

A
Project Dissertation Report
on

“AI-POWERED : RESUME ANALYZER”

SUBMITTED TO THE PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR
UNIVERSITY, SOLAPUR IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF

BACHELOR OF TECHNOLOGY DEGREE IN
Data Science

SUBMITTED BY

Mr. Shreyash Nandkumar Shastre

Roll No. 41

Ms. Shruti Pravin Thokal

Roll No. 42

Ms. Muskan Usman Makandar

Roll No. 43

Ms. Vaishnavi Dinesh Sakat

Roll No. 44

UNDER THE GUIDANCE OF
Prof. U. S. Gatkul



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
N. B. NAVALE SINHGAD COLLEGE OF ENGINEERING,
SOLAPUR - 413 255
2024-25

AFFILIATED TO



PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY,
SOLAPUR



CERTIFICATE

This is to certify that the dissertation report entitled

“AI Powered : Resume Analyser”

submitted by

Mr. Shreyash Nandkumar Shastre

Roll No. 41

Ms. Shruti Pravin Thokal

Roll No. 42

Ms. Muskan Usman Makandar

Roll No. 43

Ms. Vaishnavi Dinesh Sakat

Roll No. 44

is a bonafide work carried out by above students under the supervision of Prof. U.S. Gatkul and it is submitted towards the fulfillment of the requirement of Punyashlok Ahilyadevi Holkar Solapur University, Solapur for the award of the degree of Bachelor in Technology (Data Science) during academic year 2024-25.

(Prof. U. S. Gatkul)

**Project Guide
Department of CSE**

(Prof. H.T Gurme)

**Head of Department
Department of CSE**

(Dr. Shankar. D. Nawale)

Principal,

N. B. Navale Sinhgad College of Engineering, Solapur.

Place: Solapur

Date : / /



CERTIFICATE

This is to certify that the dissertation report entitled
“AI Powered : Resume Analyser”

submitted by

Mr. Shreyash Nandkumar Shastre

Roll No. 41

Ms. Shruti Pravin Thokal

Roll No. 42

Ms. Muskan Usman Makandar

Roll No. 43

Ms. Vaishnavi Dinesh Sakat

Roll No. 44

is a bonafide work carried out by above student under the supervision of Prof. U.S. Gatkul and it is submitted towards the fulfillment of the requirement of Punyashlok Ahilyadevi Holkar Solapur University, Solapur for the award of the honour degree of Bachelor in Technology (Data Science) during academic year 2024-25.

Internal Examiner Name & Sign:

External Examiner Name & Sign :

Place : Solapur

Date : / /

DECLARATION

We hereby declare that the work embodied in this Project Dissertation Report Entitled **“AI Powered : Resume Analyzer”** is carried out by us in partial fulfillment of the Honour degree in Technology (Data Science) from N. B. Navale Sinhgad College of Engineering, Solapur and we have not submitted the same to any other University/Institute for the award of any other degree.

Mr. Shreyash Shastre

Ms. Shruti Thokal

Ms. Muskan Makandar

Ms. Vaishnavi Sakat

Place: Solapur

Date : / /

ACKNOWLEDGEMENT

We feel profound happiness in forwarding this dissertation report as an image of sincere efforts. Our sincere thanks to respected **Prof. U. S. Gatkul**, our project guide, for providing healthy environment and facilities in the department. He allowed us to raise our concern and worked to solve it by extending his co-operation time to time.

Our Project Guide has been a constant source of inspiration and helping us for selecting the topic, contents, giving valuable suggestions to complete project, preparation of project dissertation report and presentation.

We give our special thanks to respected Head of Department Prof. Harish Gurme for their constant interest and encouragement throughout the completion of our project.

Goal makes us to do work. Vision is more important than goal which makes us to do work in the best way to make work equally the best. Thanks to our respected Principal, Dr. Shankar. D. Nawale for his support and vision.

We express our deep gratitude to all staff members who lend me their valuable support and cooperation to enable me to complete my project successfully. We also thankful to all friends for their extended support and valuable guidance.

Mr. Shreyash Shastre

Ms. Shruti Thokal

Ms. Muskan Makandar

Ms. Vaishnavi Sakat

ABSTRACT

Artificial Intelligence (AI) has become the new normal, profoundly transforming our way of living. Its widespread adoption in businesses and corporations has streamlined processes, enhanced productivity, improved efficiency, and reduced costs. In particular, the integration of AI with human resource management (HRM) practices is revolutionizing how organizations recruit, manage, and engage their workforce.

AI empowers machines to make decisions with greater accuracy than humans by analyzing existing data sets and behavioral patterns. This shift has enabled machines to assume many manual tasks, allowing HR professionals to focus on more strategic roles.

Understanding the intricacies of AI and its applications in various HRM functions is essential for companies and professionals alike. This paper reviews the insights of prominent researchers to explore how AI is transforming human resource management, highlighting both the significant benefits and the hidden challenges associated with its implementation, while also considering its future potential in the field.

Dissertation Outline

The dissertation is organized chronologically in terms of the objectives accomplished.

Chapter One gives information about AI Powered : Resume Analyzer along with scope, objectives and needs.

Chapter Two gives literature review on the relevant areas required for the current research which contains approaches considered for network performance.

Chapter Three gives complete design of the system along with system architecture, Analysis models, UML diagrams.

Chapter Four gives overview on which type of system we need to run our application.

Chapter Five gives technical aspects such as languages, application modules, technological discussions etc.

Chapter Six gives approaches of testing and different test cases to test application.

Chapter Seven gives result and its discussions.

Chapter Eight gives and conclusion of application and result.

References lists the bibliography for the system.

Contents

1	INTRODUCTION	1
1.1	Introduction to Project	1
1.2	Problem Statement	1
1.3	Scope and Objectives	1
1.3.1	Scope	1
1.3.2	Objective	2
1.4	Identification of Need	2
1.5	Unique Features of the System	3
1.6	Applications	3
2	LITERATURE REVIEW	4
2.1	Literature Review	4
2.2	Existing Systems	5
2.3	Software Requirement Specification Document	6
2.4	SDLC Model	8
3	SYSTEM DESIGN	10
3.1	System Architecture.....	10
3.2	Analysis model.....	12
3.2.1	Entity Relationship Diagram.....	12
3.2.2	DFD Level 0.....	14
3.3	UML Diagrams.....	17
3.3.1	Use Case Diagram.....	17
3.3.2	Class Diagram.....	19
3.3.3	Activity Diagram.....	20
3.3.4	State Chart Diagram.....	21
3.3.5	Sequence Diagram.....	22
4	REQUIREMENT SPECIFICATION	23
4.1	Hardware Requirements.....	24
4.2	Software Requirements.....	24
5	IMPLEMENTATION	25
5.1	Technologies used for Implementation.....	25
5.1.1	Introduction to Languages.....	25
5.1.2	Integrated Development Environments.....	26
5.1.3	Technologies Used For Implementation.....	26
5.1.4	Algorithm/Library/API Used.....	27
5.2	Project Scheduling (using GANTT charts).....	28
5.3	Module 1:Login.....	28
5.4	Module 2: menus and navigation menu.....	29

6	Testing	33
6.1	Test Plan	33
6.2	Functional Testing	34
6.3	Non-Functional Testing	36
7	RESULT ANALYSIS AND DISCUSSION	37
8	CONCLUSION AND FUTURE SCOPE	39

List of Figures

2.1	Software Development Life Cycle	8
3.1	System Architecture	10
3.2	ER Diagram	12
3.3	DFD Level 0	14
3.4	DFD Level 1	15
3.5	DFD Level 2	16
3.6	Use Case Diagram	17
3.7	Class Diagram.....	19
3.8	Activity Diagram	20
3.9	State Chart Diagram	21
3.10	Sequence Diagram.....	22
3.11	Deployment Diagram	23
5.1	Gantt Chart.....	28
5.2	User Authentication	29
5.3	Menus and navigation menu	30
5.4	Chatbot	32
7.1	RMSE	38

List of Tables

- 6.1 Functional Testing 35
- 7.1 Performance Metrics of Sequential Neural Network 37

Chapter1

INTRODUCTION

1.1 Introduction to Project

Artificial Intelligence (AI) is revolutionizing human resource management, particularly through the development of smart resume analyzers. These technologies enable machines to intelligently assess and process candidate information, enhancing recruitment efficiency across various sectors, including finance, healthcare, and marketing. The growing reliance on AI in HR stems from its ability to mimic human cognitive functions, allowing organizations to streamline hiring processes and make data-driven decisions.

Smart resume analyzers employ advanced techniques like data mining, machine learning, and natural language processing to evaluate resumes. This has transformed traditional recruitment methods, enabling HR professionals to quickly identify qualified candidates based on specific criteria. By automating the screening process, these tools reduce the time spent on manual evaluations and help eliminate biases, promoting a more diverse workforce.

The implementation of AI in HR has led to a deeper understanding of how data can drive organizational performance. AI systems analyze external data, learn from patterns, and adapt to achieve recruitment goals, providing insights that support strategic decision-making. As businesses face rapid changes in their environments, the need for agile and responsive hiring processes has never been more critical.

This review aims to highlight the applications, benefits, and challenges of smart resume analyzers in HRM, emphasizing their role in enhancing efficiency and effectiveness in recruitment. By utilizing secondary data from relevant studies, this paper explores the future opportunities that AI presents in reshaping the recruitment landscape.

1.2 Problem Statement

This project investigates the transformative impact of AI on human resource management (HRM), focusing on its benefits, integration challenges, and potential biases. It aims to provide actionable insights for organizations to effectively leverage AI, enhancing HR practices and improving workforce management and decision-making processes..

1.3 Scope and Objectives

1.3.1 Scope

Explore AI Integration: Examine how smart resume analyzers are integrated into HRM practices.

Identify Benefits: Articulate key benefits of AI technologies, such as improved efficiency and cost reduction.

Assess Challenges: Analyze challenges in AI implementation, focusing on data quality and algorithmic bias.

Evaluate Future Potential: Assess future opportunities and implications of AI in HRM for innovation and competitiveness.

Provide Recommendations: Offer actionable insights for HR professionals on leveraging AI technologies effectively. Create a platform for community building and awareness.

Objective

- **Primary Objectives:**

Explore AI Integration:

Examine how smart resume analyzers are integrated into human resource management practices.

Identify Benefits:

Articulate the key benefits AI technologies bring to HR functions, including efficiency improvements, cost reductions, and enhanced decision-making.

Assess Challenges:

Analyze the challenges organizations face in implementing AI in HR, particularly regarding data quality and algorithmic bias.

- **Secondary Objectives:**

Evaluate Future Potential:

Assess future opportunities and implications of AI in HRM, focusing on fostering innovation and competitiveness within organizations.

Provide Recommendations:

Offer actionable insights and recommendations for HR professionals on effectively leveraging AI technologies in their practices.

1.4 Identification of Need

Efficiency in Recruitment:

Organizations face increasing applicant volumes, necessitating faster and more efficient candidate evaluation processes. AI can automate resume screening, significantly reducing time-to-hire.

Quality of Hire:

Traditional manual methods often overlook qualified candidates due to human biases. AI enhances the quality of hiring by analyzing data-driven insights, ensuring a more thorough evaluation.

Data-Driven Decision-Making:

Businesses need to leverage data to make informed hiring decisions. Smart resume analyzers provide analytical capabilities, allowing HR teams to base decisions on concrete evidence rather than intuition.

Bias Reduction:

The recruitment process is often susceptible to unconscious bias. AI tools can help mitigate this by standardizing evaluations and promoting diversity and inclusion in hiring practices.

1.5 Unique Features of the System

Advanced Natural Language Processing (NLP): This feature enables the system to understand context and nuances in resumes, allowing for more accurate assessments beyond simple keyword matching.

Customizable Evaluation Criteria: Organizations can tailor evaluation parameters to align with specific job roles and company objectives, ensuring a focused hiring process.

Bias Mitigation Algorithms: The system incorporates algorithms designed to identify and reduce unconscious bias in candidate evaluations, promoting diversity and inclusion in hiring.

Real-Time Analytics and Reporting: Provides instant insights on candidate pools, helping HR professionals make data-driven decisions and optimize recruitment strategies efficiently.

1.6 Applications

Talent Acquisition: AI-powered resume analyzers can be used by HR departments to streamline the recruitment process, quickly screening large volumes of resumes to identify top candidates.

Performance Prediction: By analyzing historical hiring data, the system can predict candidate success rates, assisting organizations in making informed hiring decisions based on past outcomes.

Employee Development: The insights gained from resume analysis can inform training and development programs, helping HR tailor initiatives to the strengths and weaknesses of the workforce.

Chapter 2

LITERATURE REVIEW

A literature survey, also known as a literature review or a systematic review, is a critical examination and synthesis of existing literature on a particular topic or research question. It serves to provide a comprehensive overview of the existing knowledge, theories, concepts, and findings related to a specific area of study.

2.1 Literature Review

1. Evolution of Resume Analyzers and AI in HRM:

The integration of AI technologies in human resource management has transformed traditional recruitment practices. According to Kumar and Singh (2021), advancements in machine learning and natural language processing have significantly enhanced the capabilities of resume analyzers. Early systems focused primarily on keyword matching, while modern tools utilize sophisticated algorithms to understand context and semantics in candidate resumes. This evolution not only improves the efficiency of candidate screening but also allows organizations to align hiring processes with strategic goals, thereby enhancing overall talent acquisition.

2. Impact of AI on Bias Reduction in Recruitment:

Research by Binns (2020) highlights the potential of AI-driven resume analyzers to mitigate unconscious bias in hiring. By employing standardized evaluation criteria, these tools promote fairer assessments and help create a more diverse workforce. The study emphasizes that while AI can reduce human biases, the quality of training data remains critical. If the data used to train these algorithms is biased, it can inadvertently perpetuate discrimination. Thus, ongoing vigilance is necessary to ensure that AI implementations support equitable hiring practices.

3. Effectiveness and Challenges of AI-Powered Tools in HR:

A comprehensive analysis by Miller et al. (2022) found that organizations using AI resume analyzers experienced a 30% reduction in time-to-hire while maintaining high-quality candidates. However, the study also identified significant challenges, such as algorithmic bias and the need for high-quality data inputs. The authors argue that for AI tools to be effective, organizations must invest in data management and continuously refine their algorithms based on real-world outcomes. This dual focus on effectiveness and ethical considerations is crucial for successful AI adoption in HRM.

2.2 Existing Systems

1. Applicant Tracking Systems (ATS)

Overview: ATS are vital tools for HR departments, designed to automate the management of resumes during recruitment.

Key Features: They filter resumes through keyword matching, extract essential candidate information, and provide analytics on hiring efficiency.

Limitations: These systems can overlook qualified candidates who don't use specific keywords and often fail to capture the nuances of skills and experiences.

2. Smart Resume Screening Tools

Overview: Smart resume screening tools enhance traditional ATS by leveraging AI technologies for deeper resume analysis.

Key Features: They employ Natural Language Processing (NLP) for contextual understanding, use algorithms to minimize bias, and incorporate predictive analytics to assess candidate success.

Limitations: Their implementation can be complex and costly, relying heavily on the quality of training data for effectiveness.

3. AI-Powered Recruitment Platforms

Overview: These comprehensive platforms integrate various recruitment functions,

streamlining the entire hiring process.

Key Features: They automate workflows for tasks like scheduling interviews, enhance candidate experience with AI-driven chatbots, and analyze data from multiple sources for complete candidate profiles.

Limitations: Concerns around privacy arise from using personal data, and integrating these systems can be challenging, especially for organizations with legacy systems.

2.3 Software Requirement Specification Document

User Registration/Login:

- **Objective:** Enable users to create accounts or log in securely with their email and password, and provide a seamless password recovery process.
- **Description:** Users can register for an account using their email and a secure password. Registered users can log in with their credentials. If users forget their password, the system provides an option to reset it through email verification.

Resume Upload and Parsing:

- **Objective:** Allow users to upload resumes for analysis and extract key information efficiently.
- **Description:** Users can upload resumes in various formats (PDF, Word, etc.). The system will parse the resumes to extract relevant details such as contact information, work experience, education, and skills.

Candidate Assessment:

- **Objective:** Evaluate resumes against job requirements and rank candidates based on qualifications.
- **Description:** The system assesses uploaded resumes against predefined criteria, scoring candidates based on their skills and experience. It provides a ranking system to help HR professionals identify the most suitable candidates.

Bias Mitigation Mechanism:

- **Objective:** Identify and reduce potential biases in the candidate evaluation process.
- **Description:** The system analyzes historical hiring data to detect bias patterns and implements adjustments in the ranking algorithms to ensure fair assessments.

Analytics Dashboard:

- **Objective:** Provide insights into the recruitment process and candidate demographics.
- **Description:** The application generates visual reports and dashboards showing metrics such as time-to-hire, diversity statistics, and candidate pool trends, enabling HR teams to make data-driven decisions.

User Management:

- **Objective:** Allow administrators to manage user accounts and control access levels.
- **Description:** Administrators can create, update, and delete user accounts, assign roles, and set permissions to ensure secure access to the system's functionalities.

Feedback and Recommendations:

Objective: Offer actionable insights and recommendations for improving candidate profiles.

- **Description:** After resume analysis, the system provides personalized feedback to candidates on how to enhance their resumes, including suggestions on skills to highlight or qualifications to pursue.

2.4 SDLC Model

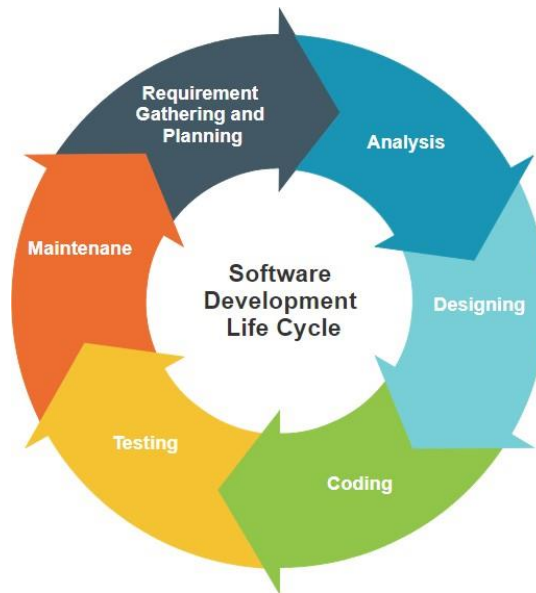


Figure 2.1: Software Development Life Cycle

Requirement Gathering and Planning:

In this phase, we collected essential information to ensure our system meets the project's objectives.

- **Consulting Experts:** Engaged with HR professionals to understand the criteria for effective resume evaluation, desired features, and privacy concerns related to candidate data.
- **Identifying Technical Requirements:** Determined the platform for deployment (web application), AI technologies to be used (NLP, machine learning), and data storage solutions (cloud-based databases).
- **Functional and Non-Functional Requirements:** Discussed the necessary functionalities (resume parsing, candidate ranking) and quality attributes (performance, usability, reliability) required for the application.

Analysis:

In this phase, we analyzed user needs to define system requirements.

- **User Needs:** Identified what HR professionals seek from the application, including efficient resume screening and data-driven insights.
- **Functional Requirements:** Listed the functionalities the system should provide, such as automated resume analysis and feedback mechanisms.
- **User Experience:** Considered how users will interact with the application and identified potential usability issues to enhance user satisfaction.

Designing:

During the designing phase, we focused on the conceptual and physical aspects of the application.

- **Architecture Design:** Established how the system will process resumes, including data flow and interaction with users.
- **User Interface (UI) Design:** Created an engaging and intuitive interface that allows HR professionals to easily upload resumes and view analytics.
- **Database Design:** Structured a secure database to store user data and parsed resume information.
- **AI Modeling:** Defined the machine learning algorithms for resume scoring and bias detection based on user input and historical data.

Coding:

In this phase, we translated design documents into functional code.

- **Environment Setup:** Configured the necessary development environment for building the application.
- **Implementing Designs:** Developed the application using suitable programming languages and tools (e.g., Python, JavaScript, libraries for NLP).

Testing:

During the testing phase, we ensured the application meets all specified requirements and is free of bugs.

- **Unit Testing:** Verified individual components (e.g., resume parser, scoring algorithm) for correct functionality.
- **Integration Testing:** Ensured that all system components work together seamlessly, particularly the interaction between resume uploads and the assessment algorithm.
- **System Testing:** Conducted comprehensive tests to confirm that the application meets all specified requirements.
- **User Acceptance Testing (UAT):** Involved potential users to validate that the system meets their needs and expectations, ensuring ease of use and effective results.

Maintenance:

Once the software is deployed, ongoing maintenance is crucial for its long-term success.

- **Providing Updates and Patches:** Regularly added new features or improved existing ones based on user feedback.
- **Monitoring System Performance:** Continuously monitored application performance to make necessary adjustments and ensure optimal functioning.

Chapter 3

SYSTEM DESIGN

3.1 System Architecture

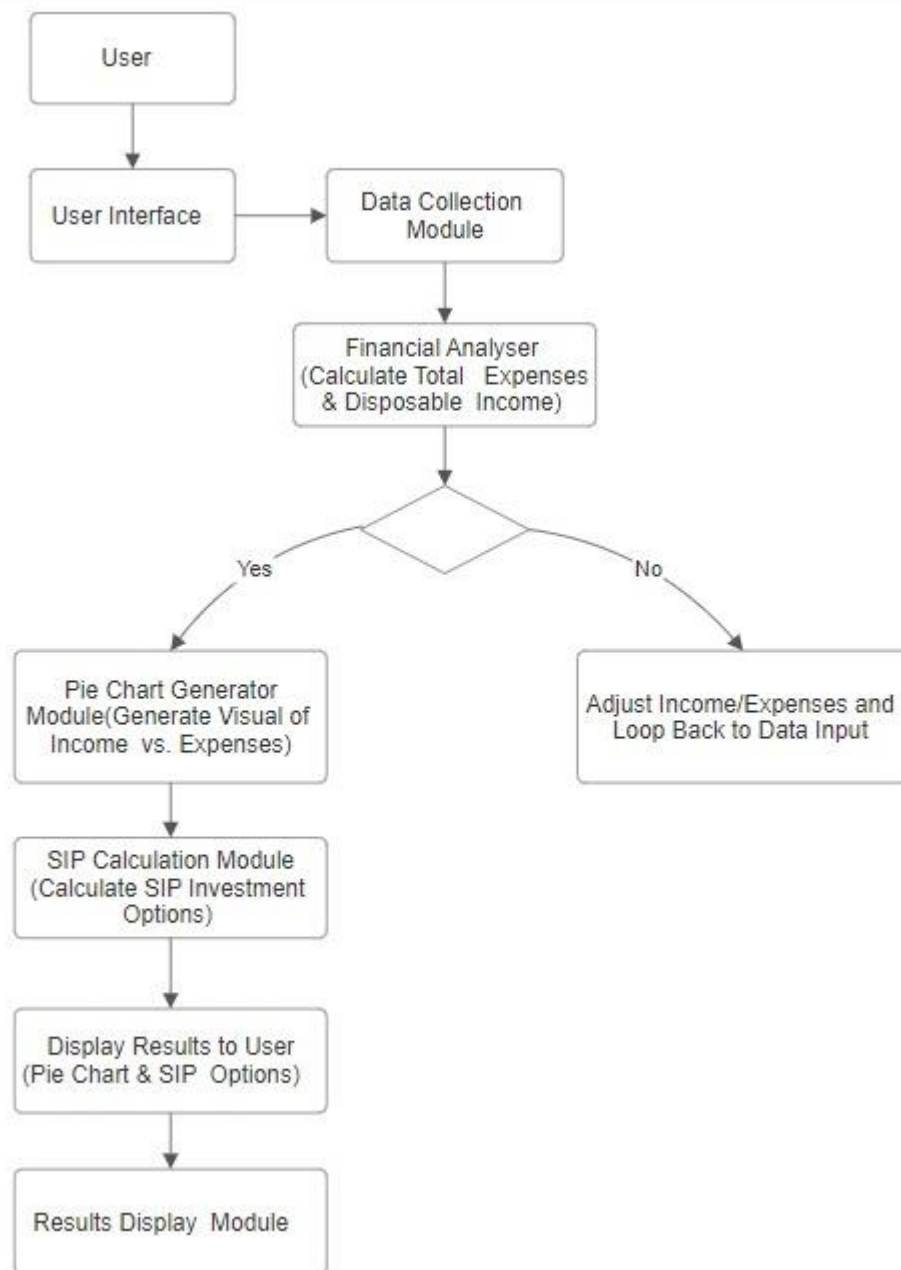


Figure 3.1: System Architecture

1. User:

- The user interacts with the system via a *User Interface*.

2. Data Collection Module:

- The *User Interface* feeds data into the *Data Collection Module*, which gathers necessary input from the user (like salary, expenses, etc.).

3. Financial Analyzer:

- The *Data Collection Module* sends data to the *Financial Analyzer*, which calculates total expenses and disposable income based on the provided inputs.

4. *Decision Branch:

- The system presents two paths based on user input:
 - *Yes*:
 - Proceeds to the *Pre-Created Generated Module* that calculates various income and investment options.
 - The *SIP Calculation Module* computes SIP (Systematic Investment Plan) investment options.
 - Results are displayed to the user, including tax details and SIP options.
 - *No*:
 - The user is asked to adjust their income and expense details and resubmit.

5. Result Display:

- After processing, the system displays the results back to the user.

3.2 Analysis model

3.2.1 Entity Relationship Diagram

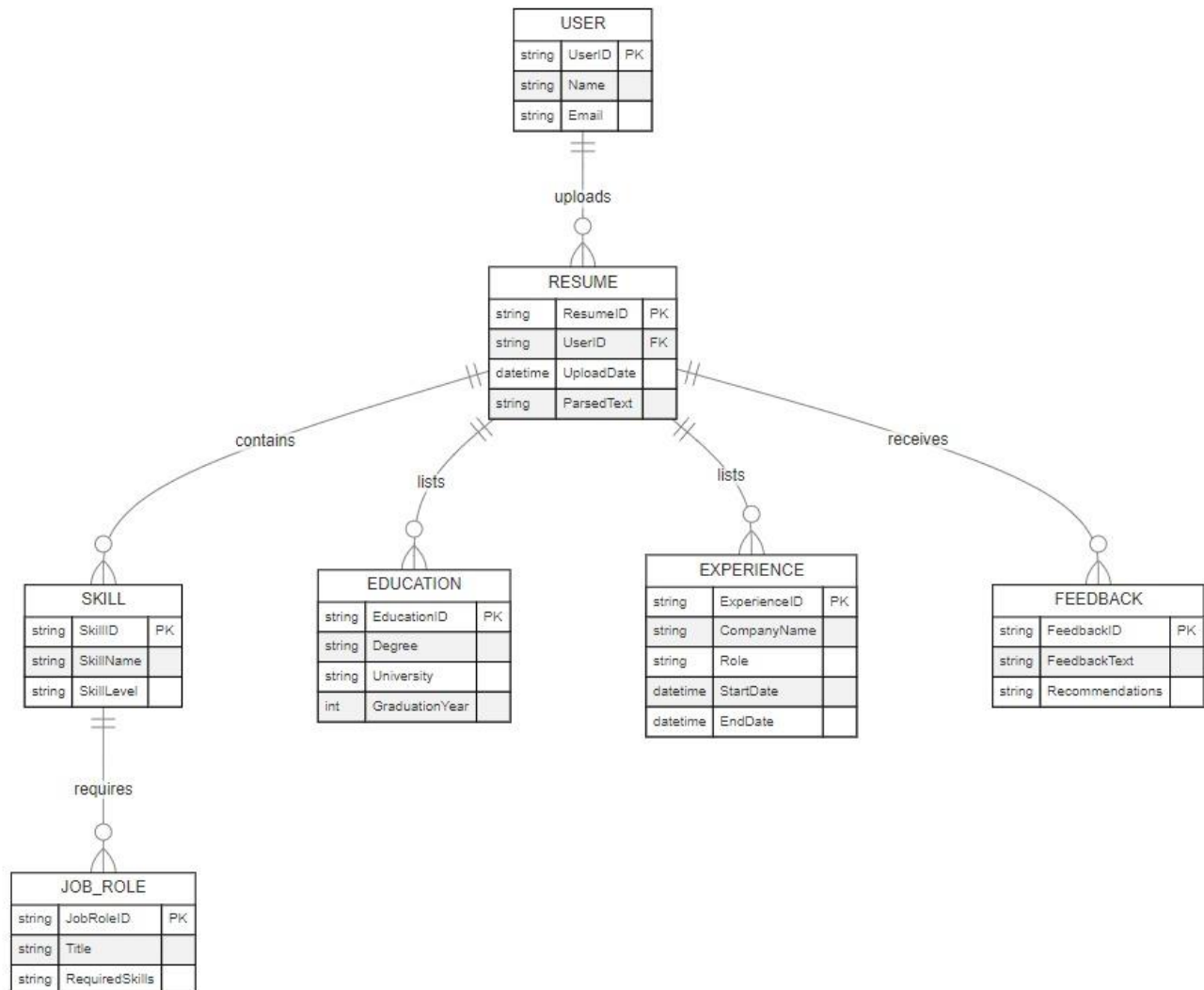


Figure 3.2: ER Diagram

An Entity-Relationship (ER) diagram is a visual representation of the relationships between entities in a database. It illustrates the structure of a database schema and the entities (such as tables or classes) within it, as well as the relationships between those entities. ER diagrams use various symbols, including rectangles to represent entities, lines to represent relationships, and diamonds to represent relationship attributes. They help in understanding the organization and connections between different entities in a database, aiding in database design, communication, and documentation. ER diagrams serve as a blueprint for database development and are a valuable tool in the early stages of system analysis and design.

attributes. In an ER diagram, entities are depicted as rectangles and are labelled with their corresponding entity names.

Attribute: An attribute represents a characteristic or property of an entity. It

describes the data that can be stored for a specific entity. Attributes are depicted as ovals and are connected to their respective entities.

Primary Key: A primary key is an attribute or a combination of attributes that uniquely identifies each instance of an entity. It ensures the uniqueness and integrity of the entity's data.

Foreign Key: A foreign key is an attribute in one entity that refers to the primary key of another related entity. It establishes a relationship between the entities, enabling data associations and referential integrity.

Relationship: A relationship represents an association or connection between two or more entities. It describes how entities interact or are related to each other. Relationships are depicted as diamonds and are labeled to describe the nature of the association, such as "has," "belongs to," or "works for."

Weak Entity: A weak entity is an entity that depends on another entity for its existence. It does not have its own unique identifier and relies on a relationship with a parent entity for identification.

Relationship Degree: The relationship degree refers to the number of entities involved in a relationship. A binary relationship involves two entities, while a ternary relationship involves three entities. These terminologies form the foundation of an ER diagram, allowing for the clear representation and understanding of entities, attributes, relationships, and their interactions in a system or database.

3.2.2 DFD Level 0

A Data Flow Diagram (DFD) is a graphical representation that illustrates how data moves within a system or process. It visually depicts the flow of data between various components, such as processes, data stores, and external entities. DFDs use standardized symbols to represent these components and data flows, making them easily understandable and communicative. They aid in system analysis, design, and documentation by helping stakeholders visualize and comprehend the data flow and interactions within a system. DFDs are valuable tools for identifying system inputs, outputs, data transformations, and storage, contributing to effective communication and decision-making during system development.

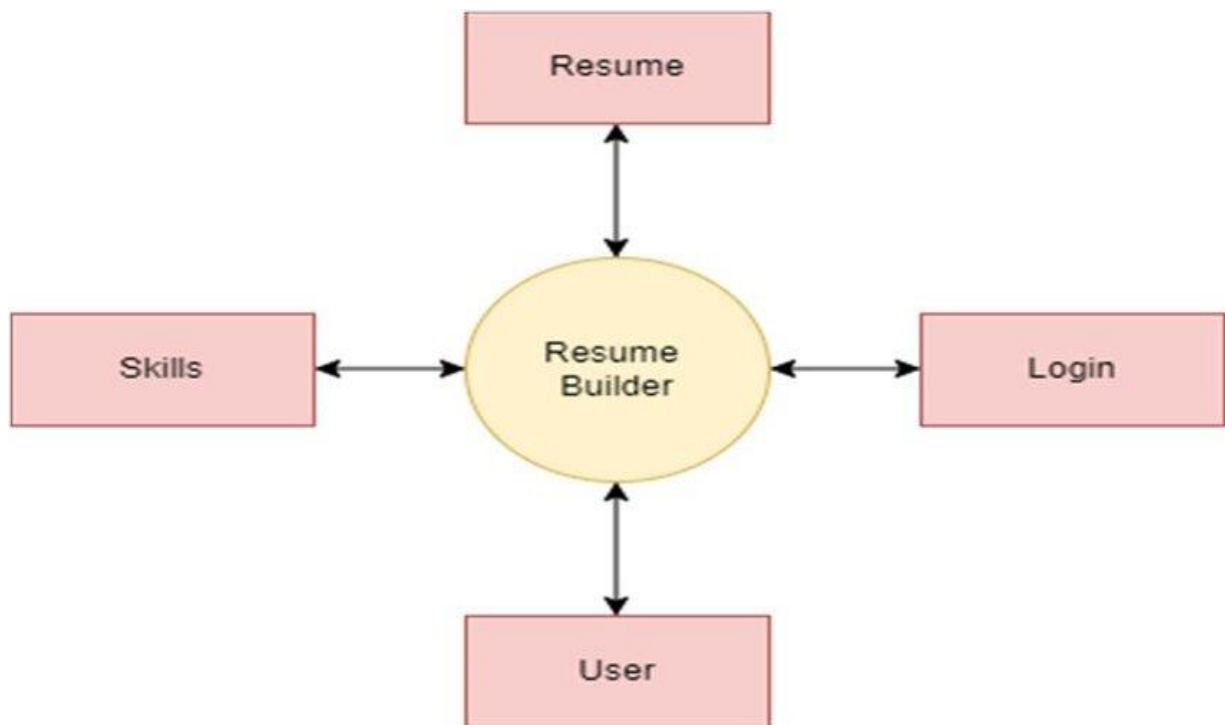


Figure 3.3: DFD Level 0

DFD Level 0, also known as the Context Diagram, is a high-level representation of the entire system or process being analyzed. It provides an overview of the system's interactions with external entities and shows the major processes involved. The Level 0 DFD abstracts away the internal complexities of the system and focuses on the overall flow of data between external entities and major processes. It helps define the system's boundaries and scope by highlighting the data inputs and outputs between the system and external entities. The Level 0 DFD serves as a starting point for further decomposition into more detailed DFDs at lower levels.

3.2.3 DFD Level 1

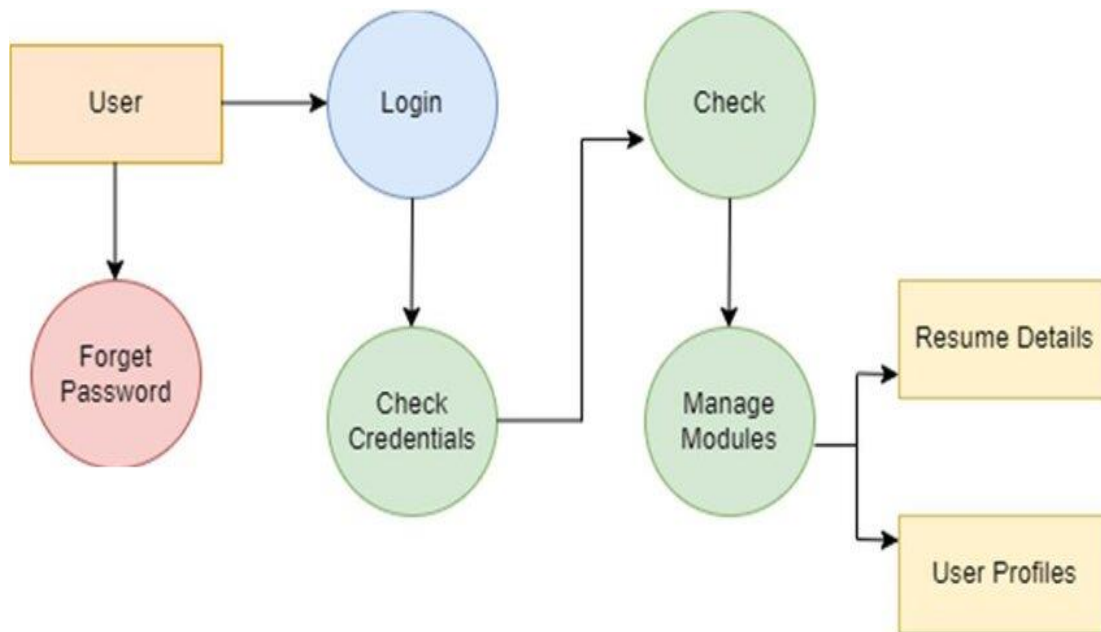


Figure 3.4: DFD Level 1

DFD Level 1 provides a detailed breakdown of the system or process, focusing on the internal components and their interactions. It is the final level of the DFD hierarchy for your report. At Level 1, the major processes identified in the Level 0 DFD are decomposed into smaller subprocesses or subfunctions. Each process in Level 1 is represented with its own set of inputs, outputs, and data flows. The Level 1 DFD illustrates the internal data flows within each process, showing how data moves and is transformed between subprocesses. It captures the relationships and dependencies between different components, including processes, data stores, and external entities, within the system.

3.2.4 DFD Level 2

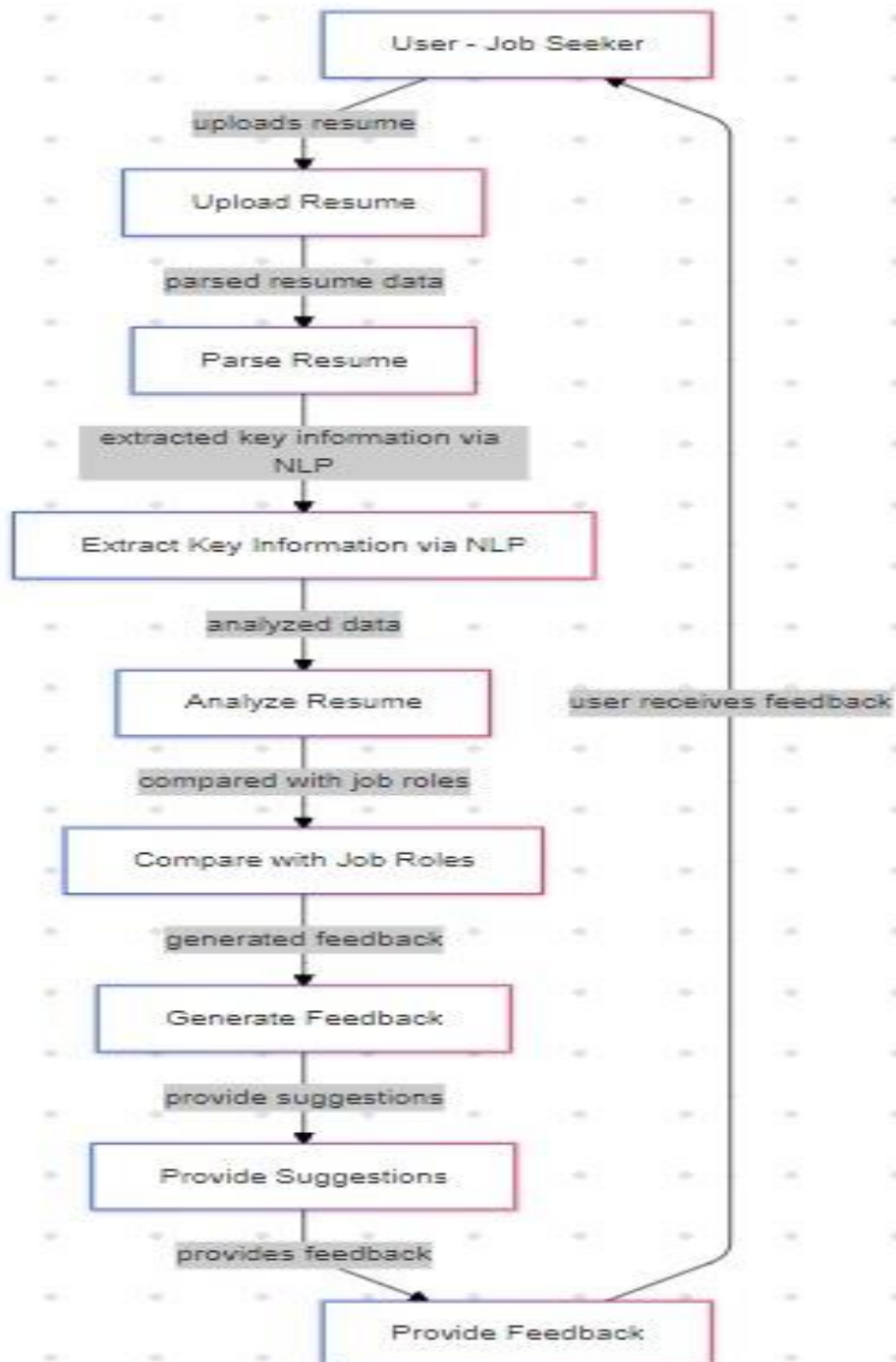


Figure 3.5: DFD Level 2

2-Level provides an even more detailed view of the system by breaking down the sub-processes identified in the level 1 Data Flow Diagram (DFD) into further sub- processes. Each sub-process is depicted as a separate process on the level 2 DFD. The data flows and data stores associated with each sub-process are also shown.

2-Level Data Flow Diagram (DFD) goes one step deeper into parts of 1-level DFD.It can be used to plan or record the specific/necessary detail about the system's func- tioning.

3.3 UML Diagrams

3.3.1 Use Case Diagram

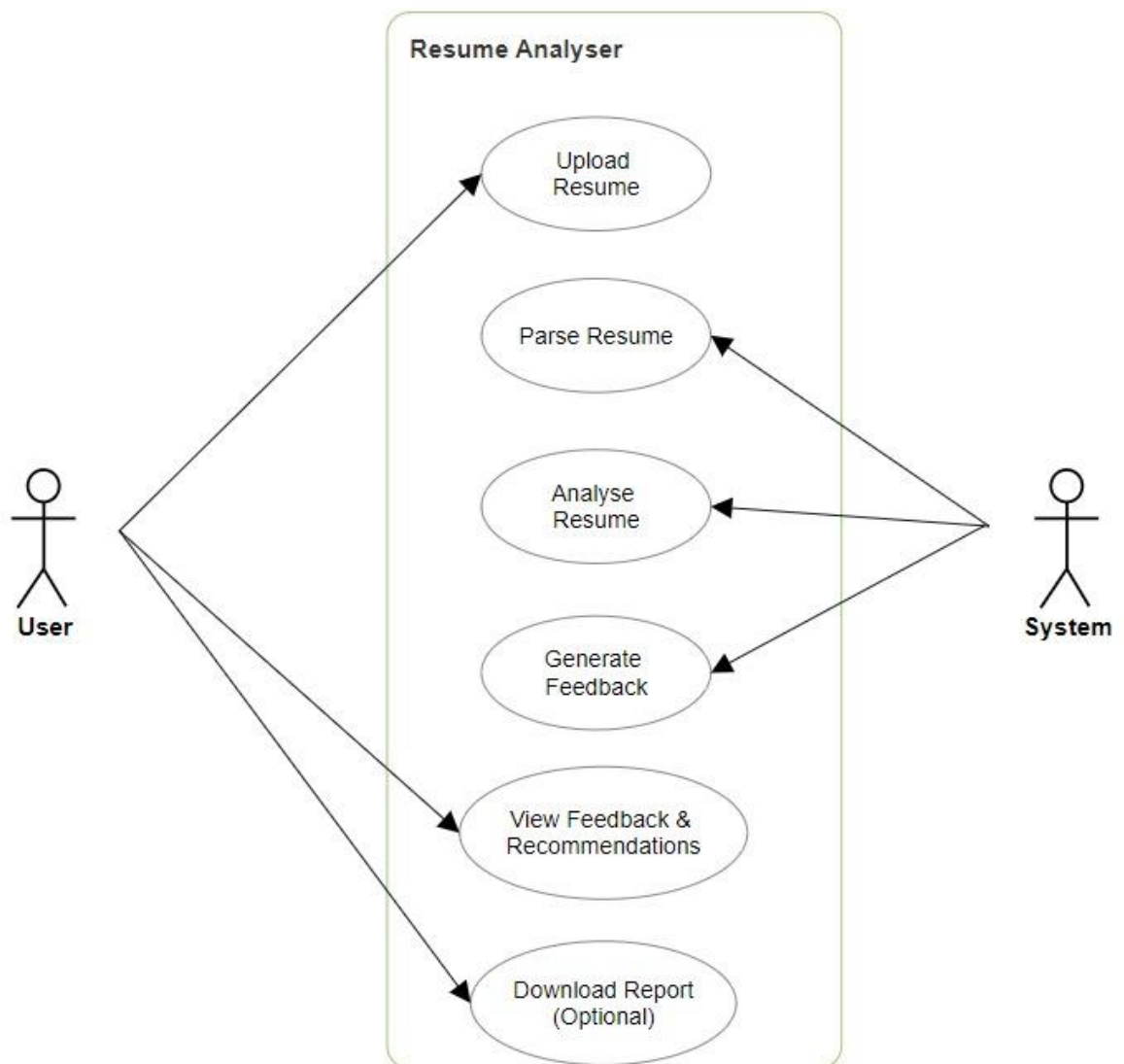


Figure 3.6: Use Case Diagram

A use case diagram is a type of behavioral diagram in Unified Modeling Language (UML) that depicts the interactions between a system (referred to as the subject) and the external actors or entities that interact with the

system. Use case diagrams are widely used in software development to represent the functionality and behavior of a system from a user's perspective.

Terminologies used in use case diagrams:

1. **Actor:** An actor is an external entity that interacts with the system. Actors can be human users, other systems, or external entities such as hardware devices. Actors are represented by stick figures in use case diagrams.
2. **Use Case:** A use case represents a specific functionality or behavior of the system from the perspective of an actor. It describes a sequence of interactions between the actor and the system to achieve a specific goal. Use cases are represented by ovals or ellipses in use case diagrams.
3. **System Boundary:** The system boundary, also known as the system box, defines the scope or boundary of the system being represented in the use case diagram. It separates the system from its external actors and shows the context in which the system operates.
4. **Association:** An association represents the relationship between an actor and a use case. It shows that an actor is associated with or can interact with a specific use case. Associations are typically depicted as lines connecting actors to use cases.

Use case diagrams provide a visual representation of system functionality and the interactions between actors and the system. They aid in requirements analysis, system design, and communication among stakeholders, helping to ensure a clear understanding of the system's behavior and user interaction.

3.3.2 Class Diagram

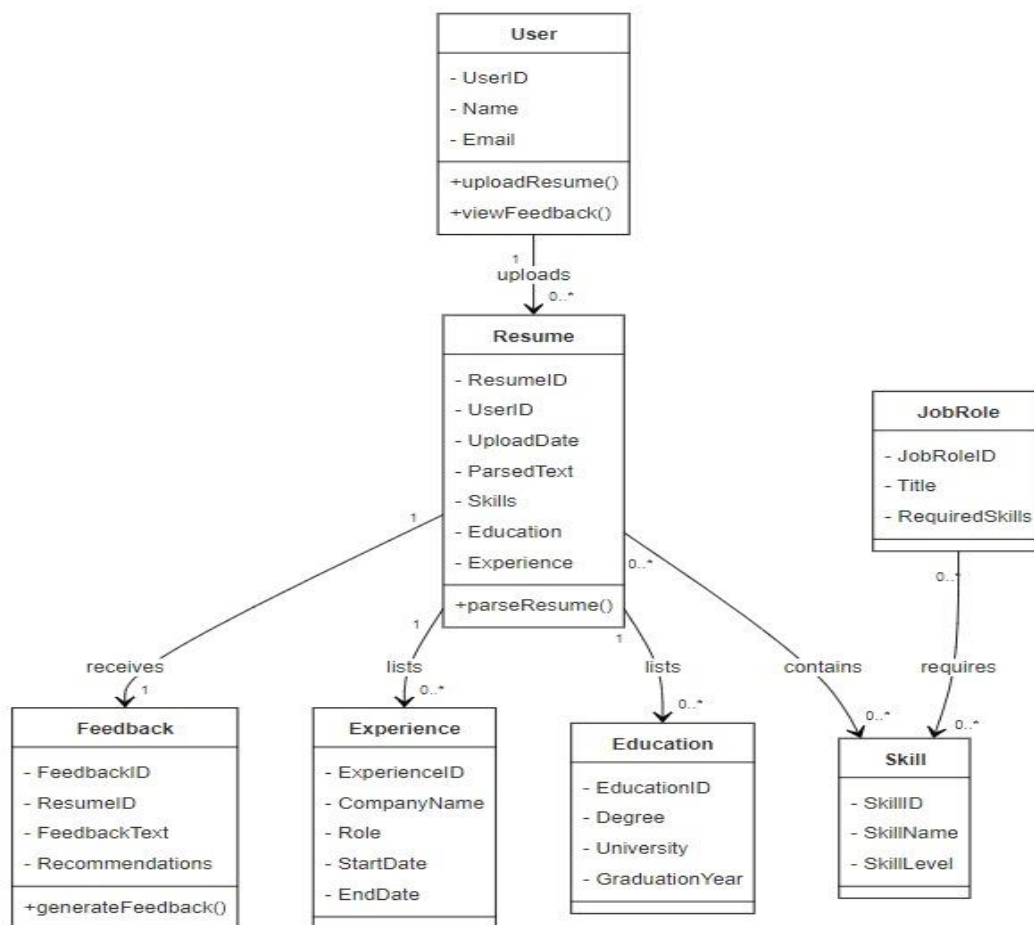


Figure 3.7: Class Diagram

The class diagram depicts a static view of an application. It represents the types of objects residing in the system and the relationships between them. A class consists of its objects, and also it may inherit from other classes. A class diagram is used to visualize, describe, document various different aspects of the system, and also construct executable software code. It shows the attributes, classes, functions, and relationships to give an overview of the software system. It constitutes class names, attributes, and functions in a separate compartment that helps in software development. Since it is a collection of classes, interfaces, associations, collaborations, and constraints, it is termed as a structural diagram.

3.3.3 Activity Diagram

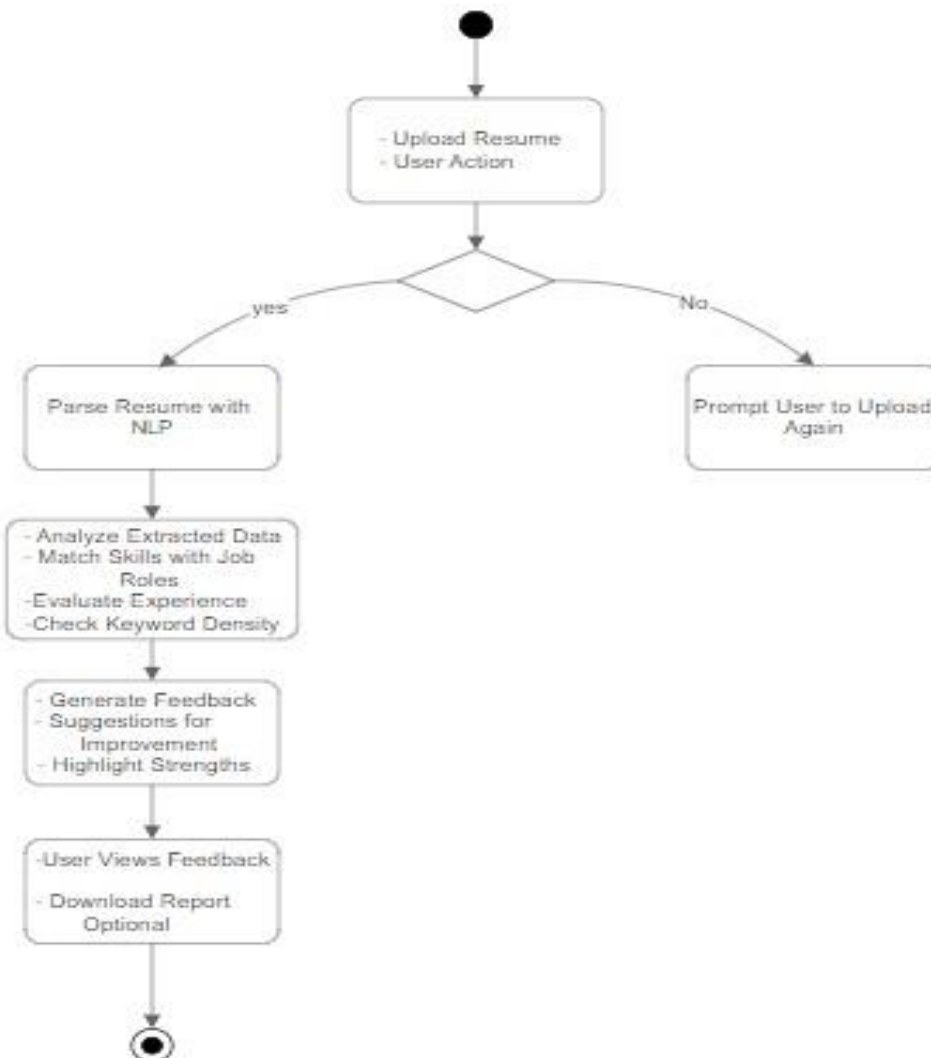


Figure 3.8: Activity Diagram

An activity diagram is a graphical representation of workflows or processes, depicting the sequence of activities, actions, and decision points. It provides a visual understanding of how different components interact and communicate within a system. Activity diagrams can be used to model complex business processes, software systems, or even everyday activities. They help in identifying bottlenecks, optimizing processes, and ensuring efficient resource allocation.

3.3.4 State Chart Diagram

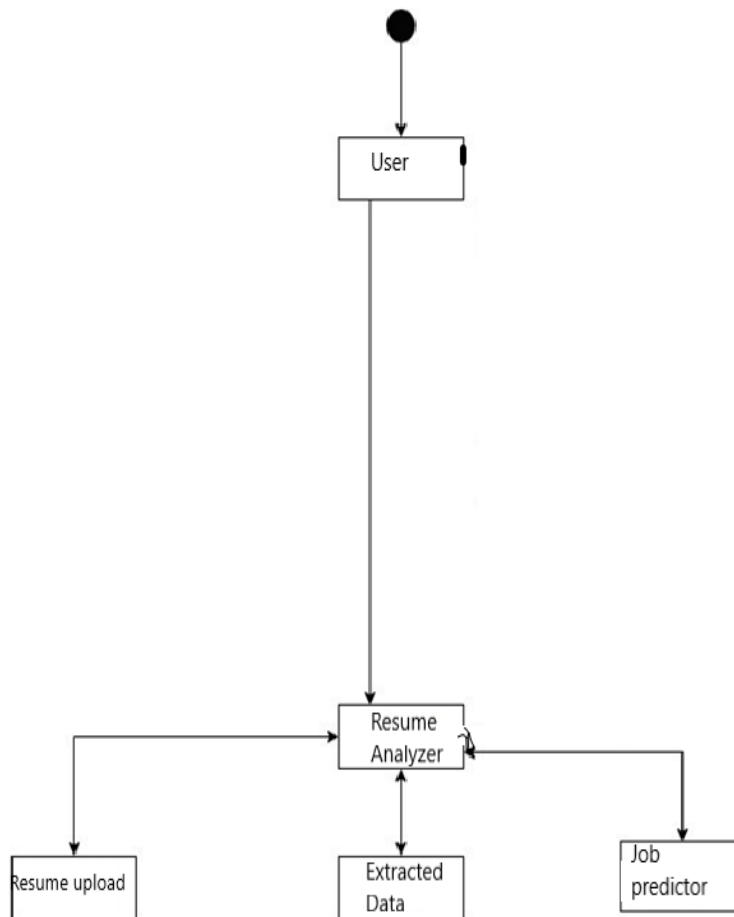


Figure 3.9: State Chart Diagram

A state diagram visually represents the possible states of a system, the events that trigger transitions between these states, and the actions taken in response to those events. It helps to understand system behavior and design control strategies effectively.

3.3.5 Sequence Diagram

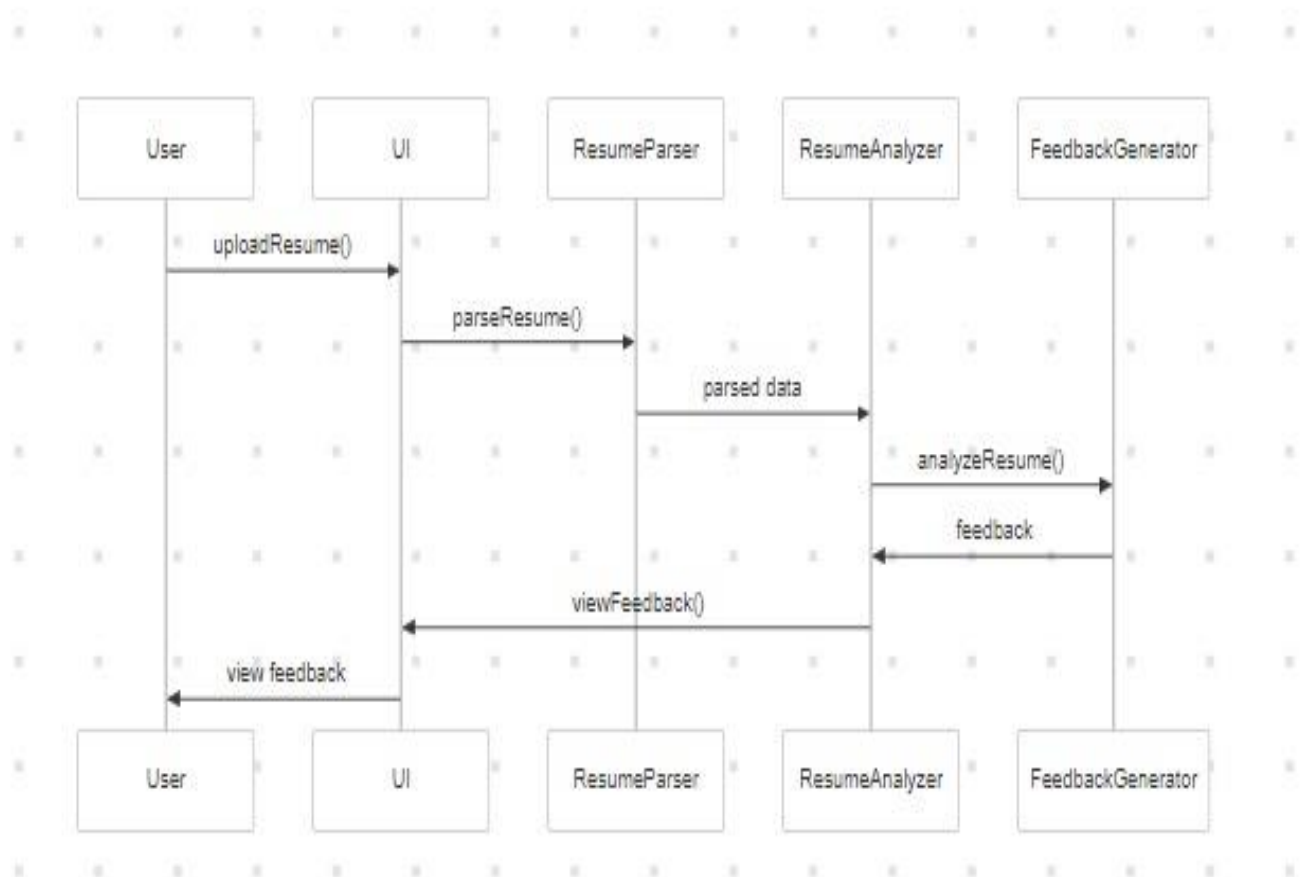


Figure 3.10: Sequence Diagram

UML Sequence Diagrams are interaction diagrams that detail how operations are carried out. They capture the interaction between objects in the context of a collaboration. Sequence Diagrams are time focus and they show the order of the interaction visually by using the vertical axis of the diagram to represent time what messages are sent and when.

3.3.6 Deployment Diagram

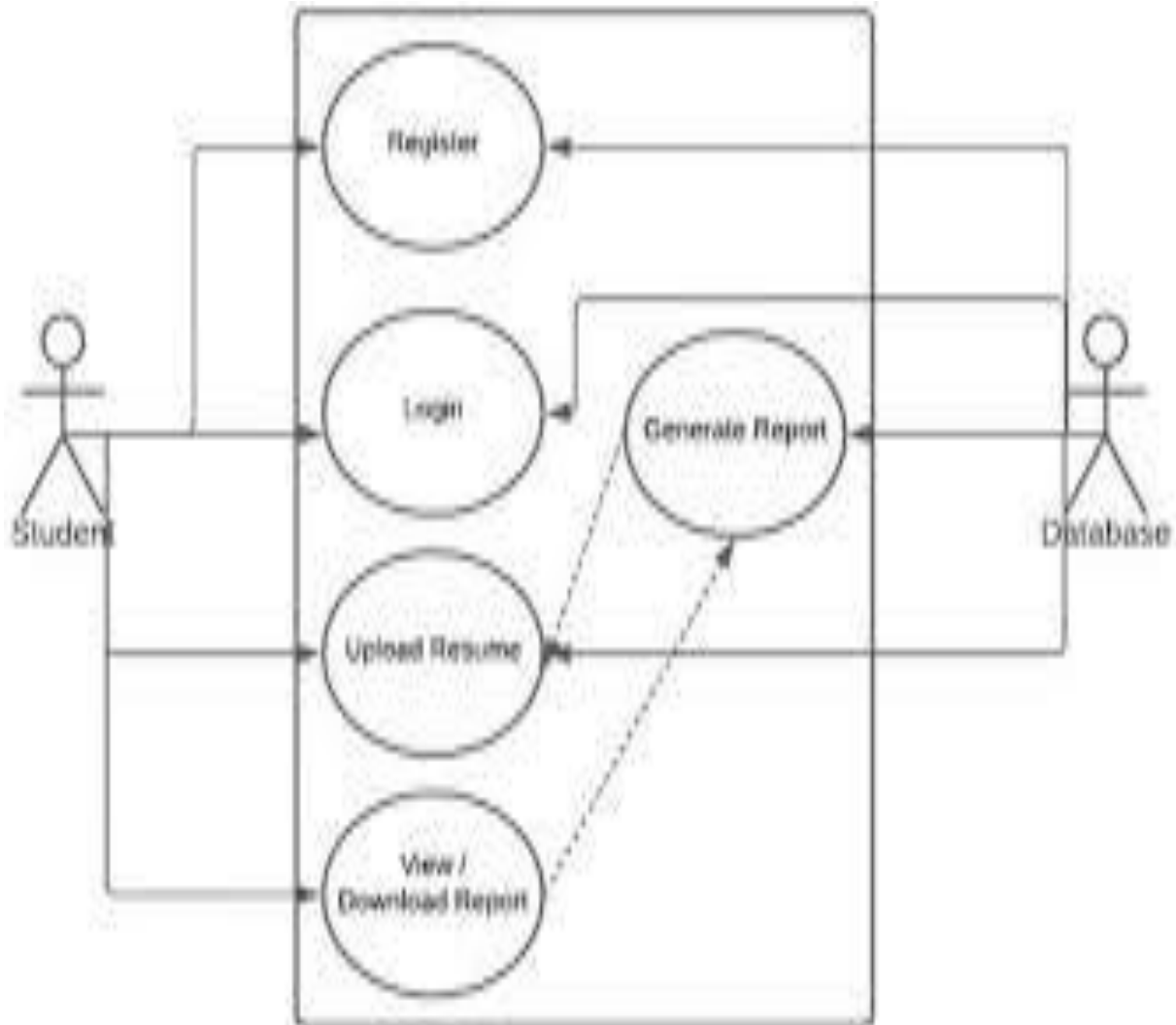


Figure 3.11: Deployment Diagram

A UML deployment diagram is a diagram that shows the configuration of run time processing nodes and the components that live on them. Deployment diagrams is a kind of structure diagram used in modeling the physical aspects of an object-oriented system. They are often be used to model the static deployment view of a system (topology of the hardware).

Chapter 4

REQUIREMENT SPECIFICATION

4.1 Hardware Requirements

Personal Computer

Ram : Minimum 4 GB

Memory : Minimum 256 GB

Processor : Minimum Intel i5

Mobile

Ram : Minimum 4 GB

Memory : Minimum 8 GB

Android Version : OS version 7+

4.2 Software Requirements

Viasual Studio

Python

Flask

Chapter5

IMPLEMENTATION

5.1 Technologies used for Implementation

5.1.1 Introduction to Languages

1. HTML :

The HTML code constructs a clean and straightforward interface for the AI-Powered Resume Analyzer. It features a main heading that clearly states the purpose of the application and includes a form with an input field for users to upload their resumes in supported formats like PDF and Word documents.

A submit button initiates the analysis process. Additionally, a dedicated results section is included to display the analysis output or feedback to the user after the resume is processed. This layout is designed to be user-friendly, ensuring that users can easily navigate the application and understand how to interact with it.

2. JavaScript :

The JavaScript code enhances the functionality of the application by handling user interactions and processing uploaded resumes. It listens for the form submission, preventing the default refresh behavior to allow for seamless user experience.

When a user uploads a resume, the script reads the file using the FileReader API, which reads the file's content as text. Once the file is successfully read, it simulates a resume analysis by displaying the content in the results section.

This approach not only provides immediate feedback but also sets the stage for future enhancements, such as integrating AI algorithms to analyze the resume for keywords, qualifications, and overall suitability for specific job postings. By structuring the code in this way, the application is both responsive and extensible, allowing for ongoing

development and improvement.

3. Python :

Python is a popular programming language known for its simplicity, readability, and versatility. It's widely used in various domains, including artificial intelligence (AI) and natural language processing (NLP).

AIML, or Artificial Intelligence Markup Language, is an XML dialect used for creating chatbots and virtual assistants. It provides a framework for defining patterns and responses for conversational agents.

Python is often used alongside AIML for implementing the logic of chatbots and virtual assistants. Python's extensive libraries, such as NLTK (Natural Language Toolkit) and TensorFlow, make it well-suited for tasks like text processing, sentiment analysis, and machine learning.

Developers can use Python to parse AIML files, process user input, generate responses, and manage the conversational flow of AI-powered applications.

Python's flexibility and ease of integration with other technologies make it a popular choice for implementing the AI components of Android applications, such as chatbots or voice assistants.

5.1.2 Integrated Development Environments

1. Visual Studio :

Android Studio is the official Integrated Development Environment (IDE) for Android App development. It is a powerful tool that allows developers to build high-quality applications for the Android platform. It has complete tools for the process of Android App development. From writing code to testing and deployment, Android studio has all the functionalities for developers to develop an Android App.

From beginner to advanced developers, it is a very common IDE for developing high-quality Android applications. And as a tech enthusiast, you should have a basic understanding of this tool as well. So in this article, we will guide you through the process of setting up Android Studio on your computer.

5.1.3 Technologies Used For Implementation

1. Python
2. Flask
3. JavaScript

1. JavaScript:

Usage: The JavaScript code enhances the functionality of the application by handling user interactions and processing uploaded resumes. It listens for the form submission, preventing the default refresh behavior to allow for seamless user experience. When a user uploads a resume, the script reads the file using the FileReader API, which reads the file's content as text.

2. Flask:

Usage: Flask is a lightweight and flexible web framework for Python, designed to make it easy to build web applications. It follows the WSGI (Web Server Gateway Interface) standard and is known for its simplicity and minimalism, allowing developers to quickly set up and prototype applications.

3. Python:

Usage: Python is a popular programming language known for its simplicity, readability, and versatility. It's widely used in various domains, including artificial intelligence (AI) and natural language processing (NLP).

–

5.1.4 Algorithm/Library/API Used

Algorithm:

Sequential model TensorFlow Lite :A Sequential model in TensorFlow Lite is a simple neural network architecture where layers are organized sequentially. Input data flows through the layers, undergoing transformations, and producing output. After training, the model can be converted to TensorFlow Lite format for efficient deployment on mobile and embedded devices.

Libraries:

Flask: Flask is a lightweight and flexible web framework for Python, designed to make it easy to build web applications. It follows the WSGI (Web Server Gateway Interface) standard and is known for its simplicity and minimalism, allowing developers to quickly set up and prototype applications.

Keras: A high-level neural networks API, Keras simplifies the development and training of deep learning models, potentially used for dosha classification within the Prakruti assessment system.

NumPy: Essential for numerical computations and array operations NumPy provides efficient data manipulation capabilities, aiding in data preprocessing and model training.

scikit-learn (sklearn): This machine learning library offers a wide range of tools and algorithms for data mining and analysis. It likely contributes to tasks such as data preprocessing, feature selection, and model evaluation.

Pandas: Pandas is a versatile data manipulation library, particularly adept at handling structured data. It facilitates data preprocessing, cleaning, and manipulation tasks, ensuring data readiness for model training and evaluation.

Matplotlib: Used for creating static, interactive, and animated visualizations in Python, Matplotlib enables the visualization of data distributions, trends, and model performance metrics, aiding in model evaluation and result interpretation.

5.2 Project Scheduling (using GANTT charts)

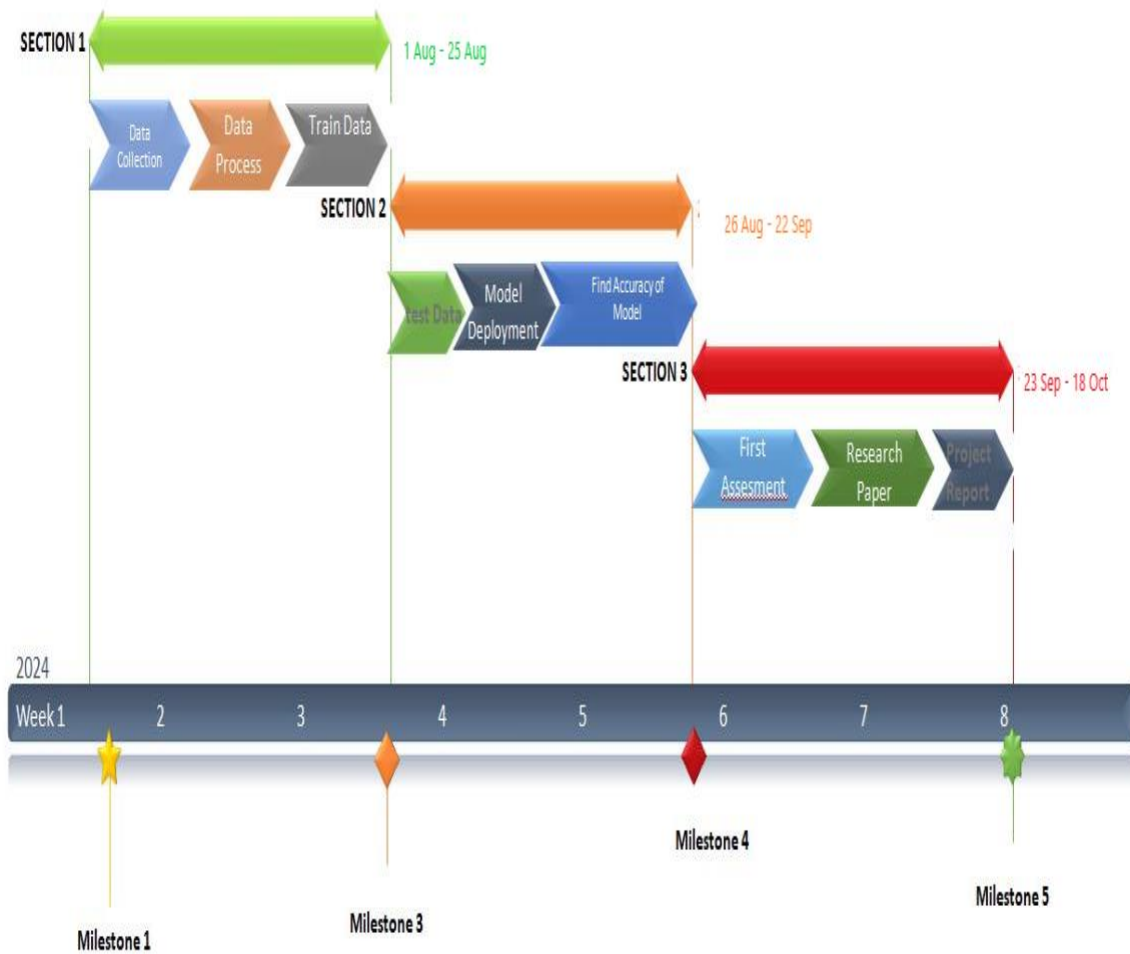


Figure 5.1: Gantt Chart

5.3 Module 1:Login

Objective:

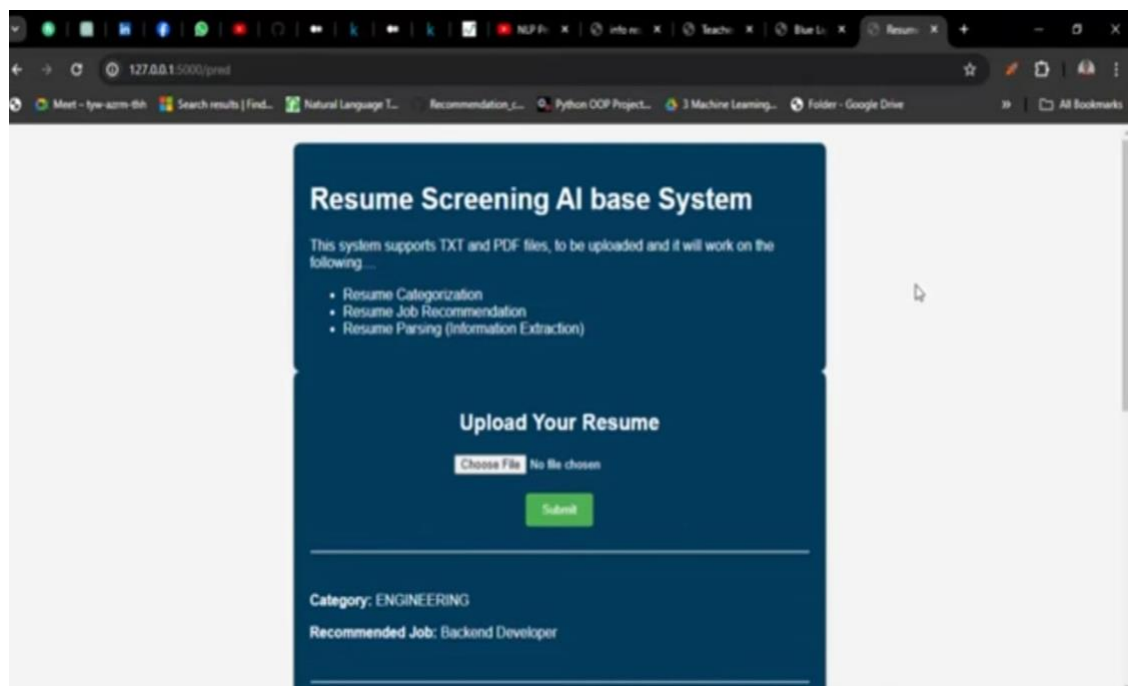
- Allow users to create accounts or log in securely with their username and password.

Description:

- User Registration: Users can sign up for an account by providing their fullname, email, and password.
- Login: Registered users access the app using their username and password.
- Forgot Password: Provide users with an option to reset their password if forgotten.

Technologies Used:

- flask: Used to create the Web Page app interface for login purposes.
- Javascript Authentication: Handles user authentication securely, including login, registration, and password reset functionalities.



5.4 Module 2: menus and navigation menu

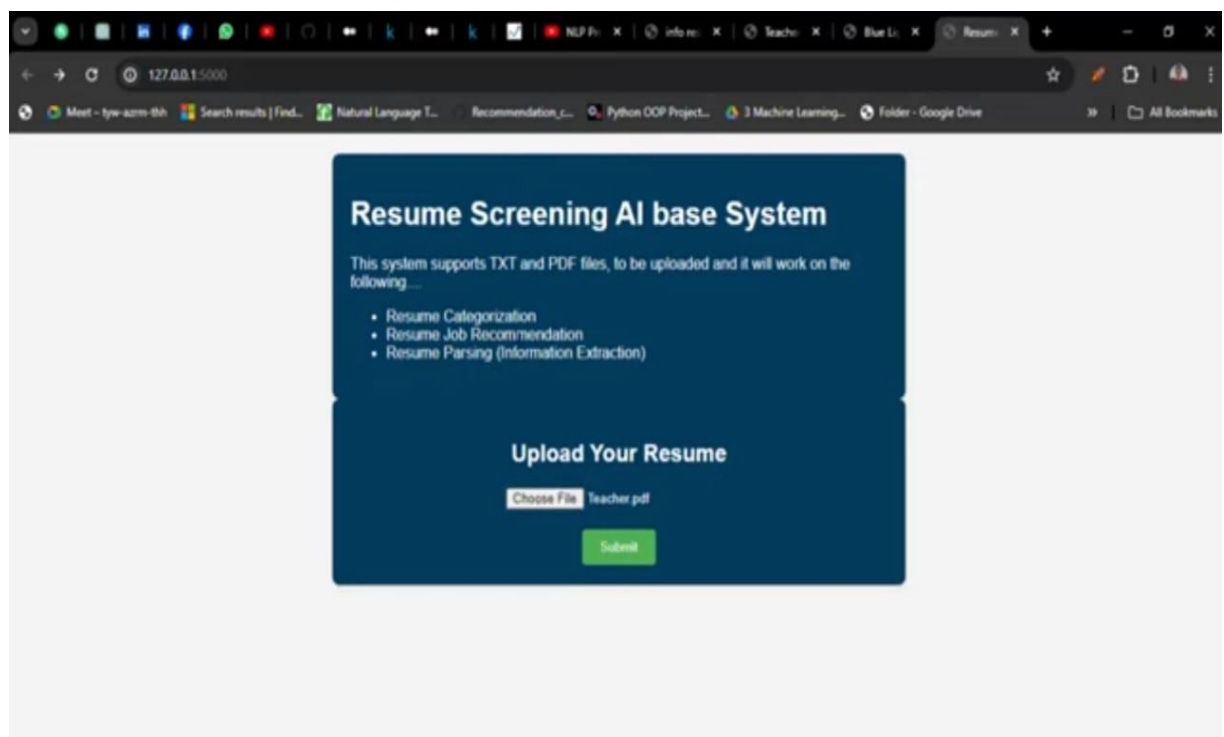
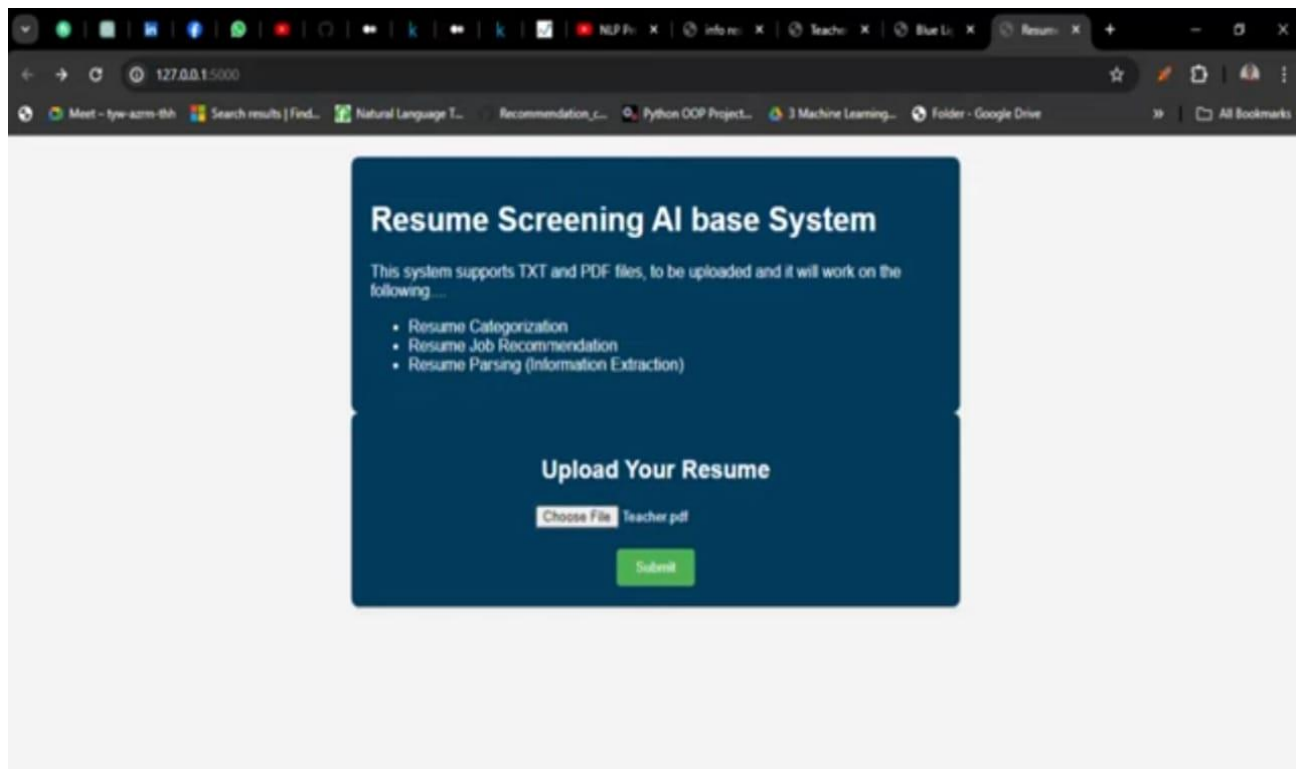
Objective: The objective of Module 2 is to enable users to upload complete files (such as resumes) and display the analysis results effectively. This module aims to streamline the process of data input and provide instant feedback, enhancing the user experience.

Technology Used:

- **Frontend:**
 - **HTML/CSS:** For creating the user interface and styling.
 - **JavaScript:** For handling file uploads and processing user interactions.
- **Backend:**
 - **Flask:** A Python web framework to manage requests, process uploaded files, and perform analysis.
 - **Pandas/Numpy:** For data manipulation and analysis of the uploaded files.

Technology Stack:

1. **Frontend Technologies:**
 - HTML, CSS, JavaScript
2. **Backend Technologies:**
 - Flask (Python)
3. **Data Processing Libraries:**
 - Pandas
 - Numpy



Chapter6

Testing

Testing in software development is a crucial process of evaluating a software system or application to ensure that it meets the specified requirements and performs as expected. It involves executing various test cases and scenarios to identify defects, errors, or inconsistencies. Testing helps improve the quality and reliability of software by uncovering issues early in the development lifecycle. It encompasses activities such as test planning, test case creation, test execution, and defect reporting. Through systematic and rigorous testing, software developers can validate the functionality, performance, usability, security, and other critical aspects of the software to deliver a high-quality product to end-users

6.1 Test Plan

Test Objectives:

- Ensure that the AI-Powered Resume Analyzer accurately evaluates resumes and provides relevant feedback.
- Confirm that the application effectively processes various file formats (PDF, Word) without errors.
- Validate the feature that identifies key skills and qualifications from resumes, ensuring accurate extraction.
- Check if the tool effectively assesses the suitability of candidates based on predefined criteria.
- Evaluate the user interface to ensure it is intuitive and provides a seamless experience for uploading and viewing results.
- Verify that the system can handle multiple concurrent users without performance degradation..

Testing Approach:

- **Unit Testing:** Test each feature individually, such as resume upload, file processing, and feedback generation.
- **Integration Testing:** Evaluate how well different components (uploading, analysis, and feedback display) work together.
- **System Testing / User Acceptance Testing:** Test the entire application as a whole to ensure it meets user expectations and functional requirements.

Test Cases:

- Create scenarios to assess the application's performance with various types of resumes (e.g., different industries and formats).
- Check for input validation errors, ensuring the system handles incorrect or unsupported file types gracefully.

Test Execution and Reporting:

- Execute the tests according to the testing plan and document the results comprehensively.
- **Provide detailed reports outlining what features were tested, findings, issues encountered, and recommendations for improvement.**

Test Environment:

- Execute the tests according to the testing plan and document the results comprehensively.
- Provide detailed reports outlining what features were tested, findings, issues encountered, and recommendations for improvement.

Test Schedule and Resources:

- Develop a timeline for testing activities, specifying when each test will be conducted and members responsible for each task.
- Allocate sufficient time for thorough testing and ensure all team members

understand their roles in the testing process.

Risk Assessment:

- Identify potential risks that could impact testing, such as performance issues under load or discrepancies in resume analysis.
- Create a mitigation plan for addressing these risks, including fallback strategies and additional testing resources if needed.

6.2 Functional Testing

Functional testing is a crucial part of the testing process for the proposed solution. It focuses on verifying that the system meets its functional requirements. The approach includes unit testing for individual components, integration testing to ensure seamless communication between components, system testing for end-to-end validation, and user acceptance testing to ensure usability. Regression testing is performed to ensure that changes do not impact previously tested functionalities. Functional testing ensures that the solution functions as intended and meets the needs of stakeholders and end-users.

Table 6.1: Functional Testing

ID	Test Cases	Input	Expected Output	Actual Output	Status
1	User Registration	Username: test-user, Password: Test@123, Email: test@example.com	Account is created and user is redirected to the home screen	Account is created and user is redirected to the home screen	Pass
2	User Login	Username: test-user, Password: Test@123	User is logged in and redirected to the home screen	User is logged in and redirected to the home screen	Pass
3	Access Home Menu	User clicks on Home menu	FAQs about resume are displayed	FAQs about resume are displayed	Pass
4	Access Explore Menu	User clicks on Explore menu	resumes Buttons are displayed	resumes Buttons are displayed	Pass
5	Access Assessment Menu	User clicks on Assessment menu	Assessment form is displayed with questions related to lifestyle, body type, hair type, skin type, etc.	Assessment form is displayed with questions related to lifestyle, body type, hair type, skin type, etc.	Pass
6	Ai Powered – Resume Analyzer	User fills in the assessment form and submits	User's Ai Powered Resume Analyzer type is determined and displayed along with recommendations	Use Ai Powered –Resume Analyzer type is determined and displayed along with recommendations	Pass
7	View Recommendations in Explore Menu	User navigates to Explore menu after assessment	Personalized dietary guides, yoga, and lifestyle recommendations for the identified Ai Powered–Resume Analyzer type are displayed	Personalized dietary guides, yoga, and lifestyle recommendations for the identified Ai Powered –Resume Analyzer type are displayed	Pass
8	Logout	User clicks on Logout button	User is logged out and redirected to the login screen	User is logged out and redirected to the login screen	Pass

9	Invalid Login Attempt	Username: wrong user, Password: wrong password	Error message "Invalid username or password" is displayed	Error message "Invalid username or password" is displayed	Pass
---	-----------------------	--	---	---	------

6.3 Non-Functional Testing

Performance Testing:

Performance testing ensures that the AI-Powered Resume Analyzer maintains fast response times and can handle multiple simultaneous users without degradation in speed or functionality. This involves simulating varying loads to assess how the system performs under peak usage conditions.

Usability Testing:

Usability testing evaluates the user interface and interaction flow of the Resume Analyzer to ensure it is intuitive and user-friendly. Real users will navigate the application to identify any usability issues, such as difficulties in uploading resumes or interpreting feedback, and suggest areas for improvement.

Compatibility Testing:

Compatibility testing verifies that the Resume Analyzer functions correctly across different devices, operating systems, and browsers. This ensures that users have a consistent experience regardless of the platform they are using to access the application.

Reliability Testing:

Reliability testing assesses the stability and robustness of the AI-Powered Resume Analyzer to ensure it operates smoothly without crashes or unexpected errors. This includes running the application for extended periods and under various conditions to detect and address any potential issues that may arise during prolonged use.

Chapter 7

RESULT ANALYSIS AND DISCUSSION

Flask: Result:

The Flask framework : facilitated the development of a robust and flexible backend for the AI-Powered Resume Analyzer, ensuring efficient processing of user-uploaded resumes.

Analysis:

API Development: Enabled rapid creation of RESTful APIs for seamless communication between frontend and backend.

Data Handling: Efficiently managed resume data and analysis results, providing quick responses to user queries.

Scalability: Modular architecture supported easy scaling as user demand increased, allowing for future enhancements.

Integration Capabilities: Compatible with various libraries and tools, facilitating the implementation of machine learning algorithms for accurate skill extraction and candidate assessment

Python:

Python was utilized for implementing the AI algorithms and handling data pro-cessing efficiently.

The language facilitated the generation of personalized recommendations based on user inputs.

Analysis :

Algorithm/Libraries used: Python's robust libraries and algorithm facilitated essential for processing user inputs and generating personalized Result.

Performance: Python ensured timely and accurate advice, contributing to a seamless user experience.

Analysis : Assessment Accuracy: High accuracy in AI-driven assessments increased user trust and confidence in the app.

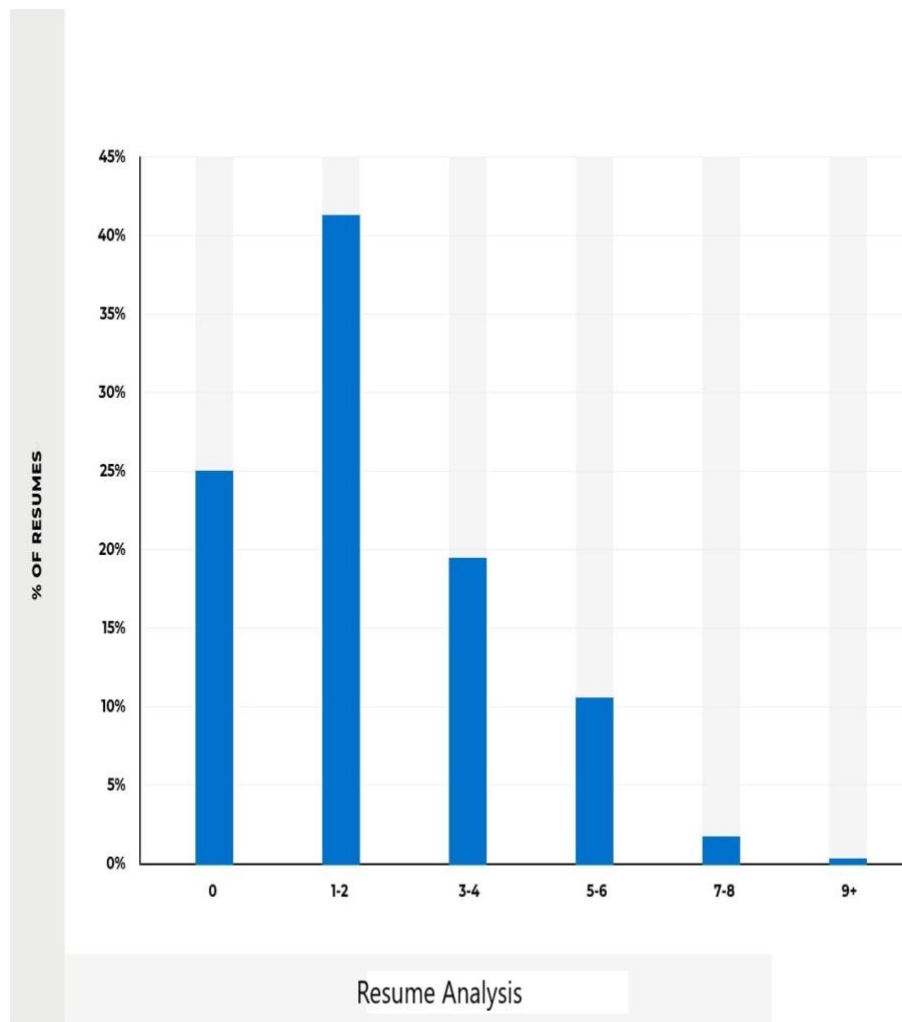


Figure 7.1: Analysis Graph

Chapter 8

CONCLUSION AND FUTURE SCOPE

Conclusion:

The integration of Artificial Intelligence (AI) in human resource management, especially through smart resume analyzers, represents a significant advancement in the field. While AI enhances recruitment accuracy and efficiency by automating repetitive tasks, challenges remain, particularly regarding the quality of data essential for effective decision-making.

These tools provide valuable insights that help HR teams anticipate trends and improve productivity. Organizations that embrace AI can gain a competitive edge, yet the lack of extensive research highlights the need for further exploration. Future studies in AI applications, especially in resume analysis, could lead to enhanced HR practices and foster a more innovative workforce.

Future Scope:

Enhanced Natural Language Processing (NLP): Advances in NLP can lead to better understanding of context and nuances in resumes, enabling more accurate assessments of candidate qualifications and skills.

Bias Mitigation: Future developments can focus on creating algorithms that actively identify and reduce biases in resume screening, promoting diversity and inclusion in hiring processes.

Integration with Other HR Tools: AI resume analyzers can be integrated with other HR technologies, such as applicant tracking systems (ATS) and performance management tools, to provide a holistic view of candidate potential.

Personalized Candidate Feedback: The ability to generate tailored feedback for candidates can improve their applications and help them understand areas for improvement, enhancing their chances in future job applications.

Bibliography

- [1] C. Barboza, "Artificial Intelligence and Hr: The new wave of Technology," Journal of Advances in Social Science and Humanities, vol. 5, no. 4, pp. 715-720, 2019.
- [2] M.Stevenson,"AI in HR," HR Exchange Network, 2019. Available: <https://www.hrexchangenetwork.com/hr-tech/articles/ai-in-hr>
- [3] A. K.Upadhyay and K. Khandelwal, "Applying artificial intelligence: implications for recruitment," Strategic HR Review, vol. 17, no. 5, pp. 255-258, 2018.

