective judgments.

Yet, despite its potential, the incorporation of AI into hiring has also raised concerns about fairness and transparency [3]. Notably, a well-known experiment by Amazon revealed that a resume-screening AI inadvertently learned gender bias from historical data, leading the company to discontinue the project [4][5]. Such cases underscore the importance of designing recruitment AI systems that mitigate bias rather than amplify it.

Another major challenge in current hiring practices is the lack of feedback and engagement for candidates. Most applicants are filtered through Applicant Tracking Systems (ATS) without ever interacting with a human recruiter; in fact, an estimated 75% of resumes are never seen by a human, having been automatically rejected by ATS filters [6]. Candidates often receive no indication of why their application was rejected or how they performed in an interview. This opacity can leave applicants frustrated and unsure how to improve, ultimately harming the candidate experience and employer brand. From the recruiter’s perspective, handling large volumes of applicants is costly and time-consuming, and traditional interviews can be inconsistent. Human interviewers may unconsciously introduce variability and bias into ratings, and decisions are sometimes made on incomplete information without data-driven insights.

Given these issues, there is a clear need for AI-driven platforms that can streamline the hiring process while also improving fairness, consistency, and feedback. Several AI-based hiring solutions have emerged. For example, HireVue’s video interview platform has been used for over 19 million interviews, automatically analyzing candidate responses and speech in an attempt to provide objective assessments [7]. Such systems aim to reduce individual interviewer bias by standardizing how each candidate is evaluated. However, they are not without controversy: HireVue had to remove its facial expression analysis component amid

concerns about the transparency and validity of its algorithms [3]. This highlights a gap in current solutions – while they offer efficiency, they must also be transparent and beneficial to candidates, not just employers.

In this paper, we introduce *AssessMe.AI*, a platform that leverages AI to conduct automated interviews and provide rich feedback, thereby addressing both recruiter and candidate needs. *AssessMe.AI* differentiates itself by offering two complementary modes: one for *candidates* to practice and improve via AI-guided interviews, and one for *recruiters* to conduct scalable assessments with AI-generated analytics. The goal is to create a more fair, data-driven, and engaging recruitment process. Candidates using the system receive immediate, personalized feedback on their interview performance—something rarely available in real hiring—helping them identify strengths and weaknesses. Recruiters, on the other hand, benefit from consistent evaluation criteria and a ranked comparison of candidates based on multiple performance parameters.

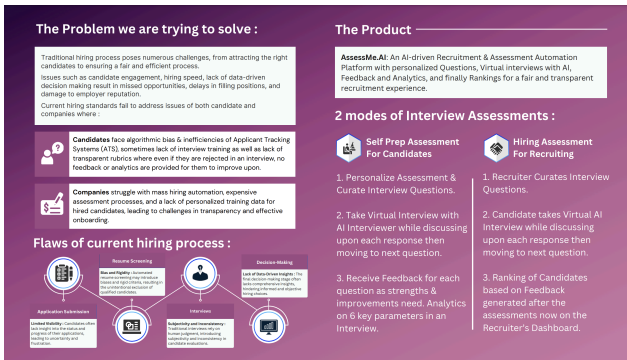


Fig. 1. Overview of challenges in traditional hiring (left) and the *AssessMe.AI* solution (right) with two modes of AI-driven interview assessments for candidates and recruiters.

As illustrated in Fig. 1, *AssessMe.AI* addresses key pain points: candidates face opaque processes and seldom get feedback, while companies struggle to efficiently identify top talent from a high-volume applicant pool. By integrating advanced AI capabilities into a unified platform, we seek to enhance the hiring experience end-to-end. The remainder of this paper is structured as follows: Section II reviews related work and technologies in AI-driven recruitment and assessment. Section III details the design and architecture of the *AssessMe.AI* platform, including its core modules and AI components. Section IV describes the implementation and discusses how the system functions in both candidate and recruiter modes. Section V presents a preliminary evaluation and observations from a proof-of-concept deployment. Finally, Section VI concludes with insights and future directions for improving AI fairness and effectiveness in recruitment.

## II. RELATED WORK

A growing body of research explores the use of AI to improve recruitment outcomes. Traditional recruitment software like ATS have long been used to filter candidates,

but these rule-based systems often lack sophistication and can inadvertently screen out qualified applicants [6]. Recent AI approaches employ machine learning and NLP to better understand candidate profiles and predict job success. For example, recommendation systems and intelligent matching algorithms aim to pair candidates with suitable roles beyond simple keyword matching [2]. Chatbots and conversational agents are increasingly used to engage applicants, schedule interviews, and answer FAQs, improving responsiveness in early recruitment stages [8], [9].

One prominent trend is the use of AI in interview and assessment phases. Video interviewing platforms like HireVue use AI to evaluate recorded interview responses. The system poses a set of pre-defined questions to candidates, records their answers, and then analyzes both content and speech characteristics. The intention is to provide a more standardized assessment and reduce biases stemming from different interviewers [7]. HireVue’s algorithms historically evaluated facial expressions and tone in addition to speech, though the facial analysis was dropped due to public concern about its scientific validity and potential bias [3]. Academic studies and ethical reviews have cautioned that without careful design, such AI systems might inadvertently favor or penalize certain groups, reflecting biases present in training data. The case of Amazon’s scrapped AI recruiting engine is a cautionary example: the model taught itself to prefer male candidates because it was trained on past resumes from a male-dominated industry [4]. Attempts to correct the model still could not guarantee it would not find new proxies for gender, leading Amazon to abandon the tool [5]. This underscores that algorithmic transparency and bias mitigation are critical considerations in AI for hiring.

On the other hand, when implemented with care, AI has shown promise in making hiring more data-driven and efficient. AI-based assessment can consider a wider array of candidate attributes and performance metrics than a human can easily track. For instance, language models can score the content of an answer against an ideal response or rubric, while speech analysis can gauge factors like confidence or communication clarity. According to LinkedIn’s Global Recruiting Trends, a majority of recruiters believe AI-based evaluations can lead to better quality hires by removing human error and prejudice [2]. Moreover, candidates have indicated a preference for processes that combine technology with human touch—one survey found 82% of job seekers believe the best hiring experience is a blend of innovative technology and personal interaction [9], [10].

*AssessMe.AI* builds on insights from these prior works. Like HireVue and similar platforms, it uses AI to conduct interviews, but places an additional emphasis on personalized feedback and candidate improvement, an area underrepresented in many current tools. Some educational and training systems provide mock interview practice with feedback, but these are often simplistic or not integrated into actual hiring pipelines. Our platform attempts to bridge that gap, serving both as a preparation tool for candidates and

an assessment aid for recruiters. In the following sections, we describe how *AssessMe.AI*'s architecture was conceived to meet these goals, leveraging state-of-the-art AI for language and speech processing while incorporating mechanisms to reduce bias and enhance transparency.

### III. SYSTEM DESIGN AND ARCHITECTURE

#### A. Overview

*AssessMe.AI* is designed as a web-based software platform integrating multiple AI services to simulate an interview environment and evaluate candidate performance. Its architecture follows a modular design:

- 1) User Interface (Front-End): A React/Next.js application providing interactive interview sessions, real-time audio/video streaming, and a dynamic question flow.
- 2) Application Server and Logic: Manages interview orchestration, calls external AI services, stores results, and generates analytics dashboards.
- 3) AI and Data Services: Includes speech-to-text, text-to-speech, question-generation APIs, and a database (e.g., PostgreSQL) for persistent storage of interview logs and feedback.

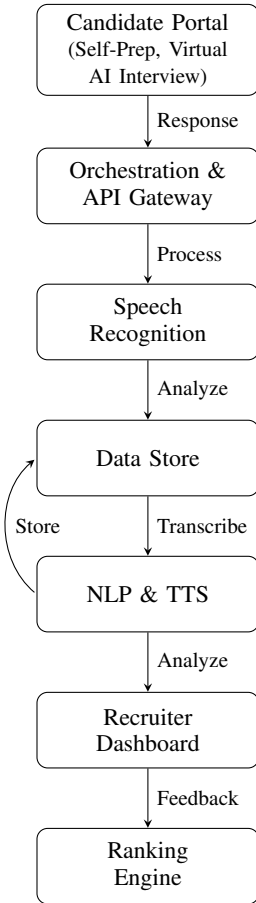


Fig. 2. Vertical flowchart of the Candidate and Recruiter Interaction Flow in *AssessMe.AI*. Arrows denote data or process flow between modules.

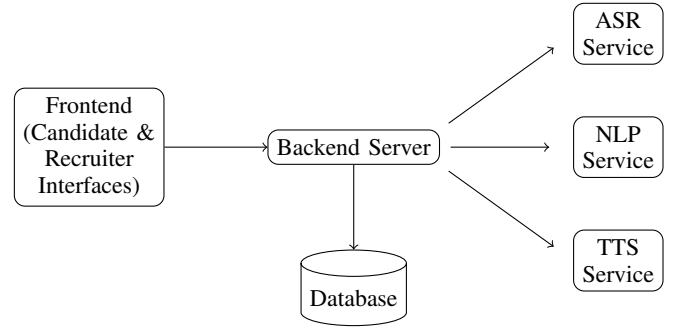


Fig. 3. System architecture of the *AssessMe.AI* platform. The Frontend (web/mobile interfaces for candidates and recruiters) communicates with a central Backend server, which orchestrates AI services—NLP (natural language processing), ASR (speech-to-text), and TTS (text-to-speech)—and interacts with the system database.

#### B. Candidate Self-Preparation Mode

A candidate specifies the role or topics of interest. The platform curates personalized questions using a large language model (LLM), or the user manually enters them. The AI “interviewer” poses each question verbally (via text-to-speech), and the candidate responds in real time. Speech recognition (e.g., Whisper) transcribes each response. The system then prompts a second LLM (e.g., GPT-4) to evaluate the answer on dimensions such as *relevance*, *coherence*, *communication*, *confidence*, and more. Constructive feedback, including strengths and improvement tips, is displayed on a candidate dashboard.

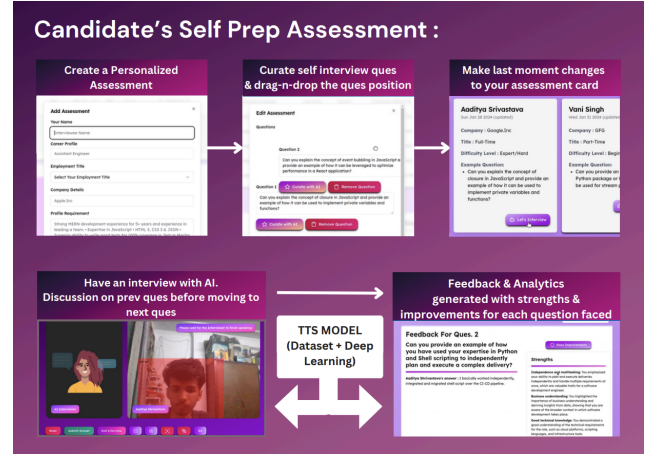


Fig. 4. Candidate's Self-Prep flow in *AssessMe.AI*. The user creates a personalized assessment, rearranges questions, takes an AI-driven interview, and receives feedback/analytics.

#### C. Recruiter Assessment Mode

A recruiter sets up an interview for a given job opening, optionally generating questions via AI. Each invited candidate answers the same set of questions, ensuring consistency. The system aggregates and scores all candidates on multiple parameters, presenting a ranked list on the recruiter's dashboard. Recruiters can view detailed breakdowns, read

transcripts, or watch recordings. The feedback helps make more data-driven hiring decisions and can optionally be shared with candidates to enhance transparency.

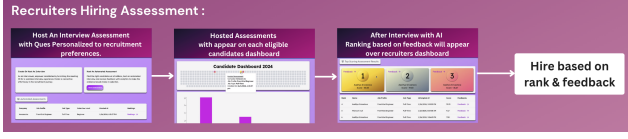


Fig. 5. Recruiters' Hiring Assessment in AssessMe.AI. Recruiters create role-specific assessments, candidates interview with AI, and final ranks guide data-driven hiring decisions.

#### D. User Interaction Model Diagram

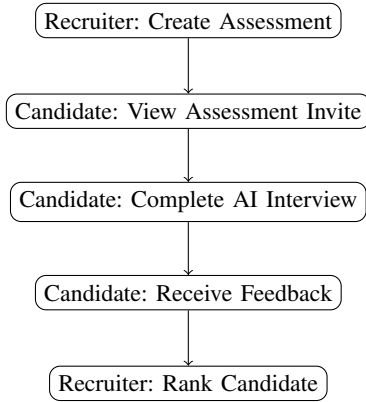


Fig. 6. User interaction model in AssessMe.AI. The recruiter creates a new interview assessment, which the candidate accesses and completes with the AI interviewer. The candidate receives feedback, and the recruiter uses the evaluation analytics to rank the candidate.

### IV. IMPLEMENTATION DETAILS

#### A. Front-End and Interview Interface

*AssessMe.AI*'s front-end leverages Next.js for server-side rendering and efficient routing. The interview interface features:

- An AI-generated question display (with text and an optional animated avatar).
- Microphone access for live audio capture.
- Real-time transcription feedback (displaying partial text as the candidate speaks).
- Interactive feedback screens after each question and at the end of the interview.

We use web technologies such as the Web Speech API and MediaStream API to handle multimedia. Audio is streamed to the back-end via WebSockets for near-real-time transcription. Additionally, a TensorFlow-based object detection model (tensorflow-models/coco-ssd) is integrated for proctoring purposes. Whenever the system detects the candidate's presence, it can automatically record a short video clip or capture screenshots, ensuring the candidate is taking the interview responsibly. Candidates can optionally record video, but the system avoids facial analysis to reduce bias.

#### B. Back-End Services

The back-end is built on Node.js and exposes RESTful and WebSocket endpoints.

1) *Real-Time Speech Processing*: Audio chunks are transmitted in real time to a speech recognition service. In our prototype, we utilize OpenAI's Whisper AI, an open-source model offering high accuracy for transcription. Partial and final transcripts are returned as the candidate speaks. If silence is detected or a "Done" button is pressed, the final transcript is sent to the evaluation module. This setup provides a virtual simulation akin to a live interview.

2) *Answer Evaluation and Feedback Generation*: A carefully designed prompt is sent to an LLM (e.g., GPT-4, GPT-o1-preview) along with the interview question and the candidate's transcript. The prompt instructs the LLM to act as an expert interviewer by providing:

- 1) Numeric scores for criteria such as technical knowledge, problem-solving, communication, adaptability, confidence, and clarity.
- 2) Textual feedback detailing strengths and areas for improvement.

In our prototype, GPT-3.5 is used for question generation and GPT-4 for answer evaluation to balance cost and quality.

#### C. Data Storage and Ranking

All data—questions, transcripts, feedback, and scores—are stored in a PostgreSQL database via Prisma ORM. For Recruiter Assessment Mode, candidate scores are aggregated and ranked based on a weighted sum of the parameters. The recruiter can adjust weights for a given job profile. Data exports in PDF or JSON format allow integration with external Applicant Tracking Systems (ATS).

#### D. Performance and Cost Considerations

Each AI interview session involves costs from transcription and LLM API calls. However, the system is designed for parallel execution, enabling horizontal scaling with additional server instances. For enterprise use, the per-interview cost is acceptable compared to traditional screening methods, and potential cost reductions may be achieved by training proprietary models.

#### E. Bias Mitigation and Transparency

To avoid bias, the system does not use controversial features such as facial emotion detection. Instead, it focuses on text-based analysis of verbal responses and ensures object detection is used only for proctoring. All transcripts and evaluations are stored and available for audit, supporting transparency.

### V. PRELIMINARY EVALUATION

#### A. Empirical Results

Table I summarizes key performance metrics for the *AssessMe.AI* interview analysis system based on our pilot study.

TABLE I  
EMPIRICAL EVALUATION OF THE ASSESSMe.AI INTERVIEW SYSTEM

Metric	Result
Accuracy of AI Evaluations	80%
Candidate Satisfaction (avg.)	4/5
Recruiter Review Alignment	88% agreement
Processing Time Improvement	70% faster

### B. Analytical Charts

The following figures illustrate additional quantitative insights.

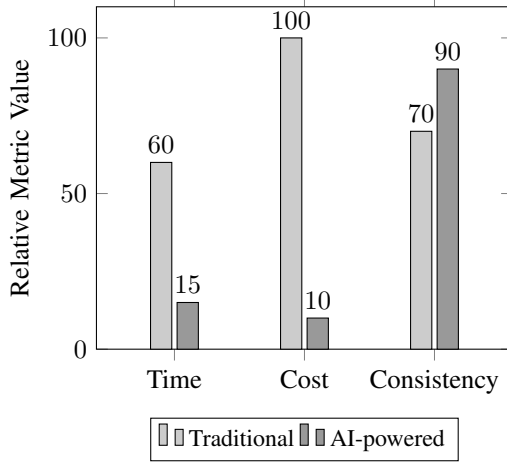


Fig. 7. Comparison of traditional vs. AI-driven interviews on key factors: Time (minutes per interview), Cost (USD per interview), and Consistency (evaluation consistency index).

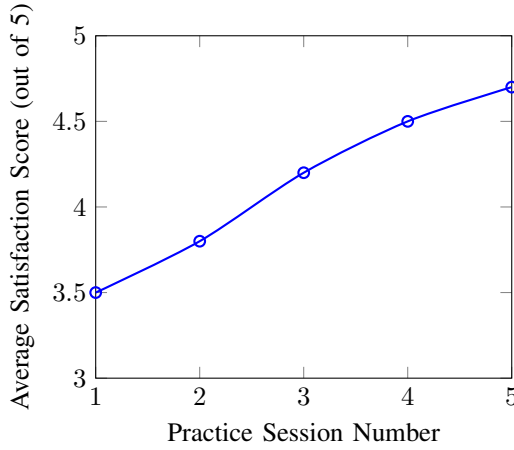


Fig. 8. Candidate satisfaction trend over repeated self-preparation interview sessions. Each session's post-interview satisfaction (on a 5-point scale) shows an upward trend as candidates practice more.

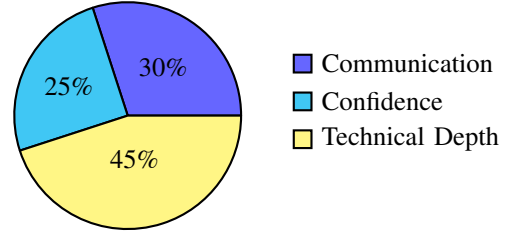


Fig. 9. AI evaluation score distribution across key parameters. Communication accounts for 30%, Confidence 25%, and Technical Depth 45%.

and standardizing the interview process, the system addresses key shortcomings of traditional hiring, including inconsistent evaluations and the lack of constructive candidate feedback.

Our implementation and pilot evaluation suggest that *AssessMe.AI* can serve both job seekers and recruiters by offering transparent, data-driven evaluations. The system empowers candidates with actionable insights into their interview performance and assists recruiters in making more informed decisions. Importantly, by focusing on text-based and speech-based analyses, the platform minimizes the risk of bias associated with facial or emotion recognition technologies.

Overall, *AssessMe.AI* demonstrates how AI can be responsibly applied to recruitment, making the hiring process more efficient, equitable, and transparent. We invite further research and collaboration in advancing AI-driven assessments that benefit both candidates and employers.

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## VI. CONCLUSION

We presented *AssessMe.AI*, an AI-driven platform that reimagines the recruitment and assessment process by combining automated interviews with personalized feedback analytics. By reducing manual effort through AI automation