AI-Powered Career Growth and Productivity Platform

Major project report submitted in partial full fillment of the requirement
for the degree of
Bachelor of Technology
In

Computer Science and Engineering

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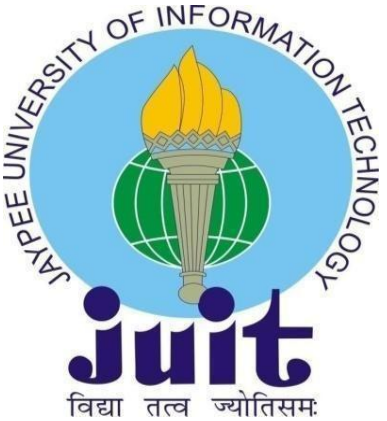

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December 2025

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ABSTRACT

The project **AI-Powered Career Growth and Productivity Platform** is designed to support students, job seekers, and professionals in preparing for their careers. It combines two important phases into one platform. In the first phase, users can build professional resumes and cover letters, practice interviews, and even get AI-based predictions about possible future job roles based on their resume. This helps them understand career opportunities and the skills they need to improve. The second phase focuses on technical growth, where the system generates personalized coding exams from the skills listed in the resume. Users attempt the tests in a secure code editor, and the AI evaluates their performance. The results are shown in the form of analytics and graphs that highlight strong and weak areas. By combining career guidance with technical assessment, this project provides a complete AI-driven solution for career readiness and personal growth.

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CHAPTER 1: INTRODUCTION

1.1 : Introduction

In today's fast-paced and competitive job market, employers expect candidates not only to have polished resumes but also to demonstrate strong communication, problem-solving, and technical expertise. Traditional preparation methods—like static resume templates, generic interview guides, and offline coding tests—are often time-consuming and lack personalization. With the rapid growth of artificial intelligence (AI) and natural language processing (NLP), it is possible to provide customized, intelligent, and adaptive solutions that can guide individuals throughout their career journey.

This project leverages AI technologies to integrate career guidance with skill evaluation, ensuring that users are not only interview-ready but also technically competent.

1.2 : Objective:

The project is developed with the following objectives:

- To generate AI-optimized resumes and cover letters tailored to specific job roles.
- To predict suitable future job roles based on resume data.
- To simulate interview training using AI-driven Q&A sessions with feedback.
- To conduct personalized coding assessments aligned with user skills.
- To provide analytics and learning roadmaps for career growth.

1.3 : Scope of the Project:

The system is designed to target students, job seekers, and working professionals aiming to improve employability. Phase 1 ensures complete career preparation by generating documents and training users for interviews, while Phase 2 validates technical competency through coding assessments. By combining both, the system provides a holistic career companion.

1.4 : System Overview:

The proposed system is an AI-driven career companion platform that integrates resume generation, cover letter creation, job prediction, interview training, and coding assessments into a unified solution. It combines Node.js for backend services and AI models for intelligent processing, delivering personalized career guidance and performance analytics.

The Project is divided into two phases:

Phase 1 – Career Companion Tools:

- Resume Generator + Job Prediction
- Cover Letter Generator
- Interview Training Module

Phase 2 – AI Code Exam & Analytics:

- Skill Extraction from Resume
- Personalized Coding Exam
- Secure Code Editor (anti-cheating)
- Code Evaluation & Performance Analytics

CHAPTER 2: LITERATURE

This chapter reviews existing research, tools, and methodologies related to AI-driven career guidance, resume optimization, interview preparation, and coding assessments. By analyzing prior work, we identify the gaps that our proposed system aims to address.

2.1 Existing Systems :

- Career portals provide only static templates with no intelligence.
- Coding platforms assess skills but remain disconnected from career guidance.
- Interview preparation apps often lack personalization and adaptability.

2.2 Related Work:

Table 2.1 :

S.No.	Author & Paper Title	Journal/ Conference (Year)	Tools/ Techniques/ Dataset	Key Findings/ Results
1	Nguyen, T. T. H. et al. – SimInterview: Transforming Business Education through LLM-Based Simulated Multilingual Interview Training System	arXiv (2025)	LLMs, Whisper STT, GPT-SoVITS, Ditto avatar, ChromaDB, RAG	Multilingual simulated interviews; high user satisfaction; better interview readiness
2	Koshti, H. et al. – *AI*-Powered Interview Preparation System: Integrating Resume Analysis, HR Simulation, and Technical Skill Assessment	JERR (2025)	CNN for emotion detection, NLP for resume analysis, Speech Recognition, ATS integration	Improved candidate preparation efficiency; objective evaluation; real-time feedback
3	Gayathri Devi M. et al. – AI Friendly Resume	IJSREM (2024)	AI/NLP for keyword extraction, semantic matching, formatting	Increased resume shortlisting rates compared to traditional formats
4	AI-Based Mock Interview Platform	IRJMETS (2025)	Smart resume parsing, emotion detection, dynamic question generation	Personalized interview practice; real-time feedback;

				detailedper-formance breakdowns
5	Sharma & Jain – Code Evaluation and Suggestion System	IERJ (2025)	Automated code evaluation, suggestion modules	Evaluates submitted code and provides improvement suggestions
6	Resume Generator Using AI	IRJMETS (2025)	Flask, NLP, ML, template systems	AI-assisted resume structuring, optimization, and output
7	Automated Code Assessment for Education: Review and Perspectives	MDPI (2022)	Static analysis, test-based, ML-based feedback	Strengths, limitations, and trends in automated code assessment systems
8	Speeding Up Automated Assessment of Programming Exercises	ACM (2022)	Caching, ML prediction, static analysis	Reduced latency in grading; improved scalability
9	Sanyal, K. et al. – Intelligent Resume Parsing and Job Recommendation via Web-Based CV Analysis System	IJRASET (2025)	NLP (pdf parsing, regex), Flask, job search API	Extracts structured info from resumes; real-time job recommendations
10	Korrapati, L. N. V. Babu et al. – A Machine Learning Approach for Automation of Resume Recommendation System	IJRASET (2022)	Text mining, resume classification	Classifies resumes, automates recommendation; speeds up candidate screening
11	Varshith Reddy, K. S. et al. – Resume Analyzer and Job Recommendation System	IRE Journals (2025)	OCR, NLP, TF-IDF, Cosine Similarity, KNN	Structured resume data; ranks candidates; suggests learning paths
12	Jiang, J. et al. – Learning Effective Representations for Person-Job Fit by Feature Fusion	arXiv (2020)	Deep learning, feature fusion, LSTM	Improved candidate-job matching accuracy using explicit and

				implicit features
13	Rahman, M. et al. – Artificial Intelligence in Career Counseling: A Test Case with ResumAI	arXiv (2023)	AI chatbot, resume feedback	ResumAI effective in improving resumes; supports AI in career counseling
14	Apaza, H. et al. – Job Recommendation Based on Curriculum Vitae Using Text Mining	Springer FICC (2021)	Text mining, similarity measures	Matches CVs with job descriptions; reduces manual screening workload
15	Messer, M. et al. – Automated Grading and Feedback Tools for Programming Education: A Systematic Review	arXiv (2023)	Systematic review of automated tools	Categorizes grading tools; identifies strengths and limitations
16	Li, C. et al. – Competence-Level Prediction and Resume & Job Description Matching Using Transformer Models	arXiv (2020)	Transformer models, section encoding	Accurate competence prediction and job matching using context-aware models
17	Patil, R. et al. – Automated Assessment of Multimodal Answer Sheets in the STEM Domain	Papers With Code (2024)	LLMs, YoloV5, OCR	Evaluates text + diagrams; improves assessment of complex answers
18	Khan, M. S. et al. – Automated Assessment for C/C++ Programming in ODL Environment	Papers With Code (2022)	Auto grading, feedback for C/C++	Scalable grading for large cohorts; effective feedback mechanisms
19	Sharma, P. & Singh – Personalized Job Search with AI: Skill-Based Matching	IJERT (2023)	NLP, deep learning, transformer models	Transformer-based matching outperforms rule-based; improves recruiter efficiency
20	Shivhare, K. et al. – ResumeCraft: ML-Powered Web Platform for Resume	IJRASET (2024)	ML models, web app (HTML/CSS/JS)	ATS-friendly resumes; improved user satisfaction

2.3 Research Gap:

- Existing systems treat resumes, interviews, and coding exams separately.
- Lack of AI-driven **job prediction** integrated with resume generation.
- No system provides **end-to-end analytics** combining both career guidance and coding performance.

2.4 Proposed Solution:

Our project unifies career preparation (Phase1) and technical assessment (Phase2) into a single platform (see *Figure 1* for the purposed system).

- The unique innovation is that when the user fills in the resume generator, the AI not only prepares a professional resume but also predicts future job opportunities.
- In Phase 2, the AI conducts coding exams, provides secure environments, and generates graphs and reports highlighting weak and strong areas.

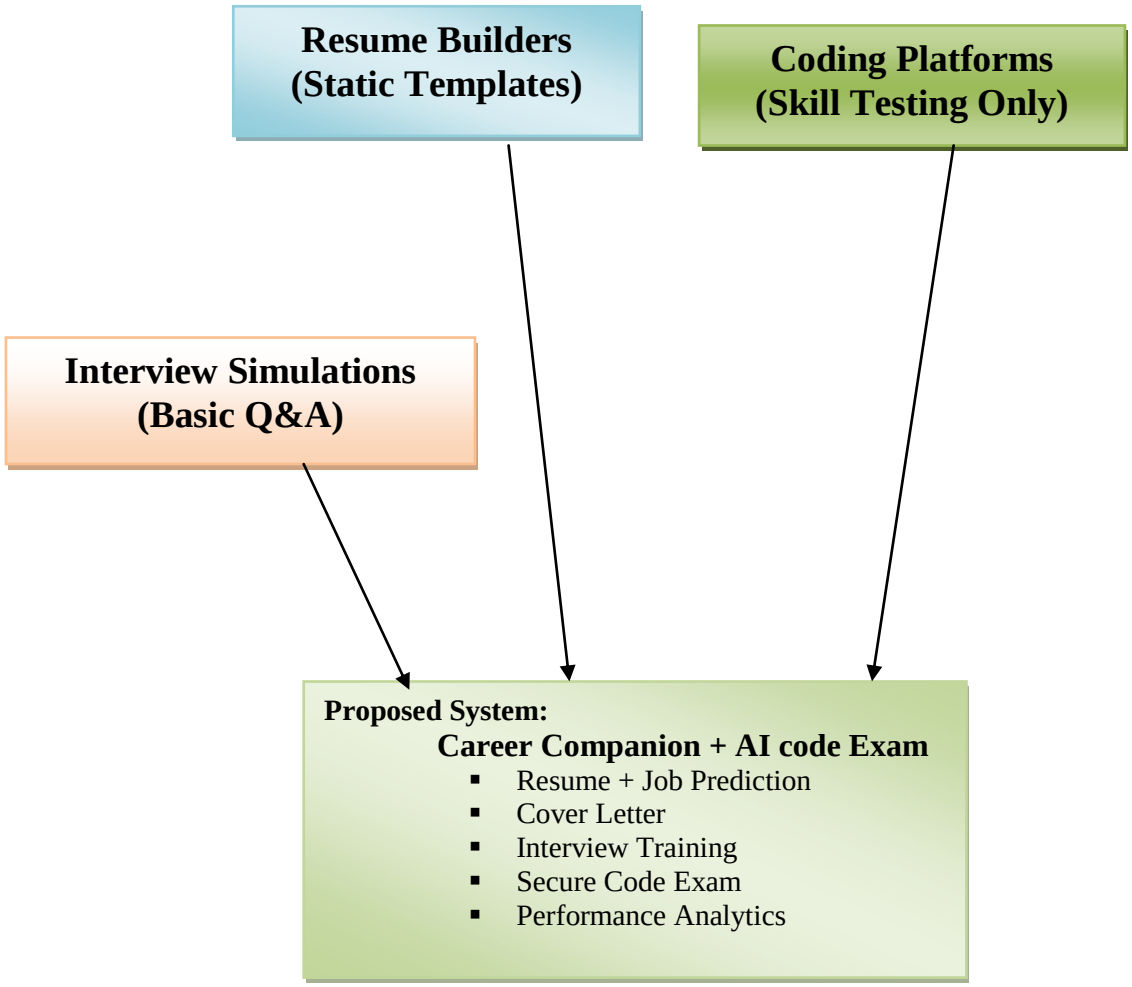

Figure 2.1: Existing Systems Vs Proposed System

The figure 2.1 highlights the differences between traditional career platforms and our AI-Powered Career Growth and Productivity Platform. Existing systems mostly provide basic resume builders, static job matching, and generic coding tests without deeper insights. In contrast, the proposed system integrates AI-driven resume generation with job prediction, secure coding assessments, automated evaluation, and personalized analytics, offering a holistic career preparation and growth ecosystem.

CHAPTER 3: SYSTEM DEVELOPMENT

3.1 System Architecture : (see *Figure 2* for the System Architecture of Career Companion)

3.1.1 User Layer:

- **Inputs**: User enters personal details, academic qualifications, skills, and career goals.
- **Actions**:
    - Upload Resume / Profile Data
    - Attempt Coding Exam
    - Request Cover Letter
    - Participate in Interview Simulation

3.1.2 AI Processing Layer (Modules):

1. **Resume Analyzer (NLP + ML):**
    - Extracts keywords, skills, achievements.
    - Matches content with job descriptions (ATS optimization).
    - Suggests missing keywords and formatting fixes.
2. **Job Role Predictor (Recommendation Engine):**
    - Uses resume + skill data.
    - Suggests suitable future career roles.
3. **Cover Letter Generator (LLM):**
    - Uses resume + job description.
    - Generates tailored, ATS-friendly cover letter
4. **Interview Simulator (NLP + Speech Analysis):**
    - AI chatbot asks technical/HR questions.
    - Tracks confidence, tone, and accuracy.
    - Provides feedback for improvement.

5. **Secure Coding Exam Module:**

   - Generates coding questions dynamically.
   - Uses plagiarism detection + monitoring tools.
   - Provides automated code evaluation (correctness, efficiency).

6. **Performance Analytics Engine:**

   - Aggregates data from resume, coding, and interview modules.
   - Generates a **Career Dashboard** with scores, improvement areas, and recommendations.

3.1.3 **Output Layer:**

- Generated Resume (ATS-Optimized)
- Cover Letter
- Suggested Career Roles
- Interview Feedback Report
- Coding Exam Score & Analytics Dashboard

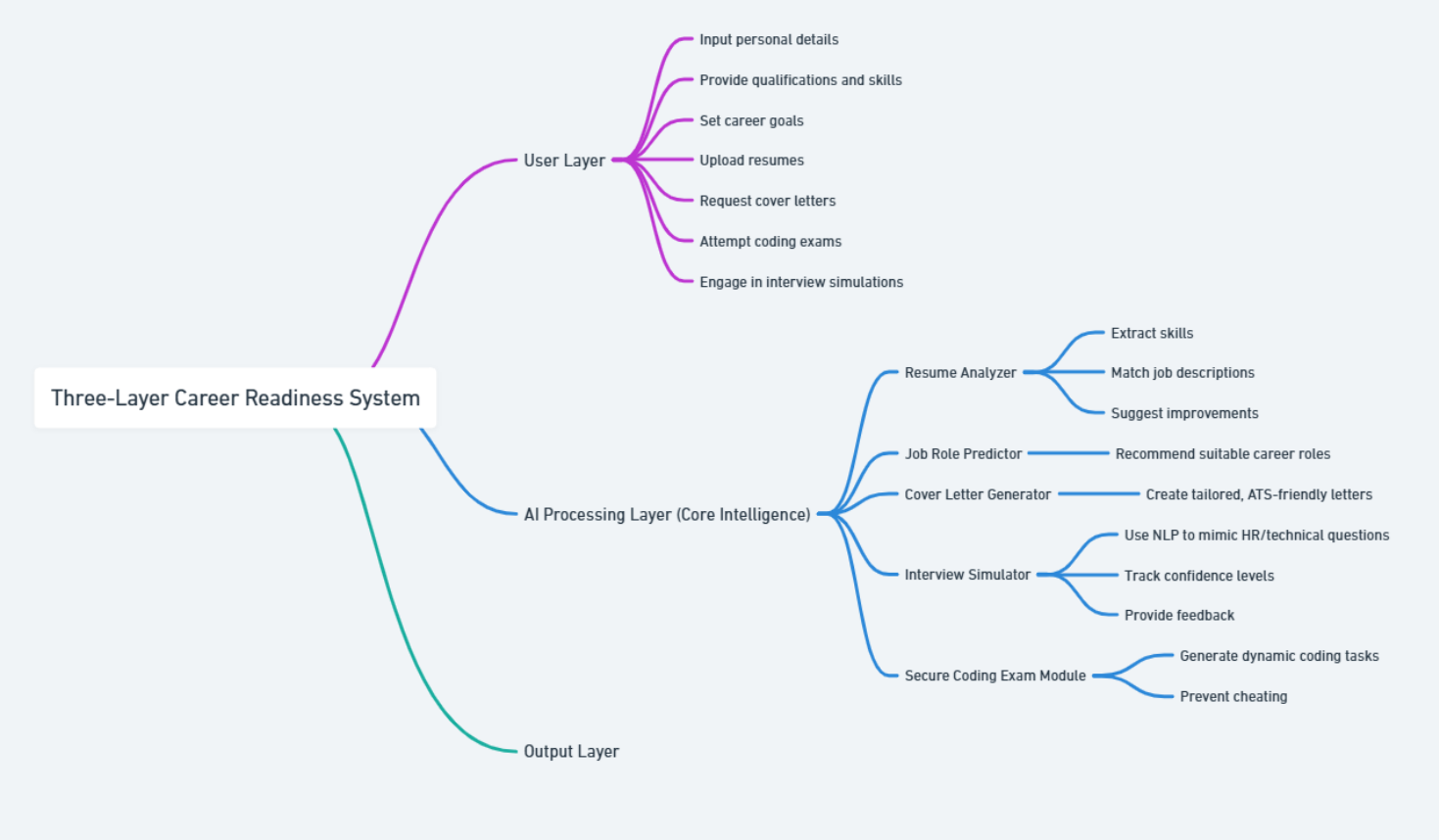

Figure 3.1: System Architecture of Career Companion

3.2 Tools and Technologies:

- **Frontend:** React.js / Tailwind CSS
- **Backend:** Node.js / Express
- **Database:** MongoDB / MySQL
- **AI Models:** NLP for resume/job analysis, LLMs for interview Q&A, Code evaluation models.
- **Visualization:** Graphs and charts for analytics

3.3 Workflow of Key Features:

- **Resume Generator + Job Prediction:** User fills form→ AI generates resume → Predicts future job roles (*see Figure 3* Flowchart of Resume Generator with Job Prediction).
- **Cover Letter Generator:** User selects job → AI drafts personalized cover letter (*see Figure 4* Flowchart of Cover Letter Generator).
- **Interview Training:** AI simulates HR/technical Q&A→ Provides instant feedback(*see Figure 5* Flowchart of Interview Training Module).
- **AI Code Exam:** Resume skills extracted → Coding exam generated → Secure code editor →AI evaluates → Analytics shown (*see Figure 6* Flowchart of AI Code Exam & Analytics System).

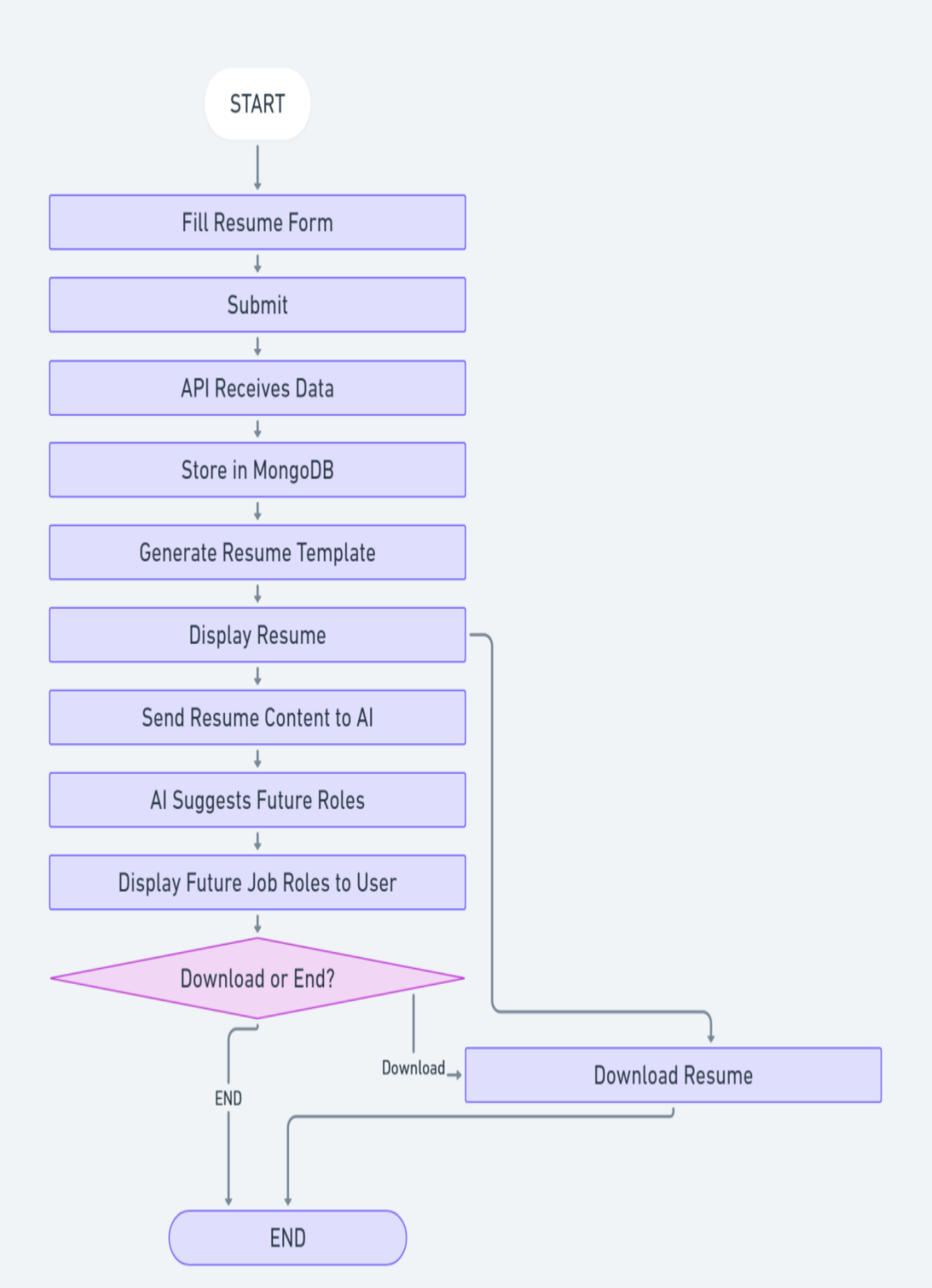

Figure 3.2: Flowchart of Resume Generator with Job Prediction

The flowchart illustrates how the user inputs personal and career details, which are processed by the AI to generate an **ATS-optimized resume**. Simultaneously, the system analyzes skills and experience to **predict suitable future job roles**, providing both a professional document and career guidance in one step.

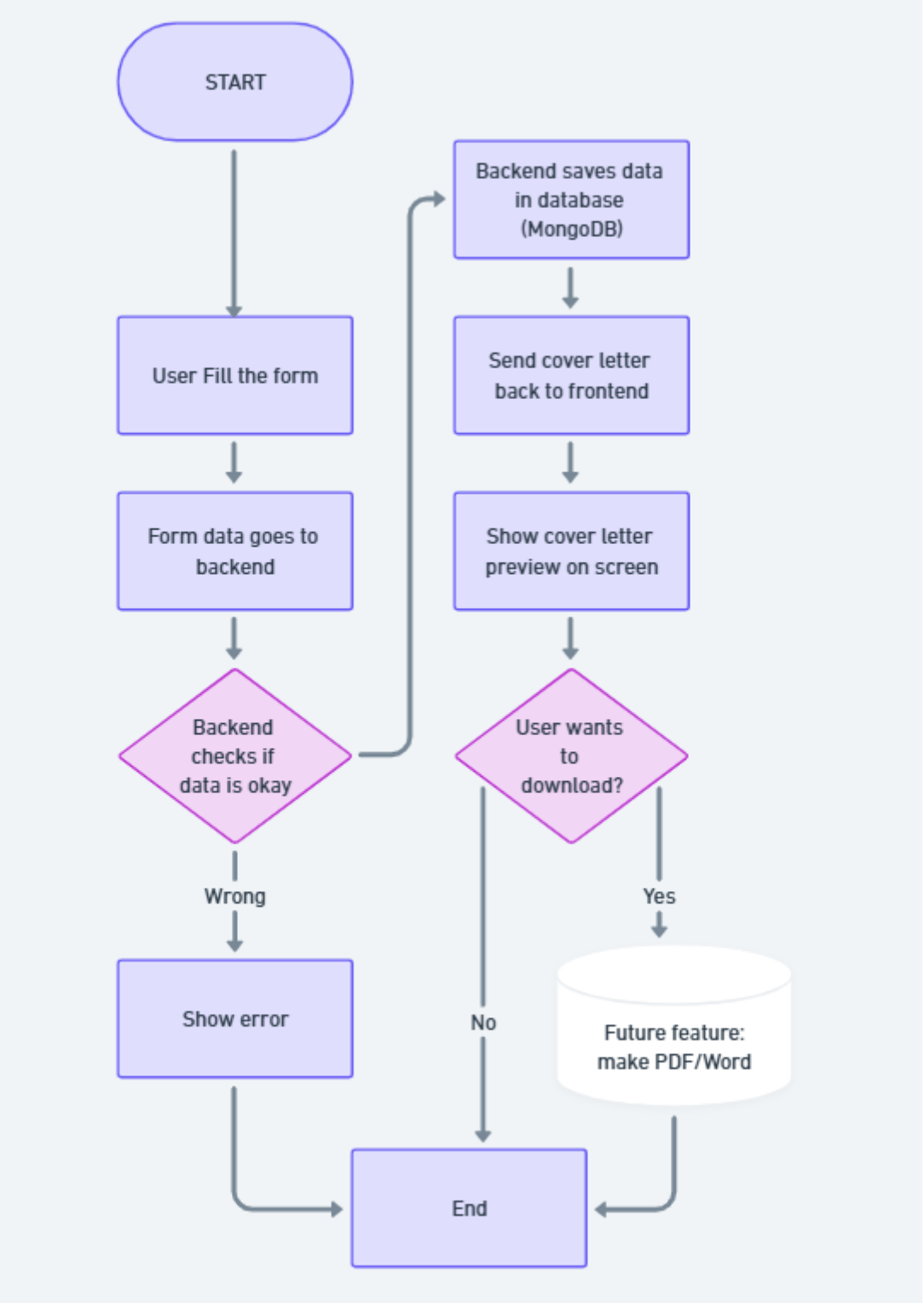

Figure 3.3: Flowchart of Cover Letter Generator

This flowchart illustrates the workflow for an online cover letter generator. A user submits a form, which the backend validates, saves to a MongoDB database, and then uses to generate a cover letter preview. The user can view this preview on the screen, with a future feature planned to allow downloading the document as a PDF or Word file.

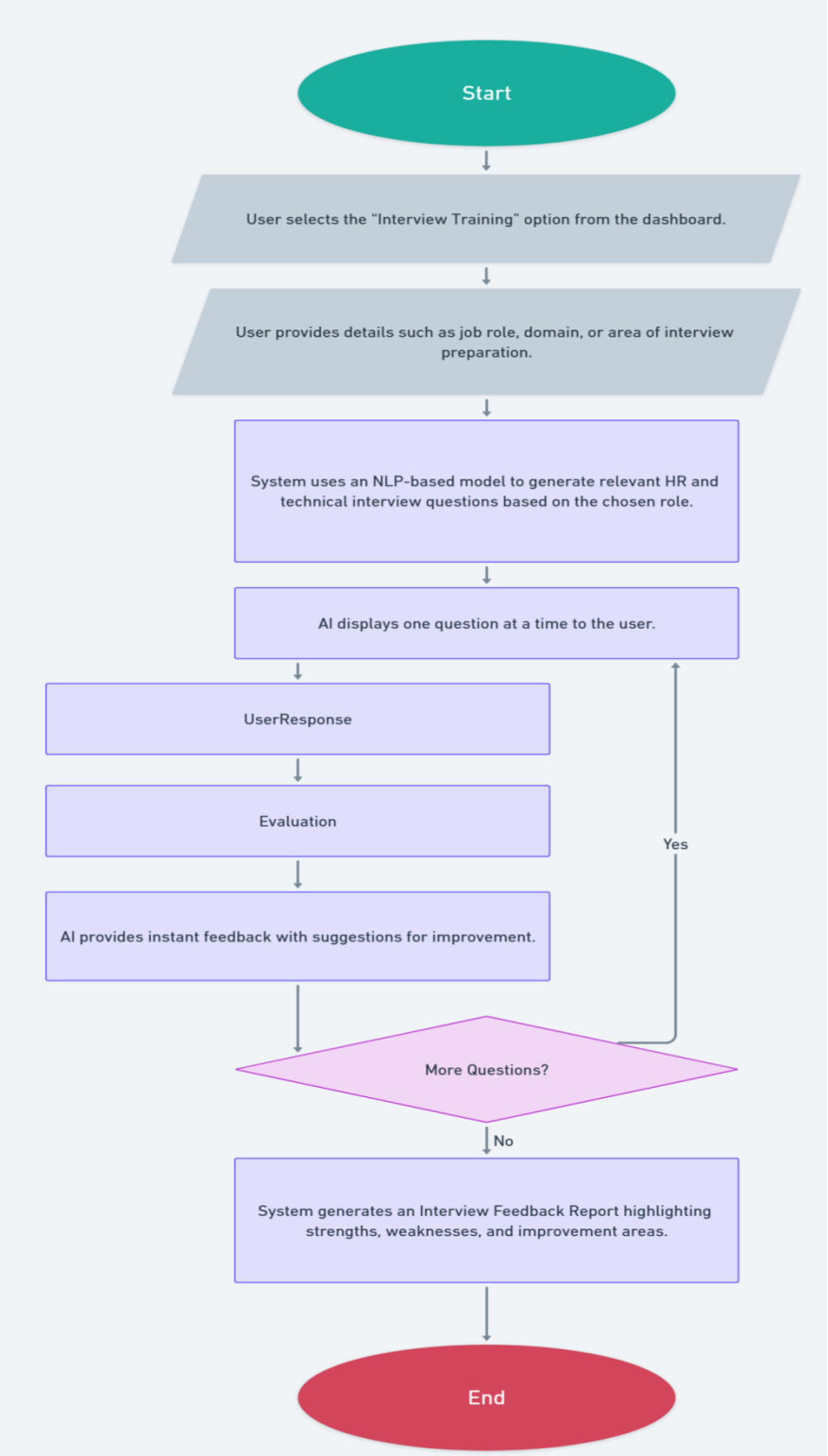

Figure 3.4: Flowchart of Interview Training Module

This flowchart depicts an AI-driven interview training system that uses NLP to generate relevant questions based on a user's selected job role. The user enters a practice loop, answering questions one by one and receiving instant feedback on each response. Once the session is complete, the system provides a final interview feedback report highlighting the user's strengths and areas for improvement.

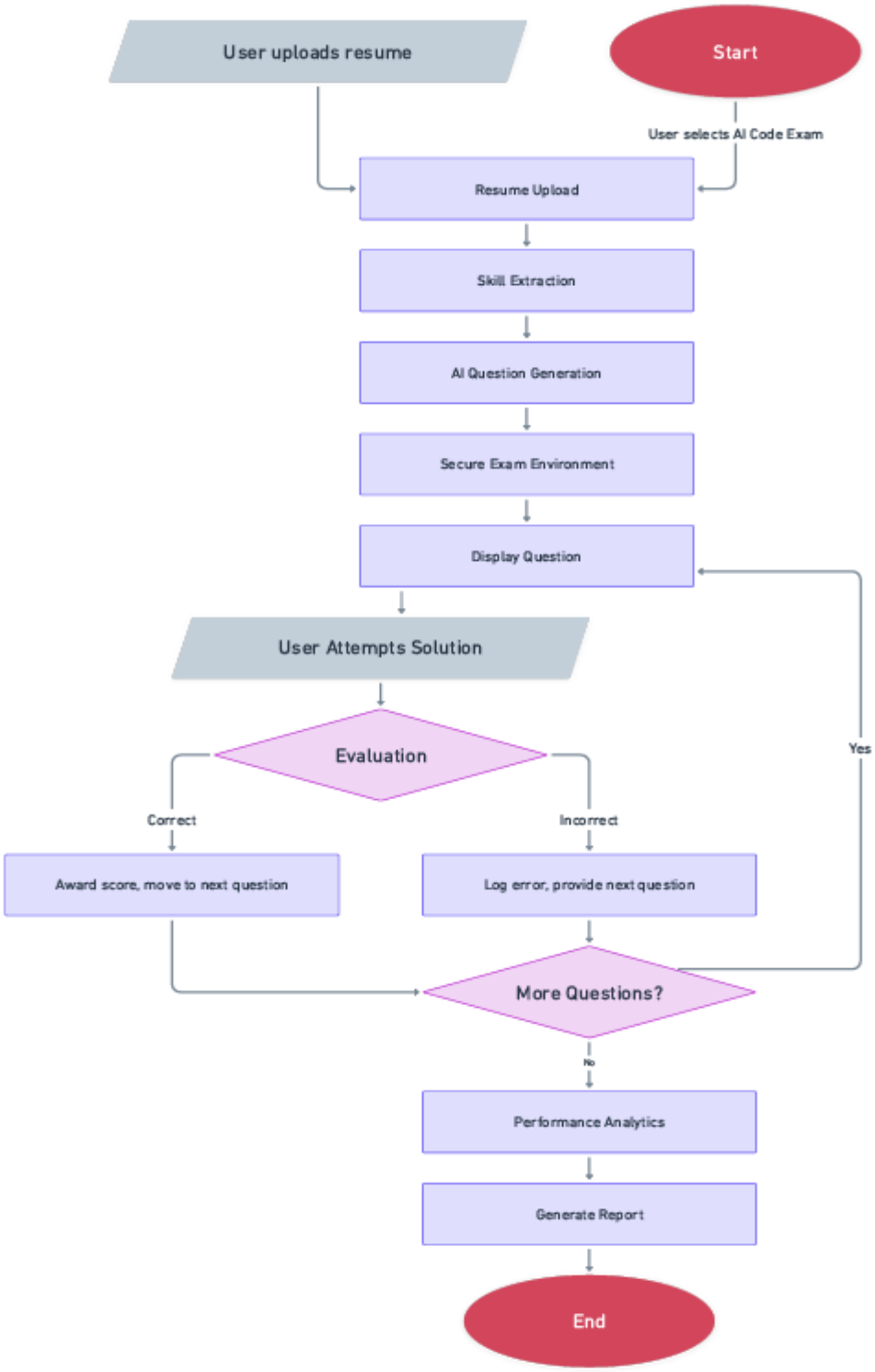

Figure 3.5: Flowchart of AI Code Exam & Analytics System

This flowchart illustrates a personalized AI-powered coding exam platform. The system analyzes a user's uploaded resume to extract their skills and dynamically generates a relevant set of questions. The user then takes the exam in a secure environment, receiving feedback after each question, before the system compiles performance analytics into a final report.

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