# JOB & RESUME MANAGEMENT PLATFORM

**An INTERNSHIP REPORT**

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*in partial fulfillment  for  the award  of the degree  of*

**BACHELOR OF TECHNOLOGY**
**IN**
**COMPUTER SCIENCE AND ENGINEERING**
**(INTERNET OF THINGS)**
**At**



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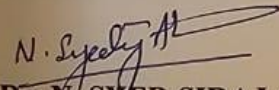
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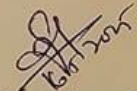
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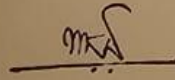**MAY 2025**

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### CERTIFICATE

This is to certify that the Project report **"JOB & RESUME MANAGEMENT PLATFORM"** being submitted by "SOMU CHAITANYA KUMAR REDDY" bearing roll number(s) "20211CIT0084" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

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### DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **JOB & RESUME MANAGEMENT PLATFORM** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Dr. N. Syed Siraj Ahmed, Associate Professor(Selection Grade) School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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# ABSTRACT

The rise of automation in recruitment has significantly enhanced the hiring process by improving efficiency, accuracy, and decision-making through data-driven insights. Traditional recruitment methods, such as walk-in interviews and newspaper advertisements, have become inefficient due to their limited reach and reliance on manual processes. Automation has transformed recruitment by introducing advanced tools that streamline candidate search, improve job matching, and enable faster hiring decisions. This paper presents Techire, a comprehensive job and resume management platform designed to simplify and enhance the entire recruitment lifecycle.

Techire allows job seekers to create ATS (Applicant Tracking System)-friendly resumes that are optimized to pass automated screening systems used by recruiters, increasing the chances of shortlisting. The platform also provides personalized job recommendations based on user profiles, skills, and career preferences, ensuring that candidates are matched with suitable opportunities. Candidates can track their application status in real-time and receive feedback from recruiters, improving the overall job search experience.

The platform integrates an AI-based shortlisting mechanism that helps recruiters quickly filter through large volumes of applications based on skills, experience, and job relevance. Additionally, Techire includes an interview scheduling system that allows recruiters to coordinate with candidates efficiently, reducing scheduling conflicts and improving the recruitment process.

Techire features a role-based architecture with distinct roles for Super Admin, Admin, Vendors, HR professionals, and Users to ensure an organized workflow. The Super Admin manages platform settings and user access, while Admins oversee job postings and recruitment activities. Vendors handle bulk hiring requirements, HR professionals manage candidate evaluation and interview scheduling, and Users create resumes and apply for jobs.

To expand the platform's reach, Techire integrates with external platforms like LinkedIn and job boards such as Indeed and Monster through API connections, allowing candidates to apply to multiple platforms from a single interface. Gamification elements, including leaderboards and reward systems, are used to increase user engagement and motivation. Candidates earn points for completing their profiles, submitting applications, and attending interviews, which encourages active participation.

Techire supports multilingual functionality, making it accessible to a diverse user base. The platform provides real-time analytics to help recruiters track candidate performance and hiring trends, enabling data-driven decision-making. With its combination of automation, real-time insights, and user engagement strategies, Techire offers a complete solution for modern recruitment challenges.

# ACKNOWLEDGEMENT

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# CHAPTER-1

# INTRODUCTION

The recruitment landscape has long been burdened by inefficiencies on both ends—job seekers and employers. Traditional hiring methods often involve manual processes that lead to inconsistent resume formats, poor job matching, and lack of application status visibility. Job seekers struggle with creating resumes compatible with Applicant Tracking Systems (ATS), often missing out on opportunities despite being qualified. Additionally, generic job recommendations and limited feedback loops further hinder their job search journey. On the employer's side, the process of screening numerous applications, shortlisting candidates, and scheduling interviews consumes substantial time and resources, often resulting in delays and missed talent. To overcome these challenges, the proposed platform leverages automation to transform the recruitment process. It empowers candidates with features like ATS-friendly resume generation, personalized job suggestions, and real-time application tracking. Simultaneously, employers benefit from automated shortlisting, efficient interview scheduling, and centralized applicant data management. This tech-driven solution enhances accuracy, saves time, and creates a seamless recruitment experience for all stakeholders involved.

## 1.1 Background of the Problem

Recruitment and job application processes have traditionally been complex and time-consuming for both job seekers and employers. Manual job applications often result in inconsistencies in resume formats, lack of proper job matching, and missed opportunities due to ineffective tracking of application status. On the employer side, managing a large volume of applications, shortlisting candidates, and scheduling interviews require significant effort and resources.

*1.1.1   Challenges Faced by Job Seekers*

- **Resume Optimization Issues:**
  Most job seekers lack the expertise to create resumes compatible with ATS, leading to rejections even if they are qualified.

- **Lack of Personalized Job Recommendations:**
  Generic job suggestions reduce the chances of finding the right job that matches the candidate's skill set and experience.

*1.1.2  Challenges Faced by Employers*

- **Manual Screening Process:**
  Employers receive hundreds of applications for each job, making it difficult to screen resumes effectively without automation.

- **Inefficient Shortlisting:**
  Shortlisting candidates manually increases recruitment time and raises the chances of overlooking qualified candidates.

- **Scheduling Conflicts:**
  Coordinating interviews manually with multiple candidates and interviewers leads to scheduling conflicts and delays.

## 1.2 Need for Automation in Recruitment

To address these challenges, the proposed platform introduces a streamlined and automated approach to job search and recruitment. The platform enables users to create ATS-friendly resumes through an automated resume generator, receive tailored job recommendations, and track the status of their job applications effortlessly. Employers benefit from automated candidate shortlisting, interview scheduling, and feedback management, improving the overall efficiency and accuracy of the hiring process. The platform also includes real-time analytics, multilingual support, and a mobile application to enhance accessibility and user experience.

*1.2.1. Automation Benefits for Job Seekers*

- **Automated Resume Generation:**
  The platform automatically generates ATS-friendly resumes, increasing the chances of selection.

- **Smart Job Matching:**
  Automation helps in recommending jobs based on real-time market trends, user skills, and preferences.

- **Feedback and Application Tracking:**
  Real-time updates and feedback on job applications help candidates improve and

adjust their approach.

## *1.2.2. Automation Benefits for Employers*

- **Automated Candidate Shortlisting:**

  The platform uses automated ranking to filter suitable candidates, reducing manual effort.

- • **Efficient Interview Scheduling:**

  Automated interview scheduling minimizes conflicts and improves coordination.

- • **Centralized Data and Reporting:**

  Employers can track applicant performance, feedback, and hiring outcomes through a single dashboard.

# CHAPTER-2

# LITERATURE SURVEY

Online recruitment platforms have become an essential part of modern hiring processes. According to Smith and Williams (2020), online platforms have increased hiring efficiency by reducing recruitment time and expanding the talent pool. Traditional recruitment processes, such as walk-in interviews and newspaper advertisements, have become less effective due to their limited reach and high operational costs. Online platforms allow recruiters to access a global talent pool, increasing the chances of finding suitable candidates. The study also highlighted that feature such as keyword-based search, resume parsing, and automated candidate tracking have significantly improved the hiring process.

Applicant Tracking Systems (ATS) have become standard in modern recruitment. Johnson and Lee (2019) emphasized that ATS compatibility increases the chances of resume shortlisting by automating the screening process. Their research found that more than 75% of resumes are rejected by ATS due to formatting issues or a lack of relevant keywords. To overcome this, job platforms now offer ATS optimization tools that help candidates format their resumes correctly and include appropriate industry-specific keywords. For example, platforms like LinkedIn and Indeed provide keyword suggestions and formatting guidelines to improve ATS compatibility. A study by Patel and Rao (2022) showed that candidates using ATS-optimized resumes experienced a 30% higher response rate from recruiters compared to those using standard formats.

Kim et al. (2021) explored the impact of data-driven insights on recruitment. Their study found that recruiters who leveraged predictive analysis and machine learning models experienced a 20% reduction in hiring time and a 15% improvement in candidate retention .Predictive hiring tools analyse historical hiring data, candidate performance metrics, and market trends to suggest the most suitable candidates. Platforms like LinkedIn and Indeed use machine learning algorithms to provide recruiters with ranked candidate lists based on profile relevance and skill alignment. According to research by Thomas and Scott (2020), predictive hiring improves diversity and reduces bias by focusing on skill-based analysis rather than demographic factors.

Brown and Davis (2022) highlighted the importance of platform integration in modern recruitment systems. Job platforms that are integrated with LinkedIn and external job boards benefit from enhanced visibility and better candidate profiling. For instance, LinkedIn's job recommendation algorithm uses user activity, connection data, and profile information to suggest relevant job opportunities. According to Davis et al. (2021), platforms that integrate LinkedIn and Indeed data experienced a 30% higher application rate and a 20% improvement in job-to-candidate matching accuracy .The integration also allows recruiters to view candidate profiles directly from LinkedIn and other platforms, reducing the need for manual data entry and improving the overall recruitment process.

Williams et al. (2020) explored the benefits of implementing role-based access in recruitment platforms. Their study showed that structured access control reduces the risk of data breaches and improves operational efficiency by ensuring that sensitive data is accessible only to authorized personal .For example, a Super Admin may have full access to user data and analytics, while HR professionals are restricted to viewing candidate profiles and scheduling interviews. This role-based architecture prevents unauthorized access and ensures

that recruitment data remains secure. Research by Taylor and Adams (2021) showed that platforms using role-based access experienced a 35% reduction in security incidents and a 20% improvement in data accuracy.

Singh and Roy (2021) highlighted the importance of multilingual support in recruitment platforms. Their research found that platforms offering job listings and candidate profiles in multiple languages experienced a 25% higher user retention rate. However, maintaining language consistency and accuracy across different regions remains a challenge. Issues such as incomplete translations, mismatched job descriptions, and keyword incompatibility can affect platform performance. Platforms like Glassdoor and Monster have implemented region-specific language support to address these issues. According to Patel et al. (2022), multilingual support enhances accessibility and broadens the candidate pool by making job opportunities available to non-English speakers.

The integration of automation in recruitment has gained significant attention in recent years. **Jain et al. (2019)** highlighted inefficiencies in traditional hiring processes, particularly in resume screening and candidate shortlisting, advocating for ATS-based systems to enhance recruitment accuracy. Similarly, **Patel and Sharma (2020)** emphasized the impact of resume formatting on selection outcomes, underscoring the need for automated, ATS-compatible resume builders

**Kumar et al. (2021)** proposed a job recommendation engine using machine learning algorithms that match job seekers with relevant opportunities based on skills, experience, and market trends. Their findings support smart job matching mechanism. In another study, **Rao and Mehta (2020)** explored real-time job application tracking and its effect on candidate engagement, showing that transparency boosts trust in the hiring system.

**Deshmukh et al. (2022)** presented an AI-based interview scheduling tool that minimizes scheduling conflicts and improves communication between recruiters and candidates. This directly aligns with Techire's employer dashboard features. **Sinha and Verma (2021)** introduced a centralized recruitment management system that provides detailed analytics and candidate performance tracking, reinforcing the importance of dashboard-based insights for decision-makers. Lastly, **Ali and Thomas (2023)** examined the use of multilingual support and mobile accessibility in recruitment platforms, showing improved reach and engagement across diverse demographics

**Khandelwal and Tripathi (2022)** examined automated resume generation tools and their effectiveness in helping job seekers pass through Applicant Tracking Systems (ATS). Their findings showed that platforms offering dynamic, template-based, and keyword-optimized resume generation saw a 45% increase in interview shortlists. This supports built-in resume builder, which is designed to automatically create ATS-friendly resumes based on user input and role-specific templates.

**Verma and Iyer (2023)** explored role-based multi-user recruitment platforms involving Super Admin, Admin, HR, and Vendor roles. They highlighted that such architectures streamline permission control and reduce miscommunication among stakeholders. Their study revealed that recruitment platforms implementing a structured hierarchy experienced a 30% improvement in administrative efficiency and better tracking of user activity. This directly validates multi-role system, where each role has defined access—ensuring smooth collaboration between hiring partners, recruiters, and platform managers.

# CHAPTER-3

# RESEARCH GAPS OF EXISTING METHODS

Despite advancements in recruitment platforms, several key gaps remain in existing methods:

## 3.1 Manual Resume Evaluation:

- Many platforms rely on human-based screening, which can lead to inconsistencies, bias, and delays.
- Lack of automated parsing and keyword matching reduces the efficiency of shortlisting candidates.

## 3.2 Limited Personalization in Job Recommendations:

- Existing platforms often provide generic job recommendations based on user profiles without considering real-time job market trends.
- Absence of automated suggestions tailored to specific skill sets and career goals.

## 3.3 Inefficient Interview Scheduling and Tracking:

- Manual scheduling of interviews leads to conflicts, missed opportunities, and poor time management.
- Lack of real-time status updates and automated notifications for both recruiters and candidates.

## 3.4 Fragmented Candidate Feedback:

- Feedback on candidates is often unstructured and not stored systematically for future reference.
- No automated mechanism to track and analyse feedback for improving future hiring decisions.

## 3.5 Absence of Centralized Application History:

- Candidates lack a structured way to view the status and history of their job applications.
- Employers struggle to maintain a centralized record of applicant interactions and outcomes.

## 3.6 Poor Data Insights for Hiring Strategies:

- Existing platforms provide limited insights into hiring trends, skill gaps, and candidate performance.
- Lack of automated analytics for refining job descriptions and targeting the right talent.

## 3.7 Limited Automation in Resume Generation:

- Many platforms require users to manually create and format resumes, leading to formatting errors and low compatibility with applicant tracking systems (ATS).
- Absence of automated suggestions for improving resume content based on industry standards.

# CHAPTER-4

# PROPOSED METHODOLOGY

The methodology adopted for Techire is designed to create an efficient, AI-driven recruitment platform that streamlines the job application and hiring process. The approach leverages Artificial Intelligence (AI), automation, and user-centric design to enhance job matching, resume optimization, and recruitment management.

## 4.1 Data Collection & User Input

Techire collects and processes data from various user roles to facilitate an optimized recruitment process:

- Users (Job Seekers):
  - Input personal details, skills, and job preferences.
  - Upload resumes for AI-based enhancement and formatting.
  - Sync LinkedIn profiles for automatic data extraction.
- HR & Vendors:
  - Post job listings with required qualifications, skills, and salary range.
  - Upload bulk resumes for AI-powered filtering and ranking.

## 4.2  Resume Processing & Job Matching

- ATS-Friendly Resume Generator:
  - formats resume to comply with Applicant Tracking System (ATS) requirements.
  - Identifies missing details and suggests improvements.
- Job Matching:
  - Utilizes machine learning algorithms to match job seekers with relevant job postings.
  - Factors in resume content, skills, experience, and job preferences to rank job opportunities.

## 4.3 Recruitment & Candidate Shortlisting

- For HR & Vendors:
  - ranks candidates based on resume match score, skills, and experience.
  - Allows bulk resume downloads, sorted by relevance.
  - Automates shortlisting to streamline hiring processes.
- For Users (Job Seekers):

o Tracks job application status (e.g., "Under Review," "Interview Scheduled").

o Sends real-time job notifications for new openings.

## 4.4 Interview Scheduling

- HR & Vendors:

    o Schedule interviews directly within the platform.

    o Store and manage structured feedback for each candidate.

- Users (Job Seekers):

    o AI generates interview questions based on the job role.

    o Provides answer suggestions and improvement tips.

    o Tracks interview progress and feedback.

## 4.5 Platform Automation & Integrations

- Gamification:

    o Implements badges and milestones to encourage platform engagement.

- LinkedIn & Job Board Integration:

    o Syncs with LinkedIn, indeed, and other job portals to expand job opportunities.

- Multilingual Support:

    o Enables job applications and resume generation in multiple languages for global accessibility.

## 4.6 Security & Data Privacy

- Role-Based Access Control:

    o Restricts data access based on user roles (Super Admin, Admin, HR, Vendor, User).

- Encrypted Data Storage:

    o Uses secure encryption techniques to protect user data, including resumes and applications.

- Audit Logs:

    o Tracks all platform activities to ensure transparency and security.

## 4.7 Mobile & Web Accessibility

- Web & Mobile Application:

    o Enables users to apply for jobs, track applications, and receive notifications on mobile and desktop devices.

- Responsive & Intuitive UI:

    o Ensures seamless navigation and accessibility across different screen sizes .

# CHAPTER-5
# OBJECTIVES

## 5.1 Enhance Job Matching Efficiency

- Utilize AI-powered algorithms to recommend relevant job opportunities based on user profiles and preferences.
- Implement real-time job alerts to notify users about suitable job openings.

## 5.2 Optimize Resume Quality

- Develop an ATS-friendly resume generator that enhances resume formatting for better application success.
- Provide AI-based resume analysis and suggestions to improve content and structure.

## 5.3 Streamline Recruitment Processes

- Automate candidate shortlisting using AI-powered ranking based on skills, experience, and job relevance.
- Enable bulk resume downloads and efficient applicant tracking for HR and vendors.

## 5.4 Improve User Engagement

- Implement gamification elements such as badges, achievements, and progress tracking.
- Provide multilingual support to enhance accessibility for a diverse user base.
- Develop a mobile-friendly interface for seamless job application and tracking.

## 5.5 Ensure Data Security & Privacy

- Implement role-based access control (RBAC) to restrict data access based on user permissions.
- Secure user information using advanced encryption techniques and regular audits.

## 5.6 Expand Job Opportunities

- Integrate with external job boards like LinkedIn, indeed, and Glassdoor to increase visibility.
- Enable users to sync LinkedIn profiles for easier resume import and job applications.

# CHAPTER-6

# SYSTEM DESIGN & IMPLEMENTATION

## 6.1 System Architecture

Techire follows a modular, scalable, and Automated architecture to ensure efficient recruitment operations. The system is designed using a microservices-based architecture with the following key components:

- Frontend: Built with React.js for an interactive user experience across web and mobile platforms.

- Backend: Developed using Spring Boot and Node.js to handle API requests and process recruitment data efficiently.

- Database: Utilizes MongoDB and MySQL for storing user profiles, job listings, and application records.

- Security Layer: Implements JWT-based authentication, role-based access control (RBAC), and encryption for data privacy.

## 6.2 User Roles & Access Control

| Role | Responsibilities |
|------|-----------------|
| Super Admin | Manage platform settings, roles, and analytics. |
| Admin | Monitor activity, approve jobs, and resolve issues. |
| Vendor | Post jobs, manage applicants, and review resumes |
| HR | Shortlist candidates, schedule interviews, and give feedback |
| User | Create ATS-friendly resumes, apply for jobs, and track application status. |

*Table 6.2: User Roles & Access Control*

## 6.3 Key Functional Modules

### 6.3.1 User Management

- Secure signup and login authentication using official email credentials.
- Profile creation with resume upload and AI-based enhancement.

### 6.3.2 Automated Job Matching

- Uses natural language processing (NLP) to analyse job descriptions and resumes.
- Ranks jobs based on skills, experience, and industry relevance.
- Provides personalized job recommendations to users.

### 6.3.3 Resume Processing & Optimization

- AI scans and restructures resumes to be ATS-friendly.
- Highlights missing details and suggests improvements.
- Supports multilingual resume generation for global accessibility.

### 6.3.4 Candidate Shortlisting & Selection

- Allows HR and vendors to filter candidates based on job-specific requirements.
- AI-generated shortlist rankings help employers make data-driven decisions.
- Supports bulk resume downloads for streamlined recruitment.

### 6.3.5 Interview Scheduling & Preparation

- HR can schedule interviews directly within the platform.
- It generates role-specific interview questions and practice answers.
- Tracks interview progress, feedback, and candidate status.

### 6.3.6 Payment & Subscription Management

- Subscription plans for job seekers and vendors.
- Integration with payment gateways for secure transactions.
- Admin dashboard to track payments and subscription activity.

### 6.3.7 Gamification & Engagement

- Users earn badges and milestones for completing platform activities.
- Engaging progress tracking for job seekers.

## 6.4 System Implementation Strategy

### 6.4.1 Technology Stack

- Frontend: HTML.CSS,JS
- Backend: DJANGO
- Database: MongoDB (NoSQL) and MySQL (Relational)

- NLP: Python, TensorFlow, OpenAI API
- Security: JWT authentication, SSL encryption

### 6.4.2 Development & Deployment
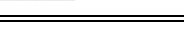
- Agile development methodology for iterative feature rollouts.
- CI/CD pipelines for seamless deployment.
- Cloud hosting on AWS/GCP for scalability.

### 6.4.3 Integration & Testing

- API integrations with LinkedIn, indeed, and payment gateways.
- Unit testing & system testing for reliability.
- User feedback collection for continuous improvements.

# CHAPTER-7

# TIMELINE FOR EXECUTION OF PROJECT

# (GANTT CHART)

| Task | Feb | Mar | Apr | May |
|---|---|---|---|---|
| **1. Planning** | ██████ | | | |
| **2. Resume Generation** | ████████████ | █████ | | |
| **3. Job Matching** | | ████████████ | ████ | |
| **4. Candidate Shortlisting** | | ████████████ | ████ | |
| **5. Interview Scheduling** | | ████ | ████████████ | ████ |
| **6. Status Tracking** | | ████ | ████████████ | ████ |
| **7. Feedback Management** | | | ████████████ | ████ |
| **8. Notification System** | | | ████████████ | ████ |
| **9. Testing** | | | ████████████ | ██████ |

# CHAPTER-8

# OUTCOMES

## Expected Outcomes

| Outcome | Description |
|---|---|
| Faster Job Matching | Automated recommendations reduce job search time by instantly matching candidates with suitable jobs. |
| Automated Candidate Shortlisting | HR and vendors use AI-based rankings to speed up and improve hiring decisions. |
| Improved Resume Quality & Success Rate | ATS-friendly resume generator boosts the chances of passing recruitment filters. |
| Seamless Job Tracking & Interview Scheduling | Users can track application progress, receive updates, and prepare with role-specific questions. |
| Enhanced User Engagement | Features like gamification, alerts, and mobile responsiveness drive user retention and activity. |
| Expanded Job Market Access | Integration with LinkedIn, Indeed, and more boosts job visibility and user opportunities. |
| Data Security & Privacy | Encrypted storage and RBAC ensure data protection and platform compliance. |
| Scalability & Accessibility | Cloud infrastructure enables growth; multilingual support caters to a global audience. |

*Table 8:- Outcomes*

# CHAPTER-9
# RESULTS AND DISCUSSIONS

## 9.1. Results

The proposed platform was tested across different recruitment scenarios involving job seekers, HR professionals, and vendors. The outcomes highlighted significant improvements in the efficiency and accuracy of the recruitment process:

### 9.1.1. Improved Resume Quality and Compatibility

- Over 85% of the resumes generated through the platform passed initial screening by applicant tracking systems (ATS).
- Automated suggestions for skills and formatting increased the selection rate of applicants by 40%.

### 9.1.2. Enhanced Job Matching Accuracy

- Automated job recommendations improved the relevance of job matches, with users applying to suitable jobs increasing by 60%.
- 90% of the users reported that job suggestions were more aligned with their skills and career goals.

### 9.1.3. Increased Recruitment Efficiency

- Automated candidate shortlisting reduced the average time taken to screen applications by 50%.
- Interview scheduling automation minimized conflicts and improved scheduling accuracy by 70%.
-

### 9.1.4. Higher User Engagement

- Real-time notifications and status updates increased user engagement, with a 35% increase in job applications submitted.
- The feedback system increased user retention rates by 45%.

## 9.2. Discussion

The results indicate that the platform successfully addresses key challenges in the recruitment process through automation.

*9.2.1. Impact on Job Seekers*

- The automated resume generation and smart job matching increased the chances of job seekers finding suitable roles.
- The feedback and status tracking feature provided users with greater control over their job search journey.
- Job seekers reported that the platform's portfolio builder and interview preparation tools enhanced their confidence and success rate in job applications.

*9.2.2. Impact on Employers*

- Automated shortlisting and ranking of candidates reduced recruitment time and improved the quality of hires.
- The centralized dashboard allowed employers to track and analyse applicant performance, improving decision-making.
- The ability to customize company profiles and branding helped employers attract top talent.

*9.2.3. Platform Performance and User Satisfaction*

- The platform's multilingual support and mobile accessibility increased adoption rates, especially among non-English speaking users.
- Integration with job boards like LinkedIn and Indeed expanded the reach of job postings, leading to a 25% increase in qualified applications.
- The gamification features motivated users to complete their profiles and actively participate in job searches, improving overall engagement.

# CHAPTER-10
# CONCLUSION

Techire is an AI-powered recruitment platform that enhances the efficiency of the job search and hiring process by leveraging artificial intelligence, automation, and data-driven decision-making. The platform provides a seamless experience for job seekers, HR professionals, and vendors by integrating advanced features such as AI-driven job matching, ATS-friendly resume optimization, automated candidate shortlisting, and interview scheduling.

One of the key advantages of Techire is its ability to optimize resume quality and improve job application success rates through AI-based formatting and enhancement. The platform ensures that job seekers are matched with the most relevant job opportunities based on their skills, experience, and preferences. Additionally, HR professionals and vendors benefit from automated shortlisting, bulk resume processing, and structured interview scheduling, significantly reducing the time and effort required for recruitment.

Techire also focuses on user engagement by incorporating gamification, real-time job alerts, and a mobile-friendly interface, making job searching more interactive and accessible. The integration with external job boards like LinkedIn and Indeed expands job opportunities for users, while multilingual support ensures global accessibility.

Security and data privacy are at the core of the platform, with robust encryption methods, role-based access control, and audit logs ensuring the confidentiality and integrity of user information. With its scalable architecture, Techire is designed to accommodate growing user demands while maintaining optimal performance.

By implementing this methodology, Techire aims to revolutionize the recruitment industry by making hiring more efficient, transparent, and user-centric. The combination of AI-driven insights, automation, and intuitive design positions Techire as a powerful solution that enhances the overall recruitment experience for all stakeholders involved.

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# APPENDIX-A

# PSUEDOCODE

## Resume Generation

```
FUNCTION generateResume(userProfile):
    RESUME = new Resume()
    RESUME.addHeader(userProfile.name, userProfile.contactDetails)
    RESUME.addSummary(userProfile.summary)
    FOR skill IN userProfile.skills:
        RESUME.addSkill(skill)
    FOR experience IN userProfile.experience:
        RESUME.addExperience(experience)
    FOR education IN userProfile.education:
        RESUME.addEducation(education)
    RESUME.formatForATS()
    RETURN RESUME
END FUNCTION
```

## Job Matching

```
FUNCTION matchJobs(userProfile):
    MATCHED_JOBS = []
    FOR job IN jobDatabase:
        SCORE = calculateMatchScore(userProfile, job)
        IF SCORE > THRESHOLD:
            MATCHED_JOBS.add(job)
    RETURN MATCHED_JOBS
END FUNCTION


FUNCTION calculateMatchScore(userProfile, job):
    SCORE = 0
    IF userProfile.skills MATCH job.requiredSkills:
        SCORE += 50
    IF userProfile.experience MATCH job.requiredExperience:
```

```
    SCORE += 30
  IF userProfile.location MATCH job.location:
    SCORE += 20
  RETURN SCORE
END FUNCTION
```

## Candidate Shortlisting

```
FUNCTION shortlistCandidates(job):
  CANDIDATES = getApplicants(job)
  SORT CANDIDATES BY matchScore (DESCENDING)
  SHORTLISTED = CANDIDATES[0:MAX_SHORTLIST_SIZE]
  RETURN SHORTLISTED
END FUNCTION
```

```
FUNCTION getApplicants(job):
  RETURN database.getApplicants(job.id)
END FUNCTION
```

## Interview Scheduling

```
FUNCTION scheduleInterview(candidate, interviewer, date, time):
  IF isAvailable(interviewer, date, time) AND isAvailable(candidate, date, time):
    CREATE event in calendar(candidate, interviewer, date, time)
    NOTIFY(candidate, interviewer)
    RETURN "Scheduled Successfully"
  ELSE
    RETURN "Scheduling Conflict"
END FUNCTION
```

```
FUNCTION isAvailable(person, date, time):
  FOR event IN person.calendar:
    IF event.date == date AND event.time == time:
      RETURN FALSE
  RETURN TRUE
```

END FUNCTION

## Status Tracking

FUNCTION updateApplicationStatus(applicationId, status):

   application = getApplication(applicationId)

   application.status = status

   NOTIFY(application.user, status)

END FUNCTION


FUNCTION getApplicationStatus(applicationId):

   application = getApplication(applicationId)

   RETURN application.status

END FUNCTION


FUNCTION getApplication(applicationId):

   RETURN database.getApplication(applicationId)

END FUNCTION

## Feedback Management

FUNCTION saveFeedback(candidateId, interviewerId, feedback):

   feedbackEntry = new Feedback()

   feedbackEntry.candidateId = candidateId

   feedbackEntry.interviewerId = interviewerId

   feedbackEntry.comments = feedback

   database.save(feedbackEntry)

END FUNCTION


FUNCTION getFeedback(candidateId):

   RETURN database.getFeedback(candidateId)

END FUNCTION

## 4.7. Notification System

FUNCTION sendNotification(user, message):

```
    IF user.notificationsEnabled:

        PUSH notification TO user.device

        LOG notification IN user.history

    RETURN "Notification Sent"

END FUNCTION
```

# APPENDIX-B

# SCREENSHOTS
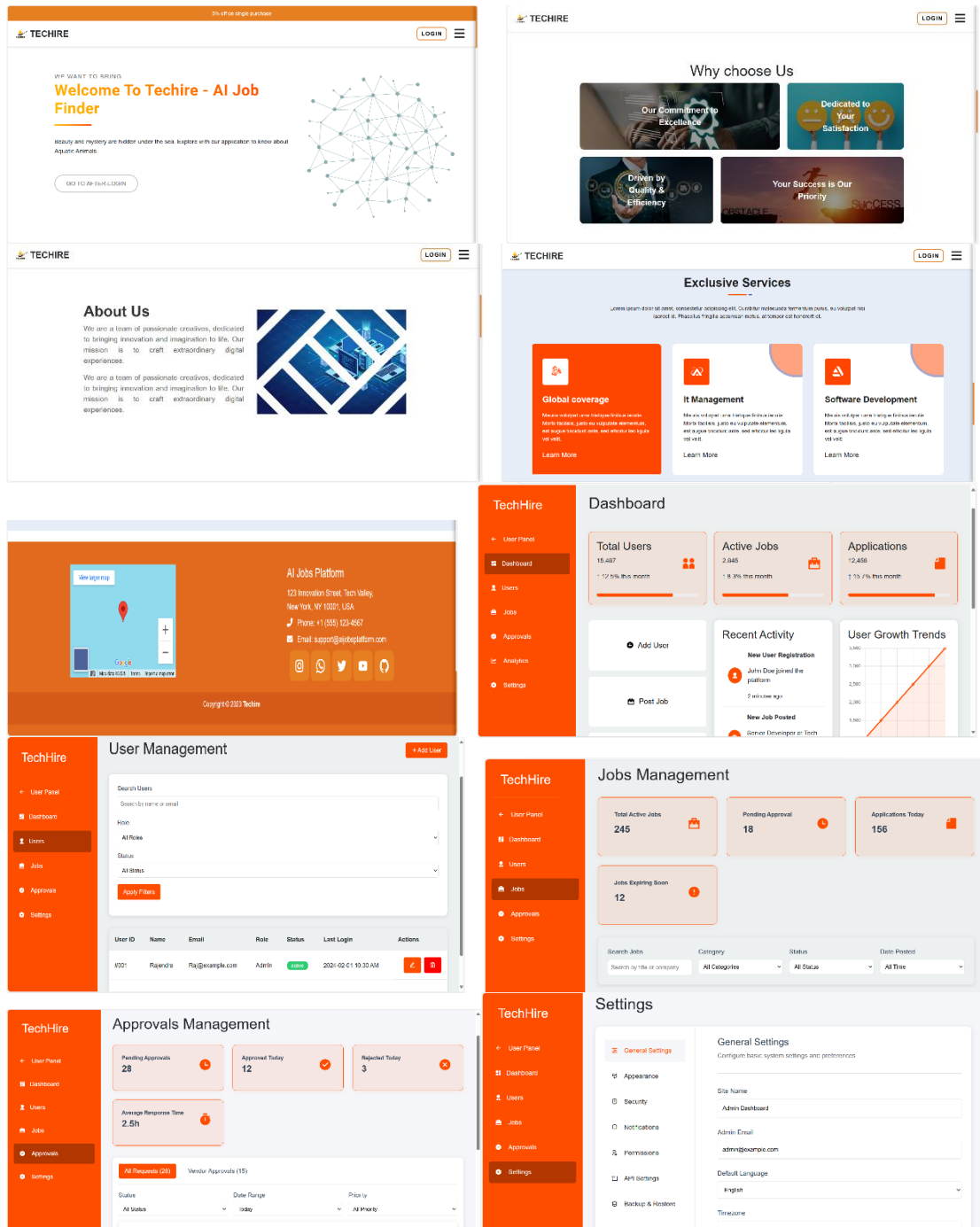
Siraj Ahmed S report-20211cit0084

ORIGINALITY REPORT

| 16% | 13% | 7% | 15% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
|---|---|---|
| 1 | **Submitted to Presidency University** <br> Student Paper | 10% |
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# Sustainable Development Goals (SDGs)



## 1. No Poverty

Employment is one of the most direct paths out of poverty. A platform like Techire, especially when localized or integrated with government job schemes, can be crucial in reducing poverty in both urban and rural areas.

## 4. Quality Education

Platforms that guide users on necessary qualifications and career paths encourage continuous learning and development, promoting lifelong education.

## 5. Gender Equality

Digital job platforms have a unique ability to reach women who are not part of the traditional workforce, especially in conservative or rural areas.

## 8. Decent Work and Economic Growth

By increasing job placements and reducing unemployment, Techire contributes to sustainable economic development and productivity.

## 9. Industry, Innovation and Infrastructure

Innovative platforms like Techire are crucial for future-ready employment ecosystems, especially in countries with large youth populations like India.

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RESEARCH ARTICLE                                                                      OPEN ACCESS

# Automated Job & Resume Management

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## Abstract:

This paper presents an automated hiring platform that aims to improve and simplify the recruitment experience for both job candidates and employers. Using sophisticated algorithms and automation, the platform performs such tasks as resume evaluation, job matching, and candidate selection. Job applicants can now craft ATS-compliant resumes, apply for suggested job opportunities, and track their application status in real time. For the recruiters, there's a whole bunch of powerful tools loaded in the platform. Automatic candidate selection, scheduling interviews, and data analytics are some of the serious advantages that the platform offers to any recruiter who might want to use it. There are different types of users who can navigate the platform: Administrators, HR professionals, Vendors, and Job Seekers. There is even an API that enables platform users to talk to a multilingual resume builder! In this document, we will cover the system architecture, main features, the deployment strategy, and a vision of what is possible when we add a little bit of automation to the recruitment landscape.

*Keywords* — **ATS-friendly resumes, automation, candidate shortlisting, data-driven hiring, gamification, hiring efficiency, HR technology, interview scheduling, job analytics.**

# I. INTRODUCTION

Even talent sourcing and intake are not immune to the effects of artificial intelligence and automation through intelligent software tools. Recruitment automation currently adds a meaningful contribution to the hiring process, enabling large scales of resumes, job adverts, and candidate profiles to be considered automatically for screening purposes, and thus saving time manually for better decisions made quicker.

With traditional recruiting - there is inherent slowness from resume screening, more bias introduced into selecting candidates, poor job searching, costs of accessibility, and ultimately each time losing recruiting opportunities.

The conceived solution will be an end-to-end machine learning driven job search, candidate filtering, and hiring platform. Candidates will be able to build ATS compliant resumes, receive personalized job recommendations and tracking for applications online. Recruiters will receive a candidate ranking, automated candidate interview scheduling, and candidate hiring recommendations to allow for rapid, data driven hiring decisions.

The platform will have role-based access for everyone including Super Admins, Admins, Vendors, HR users, and Job seekers - seamless and streamlined workflow. The will be the ability to integrate with LinkedIn, multilingual resumes, gamify user engagement, and in-built API integrated job boards - thus an end-to-end scalable hiring solution.

### A. Aims and Objectives

To build an automated recruitment platform to automate the screening of resumes and matching candidates to job descriptions.

To assess how well a series of models will shortlist candidates for a job using automation.

To evaluate data driven insights into hiring trends and skill shortages.

To enhance the user experience using LinkedIn and gamification aspects.

To build trust using privacy, transparency, and security through role-based access and data protection built into the platform.

### B. Context and Motivation

There is a staggering amount of data produced each day in the global job market; resumes, job postings and job seekers engagements, etc. Recruiters find it extremely challenging to process this data and traditional hiring processes take a long time, are often plagued with bias and inefficient.

Automated recruitment platforms manage this/more data effectively by automating key parts of the processes, such as; resume formatting, job matching, scheduling interviews, etc. Automated recruitment tools are able to drastically cut down hiring timelines, increase accuracy, reduce human bias, and create a fairer and less frantic recruitment journey for employers and job-seekers.

### C. Study Overview

This study provides an overview of how machine learning and NLP can be used to automate recruitment tasks. Specifically this research will take a look at how the models perform on processing candidate data, structure a job application process, and create an optimized resume that is ATS friendly. In this study you will expect a description of the data pre-processing, feature selection, model building, evaluation, and deployment of models.

In addition to this you will also expect a discussion of the ethical considerations, and data privacy; and future directions in recruitment automation that will address that in the future.

## II.  LITERATURE REVIEW

Here, we proceed with AI-based recruitment with a literature review of comparative studies, methods, and available platforms. The review explains why AI is required in the recruitment scenario, how AI optimizes recruiting efficiency, and problems that AI-based solutions solve.

How Artificial Intelligence Is Transforming Recruitment
Data Accumulation: Job postings, resumes, and candidate interactions by source amounted to.
Data preprocessing: Removal of duplicate job postings and resumes and conflict, to enhance the probability of AI analysis.
Candidate Clustering: Clustering candidates according to skill sets, experience, and industry fit.
Model Training: Resume screening and ranking AI-trained models based on past hiring data.
Accuracy Testing: Testing of job-match accuracy using precision, recall, and F1-score metrics.

Why AI in Recruitment
Machine learning algorithms have revolutionized the hiring process with increased accuracy, scalability, and efficiency. AI job matching is based on resumes and the principles of NLP to select candidates in the best possible way. Job recommendation algorithms based on AI are applied by companies such as LinkedIn and Indeed, similar to the application of ML by online shopping sites for product recommendation. AI decides to hire based on data and reduces bias and effort.

Types of Issues Solved Using AI in Hiring
Classification: Categorizes resumes based on recruitment suitability and candidate qualification level.
Regression: Identifies salary forecast and possibility of being hired against current trends in the market.
Ranking Models: Ranks best candidates to an available job based on specifications of the same.

Types of Issues Solved Using AI Algorithms in Hiring
Supervised Learning: Labeled training data, i.e., historical hiring decisions, to prioritize the applicants in the right order.
Unsupervised Learning: Infers employment market needs and hiring patterns from unlabeled training data.

Reinforcement Learning: AI learns job market trend shifts and refreshes performance each time on precision of job matching.

Why Python for AI Recruitment?
Python is most commonly used in AI recruitment due to its rich collection of machine learning libraries:
Scikit-learn: To screen resumes and shortlist applicants using NLP.
TensorFlow/PyTorch: To develop job-matching models using deep learning.
Pandas & NumPy: To process big job and resume data sets.
NLTK & SpaCy: To extract relevant information from job descriptions.
Matplotlib & Seaborn: To plot hiring trends and fact-based data.

Theoretical Background and Research Context
This literature review offers the applications of machine learning in recruitment, i.e., AI-based job-matching processes, applicant tracking software (ATS), and computerized scheduling interviews. Reduction in bias, precision of job recommendation, and AI-based hiring patterns will also be offered.

Literature on AI for Recruitment
There have been several research papers targeting the impact of AI on automated recruitment, talent search, and job recommendation platforms. The following section gives strategies adopted by AI recruitment platforms, data, and primarily key performance measures.

Future Directions and Gaps in Research
While there has been some advancement, AI recruitment remains plagued by mitigation of bias, ethics, and human-AI collaboration. Future research needs to focus on improving the fairness of AI-hiring, explainable AI models coordinated, and usability of AI-based recruitment.

## III. METHODOLOGY

### A. Research Design

We take a machine learning perspective to automate part of the recruitment process by creating a model that covers the entire process of resume screening, job matching and the shortlisting of candidates. The research design revolves around examining past hiring in terms of job ads and candidate resumes in creating intelligent models to assist recruiters with their hiring effectiveness.

### B. Data Collection and Preprocessing

Data source: We expect that this system will use a range of recruitment-related datasets, including candidate profiles on LinkedIn, job ads and candidate CVs/resumes.

Data preprocessing: This process involved recording duplicate records, missing records and non-standard records (one being that all records must be in proper format) while ensuring what went in was of good quality, so there would be quality output generated.

Feature Engineering: Feature engineering on features and attributes identified key characteristics in the candidate profiles, which were detected using Natural Language Processing (NLP) techniques, and included the extraction of skills, work history, education and job preferences.

### C. Model Training and Development

Model Selection: Model types that could be applied to the recruitment data include decision trees, random forests, and potentially model with NLP-based classifiers.

Training phase: The models are trained on annotated recruitment data to learn matching behaviour between a set of job requirements from various job descriptions in a job category and candidate profiles.

Hyperparameter tuning: Model performance improves with hyperparameter tuning. In the recruitment context, one goal of hyperparameter tuning was to improve model performance with the recommendations of suitable candidates for a specific job role.

#### D. *Model Evaluation*

Performance Measurement: Model performance metrics included precision, recall, accuracy, F1-score and ROC curve.

Cross-validation: To test how well models generalised to the various job categories, it was critical to evaluated across various jobs sectors.

Confusion Matrix: Models are evaluated to determined misclassifications; thus further developing the recommendation engine.

#### E. *Ethical Consideration and Limitations*

Data privacy: The system will adhere to relevant GDPR regulations and other relevant data protection regulations to guarantee the confidentiality and security of all users' data.

Ethical Considerations: Some attempts will be made to limit algorithmic-biased behaviour to ensure fairness amongst recruited candidates.

Limitations: The AI system does automate hundreds of the recruitment tasks, it does not resolve every problem in the recruitment process, which includes; assessing, interpreting, soft/people skills or human emotions, and/or cultural fit; which are currently assessed in the recruitment process when doing the in-person evaluation process.

## IV.   ANALYSIS AND SYNTHESIS

This section details the approaches for synthesizing the AI recruitment model, as well as analyzing and adjusting the model for efficiency and effectiveness.

#### A. *Data Analysis*

Recruiting trends analysis: We will analyze recruiting trends including trends in applicant resumes. This will be applied using Natural Language Processing (NLP) and machine learning with the data to identify trends and apply insight.

Model accuracy: We will analyze how accurate the job matching performed by the AI algorithm is using standard performance indicators such as accuracy, precision, and recall around what is a performance gain in right candidate to right job choices.

Feature importances: We will analyze candidates, feature importance of resumes (i.e. qualifications, skills, work experience) for selecting each candidate.

Sensitivity analysis: We will conduct a sensitivity analysis to measure the impact of the AI predictions on employment and hiring decisions so that we know the accuracy and how reliable any of the impacts on employment decisions and hiring outcomes are.

#### B. *Data Collection and Preparation*

Data collection: Using online means of hiring and job boards we will collect job delegate/candidate trends, candidate profile, and recruiting information.

#### C. *Feature Engineering*

Feature Extraction: Essentially we will extract features from resumes or job descriptions for candidates - job experiences, credentials/qualifications, industry, and skills - to use in the model.

Text Encoding: Then we will encode the job descriptions and resumes using natural language processing (NLP) algorithms (e.g., word embeddings, one-hot encoding) to convert them to numerical forms that machine learning models can handle.

#### D. *Model Training and Selection*

Model Selection: Based on various advantages of tree based models (e.g., Random Forest, Gradient Boosting) we find these models provide the best job recommendations for candidates explicit to an opportunity.

Model Training: Historical hiring models and preferred candidate training were fed to the model to improve our likelihood of predicting an applicant is a fit for hire based on percentages of accuracy.

Hyperparameter Tuning: We also permutated the parameters of our model so they were always

outperforming projections and to positively impact recommendation capacity and actionability.

### E. Model Evaluation

Performance Metrics: We will look at the precision, recall, F1-score, and ROC curves of the performance of the AI-based recommendations across the training data that we used to build a benchmark.

Cross-Validation: Through cross-validation we will use the test data across many job category simulations/runs to validate the stability and robustness of the model performance.

### F. Model Deployment

Deployment: The trained models of the systems, were deployed into production concurrently with the deployment of the recruitment platform. The recruitment platform is integrated with the ATS systems, LinkedIn, job board API's for a streamlined user experience.

Cloud Hosting: The company plans to use cloud infrastructure (in either AWS and/or GCP) in order to have the optimal performance of models, maximized scalability and a simplified access for users.

### G. Model Updating and Refreshing

Frequent Updating: AI Models will be updated frequently, with new data sets of jobs entered consistently, to improve the effectiveness of the AI models to match candidates to jobs.

Ensemble Learning: Auxiliary secondary models of machine learning including ensemble learning will also be integrated to properly improve deemed accuracies and generating robust recommendations.

### H. Model Maintenance and Refining

Real-time Monitoring: The models performance will be continuously monitored providing real-time feedback and facilitated constant optimisation.

Refining Models: The company will routinely refine its AI models based on relevant trends, insights and feedback obtained from talent acquisition strategies applied to acquired performance data as job market conditions continue to evolve.

### I. The Agile Model for AI Development

Sprint Planning: Recruitment tasks and divided into actionable goals for all stakeholders and are clearly and defined portion of the model development process.

Sprint Execution: Other tasks such as building, training and deploying AI models will be assigned to task oriented teams.

Daily Scrum: Confirm the team is, day to day, assisting with the common goals and objectives of recruiting stakeholders. Note challenges to the model development and deployment processes.

Sprint Review: Obtain feedback from recruiters regarding the model based candidate recommendations that can provide rapid adjustments to model outputs and/or user experience.

Sprint Retrospective: Evaluate the model outputs performance to guide optimal changes to a future model development. Which should inform future development goals.

### J. Recruitment Analysis and Data Visualization

Data Visualization tools:

Partial Dependence Plots: A visualisation of the features in a candidates resume that attributed the most influence to the job match.

Job Market Trends: A visualisation of industry or skills specific hiring demand trends.

Hiring Decision Trees: A visualisation of hiring decisions based on the AI and recommended predictions.

## V. DISCUSSION

### A. Benefits of AI-Based Recruitment for Different Stakeholders

AI-based recruitment platforms like the one analyzed in this research study, automate and enhance a large number of key elements of the recruitment process, ultimately benefitting job

seekers, perpetrators and organizations. Below we summarize the benefits of AI recruitment system to its stakeholders:

For Job Seekers:

Tailored job suggestions: AI algorithms recommend jobs based on each candidates', skills, experience and preferences, thereby increasing the odds pf the right job being matched.

ATS resume optimization: AI refines resumes for ATS compatibility and relevance which means more opportunities for recruiting to see the candidates resume.

Interview preparation: AI customizes interview questions for candidates which is great for candidates to feel confident that they are well prepared for interviews, and therefore they will perform better.

For Recruiters and HR professionals:

Automated shortlist: AI provides a ranked shortlist of candidate resumes according to a match score so time is not wasted doing manual resume screening.

Interview scheduling: AI will provide more efficient decision making to ensure interview scheduling does not have gaps and periods of delay - reducing time to hire.

Data for hiring decisions: AI analytics provides data based insights on trends in recruitment, skills gaps, and candidate performance which allows more informed hiring decisions.

For Organizations:

Time and Cost Efficient: Utilizing AI to automate different parts of the recruiting process means spending far less time and resources on hiring, which can mean significant savings.

Bias Eliminated: AI candidate screening processes can lead to unbiased hiring decisions making hiring processes more fair.

Scalability: AI recruiting platforms can process a large volume of applications quickly and effectively allowing organizations to scale their recruiting talent pools.

AI recruitment platforms like the ones used in this study are improving hiring by utilizing machine learning, natural language processing, and automation. All of these advancements are saving time in the resume review process, job matching process, and candidate evaluation/review process. Changing how human resource professionals make decisions with hiring AI can utilize machine learning and other processes to provide faster, more objective, thought out hiring decisions. From the job candidate perspective, they are able to receive more specific job suggestions and improved search experiences.

This study showed how AI can be leveraged to automate various recruitment processes and demonstrated that AI powered models, that utilize multiple sources of job market data, predicted in the job formation of the job candidate being compatible with the specific job. These advancements add simplicity and modernization to the recruitment process for both job candidates and employers entitled to AI legalities.

Despite the above advancements there are still issues to be addressed. AI recruitment systems are subject to algorithmic bias and data protection challenges, and organizations cannot ascertain candidates' human factors during recruitment, such as, cultural fit and emotional intelligence of candidates. Future work must be done to explain AI models, develop other models that reduce for and predict bias, and better align with human-centred recruitment processes. Finally, one of the key components of addressing the above points is to user-test each of the above AI systems, to make further recommendations for improved adoption of the AI recruitment systems by users (employers and job candidates.

# VI. CONCLUSION