Software Requirements Specification (SRS) Document

Student Details Reporting and Visualization (AN-4)

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Software Requirements Specification (SRS) Document

1. Introduction

1.1 Purpose

The purpose of this document is to define the Software Requirements Specification (SRS) for a system designed to generate reports and visualizations based on student details. The system will provide dynamic charting capabilities and support user queries through menu-driven and NLP/LLM-based approaches.

1.2 Scope

The system will:

- Generate user-requested reports and visualizations.
- Provide dynamic charts (bar charts, pie charts, etc.).
- Support querying based on department, duration, and placement records.
- Integrate with an existing student database.
- Offer customization options for visualizations.
- Support accreditation and administrative data analysis.
- Ensure scalability for future expansions, considering the growing student population at NITC.

1.3 Definitions, Acronyms, and Abbreviations

- **SRS**: Software Requirements Specification
- **UI**: User Interface
- **NLP**: Natural Language Processing
- **LLM**: Large Language Model
- **SQL**: Structured Query Language

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2. Functional Requirements

2.1 User Authentication

- Users should be able to sign up and sign in securely.
- Authentication should be handled using a username/email and password.
- Different user roles: Student, Admin, Placement Officer, Event Coordinator.
- Role-based access control to ensure that users only see relevant data.
- Authentication should restrict access to only NITC domain email IDs.
- Students shall have limited access to data, while faculty and administration shall have full access.

2.2 Dashboard & Navigation

- After signing in, users should be redirected to a dashboard.
- The dashboard should display quick insights like student reports, placement stats, and event details.
- A navigation bar should allow users to switch between different pages.

2.3 Data Management

- A page to display information about the educational platform, including:
    - Event Participation
    - Total Placements
    - GPA Trends

Overview

- Display key statistics, including Academic Progress, Placement Rate and Internship Conversion Rate.
- Provide a visual representation of placement trends using a line chart.

2.4 Query Handling

- **Menu-Driven Query Builder:**
    - The system shall provide dropdowns, checkboxes, and sliders for query selection.
    - The system shall generate SQL queries dynamically based on user selections.
- **NLP/LLM-Driven Query Generation:**
    - Users shall be able to enter natural language queries.
    - The system shall process the input and generate relevant SQL queries.
    - The system shall leverage AI Studio as it is a lightweight LLM, free, and simple to deploy and integrate with the web interface.
    - Few-shot learning shall be used by prompting the database schema to improve query interpretation and accuracy.

2.5 Report and Visualization Generation

- Users shall be able to generate bar charts, pie charts, and other visualizations.
- Users shall be able to request multiple visualizations for a single query.
- Users shall have the ability to drill down into visualizations for detailed analysis.
- Users shall have export options for reports in PDF, PNG, and Excel formats.

Trends Filtering

- Provide dropdown filters for Company, Department, Year, and Visualization type.
- Allow users to generate a customized trend report based on selected filters.
- Display trend results dynamically upon clicking the "GO" button.

2.7 Data Management

- The system shall integrate with an existing student database.
- Users shall be able to import student data from external sources.
- The system shall support role-based access control.

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3. Non-Functional Requirements

3.1 Scalability

- NITC is one of the top institutes in India, with a current student population of over 7,000.
- The student population is expected to grow beyond 10,000 in the near future.
- Proper data management is crucial to ensure smooth handling of increasing student records.
- The system shall support future expansions with additional data and features to accommodate the growing number of students.
- The system shall allow seamless integration with new data sources to ensure smooth operations as the student population grows.
- The system shall efficiently handle large datasets and scale database storage accordingly.

3.2 Security

- All student data shall be encrypted during storage and transmission.
- Only authorized users shall access administrative and accreditation-related data.
- Authentication shall restrict access to NITC domain email IDs to prevent unauthorized usage.
- Security measures should prevent the misuse of NITC's data against the institution.
- Role-based permissions shall be enforced to ensure secure data access, where students have limited access while faculty and administration have full access.

3.3 Usability

- The system shall provide an intuitive UI suitable for both technical and non-technical users.

3.4 Reliability

- The system shall implement backup mechanisms to prevent data loss.

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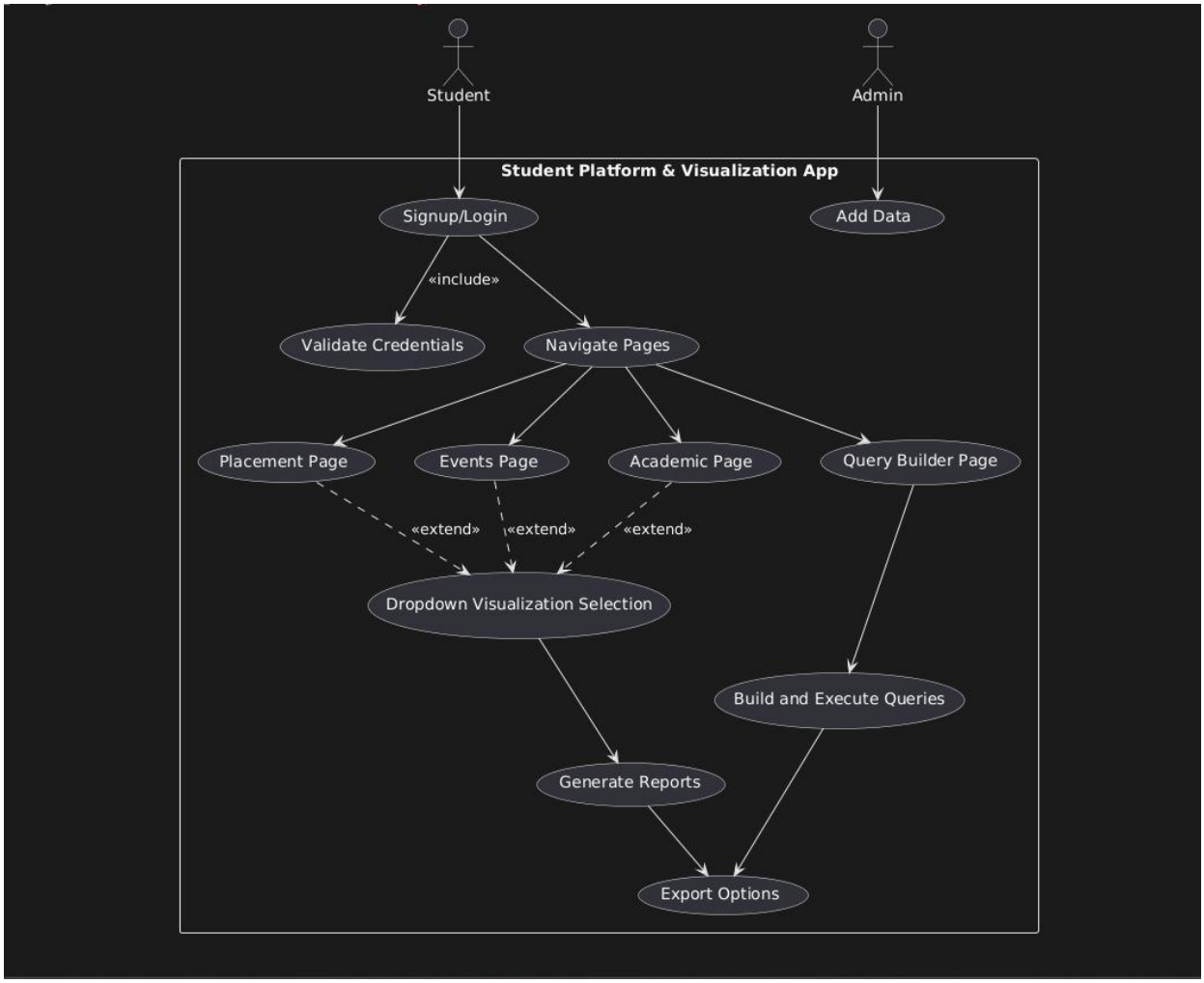
4. Use Case Diagram

4.1 Actors

- **User:** Queries the system and generates reports.
- **Administrator:** Manages data integration and user access.

4.2 Use Case Diagram



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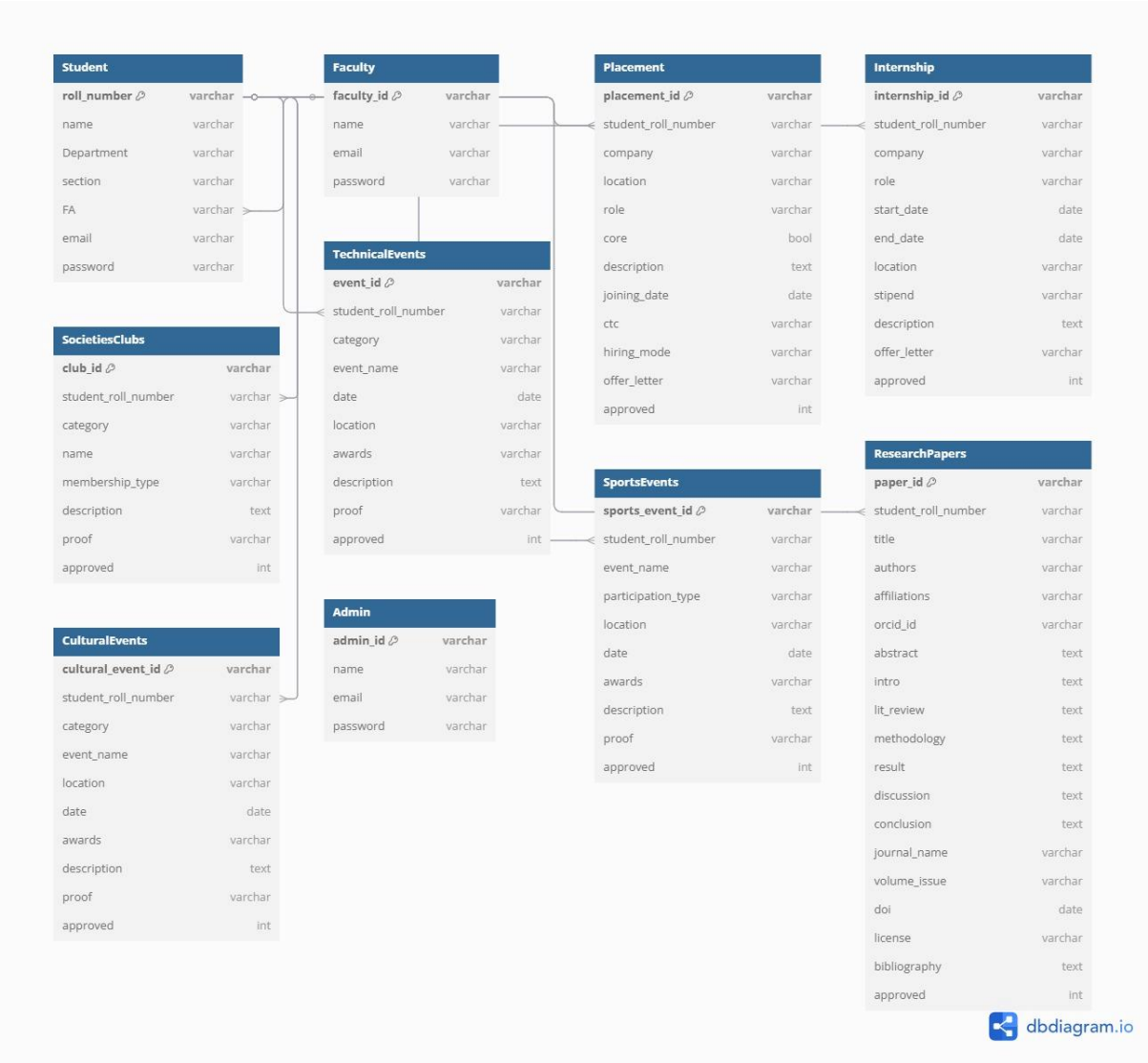
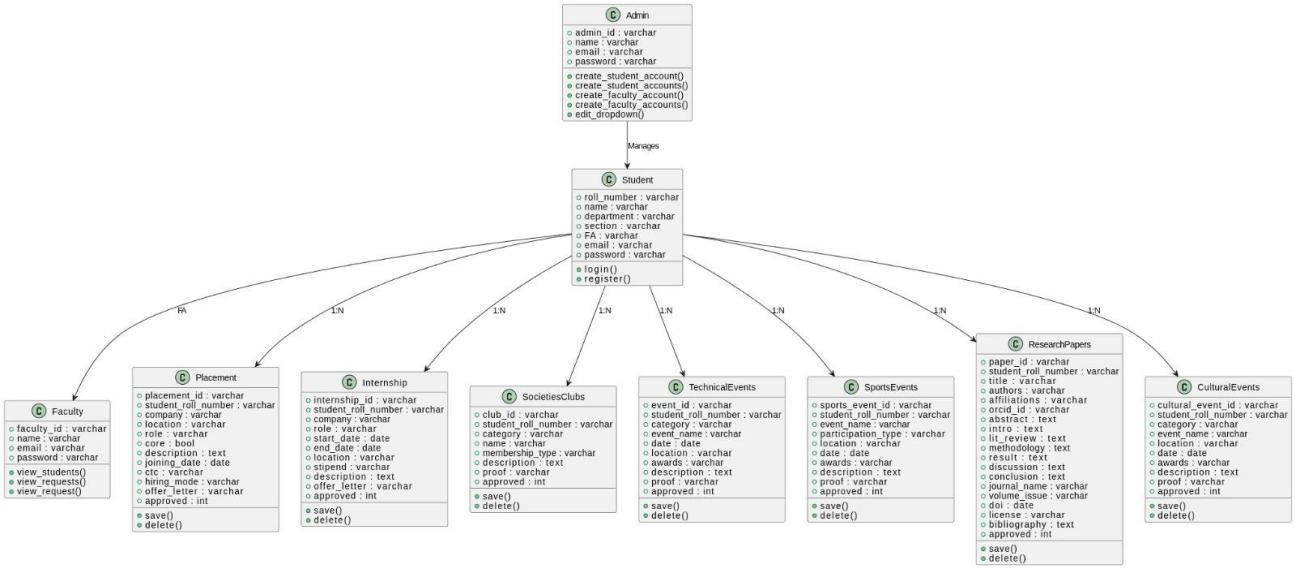
5. Database Diagram and Class Diagram

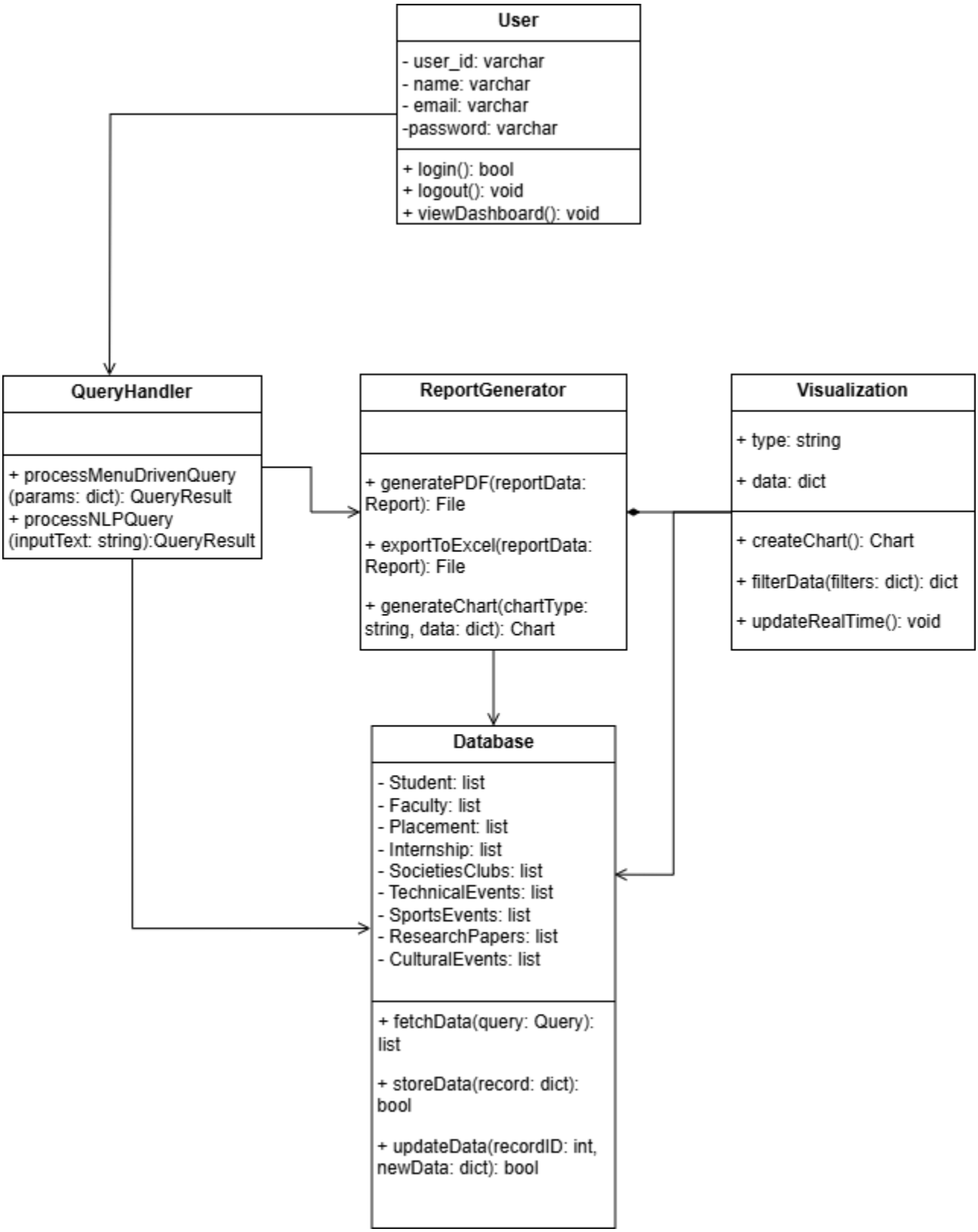
Since our project depends on the database made by another team, we designed our class diagram based on their diagrams

The Database Diagram and Schema





Class Diagram



6. Conclusion

This SRS document outlines the core functionalities and requirements for the system. It serves as a guide for development, ensuring alignment with project objectives and usability expectations.