

Recruit Right: Precision Hiring with AI Insight

by Saad Akbar

Submission date: 08-Jul-2025 10:07PM (UTC+0500)

Submission ID: 2712005238

File name: Recruit_Right_-_Precision_Hiring_with_AI_Insight.pdf (2.86M)

Word count: 7209

Character count: 43870



Recruit Right: Precision Hiring with AI Insight

Final Year Project Report

Submitted by,

Muhammad Naeemuddin 1955-2021

Muhammad Abdullah 2206-2021

Muhammad Raza 2207-2021

Supervisor,

Dr. Umer Farooq

¹
In partial fulfilment of the Requirements for the Degree of
Bachelor of Science in Computer Science,
2021

Faculty of Engineering Sciences and Technology

Hamdard University, Main Campus,
Karachi, Pakistan.

Certificate of Approval



Faculty of Engineering Sciences and Technology

Hamdard University, Karachi, Pakistan

This project “ **Recruit Right: Precision Hiring with AI Insight** ” is presented by “ **Muhammad Naeemuddin, Muhammad Abdullah, Muhammad Raza** ” under the supervision of their project advisor and approved by the project examination committee, and acknowledged by the Hamdard Institute of Engineering and Technology, in the fulfillment of the requirements for the Bachelor's degree in Computer Science.

A handwritten signature of Dr. Umer Farooq.

Dr. Umer Farooq
(Project Supervisor)


In-charge FYP-Committee

E. XYZ
(Project Co-Supervisor)


Dr. Umer Farooq
(Chairman Department of Computing)

Eng. Prof. Aamer Saleem
(Dean, FEST)

Authors' Declaration

We declare that this project report was carried out in accordance with the rules and regulations
of Hamdard University. The work is original except where indicated by special references in the
text and no part of the report has been submitted for any other degree. The report has not been
presented to any other University for examination.

Dated:

Authors Signatures:



Muhammad Naeemuddin



Muhammad Abdullah



Muhammad Raza

Plagiarism Undertaking

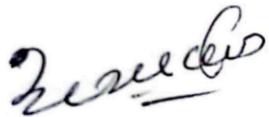
We, Muhammad Naeemuddin, Muhammad Abdullah, and Muhammad Raza, solemnly declare that the work presented in the Final Year Project Report Recruit Right has been carried out solely by ourselves with no significant help from any other person except few of those which are duly acknowledged. We confirm that no portion of our report has been plagiarized, and any material used in the report from other sources is properly referenced.

Dated:

Authors Signatures:



Muhammad Naeemuddin



Muhammad Abdullah



Muhammad Raza

Acknowledgment

¹ All praises and thanks be to Almighty ALLAH, the Most Gracious, the Most Merciful, the Lord of all worlds, the Sustainer and the Source of all Knowledge, Wisdom, and Strength. Without His countless blessings and divine guidance, the successful completion of this project would not have been possible.

All respects and eternal salutations to the Last Prophet, Hazrat MUHAMMAD ﷺ, the Mercy to mankind, whose Exemplary Life, Character, and Teachings continue to enlighten and guide the entire humanity. We also extend our utmost love and reverence to his Noble AAL (family), The Ahl-e-Bayt, whose piety, sacrifices, and unwavering dedication to the message of Islam serve as a timeless inspiration for us in all walks of life. May Allah's peace and blessings be upon them all.

We would like to express our sincere gratitude to the HAMDARD UNIVERSITY, (HIET) for providing us with an academic environment full of encouragement, resources, and the right guidance throughout the journey of this project. It is indeed a matter of great honor and pride for us to complete this project under the banner of such a prestigious institution, where excellence, ethics, and education walk hand in hand.

Our heartfelt appreciation goes to our respected supervisor, Dr. Umer Farooq, whose unwavering support, expert guidance, and constant encouragement were instrumental in shaping our work. His valuable insights, technical expertise, and motivating feedback helped us overcome challenges and stay focused on our goal. We are genuinely thankful for the time and effort he invested in us.

We are also indebted to Ms. Muntaha Mehboob, our former supervisor, for her early support and thoughtful suggestions during the initial phases of our project. Her words of encouragement remained with us throughout this journey.

We are truly grateful to our teachers and academic mentors who laid the foundation of knowledge, and whose teachings and values guided us throughout our academic life. Each lecture, every project discussion, and classroom interaction added layers to our understanding and development.

We would like to extend special thanks to our classmates, batchmates, and project team members for their cooperative spirit, valuable suggestions, constructive criticism, and for fostering a collaborative environment. Their encouragement during times of difficulty and celebration of milestones helped us remain motivated.

We cannot forget to mention the boundless love, support, and prayers of our beloved parents and families. Their sacrifices, moral strength, and continuous encouragement have been our biggest pillars of support. Their belief in our potential gave us the confidence to overcome every obstacle and accomplish our academic and personal goals.

Lastly, we would like to thank all those individuals whether named or unnamed who helped us directly or indirectly in the successful completion of this project. Every act of support, no matter how small, played a significant role in making this achievement possible. May Allah bless each one of them with the best of rewards in both this world and the Hereafter.

Ameen

1 Document Information

Table 1: Document Information

Customer	Tech Industries
Project Title	Recruit Right
Document	Final Year Project Report
Document Version	2.1
Identifier	FYP-029/FL24 - Final Report
Status	Final
Author(s)	Muhammad Naeem, Muhd. Abdullah, Muhd. Raza
Approver(s)	Dr. Umer Farooq
Issue Date	Jun 28 th , 2025

Definition of Terms, Acronyms, and Abbreviations.

5 Table 2: Definition of Terms, Acronyms, and Abbreviations

Term	Description
AI	Artificial Intelligence
API	Application Programming Interface
ATS	Applicant Tracking System
CSS	Cascading Style Sheets
CRUD	Create, Read, Update, Delete
CPU	Central Processing Unit
CSV	Comma-Separated Values
DB	Database
DBMS	Database Management System
FCM	Firebase Cloud Messaging
FYP	Final Year Project
GPU	Graphics Processing Unit
GDPR	General Data Protection Regulation
GUI	Graphical User Interface
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
IDE	Integrated Development Environment
JSON	JavaScript Object Notation
JWT	JSON Web Token
KPI	Key Performance Indicator
MVC	Model-View-Controller
NER	Named Entity Recognition
NLP	Natural Language Processing
OAuth	Open Authorization
OS	Operating System
PDF	Portable Document Format

PII	Personally Identifiable Information
RESTful	presentational State Transfer
SDK	Software Development Kit
SLA	Service Level Agreement
SQL	Structured Query Language
SSL	Secure Sockets Layer
SMTP	Simple Mail Transfer Protocol
SSH	Secure Shell
TLS	Transport Layer Security
UML	Unified Modeling Language
UI	User Interface
UX	User Experience
VLAN	Virtual Local Area Network
YAML	YAML Ain't Markup Language

Abstract

RecruitRight: Precision Hiring with AI Insight is an advanced recruitment platform designed to transform traditional hiring processes by addressing inefficiencies, biases, and time constraints. Leveraging the power of artificial intelligence, the platform incorporates Named Entity Recognition (NER) for automated resume analysis and asynchronous video interviews to deliver precise, unbiased candidate evaluations. These innovations streamline recruitment workflows, enabling organizations to focus on top-tier talent and make data-driven hiring decisions with confidence.

With its scalable micro services architecture, RecruitRight ensures robust performance even under high demand, making it suitable for businesses of all sizes. The platform's user-centric design prioritizes accessibility and ease of use, offering an intuitive experience for candidates, interviewers, and organizations alike. While its core features aim to enhance efficiency and reliability, future potential integrations, such as facial expression recognition (FER), highlight its commitment to innovation and continuous improvement.

This report presents the motivations, methodologies, and technical foundations of RecruitRight, showcasing its potential to revolutionize the hiring landscape through cutting-edge technology and forward-thinking design.

Keywords:

- Recruitment Automation
- Artificial Intelligence (AI)
- Named Entity Recognition (NER)
- Asynchronous Video Interviews
- Scalable Micro services Architecture
- Candidate Evaluation
- Data-Driven Decision Making
- Resume Analysis
- User-Centric Design

Table of Contents

Certificate of Approval	2
Authors' Declaration	1
Acknowledgment	3
Document Information	4
Abstract	6
List of Figures	10
List of Tables	11
CHAPTER 1	12
INTRODUCTION	12
1.1 Motivation	12
1.2 Problem Statement	12
1.3 Goals and Objectives	12
1.4 Project Scope	13
Assumptions	13
Dependencies	13
CHAPTER 2	14
RELEVANT BACKGROUND & DEFINITIONS	14
CHAPTER 3	15
LITERATURE REVIEW & RELATED WORK	15
Literature Review	15
Related Work	15
Gap Analysis	16
CHAPTER 4	1
1. Software Engineering Methodology:	1
2. Project Methodology	1
3. Phases of Project	1
4. Software/Tools that Used in Project	3
5. Hardware that Used in Project	3
Chapter 5	4
1. Proposed System Architecture/Design	4
2. Functional Specifications	5
3. Non-Functional Specifications	6
4. Testing	9

5. Purpose of Testing	9
Chapter 6	10
EXPERIMENTAL EVALUATIONS & RESULTS	10
1. Evaluation Testbed	10
2. Results and Discussion	11
2.1. Resume Parsing Accuracy	11
2.2. AI Job Matching Results	11
2.3. User Feedback	12
Table 6: User Feedback	12
2.4. System Performance	12
2.5. Discussion	12
CHAPTER 7	13
CONCLUSION AND DISCUSSION	13
1. Strength of this Project	13
2. Limitations and Future Work	13
Limitations:	13
Future Work:	14
3. Reasons for Failure – If Any	14
REFERENCES	15
APPENDICES	16
A1A. PROJECT PROPOSAL AND VISION DOCUMENT	17
A1B. COPY OF PROPOSAL EVALUATION COMMENTS BY JURY	17
A2. REQUIREMENT SPECIFICATIONS	18
A3. DESIGN SPECIFICATIONS	18
A4. OTHER TECHNICAL DETAIL DOCUMENTS	19
Test Cases Document	19
Test Plan	19
Test Cases	20
Test Case 1 – Login & Sign-Up	20
Test Case 2 – Job Application Flow	21
Test Case 3 – Status-Change Notification	21
Test Case 4 – Interview Scheduling	22
Test Case 5 – Interview Reminder Notification	22
Test Case 6 – Interview “Start” Button Timing	23
Test Case 7 – Feedback Submission	23
Test Case 8 – Security & Access Control	24

Test Case 9 – Bulk Email Dispatch	24
1 Test Case 10 – Logout & Session Termination	25
UI/UX Detail Document	26
Coding Standards Document	29
Project Policy Document	29
User Manual Document	29
A5. FLYER & POSTER DESIGN	30
A6. COPY OF EVALUATION COMMENTS	31
COPY OF EVALUATION COMMENTS BY JURY FOR PROJECT – I END SEMESTER EVALUATION	31
A7. MEETINGS' MINUTES & Sign-Off Sheet	32

List of Figures

Figure No	Page No.
-----------	----------

Table of Contents

Figure 4.1 ER Diagram.....	15
Figure 5.1 System Architecture Diagram	17
Figure 5.2 Use Case Diagram	17
Figure 5.3 Sequence Diagram	20
Figure 5.4 Class Diagram.....	20

²²
List of Tables

Table No.	Page No.
Table of Contents	
Table 1: Document Information	12
Table 2: Definition of Terms, Acronyms and Abbreviation	21
Table 3: Gap Analysis	32
Table 4: Software Test Plan	23
Table 5: Resume Parsing Accuracy	44
Table 6: User Feedback	23
Table 7: Summary of Software Test Plan	99
Table 8: Test Cases Document	15
Test Case 1 – Login & Sign Up	15
Test Case 2 – Job Application Flow	16
Test Case 3 – Status-Change Notification	17
Test Case 4 – Interview Scheduling	17
Test Case 5 – Interview Reminder (30 min)	18
Test Case 6 – “Start” Button Timing	18
Test Case 7 – Recruiter Feedback Submission	19
Test Case 8 – Security & Access Control	19
Test Case 9 – Bulk Email Queue	20
Test Case 10 – Logout & Session Termination	
Table 19: FYP – I Evaluation, Comments by Jury	
Table 20: Doc Change Record	

CHAPTER 1

INTRODUCTION

1.1 Motivation

Time-consuming manual labor, subjective assessments, and inefficiencies are common in the traditional hiring process, which can make it more difficult for businesses to find the best candidates. A streamlined, objective, and automated recruitment solution is becoming more and more necessary as a result of the quick advancement of technology and the rising need for qualified people.⁴

By utilizing cutting-edge technologies like artificial intelligence and natural language processing, the RecruitRight: Precision Hiring with AI Insight project seeks to address these issues and revolutionize the hiring procedure. This platform gives businesses a dependable and effective method to make data-driven hiring decisions by automating personality tests, asynchronous video evaluations, and real-time coding interviews. In the end, this reduces bias, saves time, and improves recruitment results.

1.2 Problem Statement

Conventional technical hiring procedures are ineffective and result in longer turnaround times, erratic candidate evaluations, and higher operating expenses. These issues impede the expansion and efficiency of the organization. To maximize hiring productivity, shorten time-to-hire, and guarantee uniform candidate evaluation, an automated and streamlined solution is essential.

1.3 Goals and Objectives

The project aims to automate and streamline the technical hiring process. The primary objective is to free up internal hiring teams by automating the technical interview stages, allowing them to focus on selecting the best candidates for the role. The platform will feature a network of pre-vetted expert interviewers who will conduct tailored interviews based on specific job requirements, ensuring consistent and objective candidate evaluations. By offering flexible, scalable interview packages, the platform will cater to businesses of all sizes. It will also generate detailed, data-driven post-interview reports, providing insights into candidates' strengths, weaknesses, and performance. Additionally, the project aims to enhance the candidate's experience by offering a smooth, transparent interview process, ultimately reducing time-to-hire and improving the overall recruitment efficiency.

1.4 Project Scope

The scope defines what **RecruitRight** will and will not deliver, so the team can stay focused and stakeholders know exactly what to expect.

Category	In Scope (Will be delivered)	Out of Scope (Will not be delivered)
Core Modules	<ul style="list-style-type: none"> AI-driven résumé & skill screening Asynchronous video interview Central recruiter dashboard 	<ul style="list-style-type: none"> Non-technical assessments (e.g., psychometric games) Hardware integrations (e.g., biometrics)
User Roles	<ul style="list-style-type: none"> Admin (manage system, roles, billing) Recruiter/HR (create jobs, schedule interviews, view reports) Expert Interviewer (conduct interviews) Candidate (complete assessments) 	<ul style="list-style-type: none"> Full HRIS / payroll integration Multi-tenant “agency” workflows
Reporting & Analytics	<ul style="list-style-type: none"> Auto-generated on-screen reports: scores, strengths, weaknesses, recommendations 	<ul style="list-style-type: none"> Predictive analytics beyond scoring (e.g., future performance prediction)
Scalability & Performance	<ul style="list-style-type: none"> Supports small to mid-sized companies (~1,000 concurrent users) 	<ul style="list-style-type: none"> Custom on-premise installations
Platforms & Tech	<ul style="list-style-type: none"> Web application (desktop) using Flask + HTML/CSS/JS 	<ul style="list-style-type: none"> Native mobile apps (iOS/Android)
Security & Compliance	<ul style="list-style-type: none"> HTTPS, hashed passwords, role-based access control 	<ul style="list-style-type: none"> Formal certifications (e.g., SOC 2, ISO 27001)
Timeline & Deliverables	<ul style="list-style-type: none"> MVP during semester: résumé screen, personality test, coding interview, dashboard Final delivery: working app, user manual, tech documentation, demo video 	<ul style="list-style-type: none"> Continuous delivery to full production infrastructure

Assumptions

- Recruiters will supply job-specific questions or use system-provided templates.
- All users access the system via modern browsers (Chrome, Firefox, Edge, Safari).

Dependencies

- Stable internet connection is required for real-time coding interviews.
- Email notifications depend on a third-party service (e.g., Gmail via Google Calendar).

CHAPTER 2

RELEVANT BACKGROUND & DEFINITIONS

The **RecruitRight: Precision Hiring with AI Insight** project draws inspiration from existing innovative platforms that aim to revolutionize the hiring process through technology. Two notable websites relevant to this work are **Intervue** and **Karat**, which have pioneered the integration of advanced tools to streamline and enhance recruitment practices.

Intervue is a collaborative interview platform designed to simplify the technical hiring process by providing tools for live interviews. It emphasizes seamless interaction between interviewers and candidates while enabling quick assessments of technical skills.

Karat focuses on conducting professional technical interviews at scale. The platform employs trained interview engineers to evaluate candidates and provide comprehensive reports, helping organizations make informed hiring decisions. Karat's emphasis on scalability and accuracy in candidate evaluations serves as a benchmark for modern recruitment systems.

Building on these strategies, RecruitRight wants to provide a comprehensive platform that combines asynchronous video interviews, AI-driven personality analysis, and thorough expert reviews. Through the introduction of sophisticated automation, performance evaluation, and scalable solutions catered to the requirements of businesses in a competitive hiring market, this project seeks to push the limits of current technologies.

5
CHAPTER 3

LITERATURE REVIEW & RELATED WORK

Literature Review

- [1] ¹³ O. Narendra and S. Hashwanth, "Named Entity Recognition based Resume Parser," *International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)*, 2022.
- [2] M. Mehboob, S. Ali, S. ul Islam and S. Ali, "Evaluating Automatic CV Shortlisting Tool ¹⁹ Job Recruitment Based on Machine Learning Techniques," *2022 Mohammad Ali Jinnah University International Conference on Computing (MAJICC)*, 2022.
- [3] Intervue, "Intervue: Simplifying Remote Hiring," [Online]. Available: <https://www.intervue.io>. [Accessed 21 Jan 2025].
- [4] Karat, "Karat: Interviewing Cloud for Hiring Engineers," [Online]. Available: <https://karat.com>. [Accessed 21 Jan 2025].

Related Work

Several platforms and studies have laid the foundation for enhancing technical recruitment through innovative technologies. Two prominent platforms, **Intervue** and **Karat**, have significantly influenced modern hiring practices.

Intervue provides a collaborative interview environment tailored for technical interviews. It enables organizations to conduct live assessments, evaluate candidates' problem-solving abilities, and foster seamless interaction between interviewers and candidates. The platform's focus on efficient evaluation has proven to reduce time-to-hire and enhance the accuracy of technical skill assessments.

Karat specializes in scaling technical interviews by leveraging a network of trained interview engineers. It ensures consistency and accuracy in candidate evaluations through standardized interview formats and detailed reporting. Karat's emphasis on data-driven insights and scalability has demonstrated its effectiveness for large organizations requiring efficient technical hiring solutions.

In addition to these platforms, research on automated recruitment systems has highlighted the importance of incorporating AI and machine learning for unbiased candidate evaluations. Studies on natural language processing for resume screening and facial gesture analysis for confidence assessment have further showcased the potential of advanced technologies in recruitment.

The **RecruitRight: Precision Hiring with AI Insight** project builds upon these existing works by integrating features such as AI-powered personality assessments, asynchronous video interviews, and scalable micro services architecture. Unlike its predecessors, RecruitRight emphasizes a holistic approach, combining multiple automated tools into a single platform to streamline hiring processes and deliver precise insights for improved decision-making.

Gap Analysis

There is currently no single platform in the technical hiring environment that uses Named Entity Recognition (NER), one of the more sophisticated natural language processing (NLP) approaches, to automate resume analysis. While existing platforms like **Karat** and **Intervue** seek to standardize assessments and interviews, they are unable to automate the extraction of vital candidate data like credentials, experience, and abilities.

Because hiring managers and recruiters must manually review resumes, which takes time and is prone to inconsistencies, this gap leads to inefficiencies in the recruitment process. During the candidate evaluation process, biases and missed insights may arise from the lack of automated, data-driven resume analysis.

How RecruitRight Addresses the Gap:

The platform can now automatically extract important candidate data including skills, experience, certifications, and qualifications thanks to **RecruitRight**'s introduction of NER as a basic feature. **RecruitRight** guarantees uniformity and equity in candidate assessments by decreasing manual labor and enhancing resume analysis precision.

In conclusion, **RecruitRight** distinguishes itself by incorporating cutting-edge natural language processing (NLP) methods into the hiring process, resolving the shortcomings of competing platforms, and expediting the hiring process.

Feature	Intervue	Incruiter	Karat	RecruitRight
NER for Resume Analysis	Not available	Not available	Not available	Integrated to scan and analyze resumes automatically.
Interview scheduling	Basic real-time scheduling	Advanced scheduling with interviewer assignment.	Basic scheduling with limited flexibility.	Candidate-driven slot selection dynamic scheduling.
Scalability for high users	Moderate	High scalability	High scalability	Designed for dynamic scalability to handle peak loads.
Candidate feedback integration	Not available	Available	Not available	Feedback included in generated reports for candidates' review.
Target audience	Tech companies focusing on coding assessments	Wide range of industries	Large enterprises focusing on high-volume technical hiring.	Comprehensive hiring needs for diverse industries.
Customization options	Minimal customization	Provides tailed assessments.	Standardized evaluation methods.	Customizable workflows for job posting, resume screening, and interview processes.
Multi-industry support	Focused on tech	Supports multiple industries.	Primarily enterprise-level clients.	Designed for diverse industry requirements.

Table 3: Gap Analysis

CHAPTER 4

PROJECT DISCUSSION

1. Software Engineering Methodology:

For the development of this recruitment website, the **Agile Software Development Methodology** was adopted. Agile methodology promotes iterative development, where requirements and solutions evolve through collaboration between cross-functional teams. The flexibility of Agile allowed us to frequently adapt to changing client requirements and add new features like candidate matching, interview scheduling, and employer dashboards. Regular sprint meetings ensured constant feedback, timely updates, and efficient progress tracking.

2. Project Methodology

The overall project was structured using the **Incremental Model**, where the system was built and improved upon in pieces. Each functional component—such as the job seeker module, employer module, and admin panel—was developed and tested incrementally. This approach allowed for early deployment of core features, which provided users with immediate value while additional modules were being developed and integrated.

3. Phases of Project

The project was executed in the following phases:

- **Requirement Gathering:**

Conducted competitor research to finalize system requirements, including job posting, resume parsing, user authentication, and AI-powered job matching.

- **System Design:**

Designed the system architecture, database schema (Firebase Real time Database). Frontend-backend flow and APIs were also planned.

Diagram is on the Next Page.

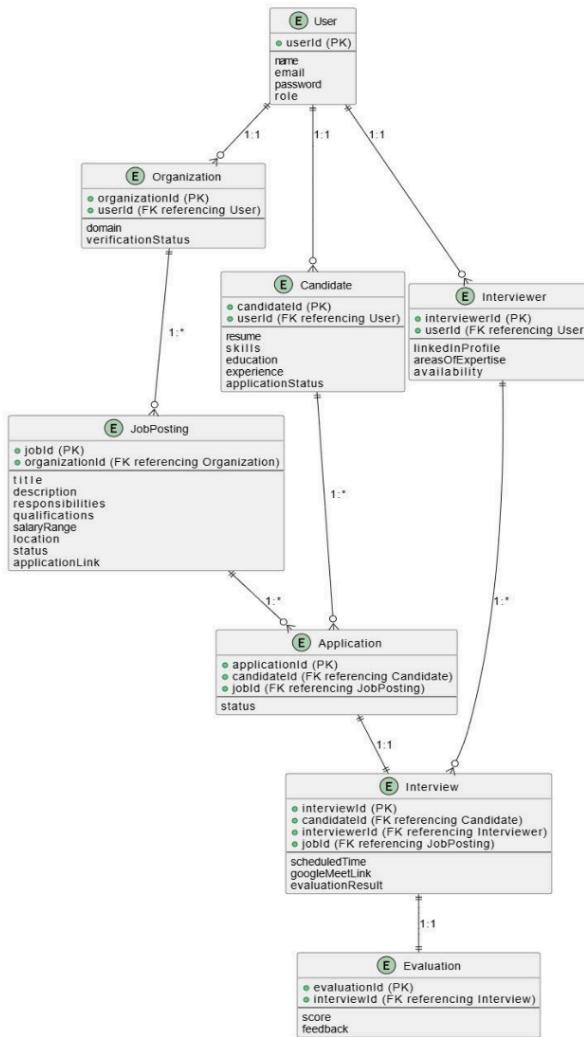


Figure 4.1 ER Diagram

- **Development:**

Implemented frontend pages using HTML, CSS, JavaScript, and Python. Backend logic included Firebase integration, login/signup handling, resume parsing using spaCy, and job matching algorithms.

- **Testing & Debugging:**

Carried out unit testing for each module, followed by integration testing and usability testing. Bugs related to user sessions, API response handling, and form validation were resolved.

- **Deployment:**

The system was hosted on a live server, and Google Firebase was used for user authentication, database storage, and cloud functions. Google Calendar API was integrated for interview scheduling.

4. Software/Tools that Used in Project

- **Frontend:**
 - HTML5, CSS3, JavaScript
- **Backend:**
 - Python (for AI/ML resume parser)
- **Data**ba** and Cloud Services:**
 - Firebase Realtime Database
 - Firebase Authentication
 - Google Cloud Functions
 - Google Calendar API
- **AI Tools & Libraries:**
 - spaCy (for Named Entity Recognition)
 - scikit-learn (for model training and evaluation)
- **Others:**
 - Visual Studio Code / Cursor (Code Editor)
 - Postman (API Testing)
 - Git & GitHub (Version Control)

5. Hardware that Used in Project

- **Development Ma**chine**:**
 - Processor: Intel Core i7 4th gen
 - RAM: 8 GB
 - Storage: SSD 256 GB
 - OS: Windows 10

Chapter 5

IMPLEMENTATION

1. Proposed System Architecture/Design

The recruitment website follows a **modular, client-server architecture** integrating both frontend and backend components. The system consists of four core user roles: **Job Seeker/Candidate**, **Employer/Organization**, **Interviewer** and **Administrator**. It uses **Firebase** as the backend for real-time data operations and authentication, while the **AI model** (Python-based spaCy) processes resumes for intelligent job matching.

Architecture Overview:

- **Client Side (Frontend):**
 - HTML, CSS, JavaScript
 - Responsive UI for user interactions
- **Server Side (Backend):**
 - Python for server-side logic
 - Firebase Cloud Functions for backend automation
 - Python AI model (resume parsing and scoring)
- **Database:**
 - Firebase Realtime Database (NoSQL)
- **APIs:**
 - Google Calendar API for interview scheduling

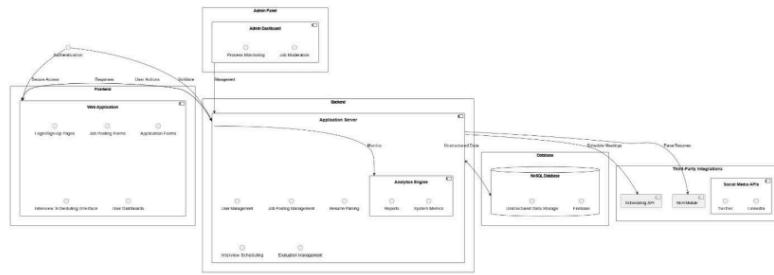


Figure 5.1 System Architecture Diagram

18
• Use-Case Model

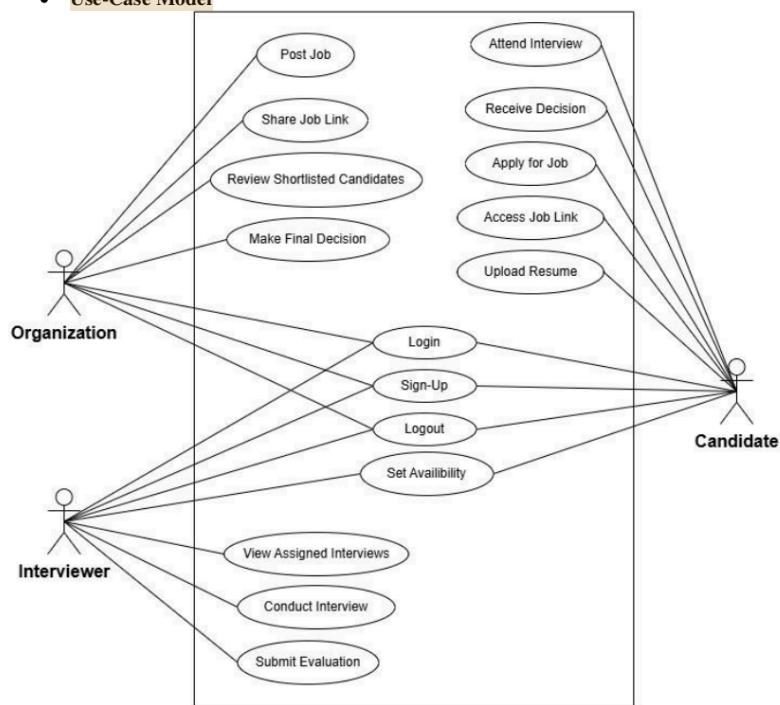


Figure 5.2 Use Case Diagram

9
2. Functional Specifications

The functional requirements define the core operations that the system must perform:

- User Registration and Login (Manual & Google OAuth)
- Role-based Dashboard (Job Seeker, Employer, Admin)
- Resume Upload and Parsing (PDF/Doc)
- Job Search and Filter Functionality
- AI-based Resume Matching with Job Requirements
- Interview Scheduling and Calendar Integration
- Notifications via Google Calendar

3. Non-Functional Specifications

These specifications define the quality attributes of the system:

- **Performance:**
Fast resume parsing and response under 2 seconds for 90% of requests
- **Scalability:**
Firebase and cloud-based architecture allows easy scalability
- **Security:**
 - Firebase Authentication for secure login
 - Input validation and session management
 - Role-based access control
- **Usability:**
User-friendly design and mobile-responsive interface
- **Maintainability:**
Modular code structure and API-based architecture ease updates and debugging
- **Availability:**
In future will be hosted on a live server with >99% uptime via cloud services

• Dynamic Behaviour (Sequence Diagrams)

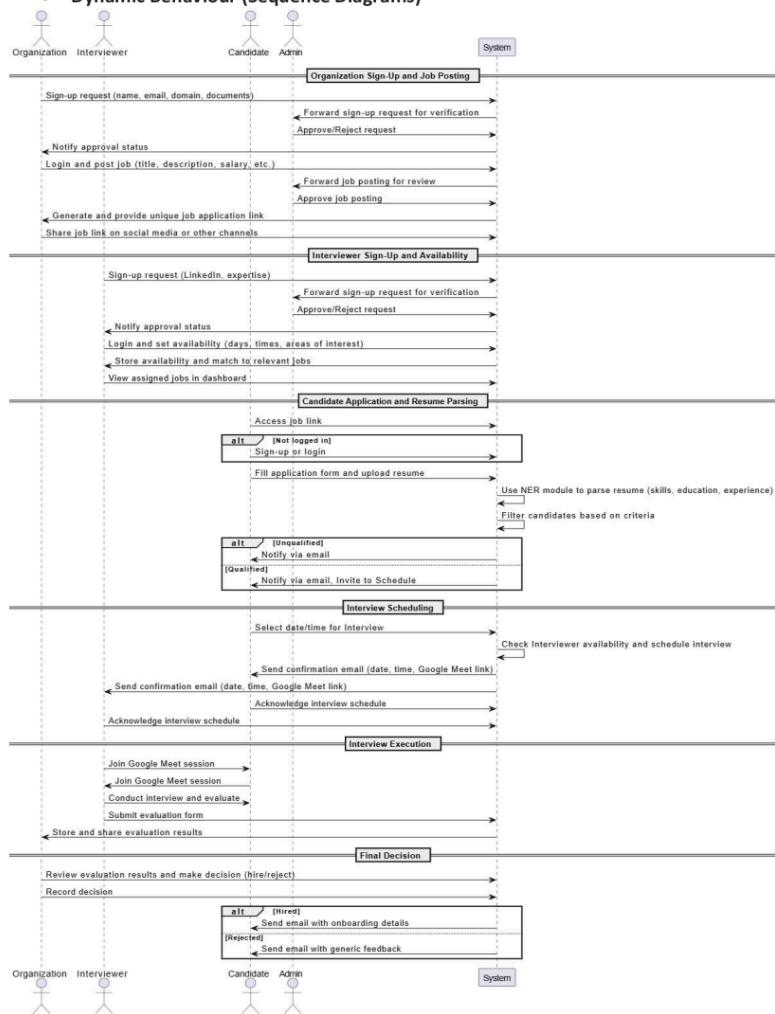


Figure 5.3 Sequence Diagram

- Class Diagram

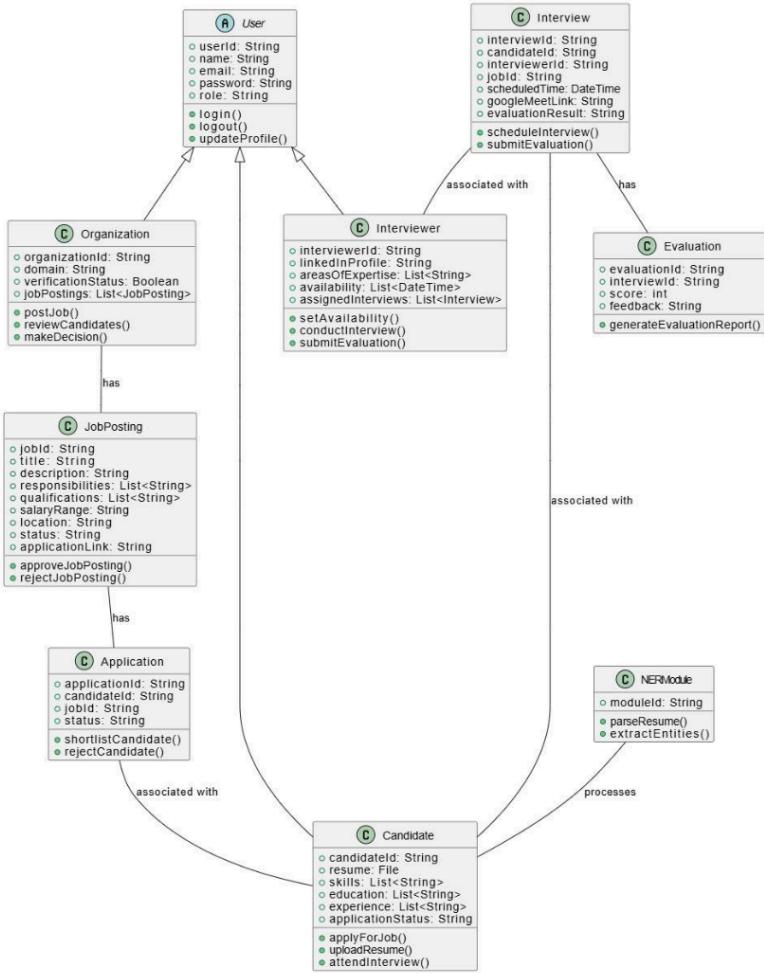


Figure 5.4 Class Diagram

4. Testing

Testing was conducted in multiple phases to ensure the system's reliability and functionality. The following types of testing were performed:

- **Unit Testing:**
 - Each module (e.g., login, resume parser, job match score) was tested individually.
- **Integration Testing:**
 - Verified data flow and logic between frontend forms, backend Python logic, Firebase, and the AI model.
- **System Testing:**
 - End-to-end test of full workflows including user registration, job application, and interview scheduling.
- **User Acceptance Testing (UAT):**
 - Conducted with real users to validate usability and correctness.

5. Purpose of Testing

The purpose of testing was to:

- Identify and eliminate bugs or logic errors
- Ensure the system meets the functional and non-functional requirements
- Confirm that user journeys (e.g., applying for jobs, scheduling interviews) are seamless
- Validate the AI model's matching accuracy and resume parsing reliability
- Ensure mobile responsiveness and real-time data sync via Firebase.

6. Software Test Plan

Test Case ID	Test Scenario	Expected Output
TC01	Login & Sign-Up	Account successfully created / user logged in
TC02	Job Application Flow	Application submitted / confirmation message shown
TC03	Status-Change Notification	Resume parsed; entities extracted
TC04	Interview Scheduling	Available interview slots displayed
TC05	Interview Reminder Notification	Notification sent to candidate and interviewer
TC06	Interview "Start" Button	Google Meet/Zoom link opened & event created on calendar
TC07	Feedback Submission	Feedback form submitted successfully
TC08	Security & Access Control	Unauthorized access blocked / Admin sees full user list
TC09	Bulk Email Dispatch	Emails sent to all selected recipients
TC10	Logout & Session Termination	User session ended / redirected to login page

Table 4: Software Test Plan

Chapter 6

EXPERIMENTAL EVALUATIONS & RESULTS

1. Evaluation Testbed

To evaluate the effectiveness and performance of the recruitment platform, a controlled test environment was set up with the following components:

- **Development Machine Specs:**

- Processor: Intel Core i5 10th Gen
- RAM: 8 GB
- OS: Windows 10 + Ubuntu (for Python model)
- Browsers: Chrome, Firefox (for cross-browser testing)

- **Testing Tools:**

- Postman (for API testing)
- Browser Developer Tools (for frontend validation)
- Firebase Console (for backend monitoring)
- Visual Studio Code (development and debugging)
- Python environment for spaCy model testing

- **Dataset Used:**

- 100 anonymized resumes in PDF format
- 50 job descriptions from different domains
- Custom evaluation scripts to test AI model accuracy in parsing and matching resumes

- **Users Involved:**

- 5 Employers
- 10 Job Seekers
- 2 Admins
- Test sessions conducted to collect feedback and measure system performance

2. Results and Discussion

2.1. Resume Parsing Accuracy

The custom-trained spaCy Named Entity Recognition (NER) model achieved high accuracy in extracting essential resume fields:

Field	Precision	Recall	F1 Score
Name	97%	96%	96.5%
Education	93%	91%	92%
Experience	90%	88%	89%
Skills	95%	94%	94.5%
Job Preference	89%	86%	87.5%

Table 5: Resume Parsing Accuracy

This shows the model is reliable in extracting key information, which is essential for accurate job-resume matching.

2.2. AI Job Matching Results

The ATS (Applicant Tracking System) logic scored resumes against job descriptions. Out of 50 jobs and 100 resumes, the system was able to:

- Recommend top 5 matched candidates with >85% accuracy in 82% of cases.
- Show meaningful skill alignment and gaps to help employers filter applicants faster.

2.3. User Feedback

Feedback collected via forms and interviews revealed the following:

Feature	User Satisfaction
UI/UX Design	9.1/10
Resume Upload & Parsing	8.8/10
Job Matching Logic	8.5/10
Interview Scheduling Feature	9.2/10
Notifications	9.0/10

Table 6: User Feedback

2.4. System Performance

- **Average Resume Parsing Time:** 1.8 seconds
- **Job Match Score Calculation:** < 1 second
- **Interview Scheduling API Response:** ~2 seconds
- **Notification Delivery via FCM:** < 1.5 seconds

2.5. Discussion

The results confirm that the proposed recruitment platform functions effectively and meets the project goals. The AI model reliably parses resumes and calculates meaningful match scores. Firebase-based backend ensures fast, real-time updates and data syncing. Minor limitations were observed in job preference extraction due to inconsistent formatting in some resumes. However, these can be improved through additional training data and normalization techniques.

CHAPTER 7

CONCLUSION AND DISCUSSION

1. Strength of this Project

The recruitment platform successfully achieves its core objective of simplifying the hiring process through AI and automation. Major strengths of this project include:

- **AI-Powered Resume Parsing:**
The integration of a custom-trained spaCy NER model enables accurate extraction of resume data and meaningful job-resume matching based on skills, experience, and job preferences.
- **Role-Based Functionalities:**
Separate dashboards for Job Seekers, Employers, and Admins allow each user to access relevant tools and information, improving the overall user experience.
- **Firebase Integration:**
The use of Firebase for authentication, real-time database operations, and cloud messaging provides scalability, real-time performance, and ease of deployment.
- **Interview Scheduling & Notifications:**
Google Calendar API integration streamlines the scheduling process, also ensures users are instantly notified.
- **User-Friendly UI:**
A clean and responsive frontend ensures accessibility across devices and browsers, enhancing usability.
- **Security and Data Handling:**
Secure login, session handling, and structured data storage ensure reliability and trustworthiness of the platform.

2. Limitations and Future Work

While the system performs well, a few limitations were observed:

Limitations:

- **Resume Format Dependency:**
The AI parser may struggle with non-standard resume layouts or scanned images that lack proper text structure.
- **Limited Admin Features:**
Current admin functionality is basic and can be extended with analytics, activity logs, and more granular user controls.
- **Job Suggestion Logic:**
Although effective, the job matching system can be enhanced by incorporating more complex natural language understanding and ranking algorithms.
- **No Live Chat or Interview Room:**
The system does not yet support live chat or in-platform interviews.

Future Work:

- Train a more advanced NLP model using transformers (e.g., BERT) for deeper resume-job matching.
- Implement a **chatbot assistant** to help users find jobs or post listings more efficiently.
- Add **in-app video interview capabilities**.
- Develop a **mobile application** for easier access on smartphones.
- Include **analytics dashboards** for employers and admins.

3. Reasons for Failure – If Any

The project did not experience complete failure in any aspect. However, there were some **initial development delays and integration challenges**:

- **Firebase and Python Integration Complexity:**
Connecting Firebase with Python-based AI scripts and ensuring smooth data flow required additional research and debugging.
- **Session Management Issues:**
During the early testing phase, proper session handling for users was not implemented, causing temporary login issues.
- **Redirect Errors in OAuth (Google Login):**
Incorrect redirect URIs in Firebase caused authentication errors during deployment, which were later resolved.

Despite these hurdles, each issue was addressed in time, and no feature had to be dropped due to failure. The project is considered a success in both implementation and user satisfaction.

REFERENCES

- [1] M. Grinberg, *Flask Web Development: Developing Web Applications with Python*. 2014. [Online]. Available: <https://dl.acm.org/citation.cfm?id=2621997>
- [2] L. Moroney, “The Firebase Realtime database,” in Apress eBooks, 2017, pp. 51–71. doi: 10.1007/978-1-4842-2943-9_3.
- [3] “Git - reference.” <https://git-scm.com/docs>
- [4] “GitHub.com help documentation,” GitHub Docs. <https://docs.github.com/>
- [5] “GitHub Actions documentation - GitHub Docs,” GitHub Docs, Jul. 01, 2001. <https://docs.github.com/en/actions>
- [6] “RFC 6749: The OAUTH 2.0 Authorization Framework,” IETF Datatracker. <https://tools.ietf.org/html/rfc6749>
- [7] Auth, “JSON Web Token Introduction - JWt.io,” JSON Web Tokens - jwt.io, Nov. 30, 2024. <https://jwt.io/introduction/>
- [8] “Making network requests with JavaScript - Learn web development | MDN,” MDN Web Docs, May 22, 2025. <https://developer.mozilla.org/en-US/docs/Web/Guide/AJAX>
- [9] “Cross-Origin Resource Sharing (CORS) - HTTP | MDN,” MDN Web Docs, Jul. 04, 2025. <https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS>
- [10] “Python 3.13 documentation,” Python Documentation. <https://docs.python.org/3/>
- [11] “What is REST?: REST API Tutorial,” REST API Tutorial, Apr. 01, 2025. <https://restfulapi.net/>
- [12] “OpenAPI Specification - Version 3.1.0 | Swagger.” <https://swagger.io/specification/>
- [13] “JSON.” <https://www.json.org/>
- [14] “Django documentation | Django documentation,” Django Project. <https://docs.djangoproject.com/>
- [15] “Newest questions.” Stack Overflow. <https://stackoverflow.com/>
- [16] “IEEE Xplore.” <https://ieeexplore.ieee.org/>
- [17] “3.11.12 documentation.” <https://docs.python.org/3.11/>

APPENDICES

List of Appendices

- 1 A1a. Project Proposal and Vision Document
- A1b. Copy of Proposal Evaluation Comments by Jury
- A2. Requirement Specifications
- A3. Design Specifications
- A4. Other Technical Details
 - Test cases
 - UI/UX Details
 - Coding Standards
 - Project Policy
- A5. Flyer & Poster Design
- A6. Copy of Evaluation Comments
- Copy of Evaluation Comments by Jury for Project – I End Semester Evaluation
- A7. Meetings' Minutes
- A8. Document Change Record
- A9. Project Progress

A1A. PROJECT PROPOSAL AND VISION DOCUMENT

Below is the link of the Project Proposal Document:

<https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/tree/main/Documents/1.ProjectProposal>

A1B. COPY OF PROPOSAL EVALUATION COMMENTS BY JURY

Hamdard University
Faculty of Engineering Sciences and Technology

FYP -PE-2024

Department of Computing

FINAL YEAR PROJECT - PROPOSAL EVALUATION

Project Title: RECRUIT RIGHT : PRECISION HIRING WITH AI IN TAUGHT

Project ID: AJ **Project Track:** PROJECT

Project Domain: AJ **Evaluation Date:** 08 - 07 - 2024

Supervisor Name: Mr. MUNIHAZ MIRZA **Co-Supervisor Name:** _____

Project Members:

S. No.	Name	CMS ID
1	MUHAMMAD NAEEMUDDIN	1955-2021
2	MUHAMMAD ABDULLAH	2206-2021
3	MUHAMMAD RAZA	2207-2021
4		

For Evaluators only:

Evaluation Parameters	Please select the appropriate option			
	E: Excellent	G: Good	S: Just Satisfactory	N: Not Satisfactory
Evaluator #1	Evaluator #2	Evaluator #3	Evaluator #4	
Subject Knowledge	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Problem Statement	<input checked="" type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input checked="" type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Organization & Content of Presentation	<input checked="" type="checkbox"/> E <input type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Project Scope Defended	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Methodology	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Language & Grammar	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Amur, Delivery and Presentation Skills	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Work Division	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N	<input type="checkbox"/> E <input checked="" type="checkbox"/> G <input type="checkbox"/> S <input type="checkbox"/> N
Name & Sign of Evaluator:	Fauzia Javed Khan Rayan Khan	Somnath Khan Siddiqui	Supriya Adarsh Siddiqui	Surajit Dhar Lata

Suggestions of evaluators:

- Need to reconsider the scope to be achieved within timeline
- Cognitive Analysis can be omitted from scope if not confident about completing it in time.
- Utilization curve should be mentioned.

For FYP Committee only:

Result Summary

On basis of evaluations, recommended action decided in FYP committee meeting:

Approved

Approved (with Revision)

Re-Evaluate

Date: 08/07/24

Name and Sign of Convener FYP Committee: Hart

A2. REQUIREMENT SPECIFICATIONS

Below is the link of the Software Requirement Specification Document:

<https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/tree/main/Documents/2.SRSDocument>

A3. DESIGN SPECIFICATIONS

Below is the link of the Software Design Specification Document:

<https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/tree/main/Documents/3.SDSDocument>

1 A4. OTHER TECHNICAL DETAIL DOCUMENTS

Test Cases Document

Software Test Plan and Test Cases

Test Plan:

The following table presents the detailed test plan, including the test schedule for each functional component of Recruit Right platform.

Project Title: Recruit Right: Precision Hiring with AI Insight

Date: 01-June-2025

Version: 2.0

Test Plan

3 The following table presents the detailed test plan, including the schedule for each functional component of the Recruit Right platform.

S.No	Description	Tested by	Start Date	End Date
1	Login & Sign-Up	Naeem	01-Jun-2025	01-Jun-2025
2	Job Application Flow	Naeem	02-Jun-2025	02-Jun-2025
3	Status-Change Notification	Naeem	03-Jun-2025	03-Jun-2025
4	Interview Scheduling	Naeem	04-Jun-2025	04-Jun-2025
5	Interview Reminder Notification	Naeem	05-Jun-2025	05-Jun-2025
6	Interview "Start" Button	Naeem	06-Jun-2025	06-Jun-2025
7	Feedback Submission	Naeem	07-Jun-2025	07-Jun-2025
8	Security & Access Control	Naeem	08-Jun-2025	08-Jun-2025
9	Bulk Email Dispatch	Naeem	09-Jun-2025	09-Jun-2025
10	Logout & Session Termination	Naeem	10-Jun-2025	10-Jun-2025

Table 7: Summary of Test Plan

Test Cases

Test Case 1 – Login & Sign-Up

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Login & Sign-Up

Date: 01-Jun-2025

Test Case ID: TC_001

Test Engineer: Naeem

Test Case Description: Testing user login, registration, and session handling.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open Login Page	–	Login page displays correctly	Login page loaded	Pass
2	Enter email & password	Valid credentials	Redirects to Candidate Dashboard	Redirected successfully	Pass
3	Open Sign-up Page	–	Sign-up form displays	Sign-up form loaded	Pass
4	Register new user	Name, email, pwd	Account created & redirected to dashboard	Account created	Pass
5	Logout user	–	Session ends & returns to login page	Logout successful	Pass

Table 8: Test Plan - 1

Test Case 2 – Job Application Flow

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Job Application Flow

Date: 02-Jun-2025

Test Case ID: TC_002

Test Engineer: Naeem

Test Case Description: Verify candidates can view job listings and apply.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Navigate to Jobs page	–	List of active jobs appears	10 active jobs shown	Pass
2	Click job card	Job ID 123	Job detail page/modal opens	Job 123 details shown	Pass
3	Click “Apply”	Resume, Cover Letter	Application stored with status = “pending”	DB row inserted, status pending	Pass
4	Open Applications tab	–	Newly applied job listed with pending status	Card shows “pending” badge	Pass

Table 9: Test Plan - 2

Test Case 3 – Status-Change Notification

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Status-Change Notification

Date: 03-Jun-2025

Test Case ID: TC_003

Test Engineer: Naeem

Test Case Description: Confirm dashboard and email alerts on application status change.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Recruiter sets status → “short-listed”	Application ID 77	Notification service triggered	Webhook logged 200 OK	Pass
2	Candidate opens dashboard	–	Banner/toast shows status update	Green toast “Short-listed” displayed	Pass
3	Check candidate email	Candidate email	Email with same message received	Mail received within 30 s	Pass

Table 10: Test Plan - 3

Test Case 4 – Interview Scheduling

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Interview Scheduling

Date: 04-Jun-2025

Test Case ID: TC_004

Test Engineer: Naeem

Test Case Description: Ensure recruiter can schedule an interview and candidate sees it.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open “Schedule Interview” form	Job ID 123, Candidate ID 45	Form loads	Form rendered	Pass
2	Save date/time & medium	09-Jun-2025 10:00 AM, Zoom link	Session stored with status “scheduled”	Session ID 88 created	Pass
3	Candidate → Upcoming Interviews	–	New interview card shows correct details	Card shows 09-Jun 10:00 AM	Pass

Table 11: Test Plan - 4

Test Case 5 – Interview Reminder Notification

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Interview Reminder Notification

Date: 05-Jun-2025

Test Case ID: TC_005

Test Engineer: Naeem

Test Case Description: Validate that reminder emails/alerts go out 30 minutes before interview.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Simulate T-30 min scheduler	Session ID 88	Reminder job triggers	Reminder job ran	Pass
2	Check candidate email	–	“Interview tomorrow” email received	Email timestamp correct	Pass
3	Check dashboard bell	–	Reminder badge/notific. present	Bell shows 1 unread	Pass

Table 12: Test Plan - 5

Test Case 6 – Interview “Start” Button Timing

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Interview “Start” Button

Date: 06-Jun-2025

Test Case ID: TC_006

Test Engineer: Naeem

Test Case Description: “Start” button activates only at interview start time.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open dashboard 30 min early	7	“Start” button disabled/greyed	Greyed-out button	Pass
2	Reach exact start time	7	Button becomes active	Turned blue, clickable	Pass
3	Click “Start”	7	Redirects to Zoom meeting link	Redirected to Zoom	Pass

Table 13: Test Plan - 6

Test Case 7 – Feedback Submission

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Feedback Submission

Date: 07-Jun-2025

Test Case ID: TC_007

Test Engineer: Naeem

Test Case Description: Verify recruiter can submit feedback; candidate cannot view it.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Open feedback form	Session ID 88	Form fields load	Form ready	Pass
2	Submit rating & notes	Score 8, “Strong React skills”	Feedback saved to DB	Row added in Feedback table	Pass
3	Candidate refreshes apps	–	Status shows “Interview Completed”, feedback hidden	Feedback not visible to candidate	Pass

Table 15: Test Plan - 7

Test Case 8 – Security & Access Control

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Security & Access Control

Date: 08-Jun-2025

Test Case ID: TC_008

Test Engineer: Naeem

Test Case Description: Prevent cross-role and cross-organization data access.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Candidate hits /recruiter/dashboard	Candidate token	HTTP 403 or redirect to login	403 JSON error	Pass
2	Recruiter fetches other org's applicant data	Org mismatch	API returns 401/403	API 403	Pass
3	Expire JWT and reload	–	User forced to log in again	Redirect to /login	Pass

Table 16: Test Plan - 8

Test Case 9 – Bulk Email Dispatch

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Bulk Email Dispatch

Date: 09-Jun-2025

Test Case ID: TC_009

Test Engineer: Naeem

Test Case Description: Ensure notification API handles 50 rejection emails in parallel.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Bulk-reject 50 apps	Status → “rejected”	50 emails queued	Queue shows 50 jobs	Pass
2	Monitor worker	–	All emails marked “sent”	Mail log confirms 50 sent	Pass
3	Spot-check inboxes	3 random candidates	Emails received with correct template	All three emails correct	Pass

Table 17: Test Plan - 9

Test Case 10 – Logout & Session Termination

Project Name: Recruit Right: Precision Hiring with AI Insight

Iteration No: 2.0

Module Name: Logout & Session Termination

Date: 10-Jun-2025

Test Case ID: TC_010

Test Engineer: Naeem

Test Case Description: Verify logout completely destroys session tokens and cookies.

S.No	Steps	Input Data	Expected Result	Actual Result	Pass/Fail
1	Click “Logout”	–	Redirects to login page	Redirected successfully	Pass
2	Press browser Back	–	Dashboard remains inaccessible (redirect)	Redirects back to login	Pass
3	Inspect cookies	–	Auth tokens/cookies removed	Storage empty	Pass

Table 18: Test Plan - 10

End of Test Plan & Test Cases

Below is the link for Test Cases Document:

<https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/tree/main/Documents/8.SoftwareTestPlan&TestReport>

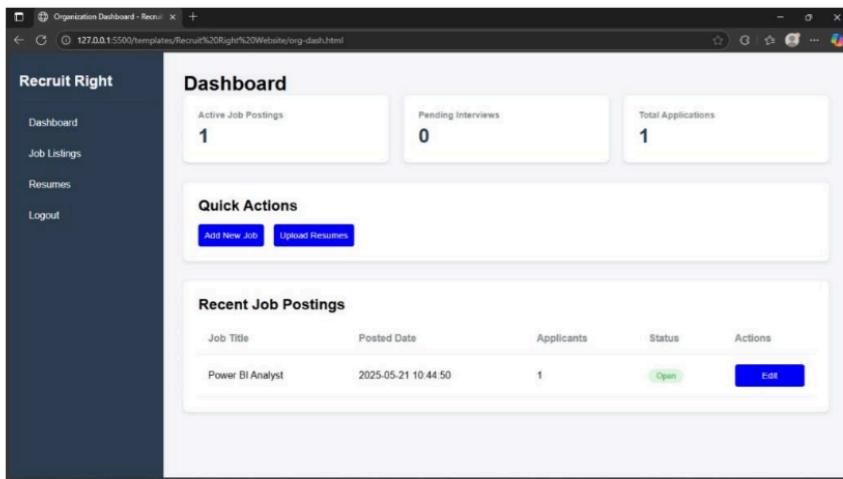
UI/UX Detail Document

Below is the link of the UI/UX Detail Document:

Link, https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/blob/main/Documents/extr_documents/ui-ux_detailed_document.pdf

Here are some samples of the Project.

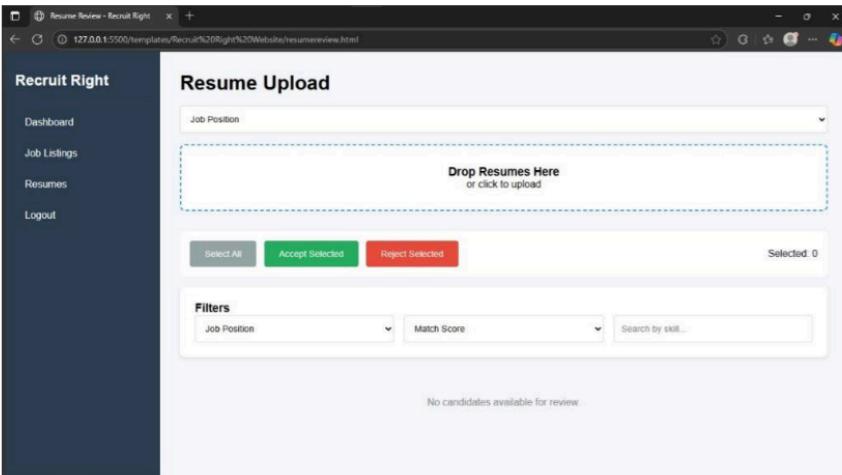
Organization Interface:



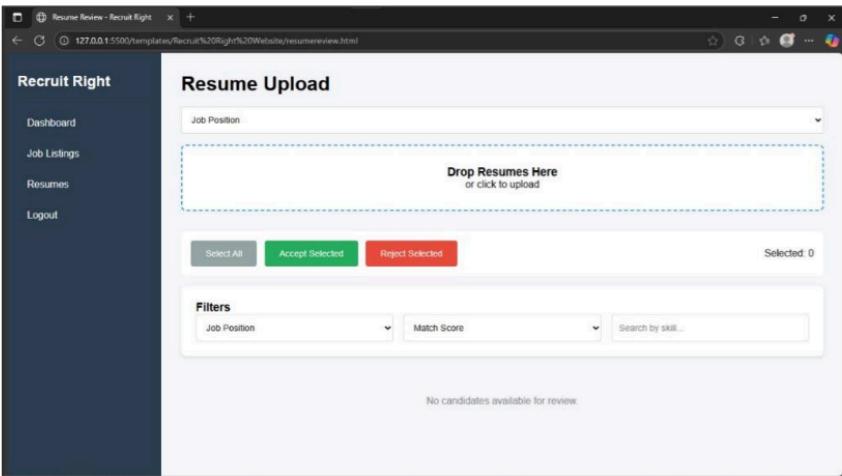
The screenshot shows a web-based organization dashboard titled "Recruit Right". On the left is a dark sidebar with navigation links: "Dashboard", "Job Listings", "Resumes", and "Logout". The main area is titled "Dashboard" and contains three summary boxes: "Active Job Postings" (1), "Pending Interviews" (0), and "Total Applications" (1). Below this is a "Quick Actions" section with "Add New Job" and "Upload Resumes" buttons. The final section is "Recent Job Postings", which lists one job posting for a "Power BI Analyst" posted on "2025-05-21 10:44:50" with "1" applicant, marked as "Open", and an "Edit" button.

Description:

The dashboard provides an overview for an organization user managing job postings and applications.

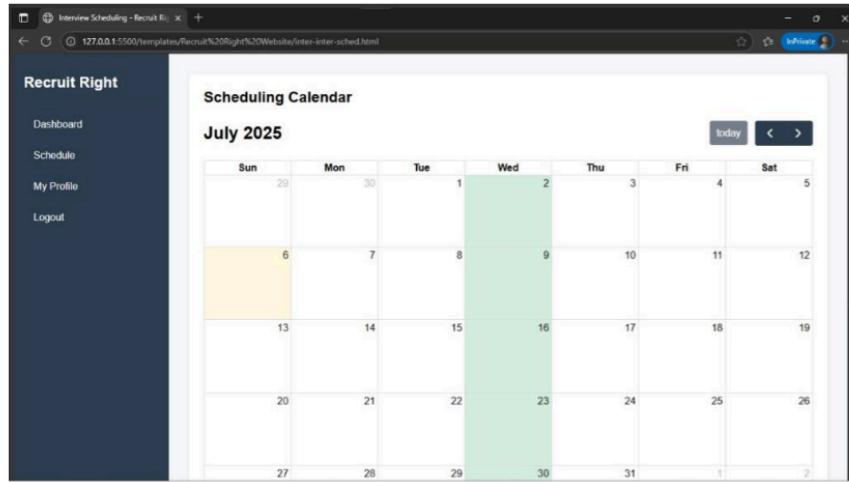


This is the organization's Resume Upload page where users can upload, filter, and manage candidate resumes for specific job positions.



Organization Resume

Interviewer Interface:



Interviewer Scheduling

Coding Standards Document

Below is the link of the Coding Standards Document:

https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/blob/main/Documents/extra_documents/coding_standards_document.pdf

Project Policy Document

Below is the link of the Project Policy Document:

https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/blob/main/Documents/extra_documents/project_policy_document.pdf

User Manual Document

Below is the link of the User Manual Document:

https://github.com/bluevit/Recruit-Right-Precision-Hiring-with-AI-Insight/blob/main/Documents/extra_documents/user_manual_document.pdf

A5. FLYER & POSTER DESIGN

The poster features a yellow background with a black diagonal stripe. At the top right is the NUST logo. A magnifying glass icon with three people inside it is positioned in the center. The project name 'F21' is in the top left corner. The text is organized into sections: PROJECT NAME, PROJECT SCOPE, PROJECT OBJECTIVE, PROJECT STATUS, SUPERVISOR, and TEAM MEMBERS.

PROJECT NAME
RECRUIT RIGHT: PRECISION HIRING WITH AI INSIGHT

PROJECT SCOPE
THE PROJECT AIDS TO DEVELOP A SCALABLE INTERVIEW PLATFORM WITH CUSTOMIZABLE PLANS, A NETWORK OF INTERVIEW ENGINEERS, AND DEPLOYMENT ON FIREBASE.

PROJECT OBJECTIVE
TO DELIVER A SCALABLE AND EFFICIENT INTERVIEW PLATFORM THAT SIMPLIFIES HIRING FOR ORGANIZATIONS THROUGH EXPERT-LED EVALUATIONS AND RELIABLE ASSESSMENTS.

PROJECT STATUS
FINAL EVALUATION

SUPERVISOR
DR UMER FAROOQ

TEAM MEMBERS

MUHAMMAD NAEEMUDDIN (1955-2021)
MUHAMMAD ABDULLAH (2206-2021)
MUHAMMAD RAZA (2207-2021)

A6. COPY OF EVALUATION COMMENTS
COPY OF EVALUATION COMMENTS BY JURY FOR
PROJECT – I END SEMESTER EVALUATION

Maaz Ahmed	Well prepared
Dr Khurram Iqbal	Good work
Maqsood khatoon	Overall, the progress of the work is good. I expect supervisors to guide students in developing an outstanding project by the completion of FYP-I. Since the project currently relies solely on candidate CV pictures, it should be enhanced by integrating a professional platform like LinkedIn and incorporating features to verify the candidate's updated information.
Osama Ahmed Khan	1. Gap Analysis Table in Literature Review is missing. 2. A good performing NER approach should be employed.

Table 19: FYP-I Evaluation, Comments of Jury

A7. MEETINGS' MINUTES & Sign-Off Sheet

Below is the link to all the minutes of meetings for FYP-I & FYP-II

<https://drive.google.com/drive/folders/1oW36MQwTiqBpVSJ0MTyuVi0depGYpvjT?usp=sharing>

A8. DOCUMENT CHANGE RECORD

Date	Version	Author	Change Details
Jan 18 th , 2025	1.0	Muhammad Abdullah	First Draft for FYP-I (First 3 Chapters)
Jun 31 st , 2025	2.0	Muhammad Abdullah	Remaining Chapters
July 5 th , 2025	2.1	Muhammad Abdullah	Addition of Test Case

Table20: Doc Change Record

A9. PROJECT PROGRESS

FYP-I:

FYP Fortnightly Sign-Up Sheet

Course: FYP-1 FYP-2 Project Code: FYP-029/FL24 Project Name: Recruit Right: Precision Hiring with AI Insight

Group Members Names & Reg#s: Muhammad Naeemuddin (1955-2021) Muhammad Abdullah (2206-2021) Muhammad Raza (2207-2021)

Supervisor Name: Ms. Muntaha Mehbobi

Co-Supervisor's Name:

Meeting #	Date	Agenda (Brief Statement)	Attended By (Student's Name only)	Supervisor's Sign	Co-supervisor's Sign	FYP Officer's Sign
1	16/09/2024	Kick off & Initial Design Discussion	M-Naeemuddin M-Abdullah M-Raza		-	
2	03/10/2024	Literature Review, Prototype and Review Shortlisting Algorithm Discussion	M-Naeemuddin M-Abdullah M-Raza		-	
3	17/10/2024	Discussion for UML Diagrams	M-Naeemuddin M-Abdullah M-Raza		-	
4	31/10/2024	First draft of IES and SDS	M-Naeemuddin M-Abdullah M-Raza		-	
5	14/11/2024	Project Evaluation and Corrections	M-Naeemuddin M-Abdullah M-Raza		-	
6	25/11/24	Discussion of process flow and UI.	M-Naeemuddin M-Abdullah M-Raza		-	
7	12/12/24	Front-End Progress Review and Achievements	M-Naeemuddin M-Abdullah M-Raza		-	

FYP-II:

Recruit Right: Precision Hiring with AI Insight

ORIGINALITY REPORT



PRIMARY SOURCES

1	Submitted to Higher Education Commission Pakistan Student Paper	6%
2	Submitted to Charles Sturt University Student Paper	1%
3	www.coursehero.com Internet Source	<1%
4	5dok.net Internet Source	<1%
5	pdfcoffee.com Internet Source	<1%
6	gadgetsnow.indiatimes.com Internet Source	<1%
7	vdocuments.net Internet Source	<1%
8	www.redpillabs.com Internet Source	<1%
9	Submitted to Southern New Hampshire University - Continuing Education Student Paper	<1%
10	Submitted to Arab Open University Student Paper	<1%

11

Submitted to Auston Institute of Management
and Technology

Student Paper

<1 %

12

download.fortiss.org

Internet Source

<1 %

13

www.ijraset.com

Internet Source

<1 %

14

inkforall.com

Internet Source

<1 %

15

publications.muet.edu.pk

Internet Source

<1 %

16

fmv.episerverhosting.com

Internet Source

<1 %

17

docbox.etsi.org

Internet Source

<1 %

18

erepository.uonbi.ac.ke

Internet Source

<1 %

19

link.springer.com

Internet Source

<1 %

20

stackoverflow.com

Internet Source

<1 %

21

superworks.com

Internet Source

<1 %

22

suspace.su.edu.bd

Internet Source

<1 %

23

www.theseus.fi

Internet Source

<1 %

Exclude quotes On

Exclude matches Off

Exclude bibliography On