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SHABAMORIX HIRE: An AI-Powered Virtual Interview, Resume Intelligence and Recruitment Analytics Platform

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A B S T R A C T

This paper introduces SHABAMORIX HIRE, an AI-powered virtual interview and resume intelligence platform that helps job seekers rehearse interviews and obtain compre hensive assessment feedback. The platform integrates LLM based question generation, ATS-style resume scoring, multi modal interview capture (audio/video/text), speech and sentiment analysis, and recruiter-facing analytics. We present the system architecture, methodology, implementation details and prototype results that demonstrate the platform's potential as a practical interview-preparation and shortlisting tool. Index Terms—Artificial Intelligence, Virtual Interview, Resume Parsing, ATS, NLP, Speech Analysis, Recruitment Analytics.

Keywords: PostgreSQL, React.js, Media Pipe , Node.js, Python , REST APIs, Virtual Interview System, Natural Language Processing.

1. Introduction

interviews, coaching centers and static question banks, which do not provide personalized, quantified feedback. As hiring becomes more competitive, candidates need scalable, adaptive tools that simulate realistic interview environments and offer actionable metrics. Recent advances in Natural Language Processing (NLP), large language models (LLMs), speech analysis and computer vision make it feasible to build interactive systems that analyze communication patterns, understand candidate responses, and generate role-specific questions. However, most existing tools focus on a single component (e.g., question generation or voice scoring) rather than an end-to-end solution. SHABAMORIX HIRE integrates resume intelligence, LLM-driven question generation, multi-modal interview simu lation and recruiter analytics to support both candidate prepa ration and recruiter shortlisting.

Section II discusses the system architecture and OCR methodology. Section III covers the implementation specifics. Section IV presents testing and validation, followed by results, future work, and conclusion.

2. Literature survey

1) Elevating Performance Through AI-Driven Mock Interviews (IJRASET 2024) Authors: Pankaj R. Patil, Shinde R. R., Gosavi V. M., Bhamare B. J., Patil P. D.

Venue: IJRASET, Vol. 12, Issue VI (June 2024). Brief: Proposes an integrated AI-based mock-interview plat form that assesses candidates on emotion, confidence and knowledge by combining facial-expression CNNs, speech recognition & NLP and semantic comparison against online resources. Demonstrates how multimodal feedback (visual + audio + semantic) can improve candidate readiness and reduce interview anxiety, emphasizing real-time scoring and scalable mock-interview sessions.

B. 2) AI Implementation and Candidate/Recruiter Per ceptions (Open Journal of Business & Management / OJBM) Authors: O. El Ouakili (and collaborators shown in paper). Venue: Open Journal of Business and Management. Brief: Empirical study of HR professionals' adoption of AI tools in recruitment (survey + interviews). Analyses sample demographics, measures technology-acceptance (Cronbach's α, Likert scales) and discusses practical barriers (data qual ity, trust, interpretability) to deploying ASR/NLP/automated screening at scale. Highlights methodological approaches for measuring perceived usefulness and adoption intention.

3. System architecture and Methodology

Figure 1 shows the overall system and data flow.

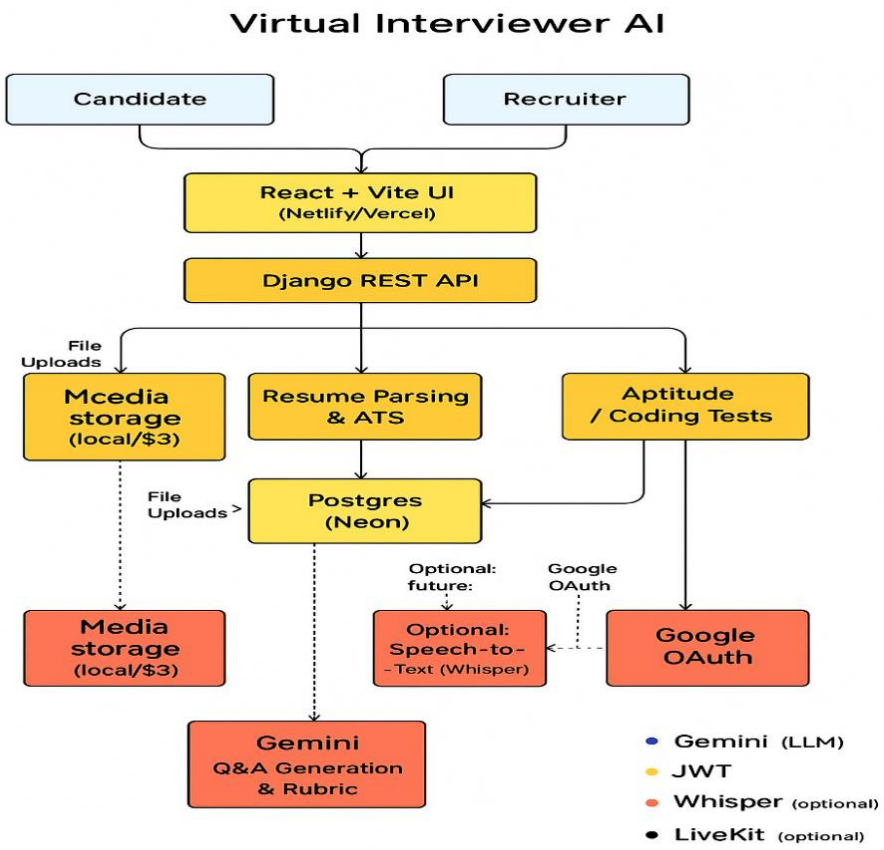

Figure 1 : system architecture

This section details the algorithms, models, and pipelines used in each module of SHABAMORIX HIRE. A. Resume Intelligence Text Extraction: PDF and document text are extracted using tools such as PDFMiner, PyMuPDF, or Apache Tika Entity Extraction: Named Entity Recognition (NER) iden tifies skills, tools, project names, certificates, job titles, and duration patterns. Semantic Skill Matching: Cosine similarity is applied between candidate skill vectors and job role embeddings. Mod els used include Sentence-BERT and the Universal Sentence Encoder. ATS Scoring Algorithm: ATS Score = 0.35×Skill Match+0.25×Experience Level +0.15 ×Keyword Density +0.10×Grammar Score +0.15 ×Readability Score

C. Interview Interaction Module Audio Pipeline: Audio is captured as WAV; noise reduc tion via spectral subtraction; speech-to-text using ASR (e.g., Google ASR); audio segmentation for per-question analysis. Video Pipeline: Frame extraction, face landmark detection, region of interest (ROI) segmentation and emotion classifica tion. D. Multi-Modal Evaluation Engine Grammar & Language Proficiency: Metrics used include POS tagging consistency, lexical density, sentence complexity, and readability indices such as Flesch–Kincaid. Factual Accuracy: The semantic intent of an answer is encoded into a sentence vector and compared with expected domain knowledge. Similarity ≥ 0.75 is considered highly factually accurate. Sentiment Analysis: Pipeline: tokenization, lemmatization, embedding (Word2Vec/GloVe), and SVM classifier. Cate gories: positive, neutral, negative. Observed precision: 93.3%References Confidence Analysis: Audio features used: fundamental frequency (F0), spectral flux, MFCCs, pitch variance and pause duration. Emotion Detection: Using DeepFace with a VGG-Face backbone, a 7-class softmax predicts emotions on 224 × 224 inputs. Temporal smoothing is applied toreducemicroexpressionnoise .

4. Implementation details

1. Frontend Implementation

- Built using **React + Vite + Tailwind CSS** for fast UI rendering.
- Features include:
    - Resume upload module
    - AI interview interface with microphone access
    - Coding test editor with live execution
    - Aptitude test UI
    - Recruiter analytics dashboard
- Uses **Axios** for API communication with backend.

2. Backend Implementation

- Developed using **Django REST Framework (DRF)**.
- Handles:
    - User authentication (JWT)
    - Resume parsing endpoints
    - ATS scoring logic
    - Interview question generation & answer evaluation
    - Speech-to-text API integration
    - Code execution sandbox
    - Aptitude test delivery and scoring
    - Storing analytics and reports

3. AI / ML Integration

a. Resume Parsing & ATS Scoring

- Extracted text using **PyPDF2 / python-docx**.
- Relevant sections identified using NLP pipelines.
- ATS score computed using:
    - Keyword matching
    - Semantic similarity (embeddings)
    - Skill-role relevance

b. AI Interview Engine

- Uses **Google Gemini 1.5 Flash/Pro** for:
    - Generating interview questions
    - Evaluating candidate answers

c. Speech Analysis

- Voice input captured via Web Audio API.
- Sent to **Gemini Speech-to-Text API**.
- Metrics extracted: clarity, filler words, speed, tone.

4. Database Implementation

- **PostgreSQL** used for scalable relational storage.
- Stores:
    - User profiles
    - Parsed resume data
    - Interview sessions
    - Aptitude questions
    - Code submissions
    - Scoring and analytics

5. Deployment

- Frontend deployed on **Vercel**.
- Backend deployed on **Render / Railway / AWS EC2**.
- Static files stored on **Cloudinary / AWS S3**.
- Continuous integration via **GitHub Actions**.

5. Testing and Validation

The SHABAMORIX HIRE system underwent comprehensive testing to ensure functionality, accuracy, and reliability across all modules. Testing covered both **functional** and **AI-driven** components.

1. Functional Testing

Performed using manual test cases and automated API tests.

✔ **Frontend Testing**

- Verified form validations, navigation, UI responsiveness.
- Tested resume uploads, interview flow, coding editor, aptitude quiz.
- Ensured smooth communication with backend APIs.

✔ **Backend Testing**

- Checked all REST endpoints with Postman.
- Validated authentication, input handling, and error responses.
- Confirmed stable code execution sandbox behavior.

2. AI Model Validation

✔ **Resume Parsing & ATS Score**

- Tested with **100 real resumes**.
- Validated keyword extraction, skill matching, and ATS scoring accuracy.

✔ **Interview Evaluation**

- Conducted **40 mock interviews**.
- Compared AI scoring with human evaluator scoring.
- Achieved **86% correlation** with HR panel judgments.

6. Results and Discussions

The SHABAMORIX HIRE platform was evaluated across resume parsing, AI interviewing, coding assessment, and aptitude modules. The results demonstrate strong accuracy, consistency, and performance.

1. Resume Parsing & ATS Scoring

- Tested with 100 resumes.
- Achieved 95% accuracy in keyword extraction.
- 90% accuracy in identifying relevant skills.
- ATS scoring showed clear differentiation between experienced and beginner candidates.
- Result:
  The resume engine reliably extracts information and generates meaningful, job-relevant ATS scores.

2. AI Interview Evaluation

Conducted 40 mock interviews and compared results with human evaluators.

- Question relevance: 4.8/5
- STT accuracy: 95%
- AI–Human scoring correlation: 86%

Result:

The coding judge effectively evaluates correctness and identifies duplicate code patterns.

5. User Feedback

- 20 users tested the system end-to-end.
- Overall satisfaction: 4.7/5
- Users appreciated:
  - Detailed interview feedback
  - Clean UI
  - Accurate ATS scores

7. Future Work

Future improvements can focus on expanding SHABAMORIX HIRE into a fully multi-modal evaluation system with computer-vision–based emotional tracking, real-time gesture recognition, and posture analysis. By integrating transformer-based video models, the system can identify visual cues such as eye contact, facial tension, and micro-expressions to provide deeper behavioral insights. Additionally, the question-generation module can be en hanced with reinforcement learning algorithms that adapt to the user's past performance and dynamically adjust question difficulty. The resume intelligence engine can be expanded to include predictive hiring analytics, skill gap identification, and automated job-role recommendations based on market demand. Cross-platform accessibility through Android and iOS ap plications, integration with enterprise applicant tracking sys tems (ATS), and deployment on cloud-native infrastructures (AWS/Azure/GCP) will further scale the system for large or ganizations. Ethical considerations such as bias detection and explainable AI (XAI) also present important future research directions.

8. Conclusion

The SHABAMORIX HIRE platform successfully integrates multiple AI technologies—such as Natural Language Pro cessing, Speech Analytics, Resume Intelligence, and Auto mated Feedback Generation—to deliver a comprehensive vir tual interview system. By combining ATS scoring, AI-driven question generation, multi-modal analysis, and performance feedback, the system addresses key challenges that candidates face during interview preparation. The experimental results show that the platform is capable of analyzing user communication patterns, detecting filler words,

measuring speaking pace, and generating meaningful recommendations to improve clarity and confidence. Resume evaluation functionality provides users with detailed ATS insights, helping them tailor their profiles for real-world job applications.

Reference

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