Smart ATS Resume Analyzer using Agentic AI

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Project Description

The Smart ATS Resume Analyzer is an AI-powered recruitment assistant that automatically analyzes resumes against a given Job Description (JD). Unlike traditional ATS systems that only do keyword matching, this system uses a Large Language Model (Google Gemini) that understands context, intent, skills, and experience like a human recruiter.
This makes the system intelligent, autonomous, and adaptive, which is why it is classified as an Agentic AI system.

Objectives of the Project

The main goals of this project are:

- To automate resume screening
- To reduce manual effort in recruitment
- To improve accuracy in candidate shortlisting
- To provide resume improvement feedback
- To demonstrate Agentic AI behavior using LLMs
- To build a real-time, industry-relevant AI system

Real-Time Case Scenario

Scenario:

A company receives 1000+ resumes for one job role.

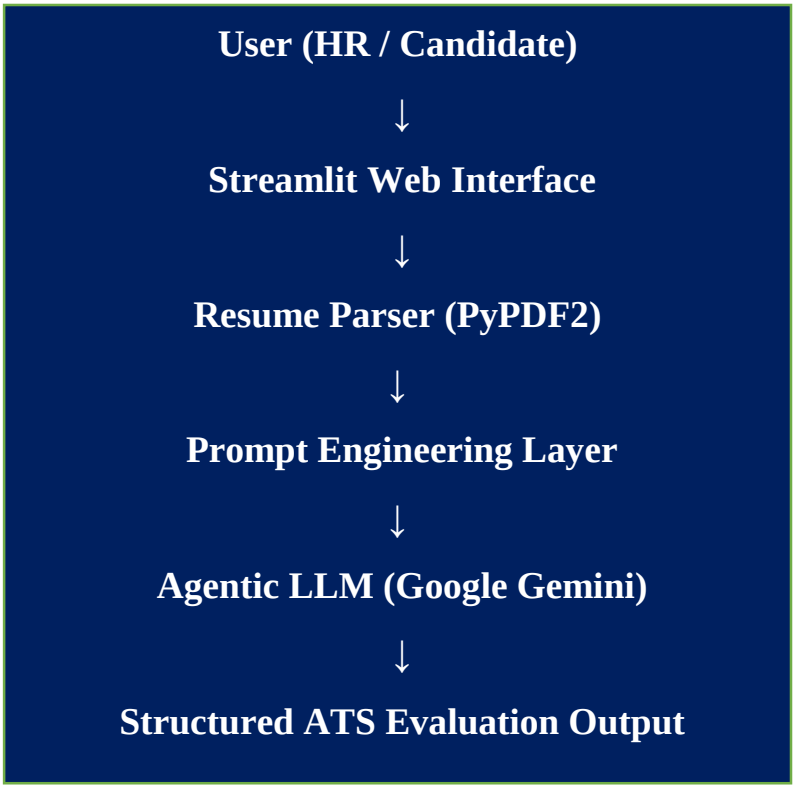
Traditional ATS:

- Matches keywords
- Rejects good candidates due to formatting
- No explanation provided

Smart ATS with Agentic AI:

- Understands the job role
- Reads resumes like a recruiter
- Reasons over skills & experience
- Explains why a resume is strong or weak
- Suggests improvements

System Architecture



Architecture Pattern:

- Layered Architecture
- AI-Agent Driven Processing
- Event-based User Interaction

How Agentic AI Works in This Project

What is Agentic AI?

Agentic AI means the AI acts like an autonomous agent that:

- Understands a goal
- Reasons independently
- Takes decisions
- Produces meaningful output

Agentic AI in This Project:

The Gemini LLM acts as a Recruitment Agent.
Agent Behavior:

1. Receives a goal
   → "Evaluate resume against job description"
2. Understands context
   → Skills, role, experience, requirements
3. Performs reasoning
   → Compares resume content vs JD expectations
4. Takes decisions
   → Match %, missing skills, candidate strength
5. Produces structured output
   → JSON with ATS score and feedback

Database Design (Current & Future)

Current Version:

- No database required
- Real-time processing

Future Enhancement:

- MongoDB / PostgreSQL
- Store resumes, scores, history
- Analytics dashboar

Technology Stack

Layer	Technology
Frontend	Streamlit
Backend	Python
AI Model	Google Gemini (LLM)
Resume Parsing	PyPDF2
Prompt Control	Prompt Engineering
Environment	Anaconda
API Security	Streamlit Secrets

LLM & Prompt Design

Prompt Strategy:

- Instruct Gemini to act as an ATS expert
- Provide resume + JD
- Request structured output

Key Features

- Resume upload (PDF)
- Job description input
- ATS match percentage
- Missing keyword analysis
- AI-generated profile summary
- Real-time evaluation
- Agentic AI reasoning

Step-by-Step Development Plan

- Requirement analysis
- UI design using Streamlit
- Resume parsing with PyPDF2
- Prompt engineering
- Gemini API integration
- Agentic reasoning validation
- Testing & optimization
- Deployment readiness

Expected Outcomes

- Faster resume screening
- Improved hiring quality
- Reduced recruiter workload
- Fair candidate evaluation
- Real-world ATS simulation

Future Scope of Enhancement

- Multi-Agent AI (Resume Agent + JD Agent)
- Interview question generator
- Resume ranking leaderboard
- Cloud deployment and HR dashboard

Conclusion

The Smart ATS Resume Analyzer using Agentic AI successfully demonstrates how modern Large Language Models, specifically Google Gemini, can be used to transform traditional recruitment systems.
Unlike conventional ATS solutions that rely on keyword matching, this system understands the context, skills, and experience of a candidate, similar to a human recruiter.

By implementing Agentic AI, the system autonomously understands the evaluation goal, reasons over the resume and job description, makes intelligent decisions, and generates structured ATS scores and feedback.
This significantly reduces manual effort, improves the accuracy of candidate shortlisting, and ensures a fair and transparent evaluation process.

Overall, this project presents a real-time, industry-relevant AI solution that bridges the gap between traditional recruitment methods and intelligent hiring systems, proving the practical impact of Agentic AI in modern talent acquisition.