

BSSE FINAL PROJECT

Software Design Specification

Vision Forge



Project Advisor

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Software Design Specification

SDP Phase II

Vision Forge

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Revision History

Name	Date	Reason For Changes	Version

Abstract

In response to the limited career guidance available in schools and colleges, Vision Forge steps in as a solution to empower students facing uncertainty about their career paths. Many students lack dedicated counselors, leading them to make choices without proper information and influenced by family pressures. Vision Forge offers a user-friendly app where students can input their academic records and interests, generating personalized career suggestions. Using advanced machine learning technology, the app analyzes this information to provide insights into potential fields, associated courses, and educational opportunities. It helps students align their academic backgrounds with career aspirations and suggests alternative courses if needed. It also helps students explore universities related to their chosen career path. The primary aim is to guide students towards confident and well-informed decisions, ensuring a rewarding and fulfilling career journey.

1. Introduction

1.1 Product

Vision Forge is a user-friendly software designed to solve the problem of limited career guidance in schools and colleges. It acts as a helpful tool for students to input their academic records and interests, receiving personalized career suggestions in return. This software, powered by advanced machine learning, not only analyzes data but also offers insights into potential career fields, associated courses, and universities related to chosen paths. It's not just a program; it's a solution that guides students in making informed decisions about their career journey. Vision Forge is a comprehensive system that combines user input, machine learning, and career exploration to help students confidently choose their career paths.

1.2 Background

In the realm of career guidance systems, "Career Vista" focuses on providing insights through assessments, while "Future Track" offers basic career advice without advanced features. However, my project, "Vision Forge," goes beyond by integrating cutting-edge machine learning algorithms, offering personalized career counseling, learning recommendations, university eligibility assessments, and detailed course information. Unlike its predecessors, "Vision Forge" takes a holistic approach to redefine the landscape of career guidance. It stands out as a comprehensive and tailored decision-making tool, providing students with an all-encompassing resource to make well-informed and rewarding choices for their career paths.

1.3 Objective(s)/Aim(s)/Target(s)

- Develop a user-friendly career guidance system, "Vision Forge," integrating advanced machine learning algorithms.
- Provide personalized career counseling, learning recommendations, and university eligibility assessments.
- Analyze and compare the effectiveness of "Vision Forge" against existing career guidance systems.
- Assess the impact of "Vision Forge" on students' decision-making processes and career outcomes.

- Offer a comprehensive and holistic approach to career guidance, redefining the landscape of available tools in the field.
- Ensure that the objectives align with the project's scope and can be realistically achieved within the stipulated time frame.

1.4 Scope

"Vision Forge" has a wide scope, aiming to help students in choosing their career paths. The project includes creating a user-friendly app that considers students' academic records and interests. With advanced machine learning, it generates personalized career suggestions, recommends learning paths, and assesses university eligibility. The scope extends to providing comprehensive insights, distinguishing "Vision Forge" as an all-encompassing tool for well-informed career decisions. The ultimate goal is to empower students with a holistic and tailored approach to navigate their academic and professional journeys confidently.

1.5 Business Goals

Vision Forge not only supports educational goals but also contributes to financial success. By attracting students and institutions, the system generates revenue through high user traffic. Streamlining administrative tasks reduces costs, maximizing profits. The software's popularity enhances the institution's reputation, attracting more students and aligning with core business objectives. Vision Forge positions the institution as a tech-enhanced education leader, ensuring sustained financial growth and success in the competitive educational landscape.

1.6 Document Conventions

Font: Times

Font Size for Text: 12

Font Size for Headings: 14

Font Size for Main Heading: 18

Highlighted Items: Enclosed in "inverted commas"

Bullet Points: Used for clear and concise understanding

2. Overall Description

2.1 Product Features

- Intuitive design for easy navigation and accessibility.
- Tailored career suggestions based on individual academic records and interests.
- Cutting-edge algorithms integrated for precise and reliable predictions.
- Personalized paths for skill enhancement and continuous learning.
- Evaluates eligibility criteria for various universities.
- Offers comprehensive insights into associated courses and educational opportunities.
- Holistic approach combining user input and machine learning for well-informed decisions.
- Boosts institutional reputation, attracting more students and supporting core business goals.

2.2 Functional Description

"Vision Forge" functions as an interactive career guidance system, helping students make informed decisions about their academic and professional paths. Users input their academic records and interests, and the system, powered by advanced machine learning, generates personalized career suggestions. It offers learning recommendations, assesses university eligibility, and provides insights into associated courses. The system's intuitive interface ensures easy navigation, making it a comprehensive tool for students to confidently explore and choose their career journeys.

2.3 User Classes and Characteristics

User Class	Characteristics	Functions
Students	Varied educational levels, technical expertise	Input academic data, explore career options, view university eligibility
Educational Counselors	Educational expertise, occasional users	Oversee student data, provide guidance, monitor career suggestions
Administrators	High privilege levels, technical expertise	Manage user accounts, oversee system security, handle data privacy

Distinguishing favored user classes involves prioritizing based on their importance and impact on the system. In this context, students are the primary users, making their satisfaction crucial for the system's success. Educational Counselors come next in importance, as their guidance enhances the system's effectiveness. Administrators, while vital for system maintenance, have a lower priority in terms of satisfying their needs compared to students and counselors.

2.4 Design and Implementation Constraints

"Vision Forge" developers face specific guidelines to ensure effective functionality. The machine learning processes are limited to Python, and web development follows the MERN framework. Advanced analysis techniques are used for dataset management. The application access is restricted to students who have completed matriculation and intermediate studies. In addition, the development is subject to specific hardware constraints, ensuring compatibility with standard computing devices commonly used by students. Design and development adhere to the Software Development Life Cycle (SDLC) methodology, using Unified Modeling Language (UML) diagrams for planning. The interface prioritizes user-friendliness for enhanced accessibility and usability.

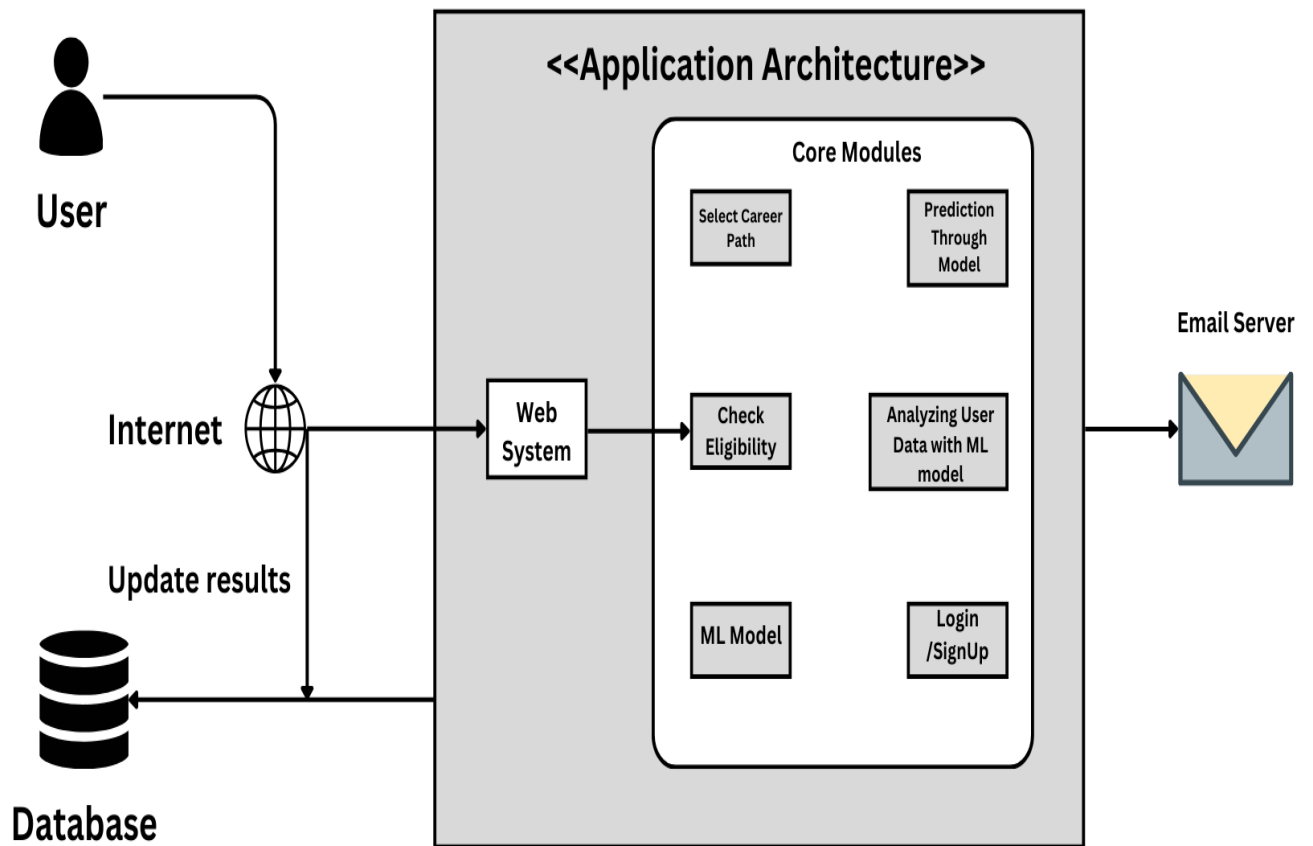
2.5 Assumptions and Dependencies

Assumed Factors	Description
Third-Party Components	Integration of external ML libraries. Changes in these libraries may impact the project.
Operating Environment	Stable internet connectivity is assumed for real-time data processing and server interactions.
Data Availability	The project assumes the availability of relevant datasets for training ML algorithms. Limited data might affect prediction accuracy.
External Services	The project depends on the continued availability of external services/APIs for real-time updates and information retrieval.
Development Tools	The assumed availability of necessary software tools and licenses for development and testing purposes.
Team Collaboration	Effective collaboration among team members is assumed for consistent development progress and issue resolution.
Documentation Accuracy	The project assumes the accuracy of information in the existing project documentation, forming the basis of development decisions.
Hardware Reliability	The project relies on the reliability of hardware components and servers hosting the application to ensure uninterrupted service delivery.

3. Technical Architecture

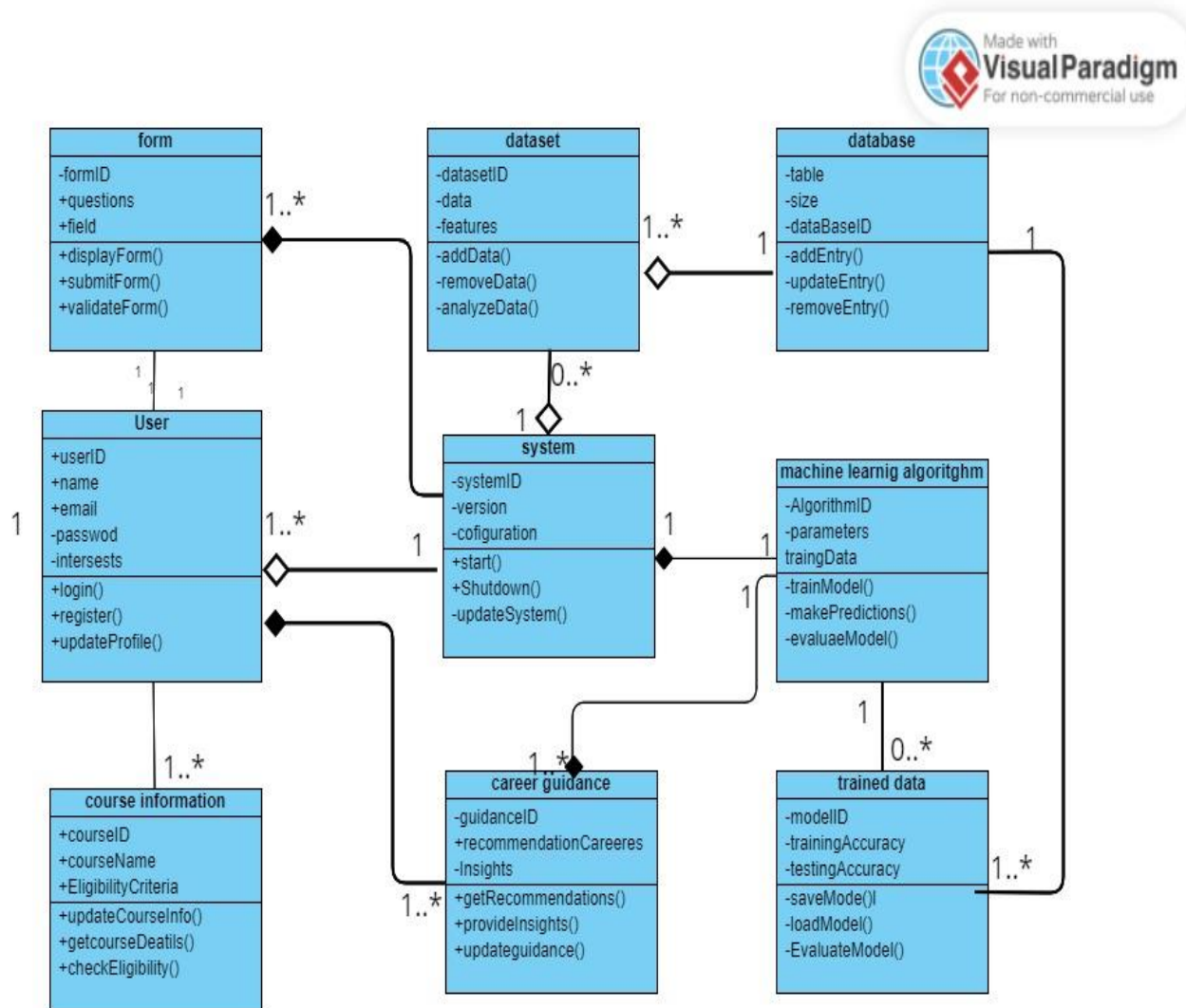
- **System Type:**
The current system is custom-built, specifically designed to address the unique requirements of career guidance and counseling.
- **Processing Type:**
The system is primarily responsible for online transaction processing, handling real-time data input, and providing instantaneous career suggestions.
- **Application Components:**
Major components include a user interface for students, an administrative interface, a machine learning module for career prediction, and a database for storing academic and user data.
- **Data Management:**
The system collects and manages academic records, career interest data, and university eligibility criteria, ensuring a comprehensive dataset for accurate predictions.
- **Application Architecture:**
The basic architecture is a client-server model where the client (user interface) interacts with the server (backend processing and data storage).
- **Programming Language:**
The system is built using the MERN (MongoDB, Express.js, React.js, Node.js) stack, combining JavaScript technologies for efficient development.
- **Hardware Platform:**
The system is hosted on cloud servers, ensuring scalability and accessibility. It does not rely on specific on premise hardware.
- **Database Platform:**
MongoDB is used as the database platform, providing a flexible and scalable solution for managing diverse data types.
- **User Interface:**
The end-user interface is browser-based, allowing students and administrators to access the system through web browsers.
- **Network Architecture:**
The system is designed to be accessible over the internet, providing flexibility for users on different networks.
- **Hosting Environment**
The system is hosted on external cloud servers, offering reliability and accessibility to users from various locations.

Technical Architecture

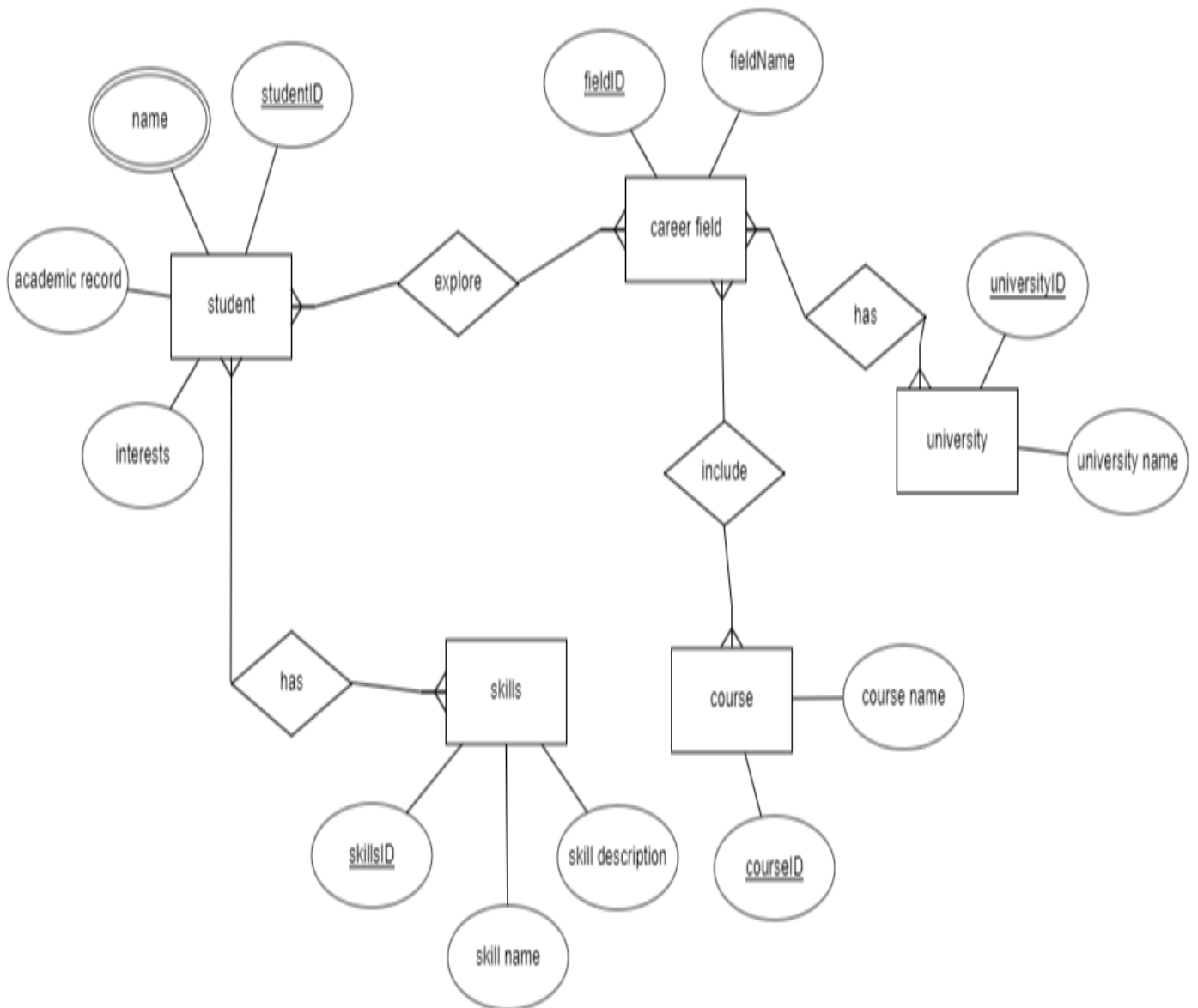


3.1 Application and Data Architecture

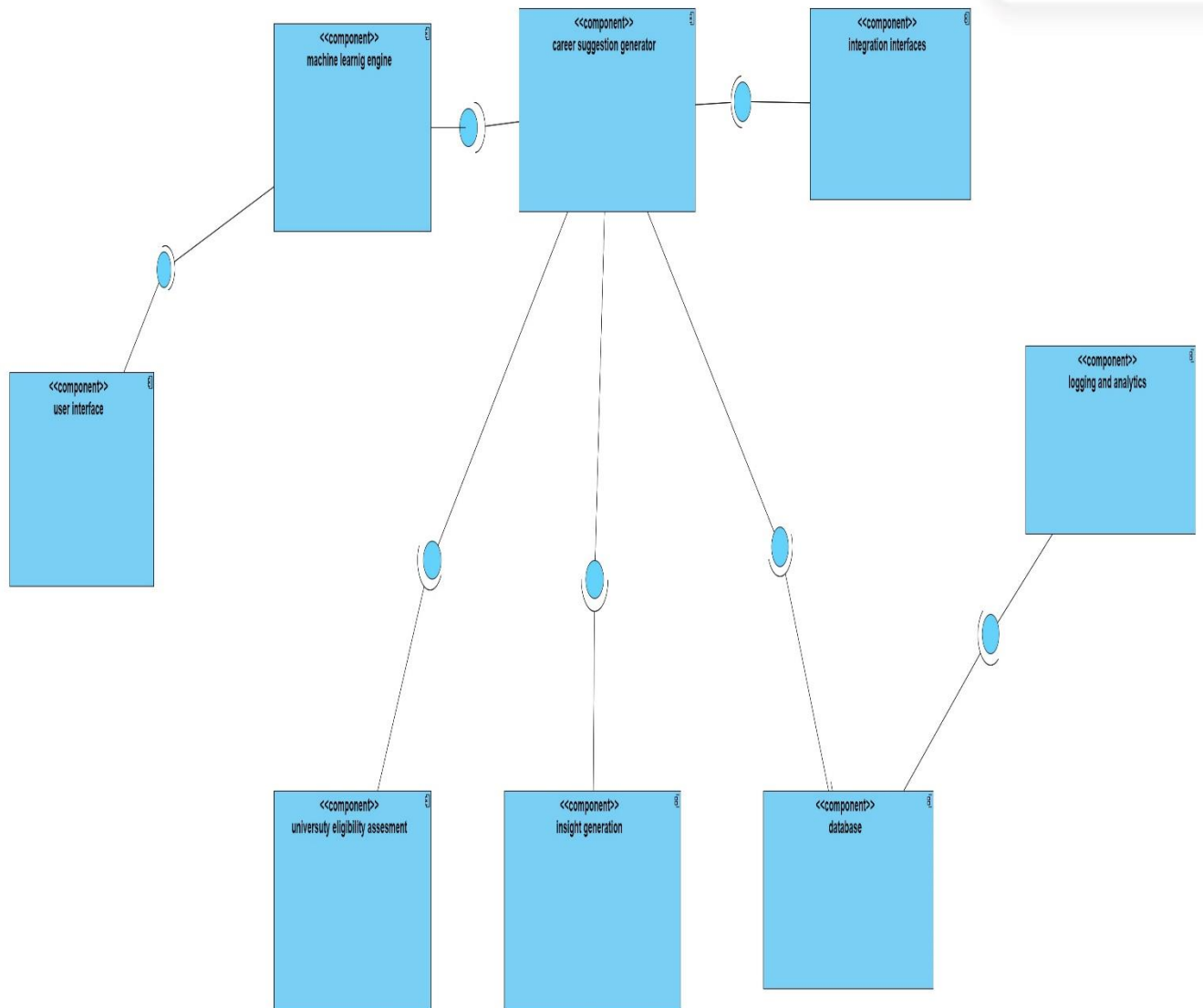
3.1.1 Class Diagram



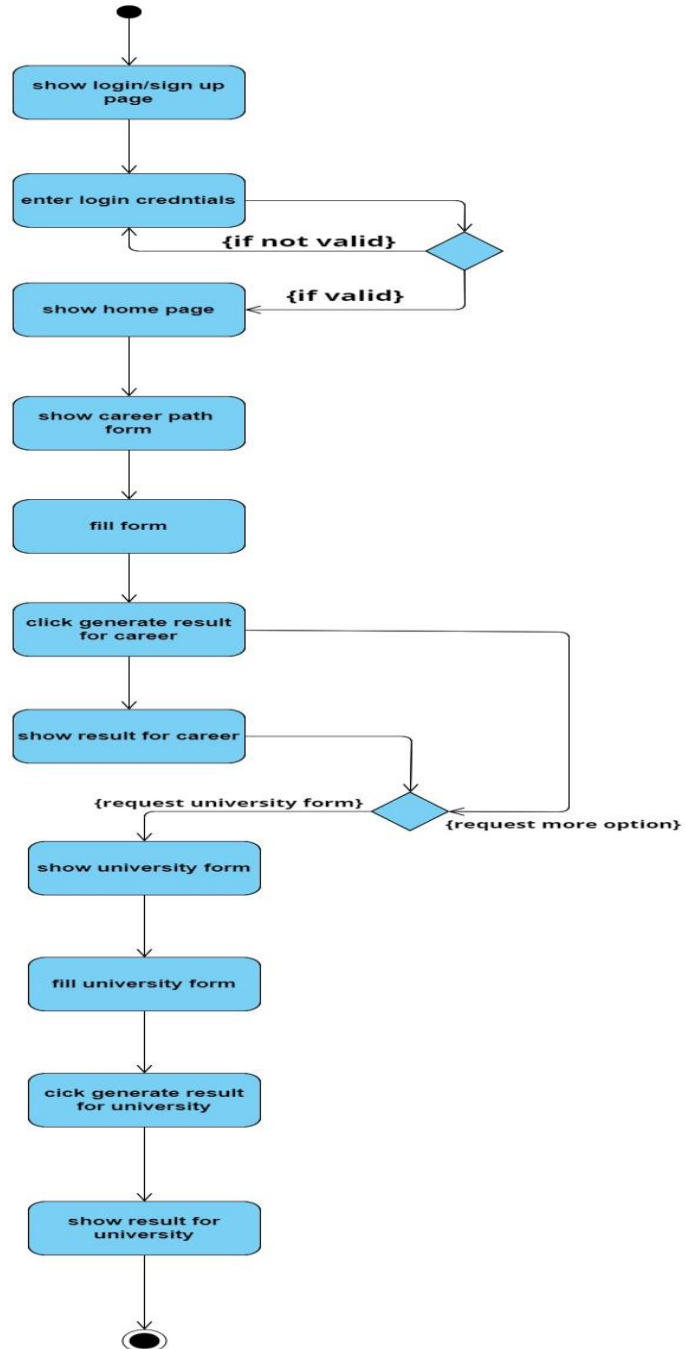
3.1.2 Entity Relationship Diagram



3.1.3 Component Diagram



3.1.4 Activity Diagram



3.1.5 Decision Table

- Login Decision Table

Condition	Rule 1	Rule 2	Rule 3	Rule 4
Valid Username	T	F	F	T
Valid Password	F	F	T	T
Action				
Successful Login	F	F	F	T

- Career Path Decision table

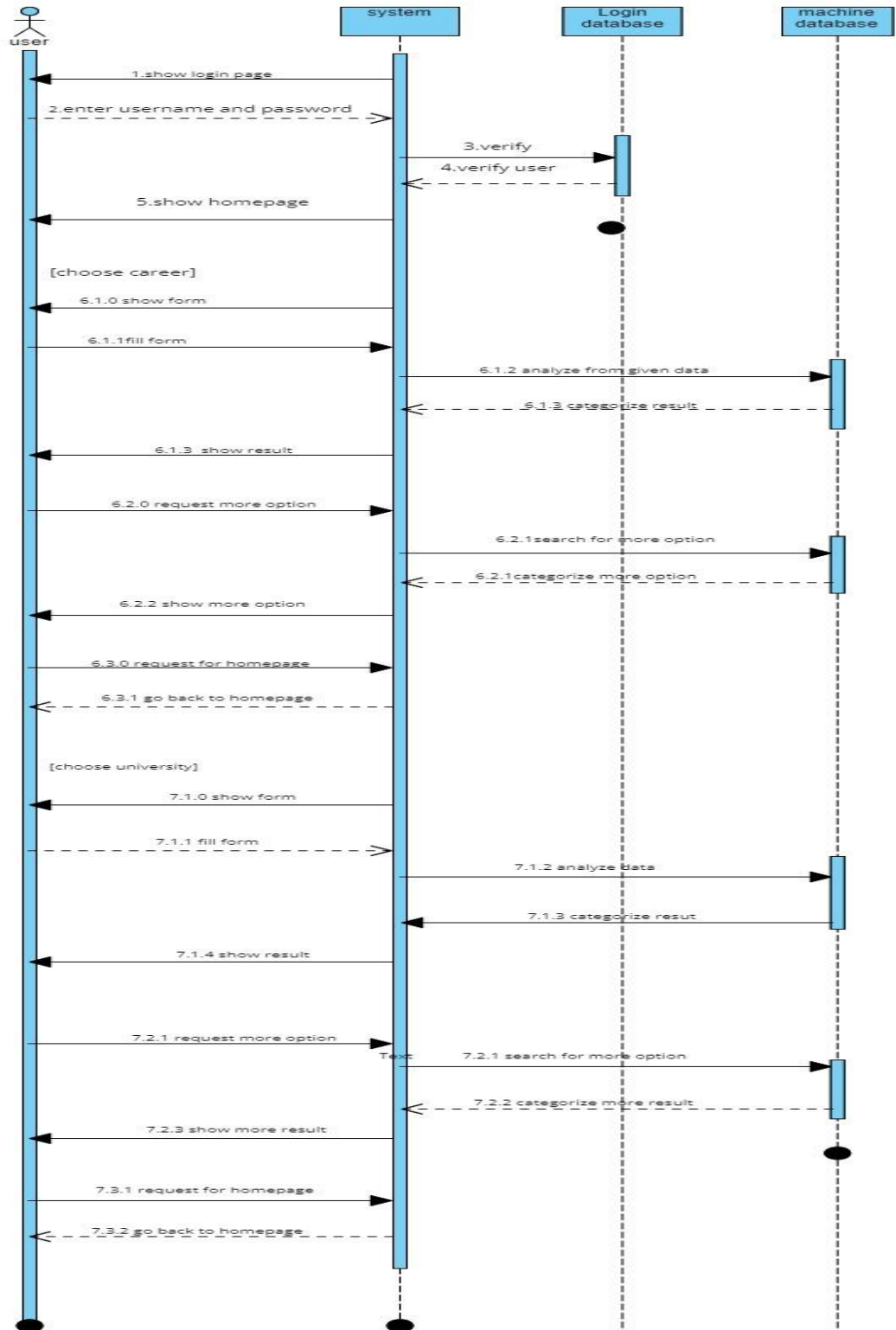
Condition	Rule 1	Rule 2	Rule 3	Rule 4
Matriculation Degree complete	T	F	F	T
Intermediate Degree complete	F	F	T	T
Action				
Career Path Prediction	F	F	F	T

- University Eligibility decision table

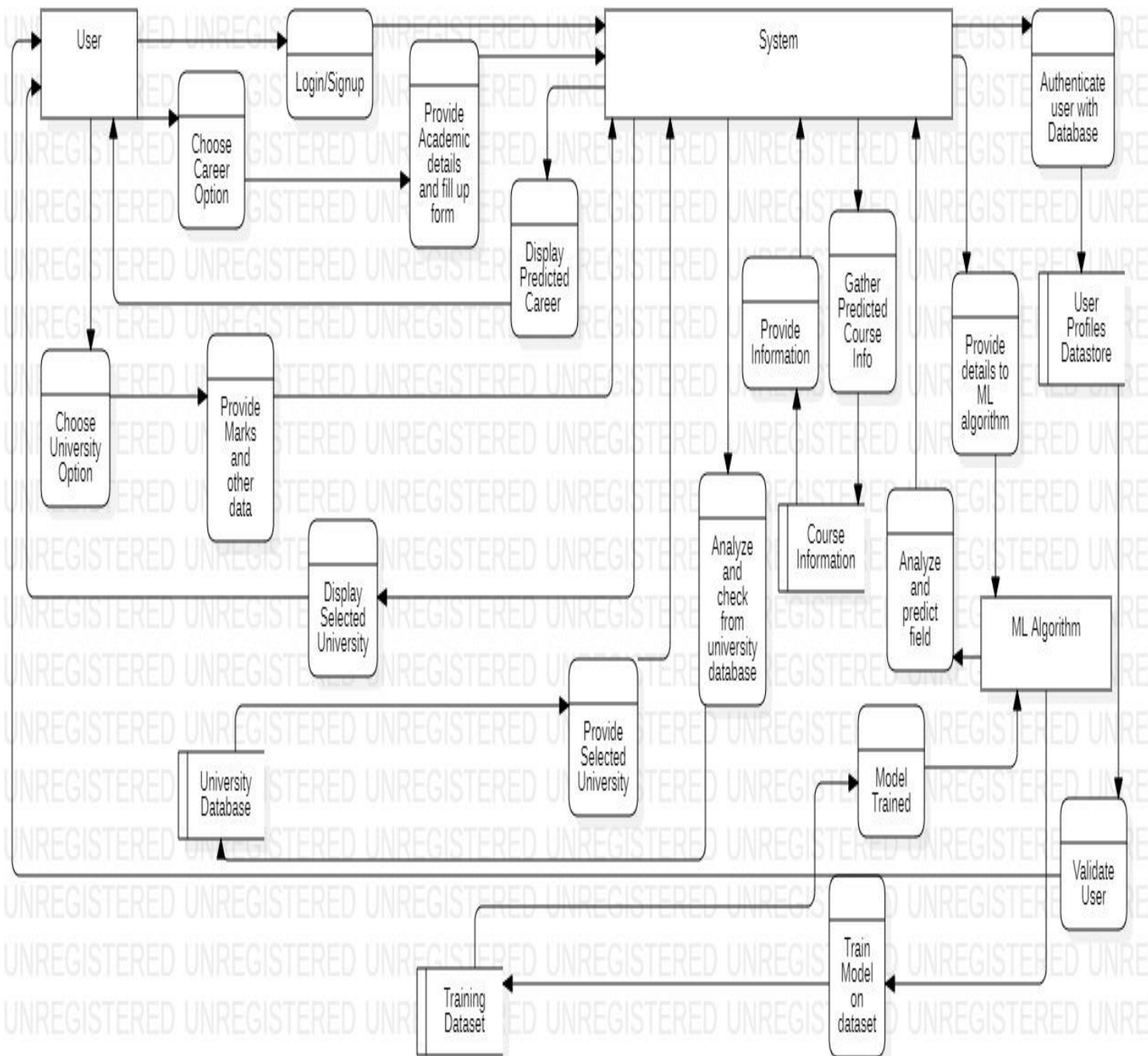
Condition	Rule 1	Rule 2	Rule 3	Rule 4	Rule 5	Rule 6	Rule 7	Rule 8
Matriculation Marks	F	F	F	F	T	T	T	T
Intermediate Marks	F	F	T	T	F	F	T	T
Career Field Name	F	T	F	T	F	T	F	T
Action								
Displaying Eligible University	F	F	F	T	F	F	F	T

3.2 Component Interactions and Collaborations

3.2.1 Sequence Diagram



3.2.2 Detailed DFD



3.3 Design Reuse and Design Patterns

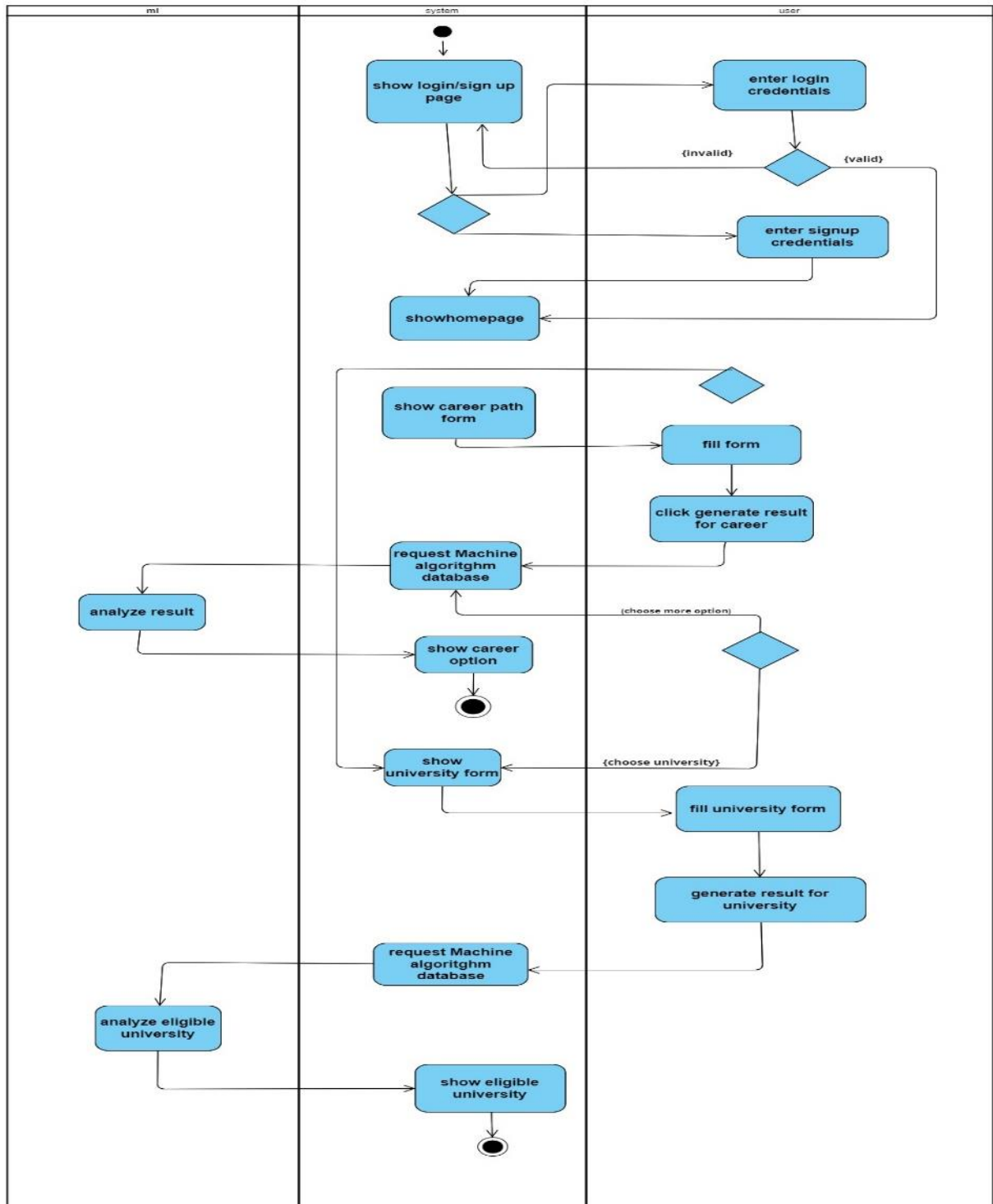
- **User Profile Module:**
The user profile creation and management components are reused for various sections, ensuring a unified and consistent user experience.
- **Data Input Forms:**
Common input forms, such as academic data entry forms, are reused across modules for collecting relevant information from users.
- **Machine Learning Integration:**
The machine learning prediction module is reused for different career-related predictions based on user data and preferences.
- **University Eligibility Assessment:**
Components used for assessing a user's eligibility for various universities are reused within the university exploration feature.
- **Result Display Components:**
The display components for presenting career suggestions and university eligibility results are reused across relevant sections.

3.4 Technology Architecture

- **Platform:**
The application will be designed to run on the MERN (MongoDB, Express.js, React, Node.js) stack, ensuring a robust and scalable foundation.
- **System Hosting:**
Hosting will be cloud-based, leveraging services like AWS or Azure for flexibility, scalability, and efficient resource management.
- **Connectivity Requirements**
Stable internet connectivity will be a prerequisite, leading to real-time data processing and user interactions
- **Modes of Operations:**
The application will operate in online mode, providing users with instant access to personalized career guidance and educational insights.


4. Screenshots/Prototype

4.1 Workflow



4.2 Screens

LOGIN




Username

Password

Login

[Forgetpassword](#)

Sign-Up



Username

Password

Confirm-Password

Signup

Select A Career

Name

Matriculation Field:

Matriculation Marks:

Intermediate Field

Intermediate Marks:

Your Field Of Interest

SUBMIT

Select A University

Career Field Name

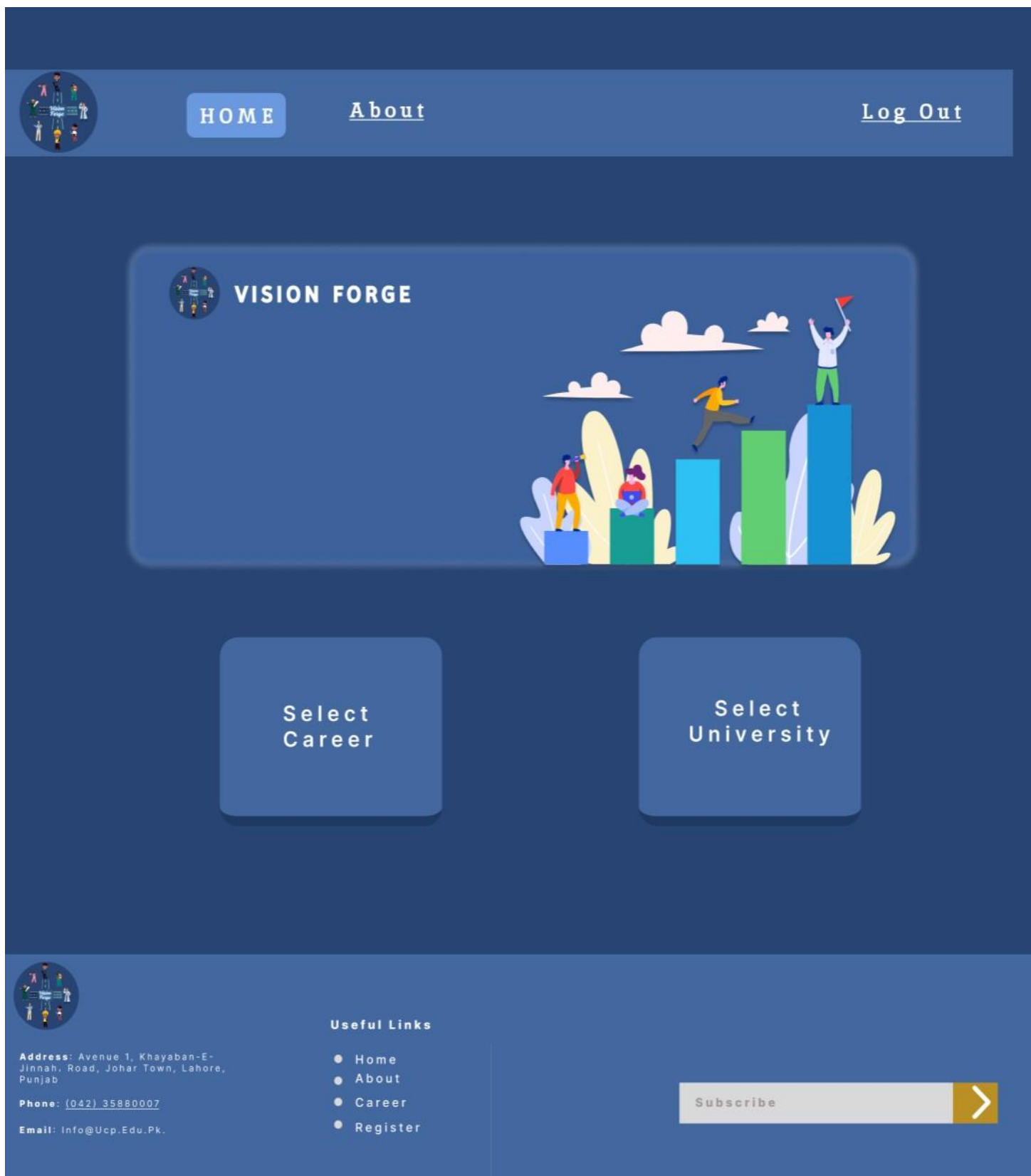
Matriculation Field:

Matriculation Marks:

Intermediate Field

Intermediate Marks:

SUBMIT





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User

Logout

Your Personality Test is Complete

Following is the List Of Careers That Are Suitable For You



Computer
Programmer



Business
Analyst



Electrical
Engineerer



Address: Avenue 1, Khayaban-E-
Jinnah, Road, Johar Town, Lahore,
Punjab

Phone: (042) 35880007

Email: info@Ucp.Edu.Pk.

Useful Links

- Home
- About
- Career
- Register

Subscribe





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Your Personality Test is Complete

Following is the List Of Careers That Are Suitable For You



UCP
UNIVERSITY



FAST
UNIVERSITY



COMSATS
UNIVERSITY



Address: Avenue 1, Khayaban-E-Jinnah, Road, Johar Town, Lahore, Punjab

Phone: (042) 35880007

Email: Info@Ucp.Edu.Pk.

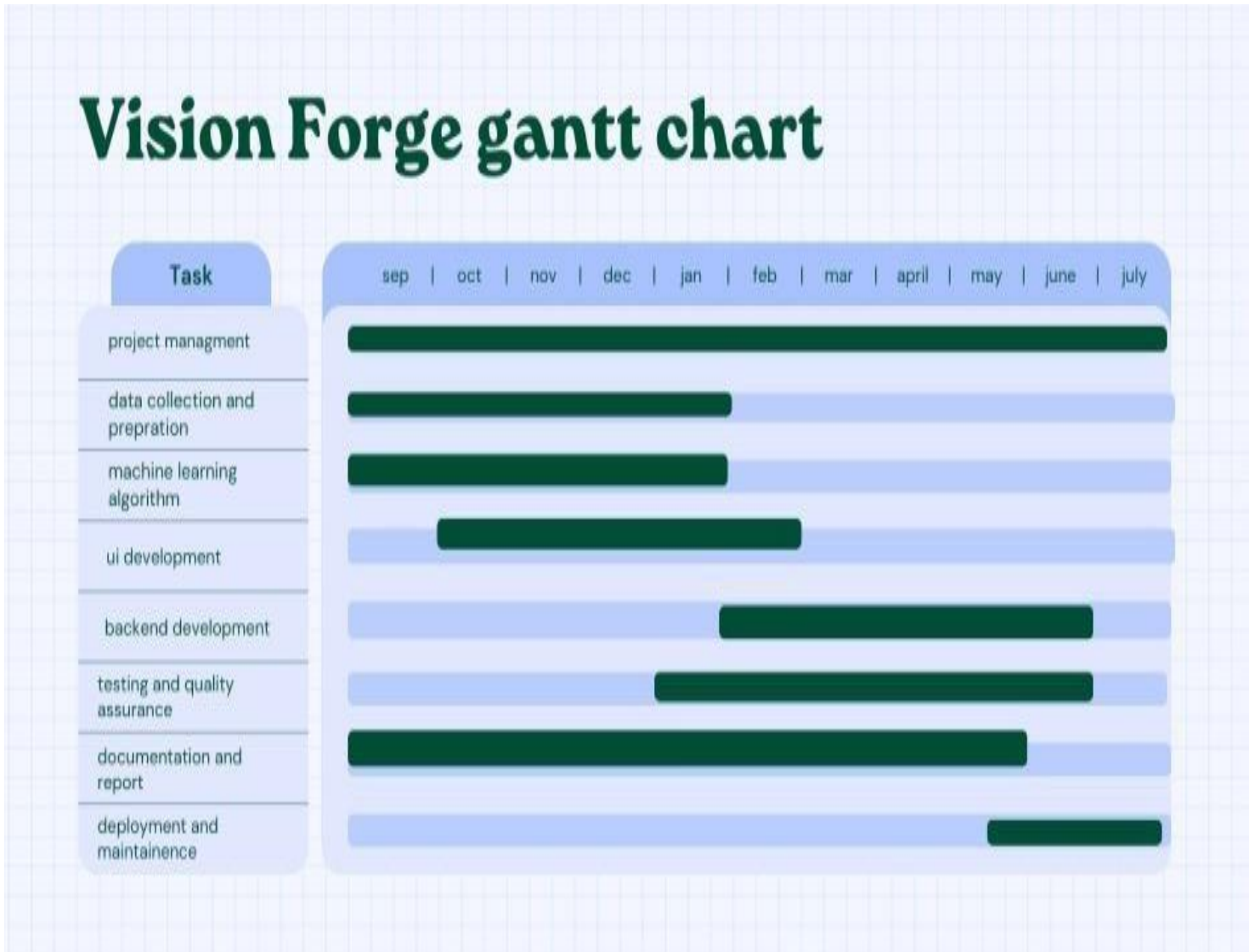
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- Career
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5. Revised Project Plan



6. References

Gorad, R., & Zalte, S. (2021). *Career Counselling Using Data Mining*. *Journal Name*, Volume(Issue), Page range. DOI or Retrieved from <https://www.semanticscholar.org/paper/Career-Counselling-Using-Data-Mining-Gorad-Zalte/8ff4c3420fce4e6e4915767207da2c52d0d6617f>

Vaishnavi Patil. (2021). *Career Guidance ML Project*. Retrieved from <https://github.com/vaishnavipatil29/Career-Guidance-ML-Project>

Figma. (2022). *Collaborative interface design tool*. Retrieved from <https://www.figma.com>

Patel, H., Sanghavi, J., Shah, S., Thacker, S., et al. (Year). *Career Guidance System Using Machine Learning*. *Career Guidance System using Machine Learning*, 9(5). Retrieved from <https://www.ijcrt.org/papers/IJCRT2105009.pdf>

Appendix A: Glossary

Acronym	Full Form
UML	Unified Modeling Language
SDLC	Software Development Life Cycle
AWS	Amazon Web Services
COTS	Commercial off-the-shelf
API	Application Programming Interface

Appendix B: IV & V Report

(Independent verification & validation)

IV & V Resource

Name

Signature

S#	Defect Description	Origin Stage	Status	Fix Time	
				Hours	Minutes
1					
2					
3					
...					

Table 1: List of non-trivial defects