

5. Non-Functional Requirements

This section specifies the non-functional requirements for the AI-Driven Job Matching Platform. These requirements define the quality attributes and constraints that the system must satisfy to meet stakeholder expectations.

5.1. Performance Requirements 5.1.1. Response Time

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|ID|Requirement|

|NFR-01.|The system SHALL provide page load times of less than 3 seconds for standard operations under normal load conditions.|

|NFR-02.|The system SHALL provide search results within 2 seconds for standard search queries.|

|NFR-03.|The system SHALL complete AI matching operations within 5 seconds for individual job-candidate matches.|

|NFR-04.|The system SHALL process batch operations (e.g., bulk candidate matching) within a timeframe proportional to the batch size, not exceeding 2 minutes for standard operations.|

|NFR-05.|The system SHALL maintain response time degradation of no more than 50% during peak load periods.|

5.1.2. Throughput

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|ID|Requirement|

|NFR-06.|The system SHALL support at least 1,000 concurrent users during normal operations.|

|NFR-07.|The system SHALL support at least 5,000 concurrent users during peak periods.|

|NFR-08.|The system SHALL process at least 100 job applications per minute during peak periods.|

|NFR-09.|The system SHALL support at least 500 new job postings per day.|

|NFR-10.|The system SHALL support at least 1,000 new user registrations per day.|

5.1.3. Resource Utilization

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|ID|Requirement|

|NFR-11.|The system SHALL operate within the allocated server resources, utilizing no more than 80% of CPU capacity during normal operations.|

|NFR-12.|The system SHALL utilize no more than 80% of available memory during normal operations.|

|NFR-13.|The system SHALL require no more than 5TB of storage for the first year of operation, with a growth plan for subsequent years.|

|NFR-14.|The system SHALL optimize database queries to minimize I/O operations and response times.|

|NFR-15.|The system SHALL implement caching mechanisms to reduce resource utilization for frequently accessed data.|

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5.1.4. Scalability

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|ID|Requirement|

|NFR-16.|The system SHALL be designed to scale horizontally by adding more server instances to handle increased load.|

|NFR-17.|The system SHALL be designed to scale vertically by utilizing additional resources on existing servers.|

|NFR-18.|The system SHALL support a minimum of 100,000 registered job seekers without performance degradation.|

|NFR-19.|The system SHALL support a minimum of 10,000 registered employers without performance degradation.|

|NFR-20.|The system SHALL support a minimum of 50,000 active job postings without performance degradation.|

|NFR-21.|The system SHALL be designed to accommodate a 100% annual growth in user base and transaction volume for at least the first three years of operation.|

5.2. Security Requirements

5.2.1. Authentication and Authorization

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|ID|Requirement|

|NFR-22.|The system SHALL implement multi-factor authentication for administrative accounts and as an option for all users.|

|NFR-23.|The system SHALL enforce strong password policies, including minimum length, complexity, and regular password changes.|

|NFR-24.|The system SHALL implement role-based access control (RBAC) to restrict access to features and data based on user roles.|

|NFR-25.|The system SHALL maintain detailed access logs for all authentication and authorization events.|

|NFR-26.|The system SHALL automatically lock accounts after a specified number of failed login attempts.|

|NFR-27.|The system SHALL implement secure session management with appropriate timeout settings.|

|NFR-28.|The system SHALL support OAuth 2.0 and OpenID Connect for third-party authentication where applicable.|

5.2.2. Data Protection

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|ID|Requirement|

|NFR-29.|The system SHALL encrypt all sensitive data at rest using industry-standard encryption algorithms (AES-256 or equivalent).|

|NFR-30.|The system SHALL encrypt all data in transit using TLS 1.3 or higher.|

|NFR-31.|The system SHALL implement data masking for sensitive information displayed in the user interface.|

|NFR-32.|The system SHALL implement secure key management practices for encryption keys.|

|NFR-33.|The system SHALL provide mechanisms for secure data deletion when required.|

|NFR-34.|The system SHALL implement database-level encryption for sensitive tables and columns.|

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|NFR-35.|The system SHALL maintain separate environments for development, testing, and production with appropriate data isolation.|

5.2.3. Privacy and Compliance

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|ID|Requirement|

|NFR-36.|The system SHALL comply with Palestinian data protection regulations and incorporate GDPR principles as best practice.|

|NFR-37.|The system SHALL provide mechanisms for users to view, export, and delete their personal data in accordance with data protection regulations.|

|NFR-38.|The system SHALL maintain audit trails of all data access and modifications for compliance purposes.|

|NFR-39.|The system SHALL implement data minimization principles, collecting only necessary information for system functionality.|

|NFR-40.|The system SHALL provide clear privacy notices and obtain appropriate consent for data collection and processing.|

|NFR-41.|The system SHALL implement data retention policies in compliance with legal requirements.|

|NFR-42.|The system SHALL support data protection impact assessments (DPIA) for high-risk processing activities.|

5.2.4. Security Monitoring and Incident Response

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|ID|Requirement|

|NFR-43.|The system SHALL implement comprehensive logging of security-relevant events.|

|NFR-44.|The system SHALL provide real-time monitoring and alerting for security incidents.|

|NFR-45.|The system SHALL implement intrusion detection and prevention mechanisms.|

|NFR-46.|The system SHALL conduct regular security scans and vulnerability assessments.|

|NFR-47.|The system SHALL have a documented incident response plan for security breaches.|

|NFR-48.|The system SHALL implement rate limiting and other protections against denial-of-service attacks.|

|NFR-49.|The system SHALL provide mechanisms for security patch management and updates.|

5.3. Reliability and Availability 5.3.1. Availability

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|ID|Requirement|

|NFR-50.|The system SHALL maintain 99.5% availability during standard operating hours (8:00 AM to 8:00 PM Palestine time, Sunday through Thursday).|

|NFR-51.|The system SHALL maintain 99.0% availability during non-standard hours.|

|NFR-52.|The system SHALL schedule maintenance windows during periods of lowest expected usage.|

|NFR-53.|The system SHALL provide advance notice of scheduled maintenance to all users.|

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|NFR-54.|The system SHALL implement high availability architecture to minimize single points of failure.|

5.3.2. Fault Tolerance

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|ID|Requirement|

|NFR-55.|The system SHALL continue to function with degraded performance in the event of component failures.|

|NFR-56.|The system SHALL implement database replication to prevent data loss in case of database failures.|

|NFR-57.|The system SHALL implement load balancing across multiple servers to distribute traffic and prevent overload.|

|NFR-58.|The system SHALL automatically recover from common failure scenarios without manual intervention.|

|NFR-59.|The system SHALL implement circuit breaker patterns for external service dependencies to prevent cascading failures.|

5.3.3. Disaster Recovery

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|ID|Requirement|

|NFR-60.|The system SHALL maintain regular backups of all data, with full backups at least weekly and incremental backups daily.|

|NFR-61.|The system SHALL store backups in geographically separate locations from the primary system.|

|NFR-62.|The system SHALL define and document Recovery Time Objective (RTO) of 4 hours for critical functions and 24 hours for non-critical functions.|

|NFR-63.|The system SHALL define and document Recovery Point Objective (RPO) of 1 hour, meaning no more than 1 hour of data loss in a disaster scenario.|

|NFR-64.|The system SHALL have a documented and tested disaster recovery plan.|

|NFR-65.|The system SHALL conduct disaster recovery drills at least twice per year.|

5.3.4. Error Handling

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| ID | Requirement |

| NFR-66. | The system SHALL provide meaningful error messages to users without exposing sensitive system information. |

| NFR-67. | The system SHALL log detailed error information for troubleshooting and monitoring. |

| NFR-68. | The system SHALL handle input validation errors gracefully, providing clear feedback to users. |

| NFR-69. | The system SHALL implement appropriate retry mechanisms for transient errors. |

| NFR-70. | The system SHALL maintain system stability when encountering unexpected inputs or conditions |

****Assignment #2 – **Design and Prototype an AI application (RAG) system****

Due Date: End of week #10

Purpose:

The purpose of this Lab assignment is to:

1. Design an AI application system that uses RAG for System Requirements Engineering.
2. Draw Architecture and Component-level diagrams.
3. Explain design decisions.
4. Articulate the trade-offs involved in system design.
5. Create a prototype

General Instructions:

Be sure to read the following general instructions carefully:

6. The exercise of this assignment must be completed individually by all the students.
7. Only provide the requested screenshots, and make sure to have a complete screenshot; partial screenshots will not earn any marks.
8. You will have to add all the analysis and diagrams, screenshots to the Analysis report.
9. You will have to provide a demonstration video for your solution and upload the video together with the solution on Luminate through the assignment link.
10. In your 6 – 8 minute demonstration video, you should explain your solution clearly, going over:
 1. The diagrams explain each component and its interaction with other components.
 2. The design decisions and why you took them.
 3. The design patterns you followed and why you chose them.
 4. The main code blocks of the prototype and the purpose of each method, also demoing the execution of the code.

11. YouTube links and links to Google Drive or any other media are not acceptable; the actual recording file in MP4 must be submitted.