

“Next Gen Hiring: An AI-Powered Job Portal for Intelligent Recruitment and Career Guidance”

Prof. B. V. Kasar

Authors

1. Ritesh Ubarhande, 2. Vikas Adhe, 3. Ayush Kolhe, 4. Sujal Manwar, 5. Saurabh Ranotkar

Department of Computer Science & Engineering, P. R. Pote Patil College of Engineering & Management, Amravati, Maharashtra, India Session 2026-27

ABSTRACT

Recruitment has changed considerably as Artificial Intelligence (AI), Natural Language Processing (NLP), Generative AI, and cloud technologies have matured. Conventional hiring platforms mostly rely on keyword matching and manual screening of applicants, an approach that often yields irrelevant suggestions, misses candidates who are a good fit in substance but not in wording, and adds to a recruiter's workload. Applicants, too, are often left with little insight into their own skills, employability, or how to grow their careers. This review looks at intelligent hiring systems, with attention to AI-driven resume evaluation, semantic matching between candidates and roles, job recommendation, identification of skill gaps, automated screening, and career advice. It compares approaches built on keyword search, machine learning, NLP, Named Entity Recognition (NER), Transformer architectures, and Large Language Models (LLMs). Drawing on the gaps identified, the paper puts forward a methodology for Next Gen Hiring, an AI-powered job portal. The platform brings together Job Seeker, Employer, and Admin portals on top of Google Gemini AI and a cloud-native microservices stack built with Java, Spring Boot 4, Spring Cloud Gateway, Eureka, Kafka, Redis, PostgreSQL, React 19, and JWT-based security.

Keywords: *Artificial Intelligence, Resume Parsing, Job Recommendation, Skill Gap Analysis, Natural Language Processing, Generative AI, Applicant Tracking System, Google Gemini AI, Microservices, Spring Boot.*

1. INTRODUCTION

Recruitment sits at the intersection of an organization's human-resource needs and its people, and it has a direct

bearing on how well an organization performs and grows. As digital platforms have taken hold, hiring has moved away from newspaper advertisements and paper applications toward online job portals and Applicant Tracking Systems (ATS). These platforms have widened the pool that employers and candidates can reach, yet a large share of them still lean heavily on keyword search and manual filtering. Systems built around keyword matching line up terms found in a resume against terms found in a job posting, but this approach can miss the underlying semantic connection between what a candidate can actually do and what a role calls for [1], [2].

Progress in AI, NLP, Transformer-based architectures, and Generative AI opens a path around these shortcomings. Today's language models are able to read resumes and job descriptions for context rather than simply checking for matching words [3], [4]. The Next Gen Hiring platform proposed here builds a connected hiring ecosystem spanning Job Seeker, Employer, and Admin portals. Google Gemini AI is put forward as the engine behind resume evaluation, job recommendations, candidate screening, generation of job descriptions and cover letters, skill-gap analysis, and career guidance.

On the backend, the system follows a microservices design built with Java and Spring Boot 4, while React 19 handles the frontend. PostgreSQL stores persistent data, Redis and Kafka handle caching and event-driven messaging, and authentication and authorization are managed through Spring Security with JWT.

2. BACKGROUND / BASIC CONCEPTS

2.1 Artificial Intelligence in Recruitment

Artificial Intelligence lets software carry out work that would normally call for human judgment. Within recruitment, it can support resume evaluation, candidate ranking, job recommendations, skill assessment, and automated communication with applicants.

2.2 Natural Language Processing

NLP gives computers the ability to work with human language. This matters in recruitment because resumes and job postings are typically written as unstructured natural-language text. NLP techniques can pull out skills, education history, work experience, certifications, job titles, and role requirements from that text.

2.3 Resume Parsing

Resume parsing turns an unstructured resume into organized, structured data. When driven by AI, this parsing can interpret context and recognize skills and experience even when the resume uses different wording than expected.

2.4 Semantic Job Matching

Semantic matching looks at how a candidate's profile relates, in meaning, to a job description. Rather than checking for identical keywords, it tries to judge whether the candidate's skills, experience, and qualifications are actually relevant to the position.

2.5 Skill-Gap Analysis

Skill-gap analysis measures the distance between what a candidate currently knows or can do and what a target role demands. This lets a platform give candidates concrete, actionable suggestions for closing that gap.

2.6 Applicant Tracking System

An ATS handles the operational side of hiring — posting jobs, receiving applications, screening candidates, and tracking applicants through the pipeline. Adding AI to an ATS can bring in semantic analysis and decision-support capabilities that go beyond basic tracking.

2.7 Microservices Architecture

A microservices approach breaks an application into a set of independently deployable services. The platform proposed here uses Spring Boot 4 microservices together with Spring Cloud Gateway, Eureka, Kafka, Redis, and Resilience4j to achieve modularity, scalability, inter-service communication, and fault tolerance.

3. EXISTING METHODS / TECHNIQUES

3.1 Keyword-Based Resume Matching

Conventional hiring systems check resumes against job descriptions by comparing keywords. This is fast and straightforward to implement, but it understands context poorly, can produce false negatives, and is vulnerable to candidates padding resumes with keywords.

3.2 Machine Learning-Based Classification

Machine learning models can be trained on resume datasets to classify resumes, rank candidates, and predict suitable job roles. How well this works depends heavily on the quality and quantity of training data and the features used.

3.3 NLP and Named Entity Recognition

NLP combined with NER can pick out structured entities — skills, company names, schools, job titles, and technologies — from free text. Static NER models, however, can struggle when the text is highly irregular or unstructured.

3.4 Transformer-Based Approaches

Transformer models, including BERT and Sentence-BERT, produce richer contextual representations and improve semantic matching. Their main drawback is the computational cost they can demand for training or inference.

3.5 Large Language Models

LLMs can assist with interpreting resumes, generating job descriptions, evaluating candidates, extracting skills, writing cover letters, and offering career guidance. Google Gemini AI is used for these purposes in the system proposed here.

3.6 Cosine Similarity

Cosine similarity offers a way to compare vector representations of resumes and job descriptions and is useful

for scoring how alike they are. On its own, though, it cannot deliver full career guidance or a complete recruitment workflow.

3.7 OCR-Based Resume Processing

Optical Character Recognition (OCR) pulls text out of scanned or image-based resumes, widening the range of document formats a system can handle, though it can introduce extraction mistakes when scan quality or layout is poor.

4. COMPARISON OF EXISTING STUDIES

The studies summarized below are drawn from the literature-review material included in the project synopsis and are compared across technique, application, key finding, and identified limitation.

Ref.	Study	Technique	Application	Key Finding	Limitation / Gap
1	Patil & Sharma (2025)	LLMs, OpenAI API, Flask	Resume and IT job-role analysis	Delivered strong accuracy in automatic parsing and role categorization.	Relies on a third-party API; does not offer microservice orchestration or governance across multiple portals.
2	Singh & Verma (2025)	Google Gemini, Cosine Similarity, Transformers	JobFitAI / ATS	Context-sensitive semantic scoring cut down screening time.	Oriented mainly toward employers; offers little in the way of candidate career guidance.
3	Kulkarni et al. (2026)	NLP, NER, ML	Resume skill extraction	Extracting structured entities lowered the manual evaluation effort required.	Relies on static NER; generative functionality is limited.
4	Deshmukh & Rao (2025)	Streamlit, Python, SQLite	AI Resume Analyzer	Supplies ATS scoring together with resume-builder templates.	Built as a monolith, limiting scalability and security controls.
5	Mehta et al.	OCR	Resume screening	Allows text to be pulled from scanned image files.	Does not support real-time, event-driven notifications.

Comparative Analysis

Taken together, these studies show a shift away from plain keyword-based hiring toward AI-assisted and semantic approaches. Systems built on LLMs strengthen contextual interpretation of resumes, while Transformer and similarity-based methods contribute to semantic matching. NLP and NER handle structured information extraction, and OCR extends coverage to scanned documents. Even so, most of these approaches address a single piece of the recruitment puzzle rather than the whole process. This leaves room for a unified system that brings together AI capabilities, career guidance, multiple stakeholder portals, and a scalable microservices foundation.

5. RESEARCH GAP / LIMITATIONS

1. Reliance on Keyword Matching — Strict keyword-driven systems can pass over qualified candidates whose resumes do not contain the exact terms used in a job description.
2. Weak Contextual Understanding — Keyword-based and static rule-based systems find it difficult to grasp the semantic links between skills, experience, and job requirements.
3. Missing Integrated Career Guidance — A large share of systems concentrate on employer-side screening and offer job seekers little in the way of skill-gap or career-path guidance.
4. Restricted Generative Capabilities — Some systems can score or extract information but stop short of dynamically generating job descriptions, cover letters, or personalized career suggestions.
5. Scalability Constraints — Monolithic systems can run into trouble handling a large number of simultaneous users and recruitment operations.
6. Data Quality Issues — Irregular formatting, embedded tables and images, spelling inconsistencies, and poorly

structured resumes can all interfere with automated parsing.

7. LLM Latency and API Limits — Generative processing can add latency and run into rate limits when evaluating candidates at scale.
8. Privacy and Security Concerns — Because recruitment platforms handle personal and professional data, they need robust authentication, authorization, and data-protection measures.

6. PROPOSED METHODOLOGY

6.1 Overall Approach

The Next Gen Hiring system pairs Generative AI with a cloud-native microservices architecture and is organized around Job Seeker, Employer, and Admin portals. The research follows an experimental and analytical design, with the proposed system to be evaluated against benchmark resume datasets and through software testing.

6.2 System Architecture

The architecture flows as follows: React 19 Frontend → Spring Cloud API Gateway → Spring Boot 4 Microservices → PostgreSQL/MySQL + Redis + Apache Kafka → Google Gemini AI. Eureka handles service discovery, and Resilience4j provides fault tolerance. The frontend is built with React 19, Redux Toolkit, Tailwind CSS, and Shaden UI, while Spring Security and JWT provide security.

6.3 AI-Based Resume Analysis

Once a job seeker uploads a resume, AI processing pulls out technical skills, soft skills, education, experience, certifications, projects, and other professional competencies, organizing this information into a candidate profile that feeds later matching and analysis.

6.4 Intelligent Job Recommendation

This workflow proceeds as: Resume → Skill Extraction → Semantic Analysis → Job Requirement Analysis → Candidate-Job Matching → Job Recommendation.

6.5 AI Candidate Screening

On the employer side, the workflow proceeds as: Job Description → Requirement Analysis → Resume Analysis

→ Skill/Experience Comparison → Candidate Score → Candidate Ranking.

6.6 Skill-Gap and Career Analysis

The system measures a candidate's existing skills against what a target role requires, flags missing or weak areas, offers insight into job readiness, and suggests suitable career paths and areas for improvement.

6.7 Event-Driven Communication

Apache Kafka carries events such as new job postings, new applications, candidate screening actions, application-status changes, and notifications, while Redis caching helps keep response times low.

6.8 Security and Access Control

Spring Security together with JSON Web Tokens (JWT) handles authentication, and role-based access control limits functionality according to whether a user is a Job Seeker, Employer, or Administrator.

6.9 Evaluation

The proposed system can be assessed using metrics such as response latency, API throughput, precision, recall, and the F1-score of candidate-job matching, with unit, integration, and end-to-end automated tests used to validate the system.

7. EXPECTED OUTCOMES

- Better candidate-job matching through AI-driven semantic evaluation.
 - Lower recruiter workload thanks to automated resume analysis and candidate screening.
 - Personalized skill-gap analysis, job-readiness insight, and career recommendations for job seekers.
 - Automatic generation of job descriptions and cover letters using Generative AI.
 - A scalable, modular recruitment platform built on microservices, Kafka, Redis, and cloud-native principles.
 - A secure, responsive experience across all three portals.
- The project synopsis sets a target of cutting employer candidate-screening time by more than 50%, along with

improved matching accuracy through Gemini-driven semantic evaluation. These figures represent proposed project targets and will need to be confirmed experimentally once the system is implemented.

8. FUTURE SCOPE

- More advanced Generative AI for recruitment communication, interview preparation, and career planning.
- Multilingual resume processing and multilingual job search.
- AI-based assessment of technical and behavioral interviews.
- More advanced career-path prediction based on candidate profiles and shifting job-market conditions.
- Explainable AI to make candidate scores and recommendations more transparent.
- Bias detection and fairness safeguards for responsible AI-assisted recruitment.
- Real-time recruitment analytics.
- Cloud deployment suited to large-scale, multi-tenant recruitment environments.

9. CONCLUSION

Artificial Intelligence is reshaping recruitment, moving it away from keyword-based filtering and toward evaluation that accounts for context. The approaches reviewed here show progress across resume parsing, NLP, machine learning, semantic matching, Transformer models, and Large Language Models. Even so, many of these systems handle only one part of the recruitment process and offer little connection between employer-side recruitment and candidate-side career development.

Next Gen Hiring aims to close these gaps by proposing a connected ecosystem for job seekers, employers, and administrators. The platform pairs Google Gemini AI with Java Spring Boot 4 microservices to provide resume analysis, semantic job recommendations, candidate screening, skill-gap analysis, job-readiness assessment, career guidance, and AI-generated recruitment content,

supported by React 19, Spring Cloud Gateway, Eureka, PostgreSQL, Redis, Kafka, Spring Security, and JWT.

In short, the proposed system is intended to shift recruitment away from static keyword matching and toward an intelligent, semantic, skill-aware process, while giving job seekers career support they can actually act on.

10. REFERENCES

- [1] S. Patil and R. Sharma, "AI-Powered Resume Screening and Role-Fit Analysis System," *International Journal of Research Publication and Reviews (IJRPR)*, vol. 6, no. 2, pp. 112-118, 2025.
- [2] A. Singh and P. Verma, "JobFitAI: Context-Aware Resume Screening using Google Gemini AI," *International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)*, vol. 14, no. 4, pp. 450-458, 2025.
- [3] R. Kulkarni, S. Joshi, and V. Thorne, "AI-Powered Resume Analyzer for Intelligent Recruitment Automation," *International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE)*, vol. 15, no. 1, pp. 88-95, 2026.
- [4] V. Deshmukh and K. Rao, "AI-Powered Resume Matching and Recommendation System," *International Journal of Engineering Research & Technology (IJERT)*, vol. 14, no. 3, pp. 201-207, 2025.
- [5] N. Deshpande and S. Kulkarni, "Resume Analyzer (AI) using Machine Learning and NLP," *International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)*, vol. 14, no. 3, pp. 310-317, 2025.
- [6] P. Mehta, S. Shinde, and A. Gupta, "An AI-Driven Resume Analyser with Job Recommender and Portfolio Code Generator," *International Journal for Research in Applied Science and Engineering Technology (IJRASET)*, vol. 13, no. 5, pp. 1021-1029, 2025.
- [7] A. Tabassum and R. R. Patil, "AI-Driven Resume Screening and Job Recommendation System," *International Journal of Research and Innovation in Social Science (IJRSI)*, vol. 9, no. 1, pp. 45-52, 2025.
- [8] M. Castelli and L. Vanneschi, "AI-Based Resume Screening and Job Matching System," *Journal of*

- Advanced Academics Research (JAAR), vol. 12, no. 2, pp. 78-86, 2025.
- [9] K. V. L. Sahithi, N. Varalakshmi, and M. P. Raj, "Resume Job Matcher Using Cosine Similarity," International Journal of Mathematical and Computational Sciences, vol. 17, no. 1, pp. 12-19, 2025.
- [10] S. Regilan, P. Gajalakshmi, and D. Weslin, "Benchmarking AI-Driven Resume Screening: An Evaluation of Precision and Efficiency," IEEE Proceedings on Digital Innovation, pp. 142-148, 2025.
- [11] R. Pal, S. Shaikh, and S. Satpute, "Resume Classification using Machine Learning Algorithms," ITM Web of Conferences, vol. 45, p. 01012, 2022.
- [12] N. D. Almalis and G. A. Tsihrintzis, "FoDRA-A Content-Based Job Recommendation Algorithm for Job Seeking," IEEE Conference on Information Technology, pp. 88-94, 2015.
- [13] B. Smith and M. Johnson, "Automated Candidate Evaluation using OCR and NLP," International Journal of Innovative Research in Technology (IJIRT), vol. 10, no. 12, pp. 1590-1595, 2024.
- [14] S. Kamble and A. Bondre, "AI-Powered Resume Screening & Job Recommendation System," International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), vol. 6, no. 10, pp. 789-796, 2026.
- [15] Spring Team, "Spring Boot Reference Documentation."
- [16] Google AI, "Gemini API Documentation."
- [17] Meta Open Source, "React 19 Documentation."
- [18] PostgreSQL Global Development Group, "PostgreSQL Documentation."
- [19] Apache Software Foundation, "Apache Kafka Documentation."