

Software Requirements Specification

for

Attrition Analysis

Version 1.0 approved

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PES University

14th September, 2023

Table of Contents

Table of Contents.....	ii
Revision History.....	ii
1. Introduction.....	1
1.1 Purpose	1
1.2 Intended Audience and Reading Suggestions.....	1
1.3 Product Scope	1
1.4 References.....	1
2. Overall Description.....	2
2.1 Product Perspective	2
2.2 Product Functions.....	2
2.3 User Classes and Characteristics.....	2
2.4 Operating Environment.....	3
2.5 Design and Implementation Constraints.....	3
2.6 User Documentation	3
2.7 Assumptions and Dependencies	3
3. External Interface Requirements.....	4
3.1 User Interfaces.....	4
3.2 Hardware Interfaces.....	7
3.3 Software Interfaces.....	7
3.4 Communications Interfaces	7
4. System Features.....	7
4.1 Attrition Rate Dashboard	8
4.2 Category-wise Analysis.....	8
4.2 Retention Enhancement.....	9
5. Other Nonfunctional Requirements.....	9
5.1 Performance Requirements.....	10
5.2 Safety Requirements.....	10
5.3 Security Requirements.....	11
5.4 Software Quality Attributes.....	11
5.5 Business Rules.....	11
6. Other Requirements	12
Appendix A: Glossary.....	12
Appendix B: Analysis Models.....	12
Appendix C: To Be Determined List.....	12

Revision History

Name Date Reason For Changes Version			

1. Introduction

1.1 Purpose

The scope of this SRS encompasses the entire Attrition Analysis System, which is designed to analyze and report on employee attrition rates within an organization. This system includes all the necessary components, modules, and features required to perform attrition analysis effectively, generate reports, and provide insights into employee turnover. It provides an overarching view of the entire system's functionality and requirements.

1.2 Intended Audience and Reading Suggestions

The following are the intended audience for this report:

- The new team which works on maintaining the software after the developer team has left the company or moved on to other projects.
- Developers need detailed information about system architecture, data structures and coding algorithms.
- Project managers are concerned with the project scope, timeline, and resource allocation. They are interested in high-level requirements, project constraints, and risks.
- Testers need to comprehend detailed functional and non-functional requirements to design test cases and ensure comprehensive testing.

1.3 Product Scope

Attrition rate is a metric that quantifies the rate at which employees depart an organization. Our product is a tool that allows companies to easily analyze the Attrition rate at different levels including department wise, project wise & team wise and provide actionable insights. The software will allow users to pinpoint the root cause of attrition & provide relevant strategies to improve employee retention rates and overall workforce satisfaction. The target customer base for this product includes medium to large enterprises with multiple levels of organization.

1.4 References

1. Data Privacy Regulations:
 - Title: GDPR Compliance Guidelines
 - Author: Legal Team
 - Version Number: 3.0
 - Date: 2023-09-14
 - Source/Location: <https://gdpr.eu/>
2. Contracts:
 - Title: Attrition Analysis Project Contract
 - Author: Legal Team
 - Version Number: [If applicable]
 - Date: 2023-09-01

3. System Requirements Specification

- Title: System Requirements Specification for Attrition Analysis
- Author: IEEE
- Version Number: 1.0
- Date: 2023-09-14
- Source/Location: https://web.cs.dal.ca/~hawkey/3130/srs_template-ieee.doc

4. Data governance and security

- Title: 14 Principles To Secure Your Data Pipelines
- Author: Denys Linkov
- Date: 2021-09-09

2. Overall Description

2.1 Product Perspective

The software is a new, self-contained product.

2.2 Product Functions

The user can gain easy access to Attrition rates of the company as a whole, each dept or team wise. The AR is calculated on the basis of data received from HR of the company.

Based on the data received from HR, We perform exploratory data analysis allowing us to pinpoint the root cause of attrition. On the basis of the root cause analysis, The software will generate relevant strategies to improve employee retention rates and overall workforce satisfaction.

2.3 User Classes and Characteristics

The following are the uses cases of the software:

1. Human Resources

- Regular use to monitor the health of the company workforce.
- Department specific analysis.
- Project/Team specific analysis.

2. Upper management

- Use of software during critical conditions, when the attrition rate is drastically high, or is trending upwards.
- When the company is restructuring itself (demerger).
- Highest access to the data of the company.

2.4 Operating Environment

The following are the conditions for the operating environment considered for the software:

- The software is a standalone program that will run as a web-application.
- Any standalone desktop with a browser.
- Hosted on an nginx linux server.

2.5 Design and Implementation Constraints

The following are the design and implementation constraints for the software:

- 2 Factor Authentication (IBM verify)
- Only company authorized IPs
- Timing analysis
- GDPR compliance
- Specific tech-stack usage requirements
- Coding standards
- Fixed database schema

2.6 User Documentation

The following are the types of documentation specified for the software:

- User Manual: A detailed document providing step-by-step instructions on how to use the software. Manual will be made available.
- Tutorials: Training videos on the most frequent and important features.
- Release Notes: Documentation outlining the changes, improvements, and bug fixes in each software release available as a PDF.

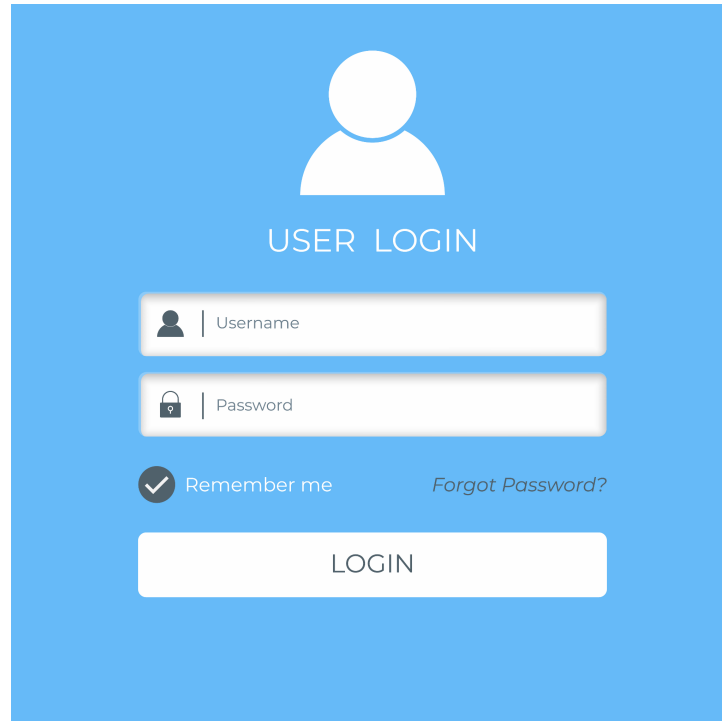
2.7 Assumptions and Dependencies

The following are the assumptions and dependencies for the software:

- Static environment: The development environment
- node v18.16.0 may cause deprecation issues with modules such as chakra-ui that will remain stable and accessible.
- Dependencies on third-party modules/components.
- React Vis, RDBMS - SQL, AWS cloud formation
- Cache invalidation policy.
- Usage of a standby node to handle requests once the master node fails.
- Microservices architecture paradigm
- Data integration and ETL tools: Tools like Hadoop and Spark can assist in data extraction, transformation, and loading (ETL) from various data sources.

3. External Interface Requirements

3.1 User Interfaces



A user login interface mockup on a blue background. At the top is a white user icon. Below it is the text "USER LOGIN". There are two input fields: the first is labeled "Username" with a user icon, and the second is labeled "Password" with a lock icon. Below the password field is a "Remember me" checkbox (checked) and a "Forgot Password?" link. At the bottom is a "LOGIN" button.

USER LOGIN

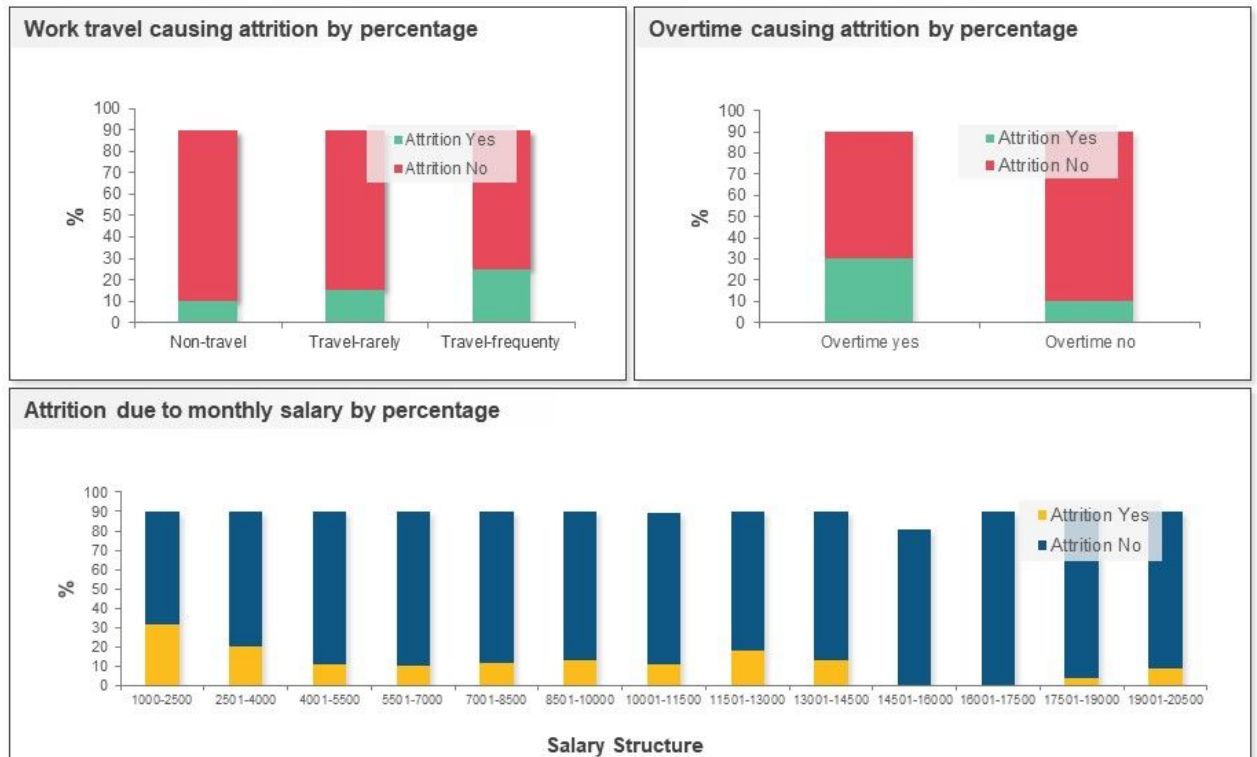
Username

Password

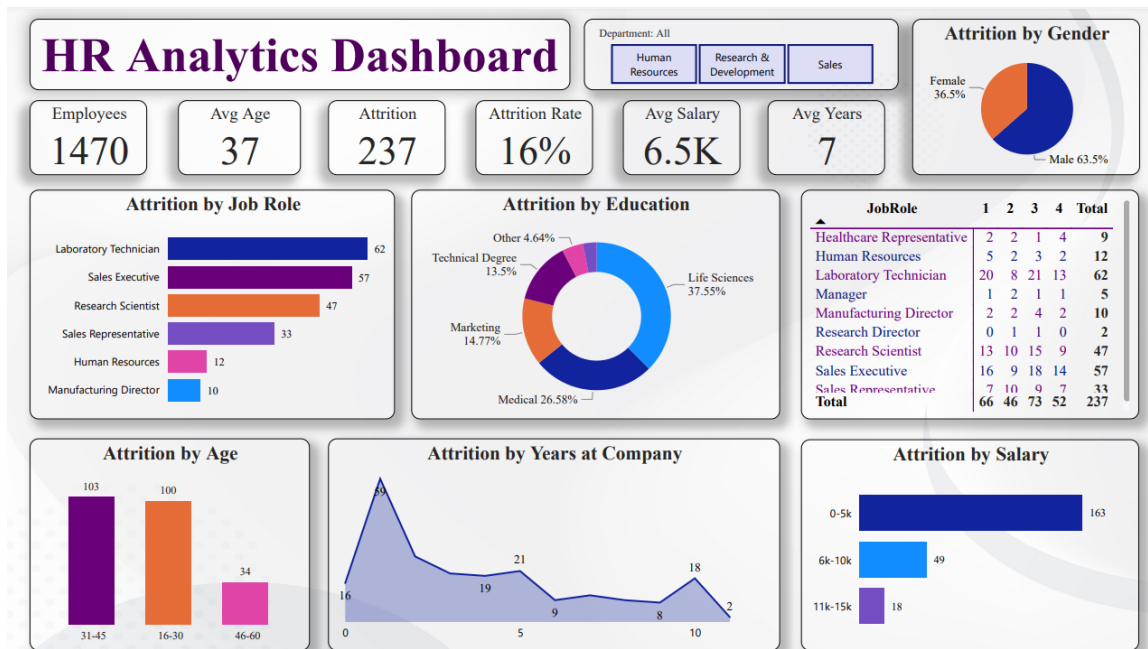
☒ Remember me [Forgot Password?](#)

LOGIN

Percent wise Attrition Rate Chart with Reasons

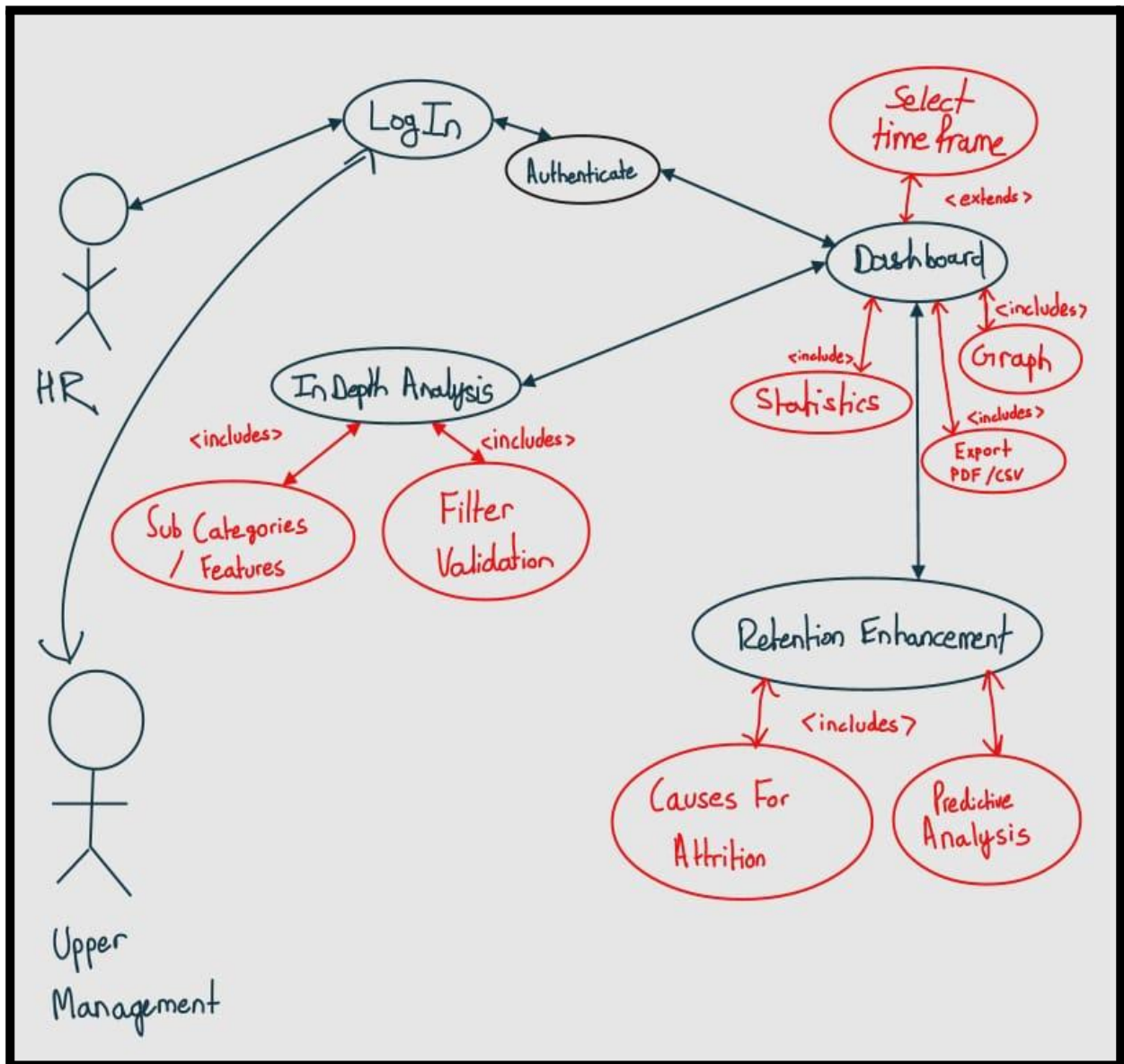


This graph/chart is linked to excel, and changes automatically based on data. Just left click on it and select "Edit Data".



- The software will have access to the company's database.
- The Upper management will be presented with a comprehensive overview of the attrition rate, encompassing all branches of the company, without limitation.
- The HR department will be provided with a distinct software version, featuring identical functionality as the version accessible to upper management. However, it will have restricted access to data, limited to the specific branch while encompassing information from all departments.
- The software should be accessible only by company desktops. So we design it to be optimized at standard desktop screen resolutions (1024x768).
- The software will primarily be a GUI which doesn't require keyboard inputs except during the login stage.

USE CASE DIAGRAM



3.2 Hardware Interfaces

Not applicable for this software.

3.3 Software Interfaces

The following are the software interfaces that have been used:

- MYSQL
- Ubuntu Server 20.04 LTS
- Python (Version X.X)
- R (Version X.X)
- Pandas (Version X.X)
- Scikit-Learn (Version X.X)
- Matplotlib (Version X.X)
- Flask (Version X.X)
- Apache NiFi (Version X.X) for ETL
- RESTful APIs: Used for communication with HR systems
- Database Connections
- Message Queues: For real-time data streaming and communication between components.
- Docker container
- Web Services

3.4 Communications Interfaces

The following are the communication interfaces that have been used:

- E-mails containing summary statistics of the overall workforce performance are pushed out to those concerned on a quarterly basis.
- Employees that will be leaving the company in the near term should be asked to complete a written exit survey collected as an electronic form followed by a one-on-one transcribed exit interview with a member of the Human Resources Team.
- The client communicates with the software by using the Web portal for a visual understanding of the attrition rates across different levels in the company.

4. System Features

4.1 Dashboard of the Organization's Attrition Rate

4.1.1 Description and Priority

- Provides the client with a bird's eye view of the overall organization's attrition rate.
- The dashboard also describes the key factors which affect the attrition rate on the whole.
- The client is provided with figures such as plots and graphs which show the major departments having a higher attrition rate at a glance.
- High data ink ratio.
- Benefit: 8

4.1.2 Stimulus/Response Sequences

- User logs into the attrition analysis system. System authenticates the user's credentials and grants access.
- Users are presented with the Attrition Analysis dashboard. User selects a specific time frame (e.g., last quarter, last year) from the dashboard. The system fetches and displays attrition rate trends for the selected time frame in the form of charts or graphs.
- The user configures attrition rate alerts based on predefined thresholds (e.g., if attrition rate exceeds 10% in a department). The system records the user's alert settings and monitors attrition rates accordingly. When an alert condition is met, the user receives a notification (e.g., email or dashboard alert).
- User selects the "Export Data" option from the dashboard. The system generates a downloadable CSV file/PDF file containing the current attrition rate data based on the user's selected parameters.

4.1.3 Functional Requirements

REQ-1: Time Frame Selection

- Users shall be able to select a specific time frame (e.g., last quarter, last year) for attrition rate analysis.
- If an unsupported time frame is selected, the system shall display an error message and default to the current quarter.

4.2 Category-wise in-depth analysis

4.2.1 Description and Priority

- Categories include "Attrition By Age", "Attrition By Education", "Attrition By Department", "Attrition By Salary"
- Clients can view attrition rates of various categories in detail.
- Further, they can significantly enhance their insights and understanding by employing filters, allowing for a more nuanced and comprehensive exploration of the data.
- Benefit: 10

4.2.2 Stimulus/Response Sequences

- User hovers over a data point on the chart. The system shows a tooltip with detailed attrition rate information for that specific point in time.
- The user applies filters, such as department, location, or employee category, to refine the displayed data on the dashboard. The system updates the dashboard to reflect the filtered data. The system allows the user to reset the filters.
- User clicks on a specific section of the dashboard or a "View Details" button to access detailed reports. The system generates and displays comprehensive reports, providing in-depth attrition analysis for the selected data.

4.2.3 Functional Requirements

REQ-1: Drill-Down Capability:

- The HR shall have the option to drill down into specific subcategories or sub-features within the selected main feature (e.g., departments within a location).

REQ-2: Validate User Operations:

- The system should validate all operations being performed by the users, this includes ensuring only valid filters are applied, appropriate reports generated.

REQ-3: Configuration or Mapping Mechanism:

- The software associates filters and filter options with specific roles and attributes. This configuration should specify which filters are available to which roles or user attributes. This should be supported using dynamic rendering of the content.

4.3 Retention Enhancement

4.3.1 Description and Priority

- The goal is to develop a comprehensive attrition rate improvement strategy within the organization. High attrition rates can negatively impact productivity and employee morale. This strategy aims to identify and address the underlying causes of attrition, leading to a more stable and satisfied workforce.
- Priority: 9

4.3.2 Stimulus/Response Sequences

- On Detection of High Attrition Rates, there is an automatic alert to HR and management
- The HR representative viewing the analysis of a particular department is advised with factors causing the inflation in attrition rate.

4.3.3 Functional Requirements

REQ-1: Attrition Data Collection and Storage:

- The system should collect and store employee attrition data, including reasons for leaving, in a secure and organized manner.

REQ-2: Predictive Analysis:

- Perform data analysis to identify trends, patterns, and attrition risk factors. Utilize statistical and machine learning techniques for predictive analysis.

REQ-3: Alerting Mechanism:

- Implement an alerting system to notify HR and management when attrition rates exceed predefined thresholds.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- Data Retrieval Time: The system should retrieve and load historical attrition data for analysis within 5 seconds for historical data of the company. Quick data retrieval ensures that users can access and analyze historical data with ease.

- Scalability: The system should be able to handle an increase in the number of employees by at least 20% without a noticeable decrease in performance. Scalability ensures that the system can accommodate organizational growth without degrading performance.
- Real-time Alerts: Alert notifications for critical attrition events (e.g., sudden spikes) should be delivered within 5 minutes of receiving the required data from HR (once HR has uploaded the employee's exit status to the company database). Timely alerts allow organizations to respond promptly to critical attrition situations, minimizing potential losses.

5.2 Safety Requirements

- Data Privacy and Security: The software must comply with relevant data privacy regulations, such as GDPR (General Data Protection Regulation) depending on the type of data collected. Implement strong data encryption, access controls to protect employee data from unauthorized access, breaches, or misuse.
- Data Anonymization: Personally identifiable information (PII) should be anonymized or pseudonymized in reports and visualizations. Implement data anonymization techniques to protect employee privacy while still allowing for meaningful analysis.
- The functioning of the software will not affect the performance or functionality of any other programs running on the same server. This is ensured by containerising the application using Docker.

5.3 Security Requirements

1. Data:
 - The company must restrict access to confidential and sensitive data to protect it from being lost or compromised in order to avoid adversely impacting our customers, incurring penalties for non-compliance and suffering damage to our reputation.
 - Role Based Access Control will be implemented to ensure that sensitive company data is accessed only by the software process and is never exposed to the users or to anyone performing maintenance activities.
2. User Authentication:
 - Users must be required to authenticate using secure login credentials (e.g., username and password). Implement password policies, two-factor authentication (2FA), or single sign-on (SSO) to ensure only authorized users access the system.
3. Data Protection:
 - To enhance data security in the data pipeline between the database and software, AES encryption can be applied to protect the confidentiality of the data during transit.
4. DDoS Protection:
 - To take protective measures against Distributed Denial of Service attacks or simply Denial of Service attacks by leveraging a DDoS mitigation service provided by Cloudflare.

5.4 Software Quality Attributes

- **Reduced Learning Curve:** Through this software, Users need not spend time learning how to utilize a database or spend valuable time performing analytics. Insights are automatically generated and made available for view.
- **Improved Readability:** Insights are presented to the users in the form of engaging and clear visuals (Graphs & Key statistics)
- **Accessibility:** Users will interact with the software by means of a web portal. This allows them to get access to the system from any company approved device without needing to install or require any additional utilities/tools.

5.5 Business Rules

- **Role-Based Access Control (RBAC):** The product will employ an RBAC system, wherein various user roles, such as HR and Upper Management, will be assigned specific and differentiated privileges and access levels. Upper Management will possess the capability to execute actions spanning multiple branches and enjoy data access that extends across all branches. Conversely, HR will be granted access to data on a departmental basis, ensuring a department-wise approach to data access and management.
- **Data Privacy Compliance:** The product will adhere to data privacy regulations such as GDPR. Only authorized personnel will have access to sensitive employee data, and proper consent and anonymization processes will be in place. All user interactions with the product will be logged in an audit trail. Administrators can review these logs for security and compliance purposes.

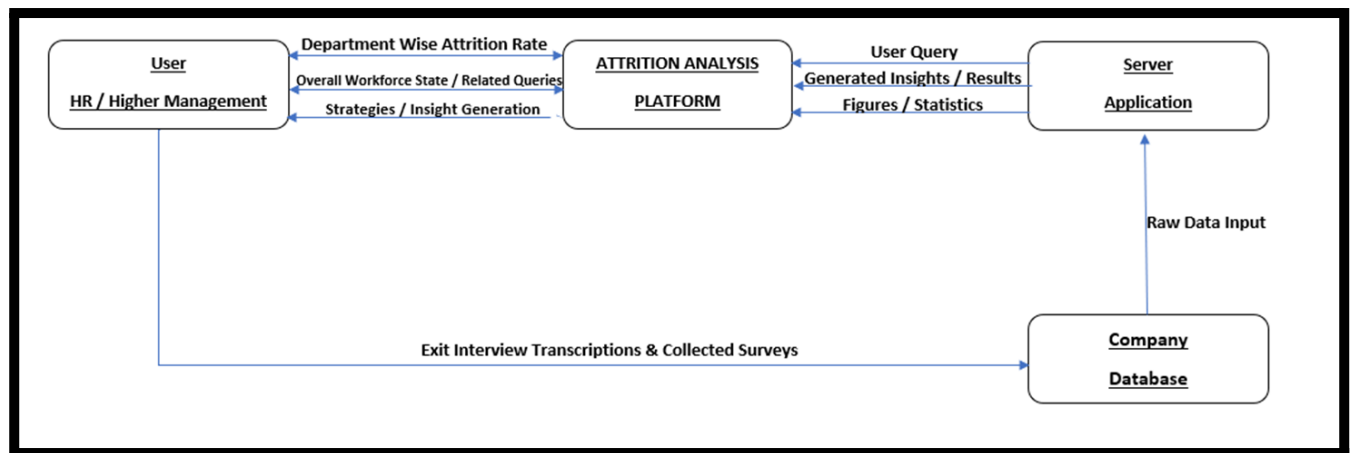
6. Other Requirements

AWS EC2 instance for running the software within the company's network.

Appendix A: Glossary

- **Attrition Rate:** The percentage of employees who leave an organization over a specified period.
- **API:** Application Programming Interface.
- **Dashboard:** A visual representation of attrition data, typically using charts, graphs, and tables to provide insights.
- **GDPR:** General Data Protection Regulation, a European Union regulation for data protection and privacy.
- **HR:** Human Resources
- **IoT:** Internet of Things
- **LDAP:** Lightweight Directory Access Protocol, a protocol for accessing and managing directory information services.
- **RBAC:** Role-Based Access Control

Appendix B: Analysis Models



Appendix C: To Be Determined List

- Database schema (to be provided by the client)
- Code standards that align with company guidelines