

HirePilot: An AI-Powered End-to-End Recruitment Platform Using Agentic AI

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Abstract: *Hiring is a crucial element in assembling a team of high performing talent, with all the necessary skills required for the company. As a result, the conventional hiring process is a time-consuming task and is more likely to be biased, which makes it difficult to ensure authenticity and efficiency in the recruitment process at scale.*

To overcome these challenges, HirePilot is envisaged as an AI-based, self-service, comprehensive recruitment platform to streamline and enhance recruitment. The system harnesses cutting-edge technologies such as 'Large Language Models (LLMs)', 'Natural Language Processing (NLP)', 'Machine Learning' and 'Agentic AI' to automate various stages of the hiring process, including resume analysis, candidate assessment and interview scoring. Through a smart analysis of the profile, background and skill sets of candidates, HirePilot enables a perfect matching of the job description and the suitable candidate.

The HirePilot is expected to revolutionize the current hiring processes by reducing bias, increase efficiency and improve quality hiring. It serves as a smart and effective way for organizations to streamline their hiring process and techniques in today's competitive and evolving market.

Keywords: Artificial Intelligence, Natural Language Processing, Human Resource Management, Recruitment, Applicant Tracking System, Algorithmic Bias, Machine Learning, Large Language Models, Agentic AI

I. INTRODUCTION

Human Resource Management is the foundational pillar of organizational success. It comprises of the important phases like identifying, developing, and gaining talent required to traverse an increasingly competitive global market.^[1] Traditional recruitment rely heavily on manual labour and human intuition. It is a resource-intensive process and sometimes prone to human bias and errors.^[1]

The emergence of Industry 4.0 has created a shift whereby AI is not just an peripheral component, but a crucial aspect that duplicates and covers high order cognitive processes. The need for organizations to adapt and respond quickly to a frequently changing environment that changes the way the work is performed, is the cause of its occurrence.^[2]

The emergence of advanced technologies such as Large Language Models (LLMs) and Generative AI has waved the "coming of age" of Human Resource Management(HRM) digitalization.^[1] These advanced technologies offer opportunities for automating a wide range of activities, like parsing resumes, generating personalized applicant descriptions, and functional 24/7 conversational chatbots to keep applicants involved at every stage of the recruitment process.^[1] Recent academic discoveries show that more than one-third of global businesses have merged AI into their hiring procedures to reduce the expenses and ensure that efficient candidates have been selected for the appropriate role.^[3] As organizations increasingly identify the importance that AI-driven hiring not only accelerates the hiring process but also contributes to superior quality-of-hire through predictive analytics, and the focus has shifted from traditional efficiency to strategic talent management.^[5]



II. PROBLEM STATEMENT

The manual hiring processes are usually biased, time consuming and inefficient while handling large volumes of data as it involves screening resumes manually, coordinate communication, evaluate candidate based on organizational goals which may lead to inconsistency, delay and miss opportunity to detect the best talent. Also, lack of standardized evaluation metrics and real-time candidate insights leads to reducing the transparency and efficiency of hiring process. As the demand increases for talented individuals with rising competitive job market, there is a need for a system that is efficient, scalable, fair and accurate. Hence, the problem addressed through this research is the creation of an end-to-end recruitment platform that leverages advanced technologies like Agentic AI, NLP, langchain and cloud storage.

III. METHODOLOGY

The implementation of the system is accomplished by a cloud-native, agentic architecture. It leverages a collection of advanced tools and technologies to ensure scalability, real-time processing, and data security.

Infrastructure and Development Environment: The intelligence that drives the HirePilot system is optimized and fine-tuned at Google AI Studio. This helps in quick testing of prompts and benchmarking of Gemini 2.5 Flash along with Gemini 3.1 pro models are chosen due to high throughput and large context window. The whole service environment can be managed through Google Cloud Console.

Backend and Orchestration Layer: For the implementation and deployment of RESTful API, the system uses Flask as its primary web framework. This pipeline handles the lifecycle from PDF upload to the final scoring of candidates. In order to implement the agentic logic, the system uses LangChain framework that uses the Supervisor- Worker architecture.

Data Management and Persistence: State Persistence and Episodic Memory are achieved using Firestore Cloud Database System. The Firestore Database acts as central storage for:

Candidate Profiles: Parses the candidate data from resumes using GEMINI embedding.

Session State: The history of thoughts and observations from agentic loops is stored to avoid recursive errors.

Job Metrics: Recording the time-to-hire and diversity ratios for organizational auditing purpose.

Communication and Messaging: The system uses Simple Mail Transfer Protocol (SMTP) for automated email communication and scheduling. Communication agent uses SMTP to share updates related to applications, links for online aptitude assessment, interview scheduling, and document verification.

IV. SYSTEM ARCHITECTURE

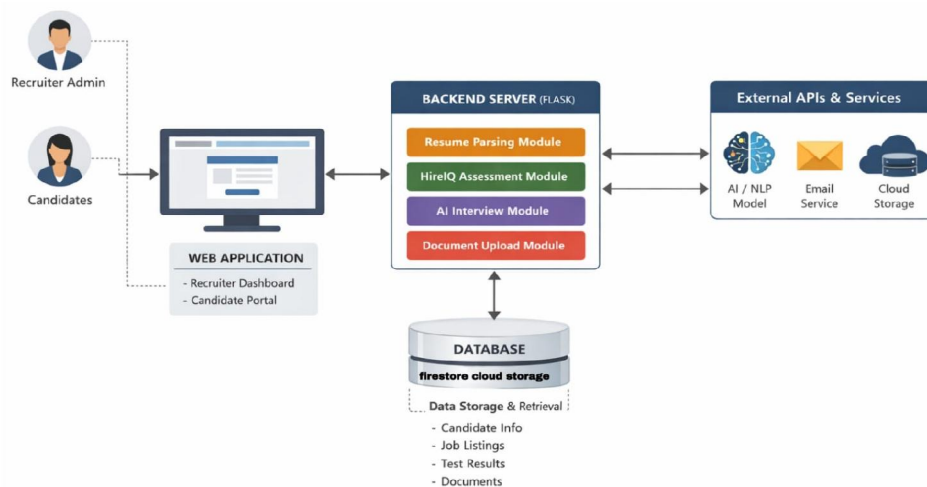


Fig.1 System Architecture



As shown in Fig.1, it depicts the system architecture of the HirePilot system that works in following manner:

Presentation Tier

The candidate interface is designed as a Single Page Application (SPA) using Tailwind CSS. It confirms that the state continues without anypage reloads that are used to initiate cheating scripts.

Logic Tier (The Flask Orchestrator)

The backend manages:

Contextual Handover: Delivering the Job Description (JD) to the AI Tier.

API Mapping: Translating frontend array indices into backend Firestore identifiers.

Intelligence Tier (Gemini 2.5 Flash)

The Intelligence tier makes use of a Recursive Agentic Pattern as mentioned below:

Screening Agent: Generates justification strings and match scores.

Architect Agent: Designs balanced Aptitude, Technical, and Coding modules.

Evaluation Agent: Compares candidate string responses against correct indices.

Persistence Tier (Google Cloud Firestore)

The database follows a Hierarchical Document Store. Every recruitment session acts as a parent document that contains an applicant’s sub-collection. This ensures that a candidate’s data never leaks into other drive. Along with that every candidate collection holds its own examination, virtual interview and document collection data, so whenever it comes to the data integrity, other candidate’s data doesn’t get cluttered with each other, along with that the encryption techniques that firestore offers helps to maintain data safety and authenticity.

V. COMPARISON WITH EXISTING SYSTEMS

Table I. Feature Comparison: HirePilot vs Commercial Platforms

Feature	Legacy ATS (Taleo/Workday)	Standard Online Proctors	HirePilot Ecosystem
Parsing	Keyword matching and regex string matching	N/A	Semantic matching and intelligence based matching
Feature	Utilizes the legacy ATS which uses slow systems (Workday/Tale)	Standard Online Proctors	HirePilot Ecosystem offers a agentic AI enabled solution, which is faster.
Test Content	Static Library, the data is static and utilization of that data is minimal	Static Library, the data is not stored at all	Real-time Dynamic Generation, the data is utilized to make the system more intellectual.
Proctoring	Passive Recording, the data flow is slow, and is not utilized in a way that it should be.	Active Human/AI Proctor.	Hardware-Agnostic "Iron Dome", the tests are monitored till the end. And timely warning and remarks are stored, it is monitored by AI.
Verification	Black-box Score	Video Logs Only	Deep-Dive Question Audit
Scaling	Expensive Per User	Per Session Cost	Token-based (Minimal Cost)

VI. RESULTS

Table II. Test Cases

ID	Module	Test Description	Steps	Expected Result	Priority
TC-	Session & JD	New Recruitment	1. Log in as Admin 2.	Session is created in Firestore with	P0





ID	Module	Test Description	Steps	Expected Result	Priority
01	Management	Drive Initialization	Click "New Drive" 3. Enter Session Name & Batch Year	is_active: true	(Blocker)
TC-02	Session & JD Management	Real-time JD Update & Sync	1. Modify JD text 2. Click "Save JD Updates"	Toast notification "Syncing with Cloud"; JD updates in Firestore	P1 (Critical)
TC-03	AI Screening & Resume Ranking	Batch Resume Parsing	1. Upload 10 PDF resumes 2. Trigger AI Evaluation	System extracts raw_resume_text and generates match_score	P0 (Blocker)
TC-04	AI Screening & Resume Ranking	Semantic Justification Audit	1. Inspect shortlisted candidate card	Justification text references JD keywords (e.g., Python, Flask)	P1 (Critical)
TC-05	AI Test Generation	100-Question Generation (Batch Loop)	1. Set question count to 100 2. Click "Generate Test"	System processes in batches of 20; no JSON truncation	P0 (Blocker)
TC-06	AI Test Generation	API Quota Failover & Back off	1. Simulate 429 error	Logs "Quota Hit!"; waits 12.5s and retries successfully	P0 (Blocker)
TC-07	Iron Dome Proctoring	Mandatory Full-Screen Enforcement	1. Click "Initialize Secure Session"	Browser enters full screen; exit triggers violation warning	P0 (Blocker)
TC-08	Iron Dome Proctoring	Tab Switch Detection	1. Switch browser tab during exam	Alert shown; violation count increments (1/3)	P0 (Blocker)
TC-09	Iron Dome Proctoring	Anti-Photography Blur Logic	1. Press PrintScreen or simulate mobile	Screen blurs (0.02 brightness, 60px blur) for 3 seconds	P1 (Critical)
TC-10	Iron Dome Proctoring	Auto-Submission on Timer Expiry	1. Let timer reach 00:00	submitAssessment('timeout') triggers; shows "Submission Encrypted"	P0 (Blocker)
TC-11	Merit Leaderboard & Evaluation	Evaluation Agent Accuracy	1. Submit test with known answers	Accurate scoring using index matching; no false negatives	P0 (Blocker)
TC-12	Merit Leaderboard & Evaluation	Dynamic Threshold Filtering	1. Change threshold from 70% to 50%	Status updates instantly to "Shortlisted"	P1 (Critical)
TC-13	Merit Leaderboard & Evaluation	Audit Trail Deep-Dive	1. Click "Verify Audit"	Modal shows candidate vs correct answers	P1 (Critical)
TC-14	Finalization & Vault	Master ZIP Data Integrity	1. Click "Download Master ZIP"	ZIP contains Merit_List.csv & candidate PDF reports	P2 (Normal)
TC-15	Finalization & Vault	Document Collection (KYC)	1. Open On boarding Vault	HR can view and verify documents	P2 (Normal)



VII. CONCLUSION

HirePilot is an automated hiring solution that moves manual hiring into the age of intelligent technologies. By seamlessly incorporating LLM capabilities in the proctoring and evaluation process, HirePilot provides a faster, yet more secure solution as compared to traditional hiring methods. HirePilot's technology-based hiring architecture achieves this advanced security without burdening the candidate with heavy client-side installations; instead it utilizes smart browser event management.

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