Hamdard University
Department of Computing
Final Year Project

Recruit Right: Precision Hiring with AI Insight

FYP-029/FL24

Software Requirements Specifications

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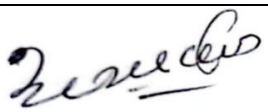
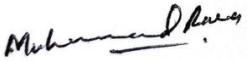
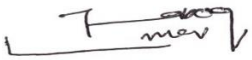
Muhammad Abdullah	Team Member 2		17-01-25
Muhammad Raza	Team Member 3		17-01-25
Dr. Umer Farooq	Supervisor		17-01-25
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Definition of Terms, Acronyms, and Abbreviations

Term	Description
NLP	Natural Language Processing
AI	Artificial Intelligence
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheet
SSL	Secure Sockets Layers
TLS	Transport Layers Security
HTTP	Hyper Text Transfer Protocol
API	Application Programming Interface
RESTFul	Representational State Transfer
SDK	Software Development Kit

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1. Introduction

1.1 Purpose of Document

The purpose of this Software Requirements Specification document is to comprehensively define the functional and non-functional requirements for our project: RecruitRight: Precision Hiring with AI Insight. This project seeks to address inefficiencies in manual technical hiring processes by creating an advanced platform that automates and streamlines key elements of recruitment.

The platform will include features such as automated personality assessments, real-time coding interviews, asynchronous video interviews, and detailed expert evaluations. These features will be supported by advanced algorithms, keywords detection capabilities, and scalable micro services architecture, ensuring reliability, efficiency, and performance.

This document provides a detailed blueprint to guide the development and implementation of the project. It specifies:

- The system's objectives, scope, and functionalities.
- Technical and design requirements for both front-end and back-end components.
- Usability standards and scalability considerations for diverse organizational needs.

It serves as a key reference for all stakeholders, including the development team, project supervisor, and end-users. By documenting these requirements, it ensures alignment with the project goals, facilities effective communication among contributors, and lays the functional for successful deployment of the system within the defined scope.

1.2 Intended Audience:

This document is intended for the development team, project supervisors, academic advisors, and potential users, such as startups and IT staffing companies. It provides detailed requirements to guide the project's development, ensure alignment with objectives, and assist stakeholders in evaluating and approving the project's progress.

2. Overall System Description

2.1 Project Background:

Traditional hiring processes often leads to prolonged timelines, inconsistent assessments, and increased costs. The RecruitRight: Precision Hiring with AI Insight project addresses these inefficiencies by automating and streamlining technical hiring through advanced algorithms, scalable microservices, and user-friendly interfaces.

By standardizing evaluations and leveraging expert interviewers, the platform aims to reduce hiring time, enhance candidate quality, and improve recruitment efficiency for organizations of all sizes.

2.2 Problem Statement:

Traditional technical hiring processes are inefficient, leading to prolonged timelines, inconsistent candidate assessments, and increased operational costs. These challenges hinder organizational growth and productivity. The need for an automated and streamlined solution is critical to optimize hiring efficiency, reduce time-to-hire, and ensure consistent evaluation of candidates.

2.3 Project Scope:

Traditional technical hiring processes are inefficient, leading to prolonged timelines, inconsistent candidate assessments, and increased operational costs. These challenges hinder organizational growth and productivity. The need for an automated and streamlined solution is critical to optimize hiring efficiency, reduce time-to-hire, and ensure consistent evaluation of candidates.

2.4 Not In Scope:

The project will not include several elements in its current phase. Integration with existing HR systems or proprietary assessment algorithms beyond publicly available tools is excluded. The development of customized proprietary assessment algorithms for specific organizations is also outside the scope. Although facial gesture analysis is considered for future iterations, it will not be part of the initial platform. Additionally, advanced AI features such as predictive analytics or deep learning-based evaluations are not included in this phase. Full integration with enterprise-level systems like payroll or employee management software is not planned, and the development of a dedicated mobile application is not within the current project scope. The focus will be on the core functionalities, with these enhancements planned for future versions.

2.5 Project 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.

2.6 Stakeholders & Affected Groups:

The primary stakeholders for this final year project, RecruitRight: Precision Hiring with AI Insight, include the three group members,

Muhammad Naeemuddin (leader), Muhammad Abdullah, and Muhammad Raza, who are responsible for designing, developing, and implementing the project. Additionally, the Current Supervisor, Dr. Umer Farooq and our great Ex Project Supervisor, Ms. Muntaha Mehboob, serves as a mentor and evaluator, providing guidance and ensuring alignment with academic and project objectives.

The affected groups include potential end-users such as startups and IT staffing companies, who will benefit from the streamlined and automated hiring process enabled by this platform. These groups stand to gain from reduced hiring time, standardized evaluations, and improved recruitment efficiency facilitated by the project

2.7 Operating Environment:

The platform will operate in a cloud-based environment, utilizing scalable and reliable infrastructure. The front-end will be developed using HTML, CSS, JavaScript, and frameworks such as Express.js and Flask, while the back-end will be powered by Node.js, Express.js, Firebase, and Python. The platform will be deployed on Firebase to ensure scalability, accessibility, and high availability. For testing, the system will run on personal computers or laptops with at least 8 GB of RAM and a dual-core processor. Mobile devices may be used for testing purposes. The system is designed to be flexible, supporting integration with third-party APIs for future enhancements like facial gesture analysis. The operating environment is optimized for performance and reliability, providing a smooth user experience for both interviewers and candidates.

2.8 System Constraints:

Project faces several constraints that guide its development. The system will not integrate with existing HR systems or proprietary assessment algorithms beyond publicly available tools. It requires personal computers or laptops with a minimum of 8 GB of RAM and a dual-core processor, with mobile devices being optional for testing. While the platform is designed to be scalable, the initial deployment will focus on core features, with future enhancements, such as facial gesture analysis, planned for later iterations. The project is constrained by an estimated budget of Rs. 369,642, limiting resources for hardware and third-party APIs. Additionally, the project must adhere to a predefined timeline for design, development, testing, and deployment, while the technology stack (HTML, CSS, JavaScript, Node.js, Express.js, Firebase, and Python) may limit certain functionalities if new technologies need to be integrated in the future.

2.9 Assumptions & Dependencies:

The project operates under the following assumptions and dependencies:

- **Assumptions:**
  - Users will have access to stable internet connections to conduct video interviews and use real-time coding features.
  - The platform will be accessed via modern web browsers that support HTML, CSS, and JavaScript.
  - The backend services, including databases and third-party APIs, will be reliable and available throughout the project.
  - The platform’s functionality will be tested on dummy data before actual deployment, assuming the availability of necessary test cases and datasets.
  - The core technologies (HTML, CSS, JavaScript, Node.js, Firebase, and Python) will be compatible with the system requirements and will meet the scalability needs for initial deployment.
- **Dependencies:**
  - The project relies on third-party APIs for certain functionalities, including resume analysis and interview evaluation, which may impact the development timeline based on availability and integration complexity.
  - The project’s success is dependent on the availability of expert interviewers to validate the candidate evaluations and provide feedback.
  - The deployment of the platform on Firebase is dependent on the chosen hosting plan's scalability and support for the required infrastructure.
  - Timely feedback and approval from the project supervisor and stakeholders are essential to ensure the project stays on track and meets its deadlines.

3. External Interface Requirements

3.1 Hardware Interfaces:

The RecruitRight: Precision Hiring with AI Insight platform requires the following hardware interfaces:

- **Logical Structure:**
  - The system will interact with personal computers or laptops as the primary hardware for both development and end-user access.
  - Optional testing on mobile devices is supported to ensure compatibility and responsiveness.
- **Physical Addresses:**
  - The platform does not depend on specific hardware physical addresses, as it operates in a cloud-based environment accessible via web browsers.
  - Server-side operations will be hosted on Firebase, requiring stable internet connections.
- **Expected Behavior:**
  - User devices must have at least 8 GB of RAM and a dual-core processor to ensure smooth operation, especially during resource-intensive tasks such as real-time coding and video interviews.
  - The system must provide responsive performance across supported hardware, ensuring compatibility with various device specifications while maintaining scalability.

3.2 Software Interfaces:

The RecruitRight: Precision Hiring with AI Insight platform interfaces with the following applications:

- **Name of Application:** Firebase
  - **External Owner:** Google
  - **Interface Details:** Firebase will serve as the hosting environment for the platform, providing services such as database management, authentication, and real-time updates. Interaction will occur through Firebase SDKs and APIs integrated into the system's backend.
- **Name of Application**: Third Resume Parsing APIs (e.g., hireAbility)
  - **External Owner:** Relevant API providers
  - **Interface Details:** These APIs will be used for analyzing and parsing candidate resumes. Interaction will occur via RESTful API endpoints provided by the external owners, returning structured data for further processing.

- **Name of Application:** Browser Environments
    - **External Owner**: Multiple (e.g., Google Chrome, Mozilla Firefox)
    - **Interface Details:** The system must be compatible with modern web browsers to ensure accessibility. Interfacing occurs through the rendering of front-end elements and execution of JavaScript for interactive features.

These applications collectively support the platform's functionality, ensuring a smooth and efficient user experience.

3.3 Communications Interfaces

The RecruitRight: Precision Hiring with AI Insight platform relies on the following communication interfaces to ensure seamless interaction between systems and devices:

- **Internet Connection:**
    - The platform operates in a cloud-based environment, requiring a stable internet connection for real-time communication between the user's device and the server hosted on Firebase.
- **API Communication:**
    - The system communicates with third-party APIs (e.g., resume parsing tools, coding evaluation services) using RESTful HTTP protocols. This ensures secure and reliable data exchange over HTTPS.
- **Client-Server Interaction:**
    - Communication between the front-end (user interface) and back-end (server-side logic) is facilitated through HTTP and WebSocket protocols. WebSockets enable real-time features such as live coding sessions and video interviews.
- **Data Storage and Retrieval:**
    - The back-end interacts with the Firebase database using a secure connection, ensuring efficient storage and retrieval of user data, interview results, and logs.
- **Local Area Network (Optional):**
    - For testing purposes, the platform can operate on a local network, with the server and client running on the same LAN for debugging and integration testing.
- **Communication Security:**
    - All communication interfaces are secured using SSL/TLS encryption to protect data integrity and confidentiality during transmission.

These interfaces collectively ensure robust, real-time communication between users, systems, and devices, enabling a smooth and efficient hiring process.

4. System Functions / Functional Requirements

4.1 System Functions:

This section outlines the system's functionalities, categorized into end-user, operator, support, and integration functions. It also includes performance requirements, design constraints, programming languages, and interface requirements.

Each function describes what the system should do, validated by the sentence: "The system should do <X>". The functions are grouped logically with their priorities assigned. These were identified through the requirement-gathering process and may refer to existing documents where applicable.

Function Categories

Function Category	Meaning
Evident	Should perform, and the user should be aware that it is performed. These are user-facing functionalities like creating job postings, scheduling interviews, and viewing reports.
Hidden	Should perform but should not be visible to users. These include backend services like saving information in persistent storage, processing NER tool data, and maintaining system logs.
Frill	Optional; adding it does not significantly affect cost or other functions. Examples could be adding visual enhancements to the user interface or providing advanced analytics beyond the core requirements.

Ref #	Functions	Category	Attribute	Details & Boundary Constraints
R1.1	Record job postings created by organizations	Evident	System Response time	Job posting should be listed within 3 seconds after submission. Availability agreement in less than 10 sec.
R1.2	Reduce available interview slots when a candidate schedules an interview	Hidden	Concurrent user load	The system should handle simultaneous scheduling by multiple user without performance degradation.

System Attributes/ Nonfunctional Requirements

- System Attributes/Nonfunctional Requirements describe the qualities of the RecruitRight system that ensure a user-friendly and efficient experience. These attributes are not specific system functions but are essential for its overall effectiveness. Examples include:
- **Attribute Details**: Characteristics like "response time = psychologically appropriate" or "interface metaphor = graphical, browser-based" that describe qualitative aspects.
- **Attribute Boundary Constraints**: Mandatory limits such as "response time = five seconds maximum," ensuring optimal system performance.
- The **Category** column specifies whether the attribute is critical for system operation:
- **Optional**: Enhances user experience but not critical.
- **Mandatory**: Essential for proper system functioning.

Attribute	Details and Boundary Constraints	Category
Response time	(Boundary constraint) The platform must process user requests, including uploading resumes and initiating interviews, within **2 seconds** under normal conditions.	Mandatory
Concurrent User Load	The system must support a minimum of **100 users** connected simultaneously without performance degradation.	Mandatory
Latency	Real-time coding sessions and video interviews must have a latency of less than **200 milliseconds**.	Mandatory

Data Processing	Candidate profiles and interview reports must be retrieved and displayed within **1 second**.	Mandatory
Scalability	The system should dynamically scale to handle peak loads, such as multiple interviews conducted across different organizations simultaneously.	Mandatory
Interface Metaphor	The system must have a browser-based graphical user interface (GUI) for seamless usability.	Optional
Accessibility	The platform must adhere to WCAG 2.1 standards to ensure accessibility for differently abled users.	Mandatory

4.2 Use Cases:

Describe the following items:

- **Actors & use cases:** Identifies the key roles interacting with the system and the actions they perform.
- **Use case diagrams:** Visual representations of interactions between actors and the system's functionalities.
- **High level, essential use cases:** Focusing on tasks such as job postings, interviews, resume evaluations, and candidates' management.

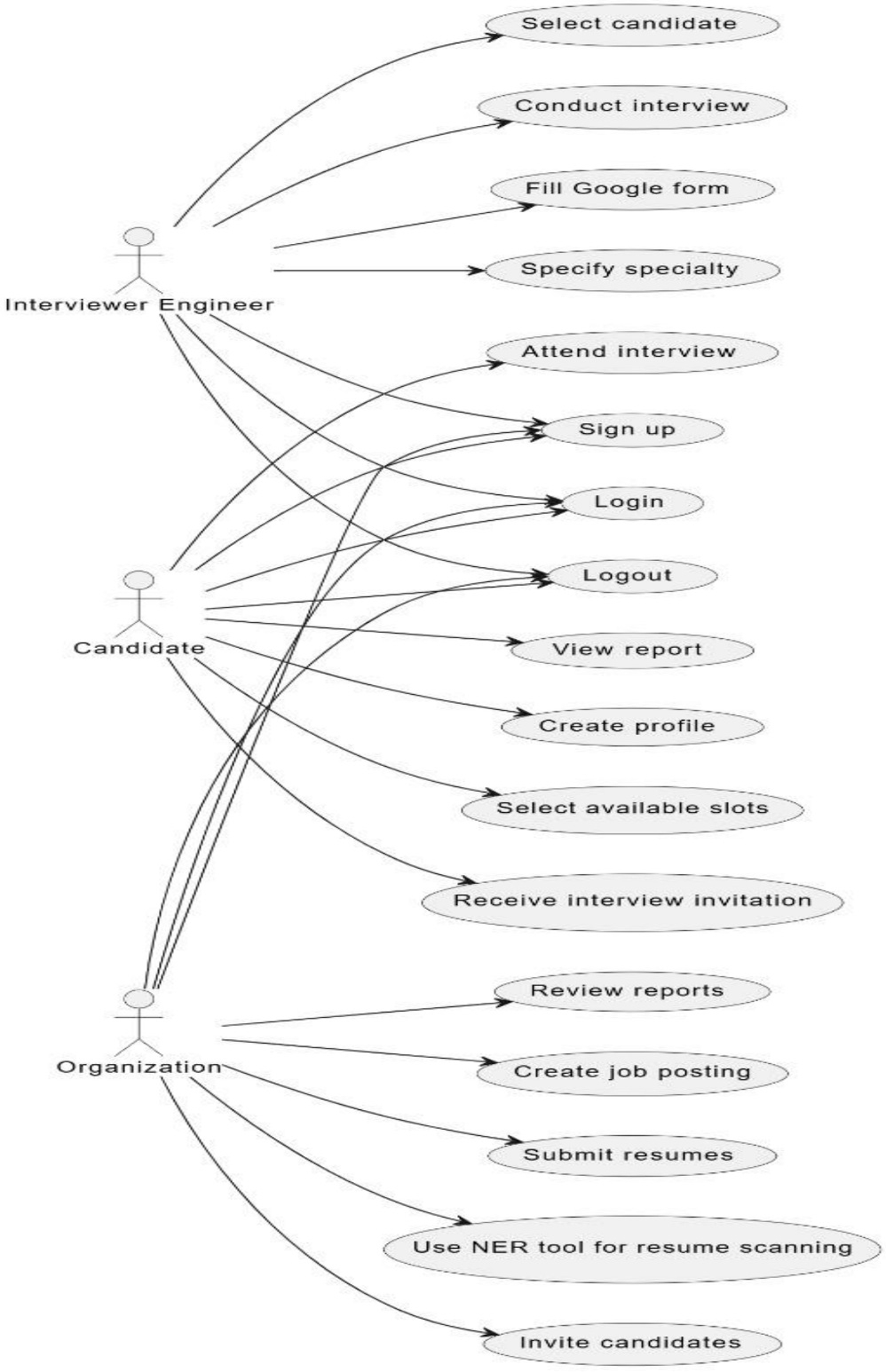
4.2.1 List of Actors:

Actor	Description
Interviewer	Responsible for evaluating candidates through coding sessions, video interviews, and reviewing reports.
Candidate	Participates in the interview process, creates profiles, uploads resume, and views reports.
Organization (Admin)	Creates job postings, invites candidates, and monitors overall hiring activities.

4.2.2 List of Use Cases:

The system facilitates seamless hiring processes through features like candidate sign-up, login, and profile creation. Organizations can post jobs, review resumes, and invite candidates, while interviewers conduct live video sessions, assess coding skills, and utilize the NER tool for efficient resume analysis, ensuring precise and effective hiring.

4.2.3 Use Case Diagram:



4.2.4 Description of Use Cases:

1. **Organization**: The org will sign up, select job details that they want to hire for, add details for the job, and enter the candidate resume that they have, once they submit our platform has a NER tool that will scan the resume for keywords that match the job description and depending on that either reject or accept the resumes, after sorting invite the passing candidate to our platform.
2. **Candidate:** Where they will sign up and create their profile and select available slots that they are available on and wait for an interviewer.
3. **Interviewer engineer:** They will sign up on platform and select their specialty that they want to interview, and then they will select the candidate that is available, then the candidate will be sent a Google meet/zoom invite link where they come 1on1, the interview will also be given a pre-made Google form that will have the list of interview questions and assessment rubrics that they will be checked for, once this is all done, a report will be generated from the Google form, and then it will be sent to the Organization and the candidate to further access and select for further procedures.

Section: Main

Name:	Recruit Right / Interview Platform
Actors:	Organization, Candidate, Interviewer
Purpose:	It is recruitment/interview platform that helps to hire faster
Description:	This platform streamlines the hiring process for organizations by allowing them to sign up, post job details, and upload candidate resumes. A built-in NER tool scans the resumes for keywords matching the job description, filtering suitable candidates. These candidates are then invited to the platform for further steps. Candidates sign up, create profiles, and select their availability for interviews. Interviewers, after signing up, choose their specialization and available candidates to interview. They conduct 1-on-1 interviews through a Google Meet or Zoom link, using a provided Google Form with questions and assessment criteria. After the interview, a report is generated and sent to both the organization and the candidate for further review and selection.

Cross References*:* Functions: R1.1, R1.2

Use Cases:

- The organization must have completed the "Sign Up" and "Create Job Posting" use cases.
- Candidates must have completed the "Sign Up" and "Create Profile" use cases.
- Interviewers must have completed the "Sign Up" and "Specify Specialty" use cases. This is a reference to the system functions as described.

Pre-Conditions	Assumption about the state of the system before execution of the operation: • The organization, candidate, and interviewer must be logged into the system. • A job posting must exist for candidates to apply. • Candidates must have selected available interview slots. • Interviewers must have chosen their interview specialization.
Successful Post-Conditions	State of the system after the completion of the operation: • The organization has invited suitable candidates for interviews. • Candidates have been notified of their interview schedules. • Interviewers have scheduled interviews with candidates. • Reports from interviews are generated and available for review by the organization and candidates.
Failure Post-Conditions	State of the system after the completion of the operation: • The organization failed to invite candidates due to an incomplete job posting or system error. • Candidates were not notified of their interviews due to scheduling conflicts or system issues. • Interviews could not be scheduled due to interviewers' unavailability or technical difficulties. • Reports were not generated due to errors during the interview process.

Typical Course of Events			
Actor Action		**System Response**	
	This use case begins when an organization logs into the platform to manage their job postings and candidates.		
	The organization creates a job posting.		Saves the job posting and makes it available to candidates.
	The organization submits candidate resumes.		The system scans resume using the NER tool to match keywords with the job description.
	The organization reviews matched candidates.		Displays a list of candidates whose resumes matched the job description
	The organization invites selected candidates for an interview.		Sends interview invitations to the selected candidates.
	Candidates sign up on the platform and create their profiles.		Saves candidate profiles and displays available job postings.
	Candidates select available slots for interviews.		Updates the candidate's availability for interviews.
	Interviewers sign up and specify their specialty.		Saves interviewer profiles and their areas of expertise.
	Interviewers select candidates to interview.		Schedules interviews and sends notifications to both candidates and interviewers with a meeting link.
	Interviewers conduct the interview and fill out the Google form.		Stores the completed interview assessment form.

	The system generates an interview report.		Generates the report and sends it to the organization and the candidate.
	The organization reviews the interview report.		Displays the report for further decision-making.

Alternative Course

Step 2: Since the system does not allow entering invalid job posting details, this step is not applicable. The organization must provide valid details to proceed.

Step 7: If a candidate cannot attend the scheduled interview, the system will log the missed interview. However, there will be no option to reschedule or cancel the meeting through the platform

Section: Pay by Cash

Typical Course of Events

Actor Action		System Response	
1	The candidate receives an interview invitation.		
2	The candidate accepts the interview invitation.	3	Confirms the interview slot and sends a confirmation notification to both the candidate and interviewer.
4	The interviewer conducts the interview and submits the assessment form.		Processes the submitted form, generates the interview report, and sends it to the organization and candidate.

Alternative Courses

Step 1: Currently, interviewers do not charge any cost for the interview, but introducing a payment system will be considered in future advancements.

Step 4: Future enhancements may include implementing a payment system for interviews.

5. Non - Functional Requirements

5.1 Performance Requirements:

The RecruitRight: Precision Hiring with AI Insight platform is designed to deliver high performance to ensure a seamless user experience. Key performance requirements include:

- **Response Time:**
  - The platform should process user requests, including resume uploads and interview evaluations, within 2 seconds under normal operating conditions.
- **Concurrent Users:**
  - The system must support at least 100 concurrent users without noticeable degradation in performance.
- **Real-Time Features:**
  - Real-time coding sessions and video interviews should have a latency of less than 200 milliseconds to ensure smooth interaction.
- **Data Processing:**
  - The system should handle large datasets efficiently, including the storage and retrieval of candidate profiles and interview reports within milliseconds.
- **Scalability**:
  - The platform must scale dynamically to handle peak loads, such as when multiple interviews are scheduled simultaneously across different organizations.

5.2 Safety Requirements

- The platform must ensure that all user data, including personal information, resumes, and interview reports, is backed up daily to prevent data loss.
- In case of a system failure, the platform should restore operations within 1 hour using failover mechanisms.

5.3 Security Requirements

- **Data Encryption**: All user data encrypted using industry-standard encryption protocols (e.g., AES-256) during storage and transmission.
- **Access Control**: Only authorized users should have access to sensitive data, with roles clearly defined for Interview Engineers, Organizations, and Candidates.
- **Session Management**: User sessions automatically expire after 30 minutes of inactivity to prevent unauthorized access.
- **Threat Mitigation**: The platform should undergo regular penetration testing and implement measures to defend against common vulnerabilities such as SQL injection.

5.4 Reliability Requirements

- The system has an uptime of **99.9%**, ensuring availability for critical recruitment activities.
- Regular health checks should be implemented to monitor system components and promptly detect failures.
- Data integrity checks must ensure that no data is lost or corrupted during transactions or storage.

5.5 Usability Requirements

- The platform has an intuitive user interface (UI) to minimize the learning curve for first-time users.
- Accessibility standards (e.g., WCAG 2.1) must be adhered to, ensuring usability for users with disabilities.
- The system provides contextual tooltips, guides, and a help section to assist users in navigating its features.

5.6 Supportability Requirements

- The platform must be designed with modular components to facilitate updates and maintenance without affecting overall functionality.
- The code base must follow industry best practices and documentation to ensure easy debugging and enhancement.
- A dedicated support team is available to resolve user issues within 24 hours.

5.7 User Documentation

- Documentation must be updated to reflect all system updates and enhancements
- Comprehensive user manuals, FAQs, and video tutorials provided for each type of user (Candidate, Interviewer Engineer, and Organization)..
- A troubleshooting guide should be included to help users resolve common issues independently.

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