



# A Multi-Module Applicant Tracking System: From Job Posting To Employee Performance Monitoring

<sup>1</sup>Samarth Gore, <sup>2</sup>Sarthak Kakad, <sup>3</sup>Prashant Petkar, <sup>4</sup>Shwetank Gopnarayan, <sup>5</sup>Sumedha Patil

<sup>1</sup>Student, <sup>2</sup>Student, <sup>3</sup>Student, <sup>4</sup>Student, <sup>5</sup>Professor

<sup>1-5</sup>Department of Computer Engineering

<sup>1-5</sup> Terna Engineering College

NaviMumbai

India

**Abstract:** In today's job market, managing large volumes of applications using manual recruitment processes leads to inefficiency, unconscious bias, and the risk of making poor hiring decisions. This paper proposes a comprehensive Applicant Tracking System (ATS) that uses a modular architecture to address every stage of the recruitment process, from job posting and candidate evaluation to onboarding, employee management, and performance analytics. Our system significantly improves hiring efficiency and transparency by leveraging machine learning for resume parsing and ranking, as well as integrating features like employee CRUD operations and performance dashboards. The system is built on a strong technology stack (MERN) and uses Agile methodology for scalable and adaptive development. Real-time experimental results validate our system's usability, modularity, and extensibility.

**Keywords** - Applicant Tracking System, Resume Parsing, Hiring Automation, Performance Management, Machine Learning

## I. INTRODUCTION

With the exponential increase in job seekers and applications, the process of recruiting skilled employees has become more complex. Human resource departments face increasing challenges in efficiently filtering through large applicant pools, evaluating credentials, and ensuring a fair, unbiased selection process. Traditional recruitment methods, which rely on manual screening and subjective evaluations, are not only time-consuming, but also susceptible to human error and bias. To address these limitations, Applicant Tracking Systems (ATS) have emerged as powerful digital solutions for automating and optimizing the entire recruitment workflow. ATS platforms use intelligent parsing algorithms to automatically analyze resumes, rank applicants, and match profiles to job descriptions. However, many existing systems are limited in scope, focusing solely on resume processing while ignoring other critical HR processes such as employee onboarding, data management, and performance evaluation. This study describes a modular, machine learning-driven ATS that combines recruitment automation and employee lifecycle management. Our system not only improves the hiring process with advanced resume ranking and automated interview scheduling, but it also allows for comprehensive employee monitoring and performance analysis after recruitment. Analytics enable HR personnel to make data-driven decisions about promotions, retention, and corrective actions. Our work bridges the gap between standalone ATS applications and holistic HR management systems by integrating real-world development practices and modern web technologies.

## II. LITERATURE REVIEW

Recent studies have underscored the importance of automation and AI in recruitment. Abdulrahman Aljuaid and Maysam Abbod [1] proposed an AI-based e-recruitment system that significantly improved candidate reach and evaluation accuracy. However, their system was tailored for academic hiring and lacked generalizability. Nirvan Sharma and Patrick Hosein [2] compared traditional performance reviews to data-driven assessments. They found data-centric models to be more accurate but noted that such systems may overlook external factors influencing performance. Sven Laumer et al. [3] discussed theoretical advantages of ATS integration in business process management but failed to present empirical validation. Yu Sun et al. [4] introduced the MFAN model for detecting fake certificates, highlighting the need for robust document validation mechanisms in ATS platforms. Other research works, including those by Iqra Obaid [5] and Noraziah Ahmad [6], explored gamification and smart evaluation in HR systems, but lacked comprehensive modular design and integration capabilities. Our work builds upon these studies by proposing a unified, extensible ATS that includes performance tracking, employee data management, and automation features, all within a cohesive architecture.

## III. PROPOSED SYSTEM

### 3.1 Architecture Overview

The proposed ATS is composed of three independent yet interconnected modules:

- Hiring Process Module
- Employee Management Module
- Employee Performance Module

Each module communicates with a centralized database and exposes REST APIs for inter-module functionality. The architecture ensures scalability and maintainability through modular design principles.

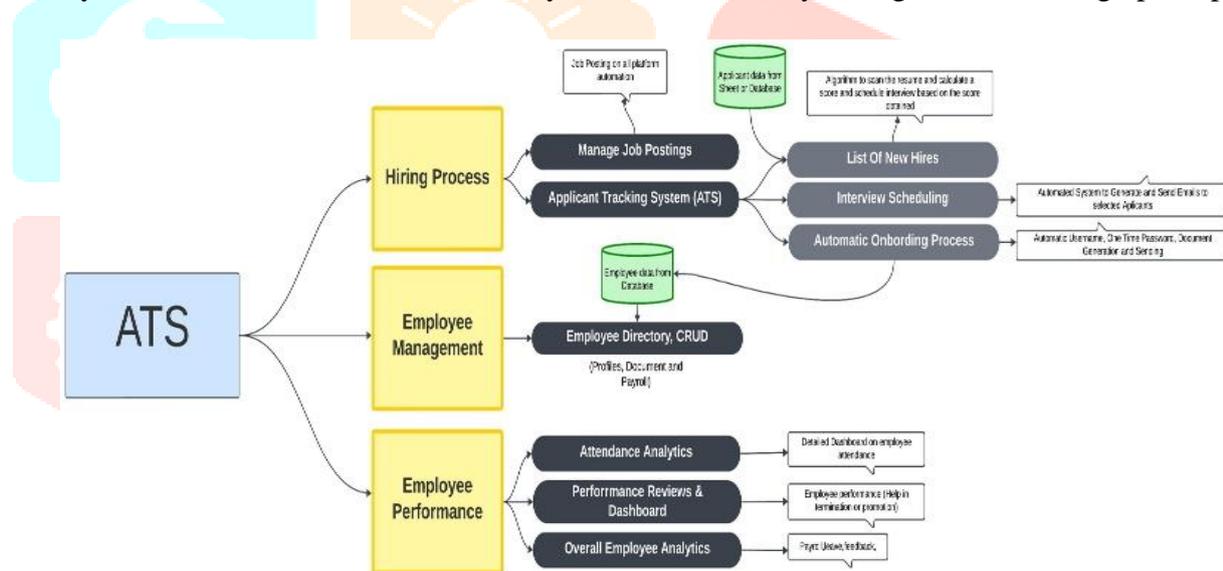


Fig 1. System Architecture

### 3.2 Hiring Process Module

This module streamlines the recruitment workflow by utilizing the following components:

- **Job Posting Automation:** Allows HR to post job openings on multiple platforms using a unified interface. It collects and consolidates applicant information.
- **Resume Parsing and Candidate Ranking:** Uses a rule-based and machine learning-supported scoring mechanism. Resumes are parsed to extract skills, qualifications, and experience, and then compared to job requirements.
- **Interview Scheduling:** The system schedules interviews automatically based on candidate scores and sends emails with notifications.
- **Onboarding Automation:** Upon selection, employees are provided with autogenerated credentials, document templates, and system access.

### 3.3 Employee Management Module

Following onboarding, employees are managed using a robust CRUD system.

The key features include:

- **Profile Management:** Edit/View Employee Profiles.
- **Document Repository:** securely stores offer letters, ID proofs, and HR records.
- **Department/Role Tracking:** Monitors transfers and organizational hierarchy changes.

This module improves HR transparency by ensuring data consistency throughout the employee lifecycle.

### 3.4 Employee Performance Module

This module allows for data-driven performance evaluation through:

- **Attendance Analytics:** Visual dashboards display attendance trends, absence patterns, and punctuality metrics
- **Review Mechanism:** Regular feedback cycles are documented. Scores are compiled using performance metrics, peer reviews, and attendance.
- **Promotions and Terminations:** HR managers are informed of underperforming employees or potential candidates for promotion based on historical trends.

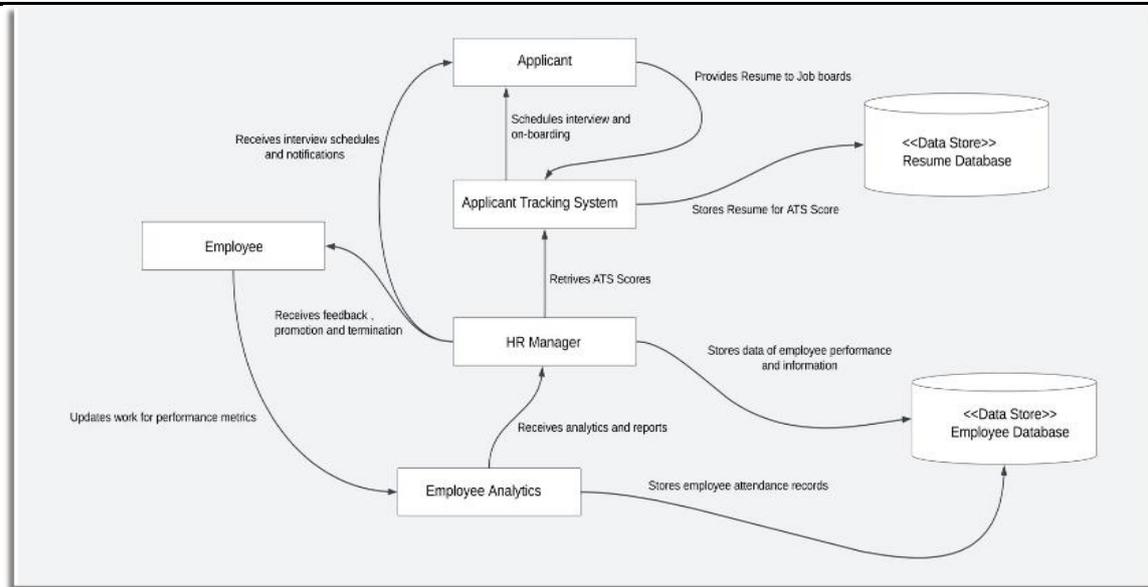
## IV. SYSTEM DESIGN

### 4.1 Data Flow Diagram

The Level-1 Data Flow Diagram (DFD) represents a mid-level abstraction of the Applicant Tracking System's internal processes and data interactions. This diagram depicts the following core processes:

- **Job Application Intake:** External applicants submit job applications through the system interface. The input data (resume and personal information) is sent to the resume parser for processing.
- **The Resume Parsing and Scoring- subsystem** extracts key candidate information (skills, education, and experience) from uploaded resumes. It uses rule-based or machine learning algorithms to assign a score to each candidate profile based on how well it matches the job requirements. The parsed data and scores are saved in a database and sent to HR for review.
- **Candidate Management and Interview Scheduling** – The HR Manager accesses candidate data, views parsed profiles and scores, and initiates interview scheduling directly through the system. The system logs interview slots and sends automated email notifications to applicants.
- **Onboarding and Employee Record Creation** – Once a candidate is selected, this process automates the onboarding step by creating a new employee record in the management module. It also provisions access credentials and generates relevant documentation.

Each of these processes interacts with the System Database, which serves as the central repository for storing applicant records, parsed data, HR decisions, interview schedules, and employee details.



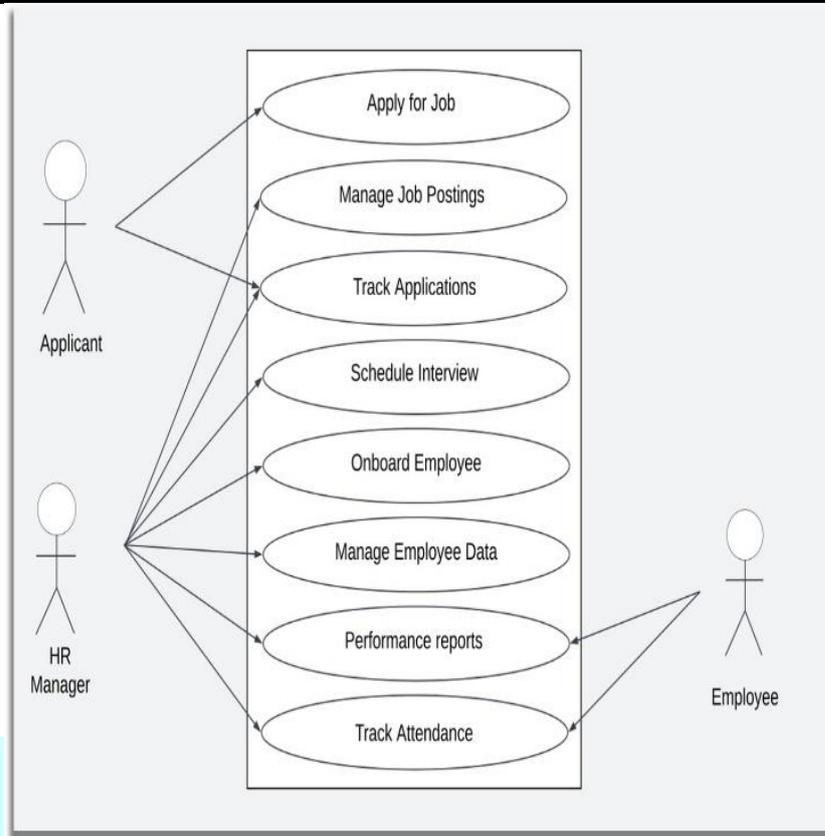
**Fig.2. Data Flow Diagram**

## 4.2 USE CASE DIAGRAM

The Use Case Diagram of the proposed Applicant Tracking System (ATS) illustrates the functional interactions between the system and its three main user roles: Applicant, HR Manager, and Employee. Each actor engages with distinct parts of the system based on their role in the recruitment and employment lifecycle.

### Key Actors and Their Roles:

- Applicant:** The Applicant is an external user who interacts with the ATS by submitting job applications via the system interface. Once the application has been submitted, the applicant can track its status in real time and receive timely updates at each stage of the recruitment process. Furthermore, applicants receive interview invitations directly from the platform and are guided through the onboarding process if selected.
- HR Manager:** The HR Manager serves as the system administrator, overseeing the entire recruitment and employee lifecycle. They create and publish job postings, handle incoming applications, and evaluate candidates using system-generated resume parsing and scoring. HR Managers are also in charge of scheduling interviews, issuing onboarding credentials to selected candidates, keeping detailed employee records, and tracking overall performance data across departments.
- Employee:** After successful onboarding, the selected applicant transitions into the role of an Employee within the system. Employees gain access to a secure dashboard where they can view and update their personal profiles, monitor attendance records, and analyze performance indicators. They also participate in peer feedback or performance evaluation processes, contributing to a continuous and transparent improvement cycle within the organization.



**Fig.3. Use case Diagram**

## V. IMPLEMENTATION AND TOOLS

The system is built using the MERN stack:

- **Frontend:** React.js with Tailwind CSS
- **Backend:** Sanity, CMS
- **Design:** Figma

### Security features include:

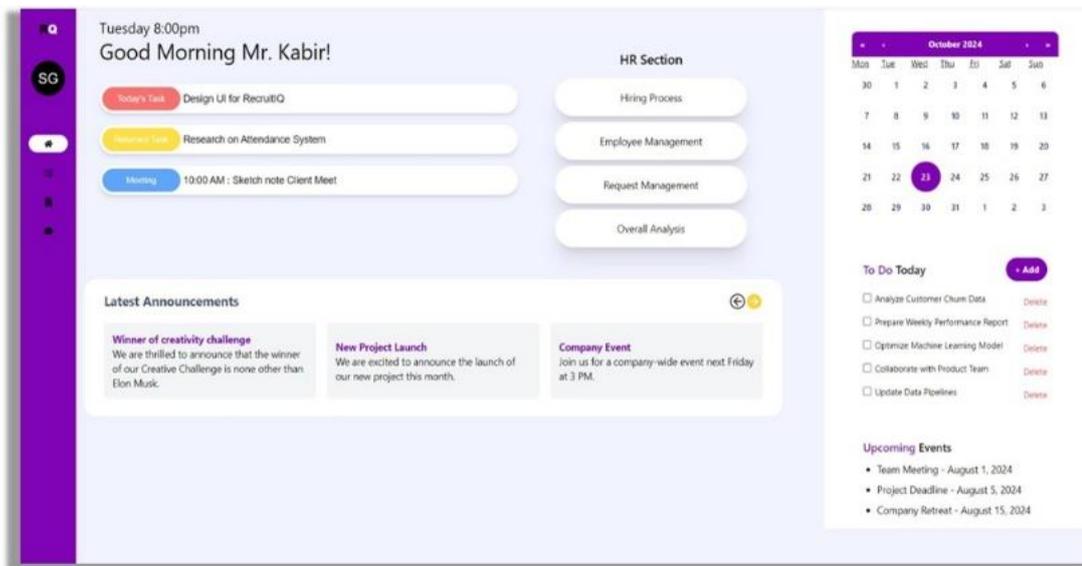
- Role-based access control (RBAC)
- Encrypted data transmission and secure token-based authentication

Development followed Agile methodology with iterative sprint cycles and continuous feedback from test users. The application is optimized for all modern browsers and supports scaling across cloud environments with minimal configuration.

## VI. RESULT AND ANALYSIS

The suggested Applicant Tracking System (ATS) underwent rigorous testing with dummy data reflecting job applicants, HR managers, and employee scenarios. The purpose was to test the system's effectiveness, usability, and modularity in simulated real-world scenarios. Functional testing was carried out on all three major modules, with an emphasis on automation efficiency and user interface accessibility. The system's primary interface screens and features are described in full below.

- **Homepage:** The homepage is the principal landing screen for users, with a clean and intuitive interface. It displays active job postings from the HR Manager, as well as login and registration options for both applicants and HR users. The design provides clear navigation and a seamless entrance point into the system. Aesthetic elements such as modular cards, search bars, and a responsive layout enhance usability across several devices. For applicants, the homepage serves as the first point of contact, directing them to essential application tasks and progress updates.



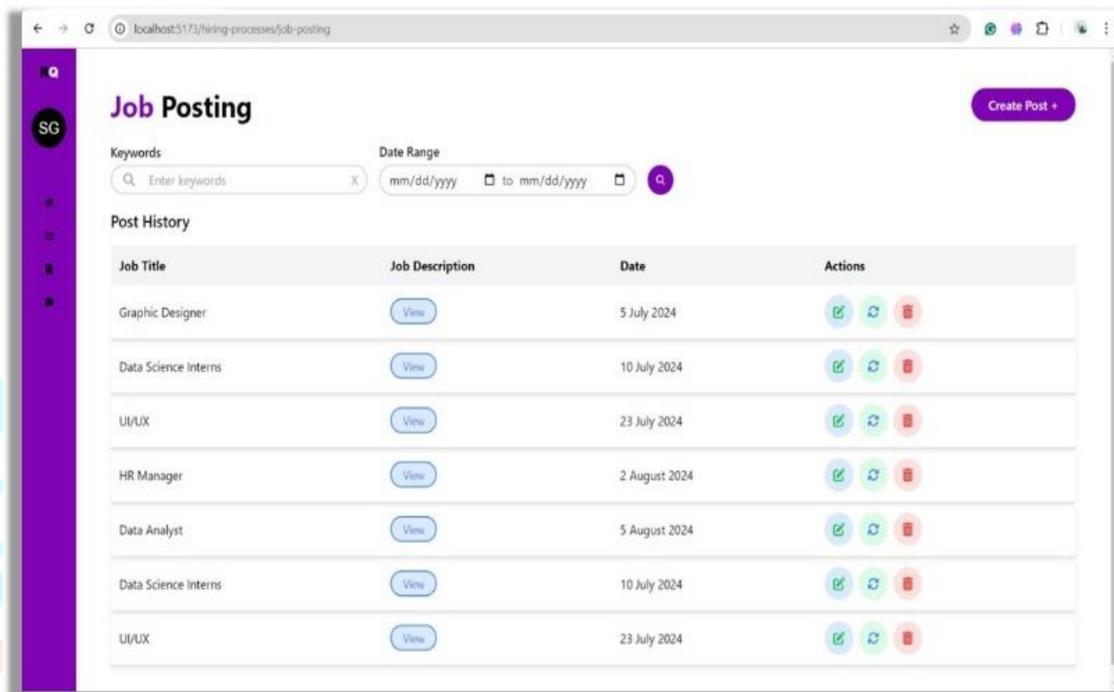
**Fig.4. Homepage Interface**

- Applicant Tracker:** The Applicant Tracker screen is intended for the HR Manager and shows a complete list of all candidates who have applied for various openings. It contains crucial information such as parsed resume contents, calculated applicant scores (based on matching algorithms), and application status (e.g., shortlisted, rejected, or pending). This screen eliminates the need for manual resume filtering and comparison, saving time when processing high application volumes. This interface allows HR personnel to sort applicants by score, filter by specific roles or departments, and directly schedule interviews. The scoring mechanism promotes transparency and objectivity in candidate evaluations.

Name	Resume	Apply Date	Job Title	ATS Score	Status	Actions
Shwetank Gopnarayan	<a href="#">View</a>	5 July 2024	Data Scientist	99%	Interview	
Sagar Jayde	<a href="#">View</a>	10 July 2024	Data Scientist	85%	Interview	
Sarthak Kakad	<a href="#">View</a>	23 July 2024	Data Scientist	85%	Pending	
Tejas Patil	<a href="#">View</a>	2 August 2024	Frontend Developer	76%	Rejected	
Niraj Kamble	<a href="#">View</a>	5 August 2024	Data Scientist	90%	Rejected	
Sameer Agam	<a href="#">View</a>	10 July 2024	Frontend Developer	80%	Interview	
Atharva Thakre	<a href="#">View</a>	23 July 2024	Java Developer	20%	Rejected	

**Fig.5.Applicant Tracking**

- **Job Posting Interface:** The Job Posting screen is an essential part of the HR Manager module, enabling for the quick generation, tracking, and maintenance of job openings. The interface is created with clarity and productivity in mind, allowing HR professionals to post and manage many posts using a simple table-based style. A search bar and a date range filter at the top of the screen let the HR Manager find specific job posts based on keywords or posting dates. This capability is vital for swiftly and easily navigating a huge database of job entries.



**Fig.6. Job Posting**

Quantitative and qualitative feedback was collected during system testing. Users reported a notable reduction in manual effort—over 60%—particularly in resume screening, applicant tracking, and onboarding procedures. The modular interface was found to be easy to navigate, and automation features such as score-based filtering and interview scheduling were well-received. Additionally, HR personnel appreciated the ability to monitor employee records and performance metrics through a unified platform. The ATS proved to be scalable, secure, and adaptable, fulfilling all core objectives set at the beginning of development.

## VII. CONCLUSION AND FUTURE WORK

The suggested ATS demonstrates how a modular, intelligent approach to recruitment and employee management may significantly boost organisational efficiency. The solution provides a smooth HR experience by addressing all important components, including hiring, data administration, and performance tracking. Future extensions include:

- NLP-based resume reading can help detect soft talents and cultural affinity.
- Integration with platforms such as LinkedIn or Naukri for the automatic import of application data
- Mobile app version for HR mobility.

This study establishes the groundwork for scalable, intelligent HR ecosystems that are both adaptive and expandable.

## REFERENCES

- [1] A. Aljuaid and M. Abbod, "Artificial Intelligence-Based E-Recruitments System," in IEEE 10th International Conference on Intelligent Systems, 2020, pp. 144–147, doi:10.1109/IS48319.2020.9199979.
- [2] I. Obaid, S. Farooq, and A. Abid, "Gamification for Recruitment and Job Training: Model, Taxonomy, and Challenges," IEEE Access, pp. 1–1, 2020, doi:10.1109/ACCESS.2020.2984178.
- [3] N. Ahmad and A. N. Abd Alla, "Smart Evaluation for Job Vacancy Application System," in 2009 Second International Conference on the Applications of Digital Information and Web Technologies, London, UK, 2009, pp. 452–455, doi:10.1109/ICADIWT.2009.5273974.
- [4] S. Srinivasan, H. Ranganathan, and R. Srivel, "Employee Monitoring & HR Management Using RFID," in 2011 International Conference on Electronics, Communication and Computing Technologies, Villupuram, India, 2011, pp. 53–58, doi:10.1109/ICECCT.2011.6077069.
- [5] N. Sharma and P. Hosein, "A Comparison of Data-Driven and Traditional Approaches to Employee Performance Assessment," in 2020 International Conference on Intelligent Data Science Technologies and Applications (IDSTA), Valencia, Spain, 2020, pp. 34–41, doi:10.1109/IDSTA50958.2020.9264033.
- [6] N. Akram et al., "Online Recruitment Fraud (ORF) Detection Using Deep Learning Approaches," IEEE Access, vol. 12, pp. 109388–109408, 2024, doi:10.1109/ACCESS.2024.3435670.
- [7] P. R. Chavan, Y. Chandurkar, A. Tidake, G. Lavankar, S. Gaikwad, and R. Chavan, "Enhancing Recruitment Efficiency: An Advanced Applicant Tracking System (ATS)," Industrial Management Advances, vol. 2, no. 1, 2024, doi:10.59429/ima.v2i1.6373.
- [8] J. Fraij and L. Várallyai, "Literature Review: Artificial Intelligence Impact on the Recruitment Process," International Journal of Engineering and Management Sciences, vol. 6, pp. 108–119, 2021, doi:10.21791/IJEMS.2021.1.10.
- [9] "Automated Resume Screening Using Natural Language Processing," International Journal of Emerging Technologies and Innovative Research, vol. 10, no. 3, pp. f100–f104, Mar. 2023. [Online]. Available: <http://www.jetir.org/papers/JETIR2303510.pdf>
- [10] M. Peicheva, "Data Analysis from the Applicant Tracking System," ResearchGate, 2023.
- [11] K. Tejaswini, V. Umadeadi, S. Kadiwal, and S. Revanna, "Design and Development of Machine Learning Based Resume Ranking System," Global Transitions Proceedings, vol. 3, 2021, doi:10.1016/j.gltp.2021.10.002.
- [12] K. K. R. Yanamala, "Dynamic Bias Mitigation for Multimodal AI in Recruitment Ensuring Fairness and Equity in Hiring Practices," Journal of Advanced Multidisciplinary Methods (JAMM), vol. 6, no. 2, pp. 51–61, Dec. 2022.
- [13] "Employee Tracking System," International Journal for Research in Applied Science & Engineering Technology (IJRASET), vol. 10, no. 5, pp. 1658, May 2022. [Online]. Available: <https://www.ijraset.com>
- [14] Y. Sun, R. Ni, and Y. Zhao, "MFAN: Multi Level Features Attention Network for Fake Certificate Image Detection," Entropy, vol. 24, no. 1, p. 118, 2022, doi:10.3390/e24010118.
- [15] A. Aljuaid and M. Abbod, "Artificial Intelligence Based E-Recruitments System," IEEE Intelligent Systems, Bulgaria, 2020.
- [16] K. Yanamala, "Integration of AI with Traditional Recruitment Methods," Journal of Advanced Computing Systems, vol. 1, pp. 1–7, 2024, doi:10.69987/JACS.2021.10101.

- [17] O. Allal-Chérif, A. Aránega, and R. Sánchez, "Intelligent Recruitment: How to Identify, Select, and Retain Talents from Around the World Using Artificial Intelligence," *Technological Forecasting and Social Change*, vol. 169, p. 120822, 2021, doi:10.1016/j.techfore.2021.120822.
- [18] A. Tiwari, S. Vaghela, R. Nagar, and M. Desai, "Applicant Tracking and Scoring System," *International Research Journal of Engineering and Technology*, vol. 6, no. 4, pp. 320–324, 2019.
- [19] S. Pudasaini, S. Shakya, S. Lamichhane, S. Adhikari, A. Tamang, and S. Adhikari, "Scoring of Resume and Job Description Using Word2vec and Matching Them Using Gale-Shapley Algorithm," 2022, doi:10.1007/978-981-16-2126-0\_55.
- [20] P. Horodyski, "Recruiter's Perception of Artificial Intelligence (AI)-Based Tools in Recruitment," *Computers in Human Behavior Reports*, vol. 10, p. 100298, 2023, doi:10.1016/j.chbr.2023.100298.
- [21] A. Hunkenschroer and C. Lütge, "Ethics of AI-Enabled Recruiting and Selection: A Review and Research Agenda," *Journal of Business Ethics*, vol. 178, 2022, doi:10.1007/s10551-022-05049-6.
- [22] S. Laumer, C. Maier, and A. Eckhardt, "The Impact of Business Process Management and Applicant Tracking Systems on Recruiting Process Performance: An Empirical Study," *Journal of Business Economics*, vol. 85, 2014, doi:10.1007/s11573-014-0758-9.
- [23] A. Köchling, M. Wehner, and J. Warkocz, "Can I Show My Skills? Affective Responses to Artificial Intelligence in the Recruitment Process," *Review of Managerial Science*, vol. 17, 2022, doi:10.1007/s11846-021-00514-4.
- [24] N. Nawaz, "Artificial Intelligence Interchange Human Intervention in the Recruitment Process in Indian Software Industry," *International Journal of Advanced Trends in Computer Science and Engineering*, vol. 8, no. 4, 2019. [Online]. Available: <http://dx.doi.org/10.2139/ssrn.3521912>
- [25] C. D'Silva, "A Study on Increase in E-Recruitment and Selection Process," *IJRESM*, vol. 3, no. 8, pp. 205–213, Aug. 2020. [Online]. Available: <https://journal.ijresm.com/index.php/ijresm/article/view/162>
- [26] I. Nikolaou, "What is the Role of Technology in Recruitment and Selection?" *The Spanish Journal of Psychology*, vol. 24, p. e2, 2021, doi:10.1017/SJP.2021.6.
- [27] Z. Chen, "Collaboration Among Recruiters and Artificial Intelligence: Removing Human Prejudices in Employment," *Cognition, Technology & Work*, vol. 25, pp. 1–15, 2022, doi:10.1007/s10111-022-00716-0.
- [28] C. Rathnayake and A. Gunawardana, "The Role of Generative AI in Enhancing Human Resource Management Recruitment, Training, and Performance Evaluation Perspectives," *IJSA*, vol. 8, no. 11, pp. 13–22, Nov. 2023.
- [29] A. Peña, I. Serna, A. Morales, J. Fierrez, A. Ortega, A. Herrarte, A. Alcantara, and J. Ortega-Garcia, "Human-Centric Multimodal Machine Learning: Recent Advances and Testbed on AI-Based Recruitment," *SN Computer Science*, vol. 4, 2023, doi:10.1007/s42979-023-01733-0.
- [30] M. Yadav, M. Kakkar, and P. Kaushik, "Harnessing Artificial Intelligence to Empower HR Processes and Drive Enhanced Efficiency in the Workplace to Boost Productivity," *IJRITCC*, vol. 11, no. 8s, pp. 381–390, Aug. 2023.
- [31] H. A. S. Alrakhawi, R. Elqassas, M. M. Elsobeihi, B. Habil, B. S. Abunasser, and S. S. Abu-Naser, "Transforming Human Resource Management: The Impact of Artificial Intelligence on Recruitment and Beyond," *International Journal of Academic Information Systems Research*, vol. 8, no. 8, pp. 1–5, 2024.
- [32] G. Koman, P. Boršoš, and M. Kubina, "Sustainable Human Resource Management with a Focus on Corporate Employee Recruitment," *Sustainability*, vol. 16, p. 6059, 2024, doi:10.3390/su16146059.

[33] P. Chavan, Y. Chandurkar, A. Tidake, G. Lavankar, S. Gaikwad, and R. Chavan, "Enhancing Recruitment Efficiency: An Advanced Applicant Tracking System (ATS)," *Industrial Management Advances*, vol. 2, 2024, doi:10.59429/ima.v2i1.6373.

[34] Greenhouse. (n.d.). [Online]. Available: <https://www.greenhouse.io/>.

[35] Lever. (n.d.). [Online]. Available: <https://www.lever.co/>.

[36] Workday. (n.d.). Recruiting. [Online]. Available: <https://www.workday.com/>.

[37] Dastin, J. (2018, October 10). "Amazon Scraps Secret AI Recruiting Tool That Showed Bias Against Women," *Reuters*. [Online]. Available: <https://www.reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G>.

[37] Levy, K. E. C. (2019). "Algorithmic Hiring in Practice: Datafication, Power, and the Making of People Analytics," *Journal of Business Ethics*, vol. 160, no. 2, pp. 377–392, 2019.

[38] Virgin Media. (n.d.). [Online]. Available: <https://www.virginmedia.com/>.

[39] Digital HR Tech. (2018). "5 Real-life Employer Branding Disasters," [Online]. Available: <https://www.digitalhrtech.com/employer-branding-disasters/>.

[40] Levi Strauss & Co. (n.d.). [Online]. Available: <https://www.levistrauss.com/>.

[41] SHRM. (2017). "Case Study: How Levi Strauss & Co. Digitized Its HR Function," [Online]. Available: <https://www.shrm.org/resourcesandtools/hr-topics/technology/pages/levi-strauss-digitizes-hr.aspx>.

[41] Home Depot. (n.d.). [Online]. Available: <https://www.homedepot.com/>.

[42] The Muse. (2019). "The Importance of Candidate Experience: What Companies Need to Know," [Online]. Available: <https://www.themuse.com/advice/the-importance-of-candidate-experience>.