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AI-Powered Recruitment Tool: Resume Evaluator and ATS Integration

Mrs. Lithu Mathew
Asst. Professor Dept. ISE
AMC Engineering College
lithu.mathew@amceducation.in

Amrutha M
Dept. ISE
AMC Engineering College Bengaluru, India
Bengaluru, India
amruthamanjunath27@gmail.com

Abstract— The recruitment process is often hindered by inefficiencies such as time-intensive manual resume screening, duplicate candidate submissions, and the absence of a centralized tracking mechanism. These challenges not only delay hiring decisions but also impact the accuracy and consistency of candidate evaluation.

This project presents an AI-powered recruitment tool designed to address these issues by integrating two core modules: a Resume Evaluator and an Applicant Tracking System (ATS).

The Resume Evaluator allows users to upload a job description (JD) along with up to ten resumes simultaneously. Using natural language processing and semantic similarity algorithms, it ranks resume based on relevance to the JD. Users can customize evaluation criteria such as skills, experience, and keywords to meet specific hiring needs. The results are compiled into a downloadable PDF report, enabling faster and more data-driven shortlisting.

The ATS module focuses on operational efficiency by detecting and eliminating duplicate resumes, logging recruiter ownership, and maintaining a comprehensive, centralized candidate database. It also provides recruiter activity tracking, allowing hiring teams to monitor the number of resumes uploaded by each recruiter on a daily or periodic basis.

By automating resume evaluation and streamlining candidate tracking, this solution reduces time-to-hire, enhances matching precision, and improves recruiter productivity. Built on scalable cloud infrastructure and driven by AI capabilities, the system ensures adaptability, reliability, and seamless integration into modern recruitment workflows.

Keywords — Artificial Intelligence (AI), Resume Evaluation, Applicant Tracking System (ATS), Recruitment Automation, Natural Language Processing (NLP), Semantic Matching, Duplicate Detection, Candidate Database, Recruiter Performance Tracking, Hiring Efficiency.

I. INTRODUCTION

In today's dynamic job market, organizations are inundated with job applications across all levels and roles, driven by increased digital access to opportunities and remote hiring trends. As a result, recruiters are burdened with manually reviewing hundreds of resumes per vacancy—a process that is not only time-intensive but also prone to inconsistency, unconscious bias, and subjective decision- making. This leads to delays in the hiring pipeline, missed opportunities to engage top talent, and increased hiring costs.

While traditional Applicant Tracking Systems (ATS) provide automation through keyword filters and rule-based workflows, they lack the depth of contextual understanding required to match candidate capabilities with job role requirements. These systems often fail to recognize synonyms, related skills, or infer potential from unstructured resume content. Additionally, most existing tools offer limited transparency into why a candidate is shortlisted or rejected, which affects hiring accountability.

With the rise of cloud-based AI services, it is now possible to design scalable, intelligent, and explainable resume screening systems. This paper presents an Intelligent Resume Evaluator Powered by Microsoft Azure, which leverages Azure Form Recognizer for resume parsing, Azure OpenAI for semantic similarity and contextual matching, and a custom rule engine to prioritize candidates based on skill gaps and organizational relevance (e.g., GCC, Fortune 500 affiliation).

The system provides secure login, multi-format support (PDF, DOCX, TXT), skill gap identification, contextual scoring, and output reporting—making it an enterprise-ready solution. Designed to process over 100 resumes in under 15 minutes, it bridges the gap between academic AI models and real-world hiring demands. This paper details the system's architecture, methodology, comparative analysis, and potential as a scalable, bias-aware AI hiring assistant.

II. LITERATURE SURVEY

Warusawithana et al. (2023) — "Layout Aware Resume Parsing Using NLP and Rule-based Techniques" Proposes a layout-sensitive parser that leverages NLP and rule-based methods to accurately extract structured sections—like personal details, education, and skills—from resumes. This improves data extraction accuracy by considering the resume's visual format.

Chandak et al. (2024) — "Resume Parser and Job Recommendation System using Machine Learning" (ICNWC 2024)
Introduces a combined architecture for resume parsing and job recommendation. It uses techniques like TF-IDF and cosine similarity to match candidate resumes with job postings, streamlining both parsing and suggestion workflows.

Murthy et al. (2023) — "A Hybrid Resume Parser and Matcher using RegEx and NER" (ACC 2023) Combines rule-based (Regex) and NLP (Named Entity Recognition) approaches. The system uses SBERT embeddings with cosine similarity to effectively rank resumes against job descriptions.

Vaishampayan et al. (2023) — "Procedural Justice and Fairness in Automated Resume Parsers for Tech Hiring: Insights from Candidate Perspectives" (VHCC 2023) Explores ethical aspects of AI-based resume screening, discussing candidate perceptions of fairness. The study highlights potential biases in automated systems and proposes guidelines to improve transparency and procedural justice.

ConFit v2 (Yu et al., 2025) — "Improving Resume-Job Matching using Hypothetical Resume Embedding and Runner-Up Hard-Negative Mining"
Tackles the problem of sparse resume–job interaction data by generating hypothetical reference resumes using LLMs and mining hard negatives. This technique significantly boosts

resume-to-job matching performance—improving recall and nDCG by approximately 13–17%.

Shruti et al. (2024) — "Automated Navigation Systems for Job Portals – A Survey on Multilingual Chatbots and Resume Builders and Parsers" (SCEECS 2023)
Surveys the role of multilingual chatbots and resume parsers in job portals. Highlights challenges in formatting, language diversity, and user navigation— suggesting the importance of multilingual support and automation in modern ATS systems

III. METHODOLOGY

The proposed system integrates two primary modules—Resume Evaluator and Applicant Tracking System (ATS)—to automate resume screening, ranking, and recruitment data management. The methodology is divided into five sequential stages as illustrated in Fig. 1.

A. Data Acquisition and Input

The system accepts a Job Description (JD) in text or PDF format, along with up to ten candidate resumes in PDF or DOCX format. All files are uploaded via a secure web interface and temporarily stored in a cloud repository for processing.

B. Resume Evaluator Module

1. Preprocessing

Text is extracted from resumes using Optical Character Recognition (OCR) for scanned documents and direct parsing for digital files. Data cleaning is applied to remove formatting, stop words, and irrelevant symbols.

2. Feature Extraction

Key attributes such as skills, education, and work experience are extracted using Named Entity Recognition (NER) combined with rule-based parsing.

3. Semantic Representation

Both JD and resumes are converted into high- dimensional vector embeddings using pre-trained transformer models (e.g., Sentence-BERT).

4. Matching and Scoring Cosine similarity is applied to measure the semantic relevance between the JD and each resume. Customizable weighting allows emphasis on specific attributes such as technical skills or certifications.

5. Ranking and Reporting Resumes are ranked in descending order of similarity score, and results are compiled into a downloadable PDF report for the recruiter.

C. Applicant Tracking System (ATS) Module

1. Database Integration

All resumes and associated metadata (e.g., uploader identity, timestamp, candidate name) are stored in a centralized relational database.

2. Duplicate Detection

Duplicate resumes are identified using hash-based fingerprinting and text similarity algorithms.

3. Recruiter Activity Logging The system records recruiter uploads, enabling daily, weekly, and monthly performance tracking.

4. Candidate Status Tracking

Each resume is assigned a status such as New, Shortlisted, Interview Scheduled, Hired, or Rejected, and status updates are recorded for analytics and audits.

D. Output and User Interaction

The Resume Evaluator module generates ranked candidate lists with PDF reports, while the ATS module provides dashboards for recruiter activity, duplicate detection, and candidate status tracking.

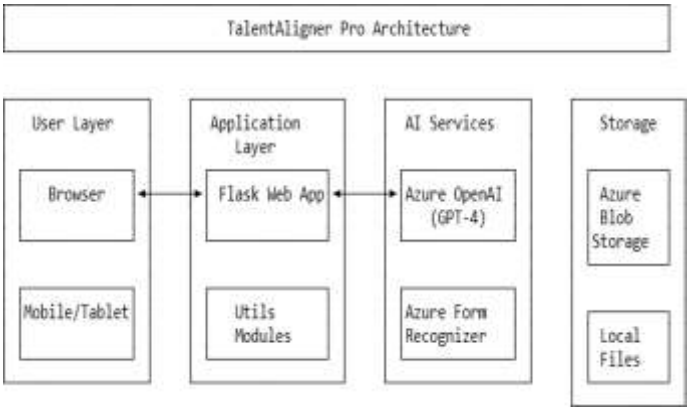

Fig. 3.1. High-Level Architecture

The system is structured into four layers: User Layer (web/mobile access), Application Layer (Flask for requests and logic), AI Services Layer (Azure OpenAI GPT-4 and Form Recognizer for analysis), and Storage Layer (Azure Blob for secure data storage). This layered design ensures scalability, maintainability, and seamless AI integration.

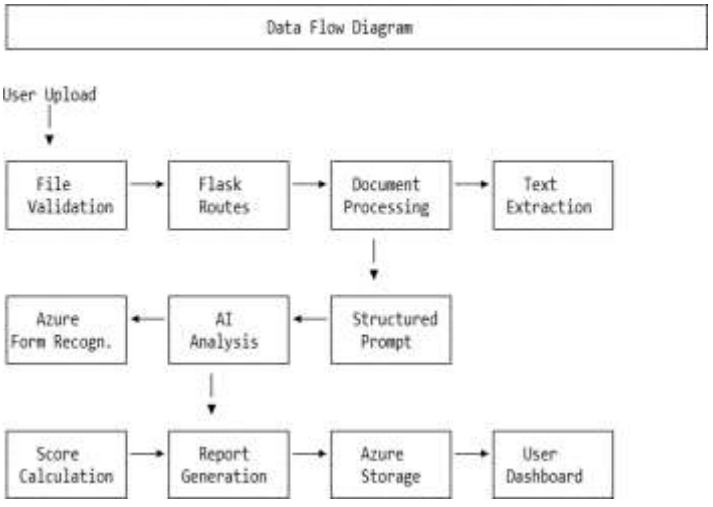

Fig.3.2. Data flow Architecture

The Resume Evaluator pipeline begins with file upload and validation, followed by text extraction and prompt creation. Data is processed through Azure Form Recognizer and analyzed by Azure OpenAI (GPT-4) for semantic matching and scoring. Results are compiled into evaluation reports, stored in Azure Blob Storage, and displayed on the user dashboard for insights and downloads.

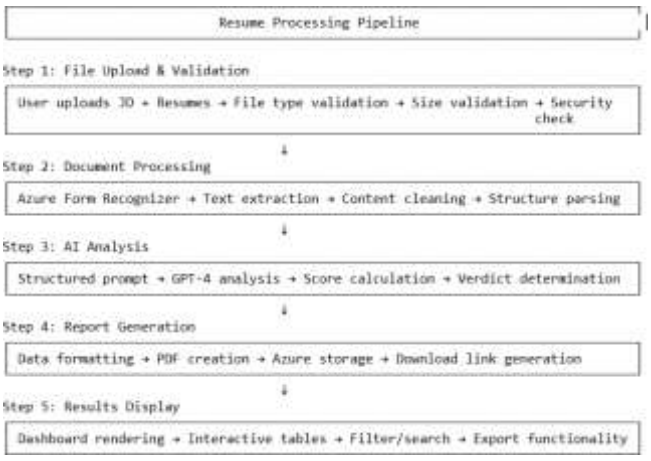

Fig. 3.3. Processing flow Architecture The Resume Evaluator

pipeline follows five stages:
(1) Upload & Validation – resumes/JDs are checked for format, size, and security;
(2) Document Processing – Azure Form Recognizer extracts and normalizes text into JSON;
(3) AI Analysis – Azure OpenAI (GPT-4) performs semantic matching, scoring, and gap detection;
(4) Report Generation – results are formatted into PDF and stored in Azure Blob;
(5) Results Display – interactive dashboard shows scores, statuses, and downloadable reports.
Cross-cutting concerns include security, scalability, observability, and reproducibility.

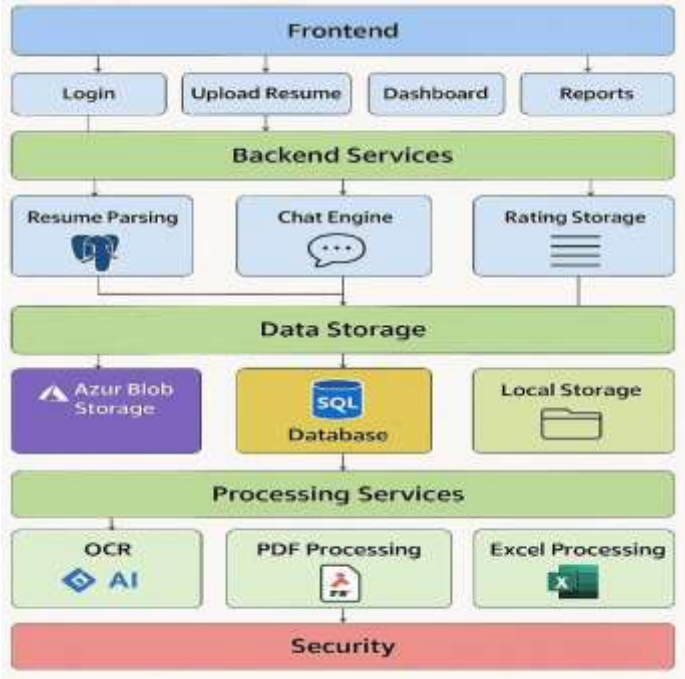

Fig. 3.4: Applicant Tracking System Architecture

The ATS is a multi-layered system with: Frontend (login, resume upload, dashboard, reports), Backend (resume parsing, chat engine, rating storage), Data Storage (Azure Blob, SQL Database, local cache), Processing Services (OCR, PDF/Excel handling), and Security (authentication, encryption, compliance). This design ensures scalability, automation, and data security in recruitment workflows.

IV. RESULT

This s ection describes the user interface screens of the "Applicant Tracking System (ATS) with AI-Powered Resume–JD Matching". Snapshots are provided below for each module of the system, including upload, analysis, reporting, and dashboard functionalities.

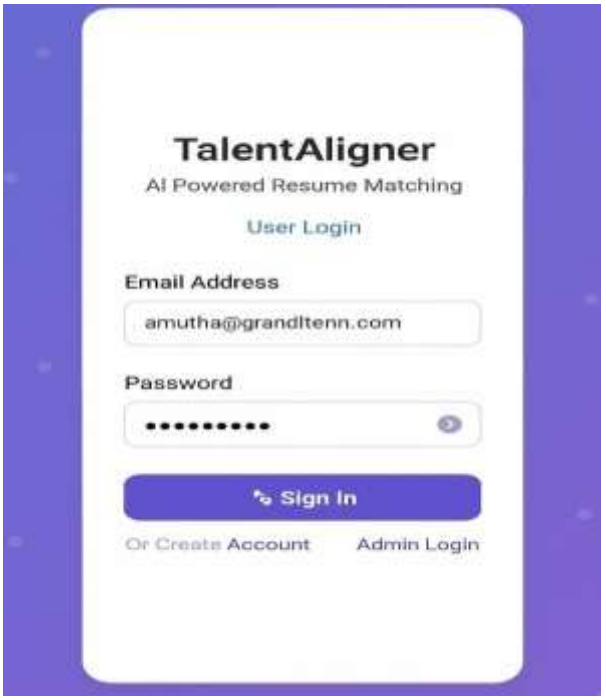

Fig 4.1 User Login Screen

The User Login Screen provides a secure entry point for candidates and recruiters with options to log in, create an account, or switch to admin access. Encrypted authentication ensures data privacy and controlled access to resume uploads, job analysis, and dashboard features.

Fig 4.2 User Dashboard Screen

User Dashboard Screen acts as the central hub for managing the resume–JD evaluation process. It guides users through uploading JDs, adding resumes, running AI processing, and viewing results, while offering quick access to help and secure logout.

Fig 4.3 Job Description & Resume Upload Screen

Upload Screen allows recruiters to upload a job description and up to 10 resumes in supported formats (.pdf, .docx, .txt). It supports drag-and-drop or file browsing, with secure, AI-driven processing to ensure speed, accuracy, and precise scoring.

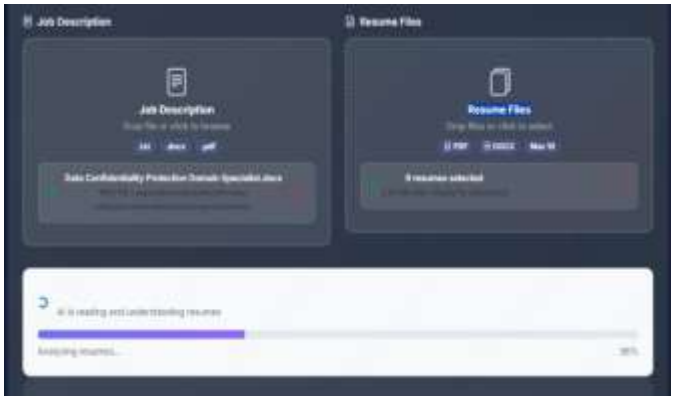

Fig 4.4 AI Processing Screen

Figure 4.4 AI Processing Screen shows the stage where uploaded JDs and resumes are analyzed. The AI engine extracts skills, experience, and qualifications, with a progress bar indicating secure processing. Azure AI services handle parsing, analysis, and scoring in real time for accurate resume–JD alignment.

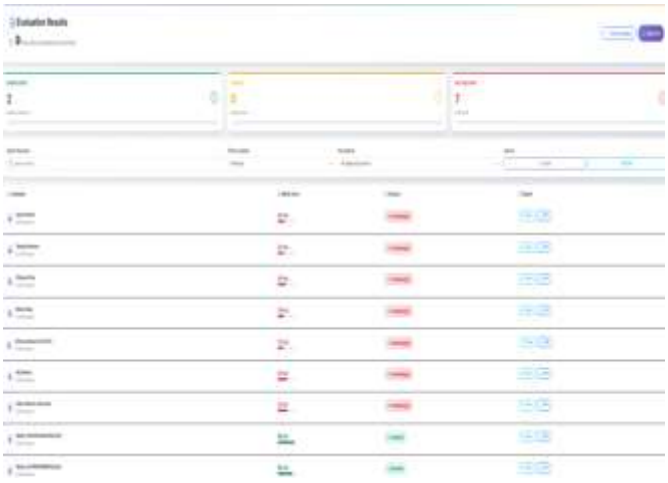

Fig 4.5 Evaluation Results Screen

Evaluation Results Screen shows the outcomes of resume–JD analysis, with candidates categorized as Shortlisted, On Hold, or Not Relevant. Recruiters can view match scores, system decisions, and download PDF reports, with options to filter, sort, and export results for faster, more transparent hiring decisions.

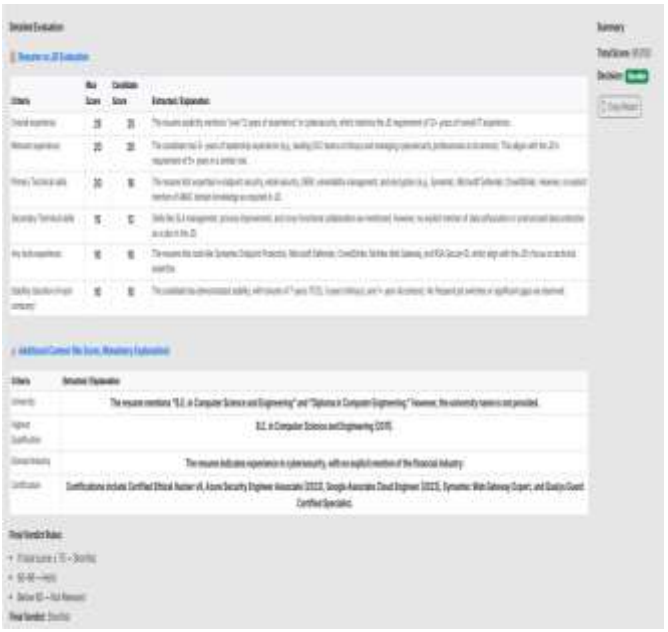

Fig 4.6 Detailed Evaluation & Report Screen

Detailed Evaluation Screen provides an AI-generated comparison between a candidate's resume and the job description. It shows scores for experience, skills, tools, and stability, along with context like qualifications and certifications. A summary panel displays the total score and final verdict (Shortlist, On Hold, or Not Relevant), with options to copy or export the report for documentation.

Fig 4.7 Final Report Screen

Final Report Screen presents the overall evaluation in a structured format, showing detailed scores for criteria like experience, skills, and stability with added context on qualifications and certifications. It generates a total score, final decision (Shortlist, On Hold, or Not Relevant), and a summary recommendation for clear, professional hiring reports.

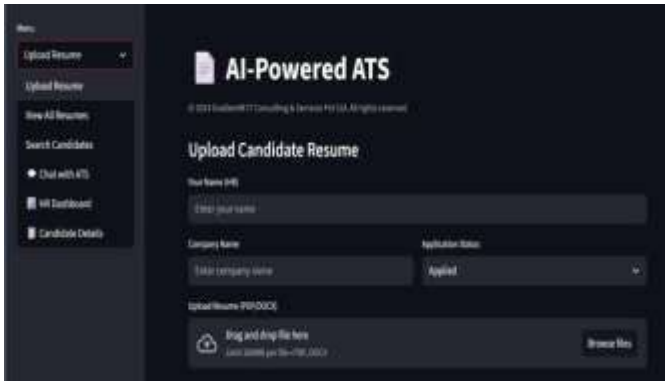

Fig 4.8 ATS Resume Upload Results Screen

ATS Resume Upload Results Screen confirms successful addition of resumes, showing HR name, company, and application status (e.g., Applied, Shortlisted, Hired). Resumes in PDF/DOCX (up to 200MB) are securely stored and made available for search, evaluation, and dashboard reporting, enabling efficient candidate management.

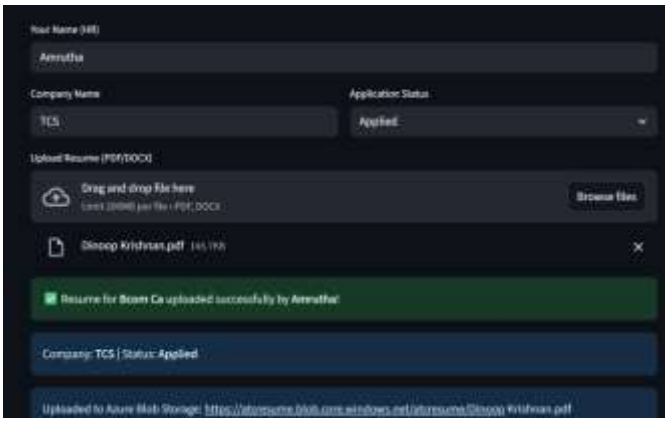

Fig 4.9 Resume Upload Confirmation Screen

Resume Upload Confirmation Screen verifies successful resume upload, showing HR name, company, and application status (e.g., Applied). A success message confirms secure storage in Azure Blob with a generated link, ensuring transparency and trackable candidate data.

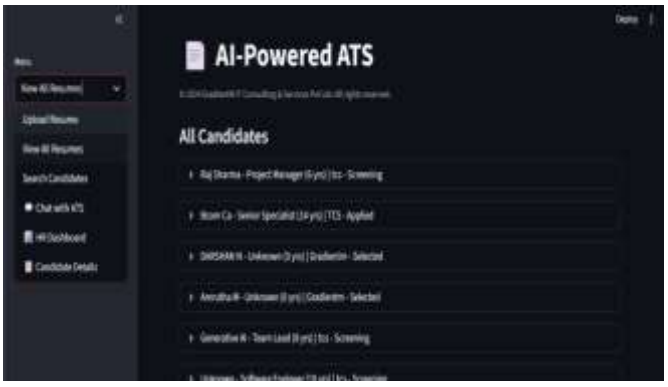

Fig 4.10 View All Resumes Screen

View All Resumes Screen provides HR with a centralized list of uploaded resumes, showing candidate name, role, experience, company, and status (e.g., Applied, Screening, Selected). It offers full visibility for monitoring progress and managing the recruitment pipeline.

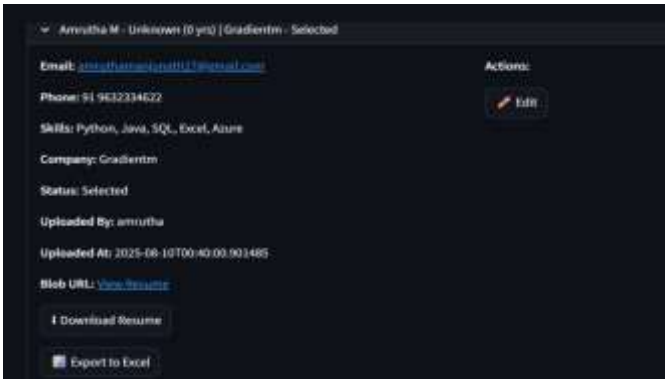

Fig 4.11 Candidate Details Screen

Candidate Details Screen shows a detailed applicant profile with email, phone, skills, company, and status (e.g., Applied, Screening, Selected). It also records uploader details, timestamp, and Blob link, with options to edit, download, or export, giving recruiters full visibility into each candidate.

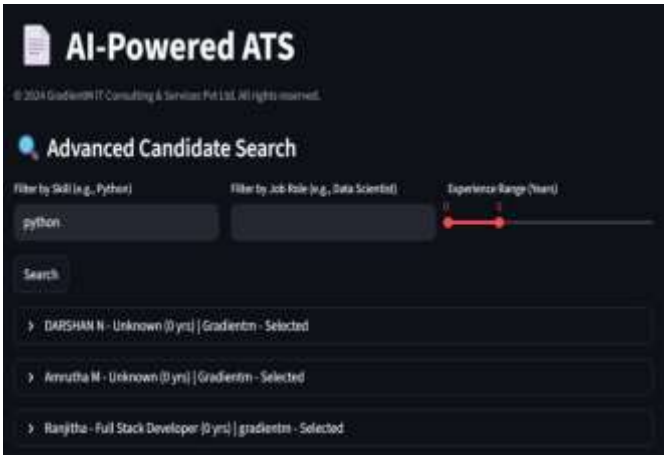

Fig 4.12 Candidate Search Results Screen

Candidate Search Results Screen displays filtered candidates based on recruiter criteria (e.g., Python, 0–5 years). It lists names, roles, experience, company, and status, enabling quick and accurate identification of suitable profiles through AI-powered filtering

Fig 4.13 HR Dashboard – Weekly Stats Screen

HR Dashboard Screen gives a weekly overview of recruiter activity, showing resumes uploaded by each HR in the past 7 days. It also supports exporting data into reports, ensuring visibility, accountability, and data-driven recruitment management.

V. CONCLUSION

This project demonstrates the design and development of an AI-powered recruitment tool that integrates a Resume Evaluator and an Applicant Tracking System (ATS) to address the inefficiencies of traditional hiring processes. The system automates resume screening by semantically matching candidate profiles with job descriptions, producing ranked results and downloadable PDF reports. Additionally, the ATS module eliminates duplicate submissions, tracks recruiter activity, and maintains a centralized candidate database, thereby improving operational transparency and data integrity.

Experimental results indicate significant improvements in recruitment efficiency, with reduced screening time, enhanced matching accuracy, and better recruiter performance tracking. The modular architecture allows flexibility in customizing evaluation criteria and scaling the system to handle large volumes of applications.

By leveraging advanced natural language processing techniques and automated data management, this solution not only streamlines the hiring workflow but also provides a foundation for future enhancements, such as multilingual support, integration with job portals, and predictive analytics for hiring trends. Overall, the proposed system offers a scalable, accurate, and efficient approach to modern recruitment challenge.

VI. FUTURE SCOPE

The proposed AI-powered recruitment tool can be enhanced further to expand its capabilities and adaptability in dynamic hiring environments. Potential future improvements include:

1. Integration with Job Portals – Direct connection with platforms such as LinkedIn, Indeed, and Naukri to automatically import resumes and update candidate statuses.

2. Multilingual Resume Processing – Extending NLP models to support multiple languages for diverse global recruitment needs.

3. Advanced Analytics and Dashboards – Incorporating predictive analytics to forecast hiring trends, measure recruitment efficiency, and identify skill gaps.

4. Interview Scheduling Automation – Integrating with calendar systems to automatically schedule interviews for shortlisted candidates.

5. Bias Detection and Fairness Auditing – Implementing fairness evaluation modules to identify and mitigate bias in resume screening.

6. Mobile Application Support – Providing a mobile-friendly interface for recruiters and hiring managers to access candidate data on the go.

7. Integration with HRMS Systems – Seamless data exchange with Human Resource Management Systems (HRMS) to unify recruitment and employee onboarding workflows.

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