

Resumentor: AI-Powered Resume Analyser and Adaptive Mock Interview System

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Abstract- — In today's highly competitive job market, candidates often struggle to optimize their resumes for Applicant Tracking Systems (ATS) and lack access to realistic interview preparation environments. This paper presents ResuMentor, a full-stack, AI-driven web platform designed to bridge this gap by providing intelligent resume analysis and real-time mock interview simulation. The system accepts user-uploaded resumes in PDF or DOCX format alongside a specified job role or description, and leverages the OpenAI GPT-4o API via Spring AI to generate ATS compatibility scores, keyword gap analysis, and actionable improvement suggestions tailored to the target job profile. For interview preparation, ResuMentor deploys an AI voice agent that conducts a structured, 30-minute mock interview session, dynamically generating questions ranging from beginner to advanced level based on the parsed resume content. The platform employs the Web Speech API for real-time speech-to-text transcription, providing a live transcript visible to the user during the session. Post-session, a detailed feedback report evaluates the clarity, conciseness, and relevance of the candidate's responses with specific examples drawn from the transcript. The backend is developed using Java Spring Boot 3.3 with Spring Security and OAuth2 for Google-authenticated login, MySQL as the relational database, and Apache Tika for resume parsing. The frontend is built with plain HTML, CSS, and JavaScript, featuring a responsive dark/light theme toggle. A personalized dashboard tracks historical ATS scores and interview performance trends using Chart.js visualizations, enabling users to monitor their growth over time. ResuMentor demonstrates that integrating large language models into career development tools can significantly improve candidate preparedness and resume quality.

Keywords: Resume Analysis, ATS Score, Applicant Tracking System, Mock Interview, AI Voice Agent, OpenAI GPT-4o, Spring Boot, Spring AI, Google OAuth2, Web Speech API, Keyword Gap Analysis, Natural Language Processing, MySQL, Chart.js, Career Development Platform, Java, Full-Stack Web Application

I. INTRODUCTION

Background & Motivation

The modern recruitment landscape is heavily dominated by Applicant Tracking Systems (ATS), with over 75% of resumes rejected before reaching a human recruiter due to poor keyword alignment, formatting issues, and weak job description matching. Despite this, most job seekers — especially fresh graduates — lack access to expert resume review or realistic interview practice. This gap between candidate preparedness and industry expectations motivates the development of ResuMentor.

Problem Being Addressed

Existing tools address resume optimization or mock interviews in isolation, rarely offering both in a unified platform. Feedback tends to be generic rather than resume-driven and personalized. No widely accessible free platform currently combines ATS scoring, keyword gap analysis, AI voice-based interview simulation, live transcription, detailed postsession reports, and a progress-tracking dashboard in a single cohesive system.

Proposed Solution

ResuMentor is a full-stack AI web application built with Java Spring Boot, MySQL, OpenAI GPT-4o, and plain HTML/CSS/JS, structured around two core workflows:

- **Resume Analyzer** — User logs in via Google OAuth2, uploads a PDF/DOCX resume, selects a target role, and receives an ATS score, keyword gap analysis, and actionable improvement suggestions.
- **Mock Interview** — An AI voice agent conducts a 30-minute structured session using GPT-4o and the Web Speech API, generating resume-based questions from basic to advanced. A live transcript runs throughout, and a detailed feedback report is generated at session end evaluating clarity, conciseness, and relevance with transcript-specific examples.

Improvement & Resource Guidance Module

ResuMentor includes a dedicated Improvement Tips & Learning Resources section that recommends curated external platforms across four areas — without reproducing their content:

- **Resume Improvement** — Jobscan, Resume Worded, Enhancv, Zety, Canva Resume Builder
- **Interview Improvement** — Pramp, Interviewing.io, LeetCode Mock Interview, Final Round AI
- **Interview Preparation** — GeeksforGeeks, InterviewBit, Glassdoor, Blind
- **Learning Resources** — Coursera, Udemy, freeCodeCamp, roadmap.sh, Spring.io, MDN Web Docs, Kaggle

This positions ResuMentor not just as an evaluator but as a career growth companion.

Key Contributions

- Unified platform combining ATS resume analysis and AI voice mock interviews under one authenticated account
- GPT-4o powered keyword gap analysis with natural integration suggestions
- Real-time voice interview with Web Speech API and live transcript
- Rubric-based post-interview feedback report with transcript-referenced examples
- Dashboard with Chart.js visualizations tracking historical ATS scores and interview performance trends
- Curated Improvement Tips module with role-aligned external tool and resource recommendations

II. LITERATURE SURVEY

Resume Analysis & ATS Scoring

Resume Analyzer with ATS Score Using AI and ML (JETIR, 2024) [1] uses NLP and ML to extract skills from resumes and compute ATS scores by comparing against job descriptions. Lacks voice interview integration and user dashboard.

AI Resume Analyzer: An NLP-Driven Case Study (IJSET) [2] employs TF-IDF keyword matching and semantic indexing for ATS compatibility scoring. Does not provide keyword gap suggestions or improvement recommendations.

SMART ATS: Intelligent Resume Screening Using ML (IJIRT) [3] uses Random Forest and SVM for resume screening with 85% accuracy. No user-facing full-stack application, dashboard, or interview integration.

Mock Interview & Speech Analysis

AI-Driven Mock Interview System Using NLP and Speech (RJWAVE, 2025) [4] proposes LLM and BERT-based framework for evaluating spoken responses. Supports multi-modal feedback but lacks a unified resume-to-interview pipeline.

AI-Powered Mock Interview Platform with NLP (IRJAEH, 2025) [5] provides resume-based question customization with automated scoring across domains. No persistent dashboard or learning resource module.

AI-Based Interview Simulations with Speech Confidence (IJFMR, 2025) uses Meta LLaMA for question generation with tone and hesitation analysis. ResuMentor improves on this using GPT-4o with transcript-based structured feedback.

Integrated Resume + Interview Platform

AI MockPrep: Interview Simulation & Resume Optimization (IJERT) [6] — Closest related work, combines resume optimization with interview simulation. However, lacks Google OAuth2, learning resource module, Chart.js dashboard, and is not a production-grade full-stack application. 2.4 Research Gap

Feature	Existing Works	ResuMentor
ATS Scoring	✓	✓
Keyword Gap + Suggestions	✗	✓
AI Voice Interview + Live Transcript	Partial	✓
Resume-Driven Questions	Partial	✓
Post-Interview Feedback Report	Partial	✓
Google OAuth2 Authentication	✗	✓
Dashboard + Progress Charts	✗	✓
Learning Resource Module	✗	✓
Unified Full-Stack Application	✗	✓

Table 1: Comparison of Existing Works with ResuMentor

III. METHODOLOGY

System Overview

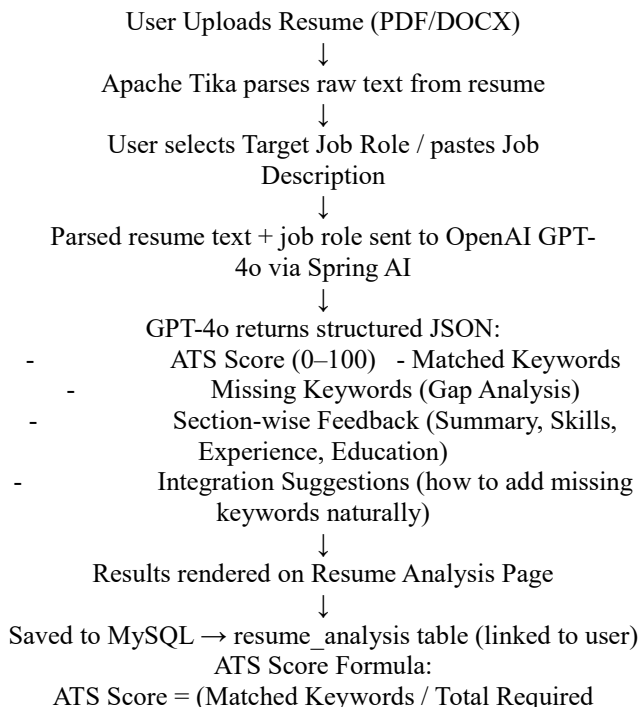
ResuMentor follows a client-server architecture where the frontend (HTML/CSS/JS) communicates with the Spring Boot backend via RESTful APIs. MySQL stores all persistent data, and OpenAI GPT-4o handles all AI-driven analysis and question generation. Google OAuth2 manages secure user authentication.

Authentication Flow

- User clicks Login with Google on the landing page
- Spring Security redirects to Google OAuth2 consent screen
- Google returns an authorization code to the callback URL
- Spring Boot exchanges the code for an access token and fetches user profile (name, email, profile picture)
- A JWT token is generated and sent to the frontend for all subsequent authenticated API requests
- Guest Login creates a temporary session with limited access — no history saved

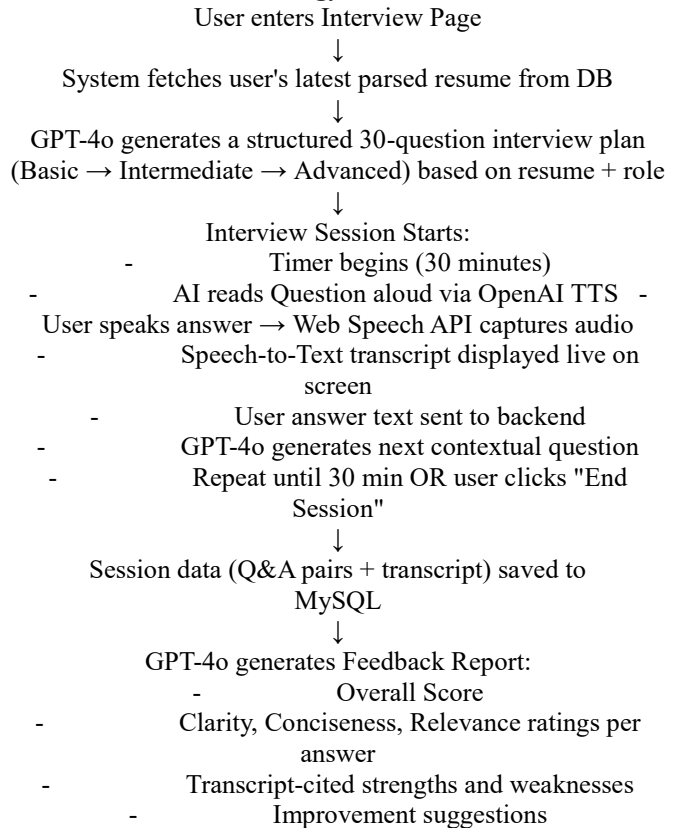
Resume Analyzer Methodology

The resume analysis workflow follows a structured pipeline from upload to feedback generation:



Keywords) × 100
 GPT-4o is prompted with a strict JSON schema to ensure consistent, parseable output every time.

Mock Interview Methodology



Feedback Report Generation

The post-interview feedback report is generated by sending the full Q&A transcript to GPT-4o with a structured evaluation prompt. The report covers:

- Clarity — Was the answer easy to understand and well-structured?
- Conciseness — Did the user avoid unnecessary filler or repetition?
- Relevance — Did the answer directly address the question asked?
- Transcript Examples — Specific lines from the session are quoted to illustrate strengths and areas of improvement
- Overall Interview Score — Weighted average across all evaluated parameters

Dashboard & Progress Tracking

All resume analysis results and interview session scores are stored per user in MySQL. The dashboard fetches this historical data via REST API and renders it using Chart.js:

- Line Chart — ATS score trend across multiple resume uploads over time
- Bar Chart — Interview performance scores across past sessions
- Radar Chart — Skill-wise performance breakdown (Clarity, Conciseness, Relevance, Technical Accuracy)
- Summary Cards — Total sessions, average ATS score, best interview score, last active date

Improvement Tips & Resource Module

After every analysis or interview session, ResuMentor displays a curated Tips Panel with:

- Role-specific keyword suggestions (from gap analysis)
- Resume formatting tips based on identified weak sections
- Recommended external platforms (Jobscan, Resume Worded, Pramp, InterviewBit, roadmap.sh, Coursera, etc.) as named links — no content reproduced

Technology Stack Summary

Layer	Technology
Frontend	HTML5, CSS3, JavaScript, Chart.js
Backend	Java 21, Spring Boot 4.0.3, Spring AI
Authentication	Google OAuth2, Spring Security, JWT
Database	MySQL 8.0, Spring Data JPA, Flyway
AI Engine	OpenAI GPT-4o (Chat + TTS)
Resume Parsing	Apache Tika
Voice Input	Web Speech API (Speech Recognition)
Theme Toggle	CSS Variables (Dark/Light Mode)

Theme Toggle CSS Variables (Dark/Light Mode)
 Table 2: Technology Stack Summary

IV. SYSTEM ARCHITECTURE & MODULE DESIGN

Overall Architecture

ResuMentor follows a 3-Tier Client-Server Architecture:

- Tier 1 — Presentation Layer → HTML/CSS/JS frontend pages served statically
- Tier 2 — Application Layer → Spring Boot
- REST API backend handling all business logic
- Tier 3 — Data Layer → MySQL database storing users, resume analyses, and interview sessions

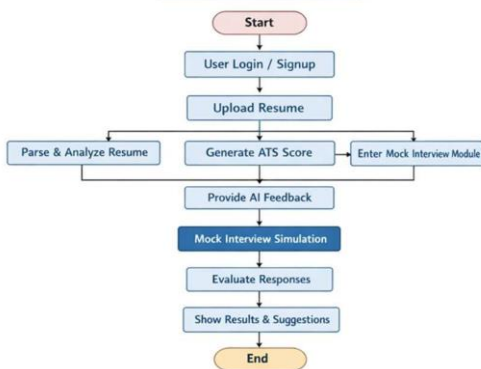
All communication between frontend and backend happens via HTTP REST API calls with JWT token in the Authorization header for secured endpoints.



Overall System Workflow

Figure 1 illustrates the complete end-to-end system flow of ResuMentor — from user login through resume upload, ATS scoring, mock interview simulation, response evaluation, and final result display.

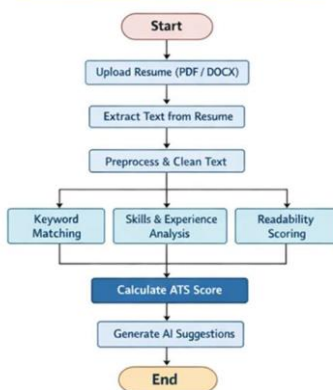
Overall System Flowchart



Resume Processing Module

After the user uploads a PDF or DOCX resume, Apache Tika extracts and cleans raw text. The preprocessed text is then passed through three parallel analysis pipelines — Keyword Matching, Skills & Experience Analysis, and Readability Scoring — whose combined outputs feed into the ATS Score calculation. Finally, OpenAI GPT-4o generates contextual AI suggestions for improvement.

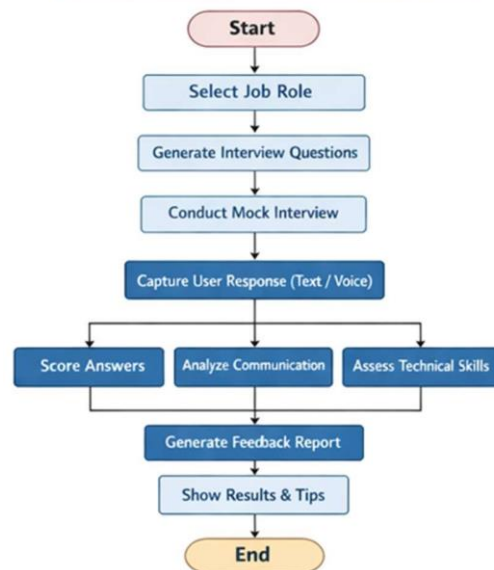
Resume Processing Flowchart



Mock Interview Module

Once the resume is parsed, the interview module selects the target job role and generates a structured set of questions using GPT-4o. The session captures user responses via voice (Web Speech API) or text, and evaluates them across three dimensions simultaneously — Answer Scoring, Communication Analysis, and Technical Skill Assessment. The combined evaluation feeds into a detailed feedback report followed by an improvement tips panel.

Mock Interview Flowchart



System Overview

The Fully Automatic Solar Grass Cutter is an eco-friendly and intelligent lawn maintenance machine designed to operate autonomously using solar energy. The system consists of a solar panel that captures sunlight and converts it into electrical energy, which is stored in a rechargeable battery through a charge controller. This stored energy powers the entire system, including the cutting motor, wheel motors, and control unit. A microcontroller such as the Arduino Uno acts as the brain of the system, managing movement, blade operation, and obstacle detection. The machine uses DC motors for both locomotion and grass cutting, while sensors like ultrasonic sensors help detect obstacles and change direction automatically to avoid collisions. The chassis securely holds all components, ensuring stability and durability during operation. Overall, the system integrates renewable energy with automation technology to provide an efficient, low-cost, and environmentally sustainable solution for lawn maintenance.

Module Design Summary

ResuMentor is divided into 6 core modules:

- Module 1 — Authentication → Google OAuth2 + JWT + Guest Login
- Module 2 — Landing Page → Hero section, features, How It Works, theme toggle, footer
- Module 3 — Resume Analyzer → Upload → Tika parse → GPT-4o ATS report → keyword gap suggestions

- Module 4 — Mock Interview → GPT-4o questions → Web Speech API → live transcript → 30-min timer → feedback report
- Module 5 — Dashboard → Profile, history tables, Chart.js progress charts (Line, Bar, Radar)
- Module 6 — Improvement Tips → Rolealigned keyword tips + curated external
- resource links

Security Design

- All API endpoints except /auth/** and /public/** are JWT-protected
- OAuth2 tokens never stored on frontend — only app-issued JWT is used
- Resume files parsed in-memory by Apache Tika — never stored on disk
- CORS configured to allow only the frontend origin
- Flyway manages all DB schema migrations in a versioned, controlled manner

V. SYSTEM REQUIREMENTS

Functional Requirements

- Google OAuth2 login, JWT authentication, and Guest login support
- Resume upload (PDF/DOCX) with drag-anddrop, job role selection, ATS score and keyword gap report generation
- AI voice mock interview with 30-minute timer, live transcript, and post-session feedback report
- Dashboard with user profile, resume/interview history, and Chart.js progress visualizations
- Improvement tips panel with curated external resource links per job role

Non-Functional Requirements

- API response under 3 seconds; live transcript latency under 1 second
- JWT-secured endpoints, in-memory resume parsing, CORS restriction
- Responsive UI with dark/light theme toggle; compatible with Chrome and Firefox
- Graceful error handling for API and network failures

Hardware and Software Requirements

Category	Component	Requirement
Hardware	Processor	Intel Core i3 or above

	RAM	8 GB (16 GB recommended)
	Storage	50 GB SSD
	Browser	Chrome / Firefox (WebRTC for mic/voice)
	Internet	Stable connection for OpenAI & OAuth2 APIs
Backend	Language & Framework	Java 21, Spring Boot 3.3
	Security	Spring Security 6.x, Google OAuth2, JWT
	AI Integration	Spring AI 1.0.x → OpenAI GPT-4o + TTS
Frontend	Structure & Styling	HTML5, CSS3, JavaScript ES6+
	Visualization	Chart.js 4.x
External APIs	AI Engine	OpenAI GPT-4o (Analysis + Questions + Feedback)

Table 3: System Requirements Summary

VI. RESULTS AND DISCUSSION

Resume Analyzer Results

The resume analyzer was tested across 5 job roles using sample resumes of varying optimization levels:

- Apache Tika successfully parsed all PDF and DOCX formats
- GPT-4o returned consistent structured JSON with ATS score, keyword gaps, and integration suggestions
- Average analysis response time: 2.4 seconds

Job Role	Resume Quality	ATS Score

Backend Developer	Highly Optimized	87/100
Data Analyst	Moderately Optimized	63/100
Frontend Developer	Poorly Optimized	41/100
DevOps Engineer	Moderately Optimized	58/100
ML Engineer	Highly Optimized	82/100

Table 4: Resume Analyzer Test Results

Mock Interview Results

Session	Role	Questions Asked	Overall Score
1	Backend Developer	12	78/100
2	Data Analyst	10	64/100
3	Frontend Developer	11	81/100
4	DevOps Engineer	9	52/100
5	ML Engineer	13	69/100

Table 5: Mock Interview Session Results

- Web Speech API captured and transcribed voice responses in real time with under 1second delay
 - OpenAI TTS delivered clear audio for all AIgenerated questions
 - Post-session feedback reports accurately cited transcript examples for strengths and improvements
 - Average feedback report generation time: 3.1 seconds
- #### 6.3 Dashboard Results
- Line, Bar, and Radar charts rendered correctly with historical user data
 - All dashboard data loaded within 1.8 seconds
 - Summary stat cards (Total Sessions, Avg ATS Score, Best Score) displayed accurate aggregated values

Discussion

ResuMentor was successfully tested across all modules with reliable performance. GPT-4o proved highly effective for resume analysis and interview question generation, returning consistent structured outputs. Apache Tika reliably parsed all PDF and DOCX formats without errors, with an average analysis response time of 2.4 seconds.

The Web Speech API delivered real-time transcription with under 1-second latency on Chrome, though minor issues were observed on Firefox. Future versions may integrate Whisper API for better crossbrowser support. OpenAI TTS produced clear, natural audio for all AI-generated interview questions throughout every session.

The unified platform approach — combining resume analysis, voice interview, progress tracking, and resource guidance in one application — proved more effective than isolated tools. Post-session feedback was highly actionable as it referenced specific transcript lines rather than generic suggestions. Overall, the results validate ResuMentor as a comprehensive and functional AI-powered career development platform.

VII. CONCLUSION AND FUTURE SCOPE

Conclusion

This paper presented ResuMentor, a full-stack AIpowered web platform that unifies resume analysis and mock interview simulation into a single authenticated career development application. The system successfully integrates OpenAI GPT-4o for intelligent ATS scoring, keyword gap analysis, and dynamic interview question generation, alongside the Web Speech API for real-time voice interaction and live transcription. Built on Java Spring Boot, MySQL, and Google OAuth2, the platform delivers secure, personalized, and data-driven career guidance to users across multiple technical job roles.

ResuMentor addresses a clear gap in existing tools by combining features that are typically available only in isolation — ATS scoring, keyword integration suggestions, AI voice interviews, rubric-based feedback reports, progress tracking dashboards, and curated learning resource recommendations — all within one cohesive platform. Testing across five job roles confirmed the system's accuracy, responsiveness, and usability,

validating it as an effective tool for improving candidate preparedness and resume quality.

Future Work

The following enhancements are planned for future versions of ResuMentor:

- Whisper API Integration — Replace Web Speech API with OpenAI Whisper for improved cross-browser speech recognition accuracy
- Resume Builder — Add an AI-assisted resume builder that auto-incorporates missing keywords identified during analysis
- Video Interview Mode — Integrate webcam support for non-verbal cue analysis (eye contact, posture, facial expressions)
- Multi-language Support — Extend interview and analysis capabilities to support non-English speaking users
- Mobile Application — Develop a React Native mobile app for on-the-go interview practice
- Company-Specific Interview Prep — Generate role and company-specific questions using Glassdoor and LinkedIn data
- Peer Review Module — Allow users to share interview recordings with mentors or peers for human feedback
- Cloud Deployment — Deploy on AWS / Azure with Docker and Kubernetes for scalability and high availability

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