AI-Based Mock Interviews

Final Year Project

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Rahim Yar Khan

Project Detail

Type (Nature of project)	[ ] **D**evelopment [ ] **R**esearch [✓] **R&D**			
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Plagiarism Certificate

We declare that our **FYP** report is written by us and checked by our supervisor. The similarity index of the report is 14%.

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Acknowledgment

First of all, we would like to thank our institute, **KFUEIT**. The development and documentation phases of FYP are a great chance for learning and professional development for me and my team. We gratefully acknowledge the support and patience of our family, professors and friends throughout our studies. Without them, this project report can never be completed. We are grateful to **Dr, Madiha Amjad**, Assistant Professor in the Computer Science and Information Technology Department and Supervisor of our project, for his support, guideline and great supervision. We are also very grateful to **Dr. Kashir Munir** Head of the Information Technology Department, for their support and appreciation. We again thank our course fellows for their good cooperation during the course. Throughout this phase of documentation, we did not only gain a lot of knowledge but more importantly, we also had a great chance to sharpen our skills in a professional working environment. Above all, to the **Almighty ALLAH**, for granting knowledge and for all the blessings that He has provided and poured upon us. He has shown His unconditional and pure love by using the people around us who are able to let us feel that we are loved and cared.

Abstract

The integration of Artificial Intelligence (AI) into educational and professional preparation tools is transforming traditional methods of interview training. AI-powered mock interview platforms are emerging as a valuable resource for individuals seeking to enhance their interview skills by offering realistic and adaptive interview simulations. This project focuses on developing a web-based platform that assists users in preparing for job interviews. The system will enable users to input job-specific details such as the role and its description, generating tailored questions through AI. The platform will record user responses, analyze their content, and provide immediate feedback. Using speech-to-text and basic AI analysis, the platform will highlight areas of improvement and track user progress. At the conclusion of each session, users will receive a summary report of their performance. A comprehensive final report, containing detailed insights and sentiment analysis, will also be sent via email once the data is fully processed. Follow-up questions will be dynamically generated based on user responses, creating a personalized and interactive experience that closely mimics a real-world interview.

Table of Contents

List of Table

List of Figures

Chapter 1

Introduction

1.1 Introduction to AI-Based Mock Interviews

Artificial intelligence (AI) advancements have transformed industries like education, recruitment, and career development. Job seekers often struggle with interview performance, and traditional methods like books, peer practice, or coaching sessions lack personalization, and real-time feedback. In contrast, AI interview platforms offer dynamic, interactive environments that offers real-world interviews environment, providing feedback and performance insights. While traditional interview preparation methods have their merits, they often lack fairness and efficiency. These AI systems evaluate users' skills, personalities, and emotional responses by utilizing advanced technologies like voice recognition and machine learning algorithms. They analyze key aspects such as speech patterns to deliver a more thorough assessment of a candidate's fit for a job. An AI-based mock interview website offers significant advantages over traditional interview preparation methods. This platform allows users to experience real-time interviews with AI-generated questions tailored to the specific job role they are preparing for, eliminating the need for a human interviewer. The system records users' responses, both in audio and text format, by converting their spoken answers into text. These responses are saved in a database for easy reference and analysis. The AI then evaluates the responses, identifying any incorrect answers, which helps users understand their weaknesses and prepare more effectively. Additionally, the platform performs sentiment analysis on the saved audio and text, providing insights into users' confidence and tone during the interview. This comprehensive system not only prepares candidates for a variety of interview scenarios but also offers them the tools to improve their performance, making interview preparation more accessible and effective. By offering personalized and scalable support, this AI-powered solution enhances candidates' readiness for professional interviews, making it an innovative tool in career development and recruitment preparation.

We aim to empower individuals for success in the competitive job market by providing a solution that is a dynamic platform that identifies weaknesses and strengths. Our motivation lies in reshaping individuals' careers, enabling them to navigate interviews with competence, and self-assurance. The goal of this concept is to use AI in preparing users by voice analysis. This strategy

addresses the limitations of current interview practices by offering a more intelligent and efficient way to evaluate candidates. The integration of advanced ~~data communication,~~ deep learning models, and data processing techniques will further enhance the accuracy and efficiency of candidate evaluations. The aim is to update the interview preparation process by using AI to create a more reliable, and effective system.

1.2 System Overview

We will develop a Real-time AI Interview Website with Sentiment Analysis named AI-based mock interviews. This website will allow users to prepare for interviews, users can attempt interviews in real-time by answering questions through voice. It gives users an experience or real interviews without the need for an interviewer. At the end of the interview, the report of the interview including sentiment analysis is shared with users, so users can focus on areas of improvement and prepare well for real interviews.

1.3 Objectives

i. Create an AI system that generates interview questions specific to the user's chosen job field, so they can practice questions they might really face in interviews.
ii. Set up a live, interactive interview experience where users answer questions in real time, just like they would in an actual interview.
iii. Allow users to speak their answers out loud, which the system will then turn into text, making it easy to review and store.
iv. Save both the audio recordings and transcribed answers securely in a database.
v. Use AI to check if user answers are correct and complete, and provide feedback on areas they can improve to be better prepared for real interviews.
vi. Analyze the audio and transcribed answers to perform sentiment analysis.
vii. Based on all the analysis, give users insights into their performance, confidence level, and any patterns in their answers that might be worth focusing on.

1.4 Project Definition

With AI-based mock interviews, you can conduct real interviews, receive instant feedback on your answers, and analyze your confidence, and emotions, all in one place. By using AI-based mock interviews, users can refine their interview skills and increase their chances of success, without any need for in-person mock interviews or extensive preparation sessions.

1.5 Project Scope

The scope of our project is to create an AI-based mock interview website. The features of this website help users prepare for interviews. Our goal in this platform is to make it easier and more effective for users to prepare for interviews. This provides real-time interview simulations, tailored question generation, and personalized feedback dependent on the response given by the user. This site also contains tools like audio-to-text conversion, answer validation, and sentiment analysis, to help users improve their interview skills and build confidence.

1.6 Advantages

The advantages of AI-based mock interviews are:

- Users can practice interviews from the comfort of their own space, without the need for scheduling and interviewer.
- The real-time, interactive simulation prepares users for the actual interview experience, helping them get comfortable with live responses.
- It generates questions relevant to the user's chosen field or role, making practice highly relevant and aligned with real interview scenarios.
- With features like answer validation and sentiment analysis, users get instant feedback on their performance, so users can work on areas of improvement.

1.7 Features

- Ensures secure login and authentication for access.
- Questions are customized based on user input of role and job description.
- Spoken answers converted into text answers, stored and evaluated.
- Follow-up questions are dynamically generated on the base of user answers.
- Evaluates tone and sentiment from answers both text and audio
- Detailed feedback report is provided at the end highlighting strengths and weaknesses
- Real-time interview simulations to offer a more realistic environment
- ~~All Progress is displayed on Profile~~

Chapter 2

Existing Systems

2.1 Existing Systems

We reviewed existing mock interview systems and identified several issues affecting their functionality and user experience.

First, these systems are often limited to specific regions, making them unavailable to a broader audience. Second, their payment processes are overly complex, discouraging users from utilizing their services. Additionally, excessive advertisements disrupt the user experience and leave a poor impression when interacting with the interface. Moreover, these systems lack sentiment analysis, which is crucial for understanding the candidate's emotional and behavioral responses during an interview.

1. Interviews by AI [1]

Interviewsby.ai is an online platform where you can enter job description. This website provides a question set generated by Ai and the answer is recorded which is then subjected to text analysis.

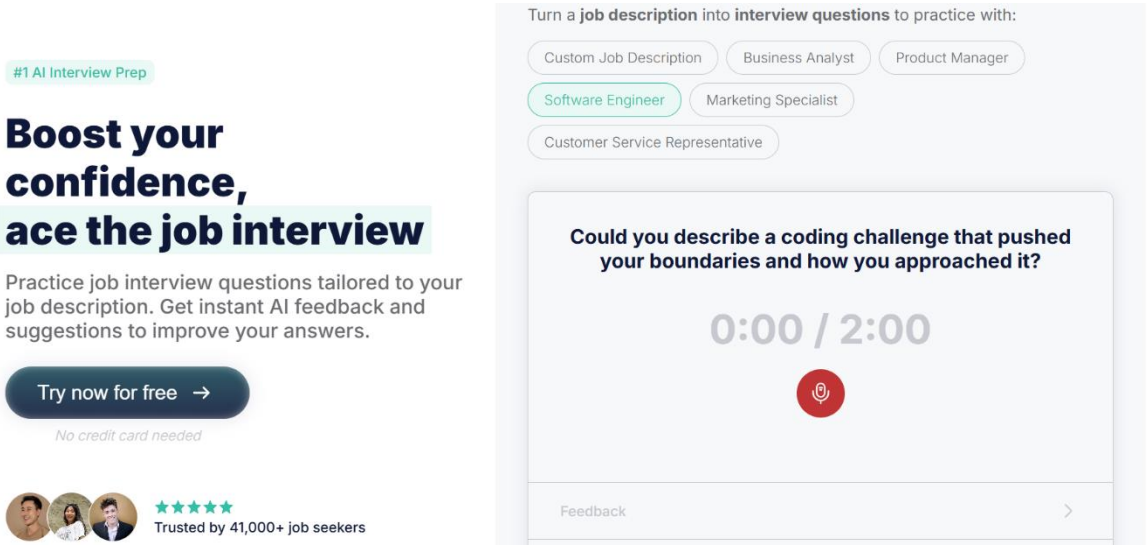

Figure 2.1 Screenshot of Interviews by AI

2. Interview Prep by AI

Interview Prep by AI is an online platform where you can enter job description. This website provides a question set generated by Ai and the answer is recorded also has an option for text answers which is then subjected to text analysis.

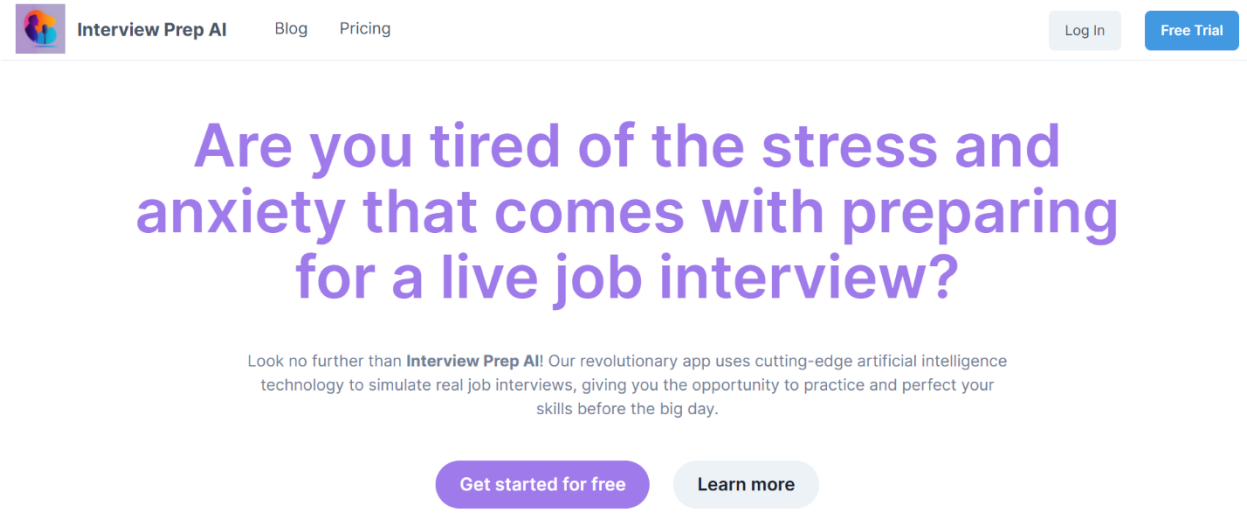

Figure 2.2 Screenshot of Interview Prep by AI

3. Final Round AI

Final Round AI is an online platform where you can enter job description. This website provides a question set generated by Ai and the answer is recorded also has the option of text answers which are then subjected to text analysis.

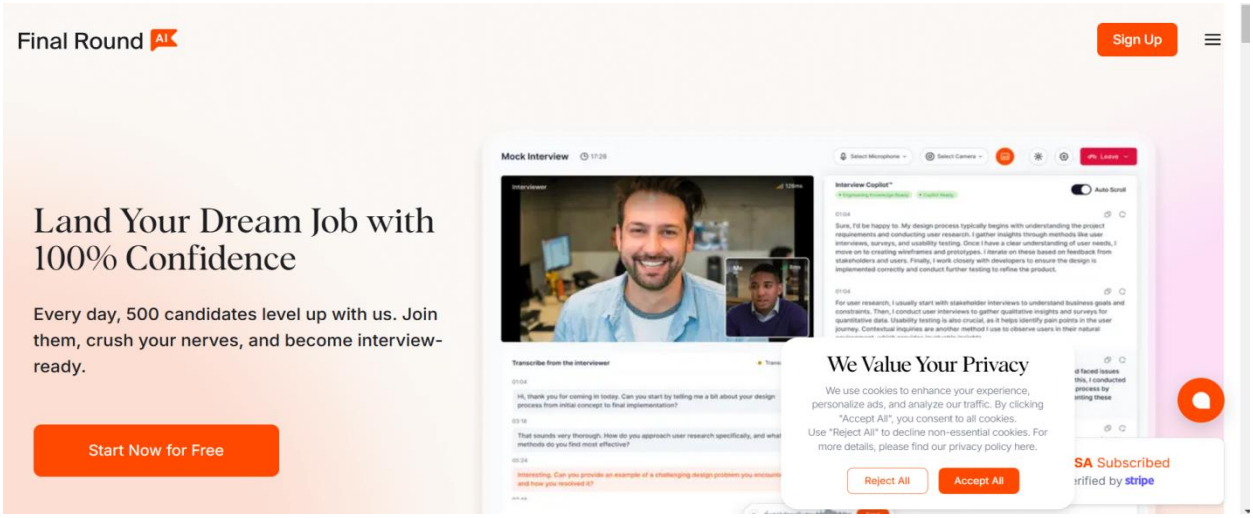

Figure 2.3 Screenshot of Final Round AI

4. Yoodli

Yoodli is an online platform where you can enter job descriptions. This provides a feature of follow-up questions that are generated on the basis of previous answers and the answer is recorded also has the option of text answer which is then subjected to text analysis.

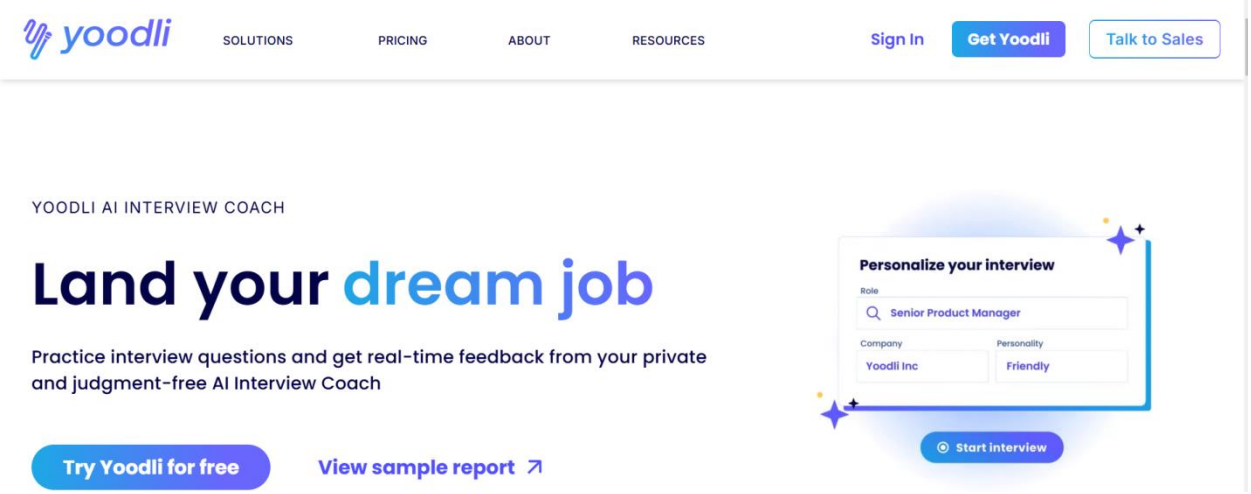

Figure 2.4 Screenshot of Yodli

5. CareerFlow AI

CareerFlow AI is a platform where you can enter job descriptions. This provides a feature of follow-up questions that are generated on the basis of previous answers and also provides question banks on different topics. The answer has the option of text or audio which is then subjected to text analysis.

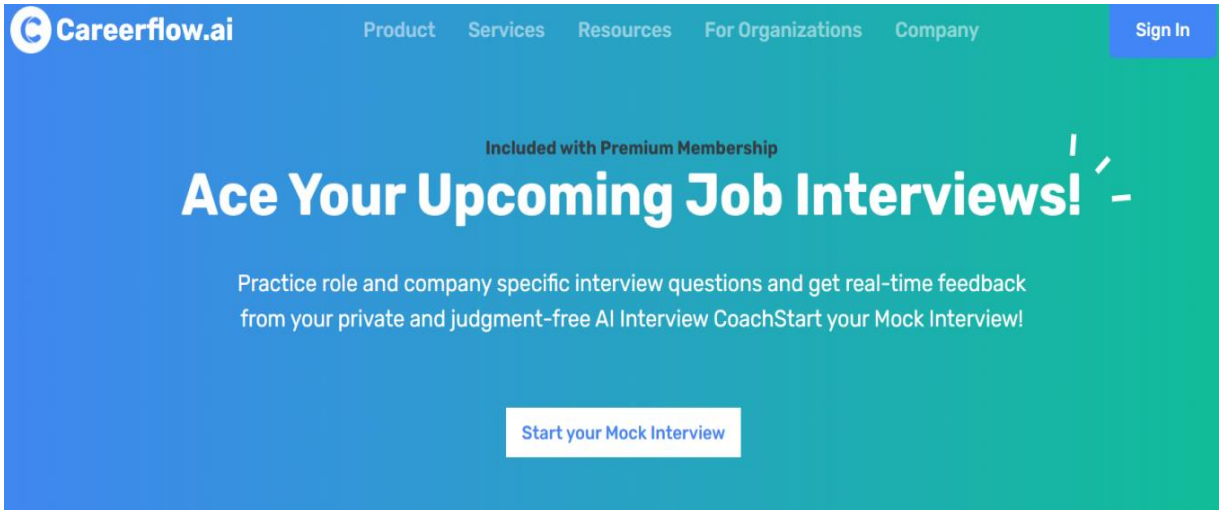

Figure 2.5 Screenshot of Careerflow AI

Links of Existing Systems

Table 2.1 Literature Review Sources

Source	URL
Interview by ai	https://interviewsby.ai/
Interview prep ai	https://interviewprep-ai.com/
Finalround ai	https://www.finalroundai.com/ai-mock-interview
yoodli	https://yoodli.ai/use-cases/interview-preparation
careerflow	https://www.careerflow.ai/mock-interview

2.2 Drawbacks of Existing Systems

- Existing Systems lack evaluation of emotional tone and delivery.
- Feedback generated does not focus on specific areas and only provides a basic overview
- In most systems follow-up questions are not generated and question banks are used.
- All the existing systems are provided with high costs.

2.3 Proposed System

The AI-Powered Mock Interview System addresses the shortcomings found in the existing platforms. It generates customized questions based on job title, description, and company level, as provided by users. An audio-to-text response enables the user to verbally respond. As any user would have thought, it makes use of AI to generate follow-up questions based on what the user has said, and real-time feedback that includes sentiment analysis allows a deeper look into users' tone and delivery. At the end of each session, report with strengths and areas for improvement. This system obviates all the limitations of the existing solutions.

2.4 Understanding the proposed system

There are two main actors in the system:

- **End Users:** Job seekers, students, and professionals looking for interview preparation.
- **Development Team:** Zainab Sarwar, Hashir Ali Ahmad

2.4.1 Initial Requirement for User

- Access to a stable internet connection.
- Ability to sign up for a free account with valid credentials (email/password).
- Microphone access to record responses.
- Option to view performance reports and receive actionable feedback.

2.5 Requirement Elicitation

The requirements engineering process provides the appropriate mechanism for understanding what the user wants, analyzing needs, assessing feasibility, negotiating a reasonable solution, specifying the solution unambiguously, validating the specification, and managing the requirements as they are transformed into an operational system. This document will provide the requirements of the end users and the system we are developing. Requirements are as follows:

2.5.1 Real-Time Interaction and AI Analysis

The system provides users with an opportunity to rehearse interviews using AI-driven, real-time interactions. The users will engage with customized questions, while the AI scrutinizes the answers according to sentiment, tone, and content.

2.5.2 Client-Side Requirements

Users require a device equipped with internet connectivity. Following the login step, users will be able to access their unique profiles and participate in mock interviews. Audio input (microphone) is mandatory for vocal communication during the interview process.

2.5.3 Database Management

Only an efficient database is necessary for maintaining user profiles, answers, and reports. Interview data, performance metrics, and analysis reports will be maintained for future study.

Table 2.2: End User Requirements

Sr No.	External Entities	Initial Requirements
1	User	User shall connect to the internet.
2	User	User shall sign up for a free account.
3	User	User shall provide an accurate email/password to log in.
4	User	User shall press the login button to continue.
5	User	User shall enable microphone access.
6	User	User shall start a mock interview session.
7	User	User shall view detailed performance reports.

Table 2.3: Allocate Resources

Sr No.	Initial Requirements	Use Case Name
1	User shall sign up for a free account	Registration
2	User shall input job details.	Job Data Input
3	User shall start a mock interview session.	Start Interview
4	User shall enable microphone access.	Microphone Activation
5	User shall respond to interview questions	Answer Submission
6	User shall view detailed feedback.	Feedback Viewing
7	User shall access their interview history.	Report Retrieval

Table 2.4: Prioritized Requirements

Sr No.	Rank	Initial Requirements	UC_ID	Use Case Name
1	Highest	User shall sign up for a free account	UC_1	Registration
2	Medium	User shall input job details.	UC_2	Job Data Input
3	Highest	User shall start a mock interview session.	UC_3	Start Interview
4	Highest	User shall enable microphone access.	UC_4	Microphone Activation
5	Highest	User shall respond to interview questions	UC_5	Answer Submission
6	Medium	User shall view detailed feedback.	UC_6	Feedback Viewing
7	Medium	User shall access their interview history.	UC_7	Report Retrieval

2.6 Non-Functional Requirements

Non-functional requirements define the quality attributes, system performance, and operational standards that ensure a system's effectiveness and usability, such as security, scalability, and reliability.

- **Performance:**

The system is designed to deliver high performance, ensuring quick responses with minimal lag, so users can get real-time feedback without delays.

- **Reliability:**

It is built to be reliable, providing accurate analysis and generating detailed reports while preventing any crashes or data loss during operation.

- **Scalability:**

To handle growing demand, the platform is scalable, capable of supporting multiple users simultaneously, even during high-traffic periods.

- **Security:**

Security is a top priority, with robust encryption in place to protect user data and maintain privacy.

- **Ease of Use:**

Creating a simple and intuitive interface that anyone can navigate easily, regardless of technical expertise.

- **Portability:**

The system is portable, accessible on both web and mobile platforms, allowing users to prepare for interviews anytime, anywhere.

Chapter 3

Proposed System

3.1 Detail Description of Proposed System

This AI-Powered Mock Interview System completely changes how people prepare for job interviews. Unlike traditional tools, it offers a personalized and interactive experience with tailored questions, real-time feedback, and even sentiment analysis to help users improve. The system uses AI to create questions based on details like job title and company level. Users answer verbally, and their responses are instantly processed with speech-to-text technology. The AI then adapts follow-up questions based on what was said, making the interview feel realistic and engaging. At the end of the session, users get a detailed performance report with feedback on their answers, emotional tone, and areas for improvement. It's a practical, easy-to-use tool designed to help job seekers feel confident and ready for real interviews.

3.2 Features of the Proposed System

- Ensures secure login and authentication for access.
- Questions are customized based on user input of role and job description.
- Spoken answers converted into text answers, stored and evaluated.
- Follow up questions are dynamic generated on the base of user answers.
- Evaluates tone and sentiment from answers both text and audio
- Detailed feedback report is provided at the end highlighting strengths and weaknesses
- Real-time interview simulations to offer more realistic environment
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3.3 Advantages of the Proposed System

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- The real-time, interactive simulation prepares users for the actual interview experience, helping them get comfortable with live responses.

- It generates questions relevant to the user's chosen field or role, making practice highly relevant and aligned with real interview scenarios.
- With features like answer validation and sentiment analysis, users get instant feedback on their performance, so users can work on areas of improvement.

3.4 Scope of the Proposed System

The scope of our project is to create an AI based mock interview website. The features of this website help users prepare for interviews. Our goal in this platform is to make it easier and more effective for users to prepare for interviews. This provides real time interview simulations, tailored question generation and personalized feedback dependent on the response given by the user. This site also contains tools like audio to text conversion, answer validation, sentiment analysis, to help users improve their interview skills and build confidence.

Chapter 4

Software Design and Model

4.1 Software Process Model

For the development of the AI-based mock interview website, we have chosen the Incremental Model as our software process model. This model aligns well with our project requirements and development strategy. Since we are building the platform internally without external clients, we have the flexibility to dictate how the development process will unfold.

The Incremental Model involves breaking the project into smaller, manageable modules or increments. Each increment is developed, tested, and delivered as a standalone component, which is later integrated into the complete system.

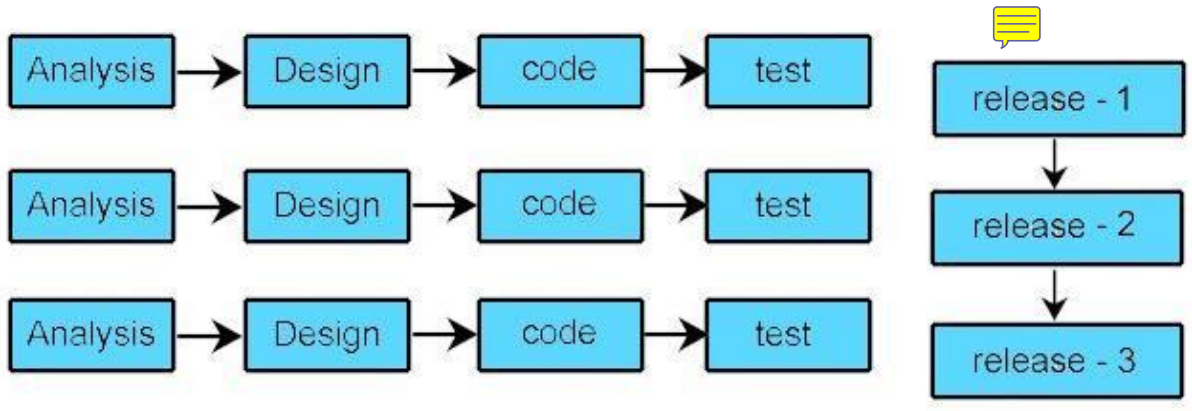

Figure 4.1 Screenshot of Incremental Model

4.2 Software Requirement Analysis

The purpose of this document is to collect, analyses and define high-level requirements, user needs and features of our website. This website is a Web based application. The initial version is under construction though tested inside the team. This document briefly describes the requirements, the characteristics of the system, constraints it applies, rules and other requirements. First part of this deliverable is all about planning and scheduling of project. This deliverable will contain following artefacts:

4.2.1 Feasibility Report

When a project is started the first matter to establish is to assess the feasibility of a project or product. Feasibility means the extent to which appropriate data and information are readily available or can be obtained with available resources such as staff, expertise, time, and equipment. It is basically used as a measure of how practical or beneficial the development of a software system will be to you (or organization). Problems and improvement opportunity, description of product and service accounting statements, financial data, legal requirements and tax obligations.

4.2.2 Technical Feasibility

In this era of technology in which we have different type of technologies to develop excellent websites, almost every website is developed in Python or Javascript and requires different type of technologies for development. In our current website, we also require different technologies.

Technologies Required:

- **Backend Development:** Python frameworks like Flask or Django for implementing server-side operations and integrating AI functionalities.
- **Frontend Development:** Core web technologies such as HTML, CSS, JavaScript, and React to ensure an interactive and user-friendly interface.
- **Database Systems:** SQL or NoSQL solutions to manage and store user profiles, interview questions, answers, and generated reports.
- **Development Tools:** XAMPP for local testing, Postman for API testing, VS Code as an IDE, and Git for version control.

4.2.3 Operational Feasibility

This AI based mock interview platform is designed for ease of use with an intuitive interface and interactive features, making it accessible to all users. Built with modern tools, it ensures smooth functionality and adaptability. Our dedicated team supports its development, and the platform's scalable design allows for effortless updates and feature enhancements as needed.

4.2.4 Economic Feasibility

For the evaluation of the effectiveness of the project Economic Analysis is mostly used. Cost Estimations are provided through Function Point Method FPA in this deliverable. We are not using any costly software or hardware for our project. Any user can use this website by using high speed internet.

4.2.5 Schedule Feasibility

Time is very important factor for any project. The time given to complete the Project is almost 4-5 months. We have designed our project time-line keeping in view our deliver date of a quality product. We are capable to complete the Project within available time with available resources and staff.

4.2.6 Specification Feasibility

We understand the specifications and functional requirements based on the input provided to develop an AI based mock interview system. With user friendly specification, our website will receive job information from users and after that it will generate interview questions, the user will start solving interview.

4.2.7 Information Feasibility

Information required for the development of this project is available on Internet. Up till now we have gathered quite much information which will be helpful in our further development and support in predicting success of our project in terms of its completeness, reliability and meaningfulness.

4.2.8 Motivational Feasibility

We have started our project like how a project should be started from project requirements gathered, analysis and research. And we will be moving ahead according to development lifecycle. We are preparing an online application, no need to install any extra device for use. You can easily use it from anywhere using the internet.

4.2.9 Legal & Ethical Feasibility

Our project meets the entire legal and ethical requirement. An ethical behavior for a website during its developments means not to use pirated versions of software, as we are using open-source

tools and technologies so there no chance of illegal activity in this project, also we provide a complete assurance of user security for their profile/password/emails etc.

4.3 Design

This UI is a mock example; the actual UI will be more concise and user-friendly. The final version will be optimized for better usability and a seamless experience.

Signup/Login Page

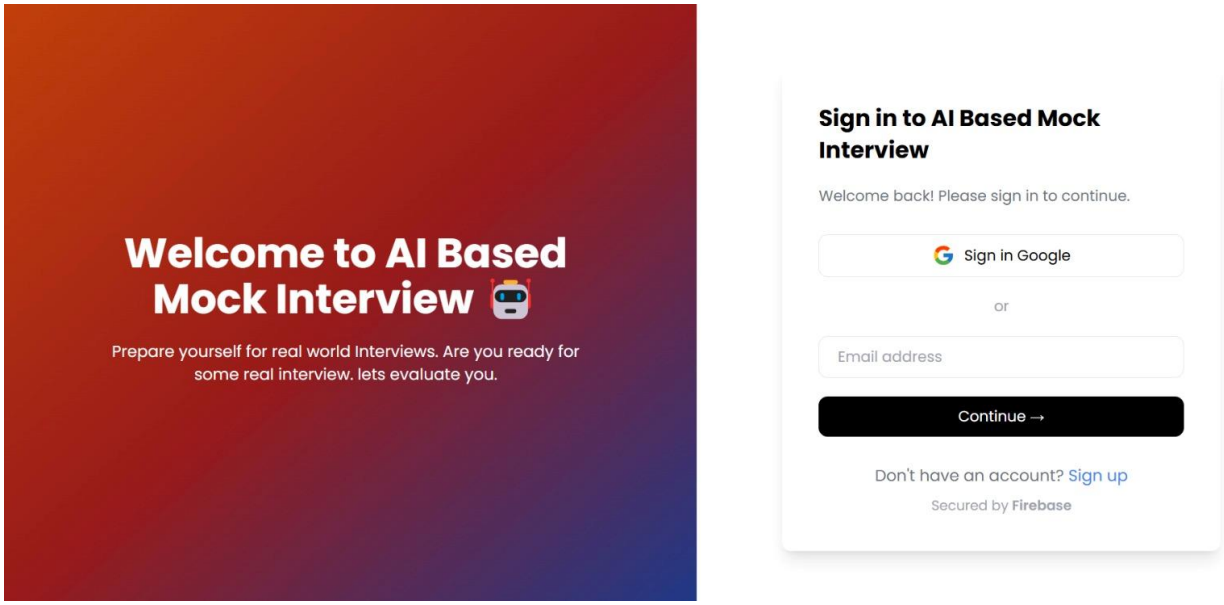

Figure 4.2 Screenshot of Signup/Login Page

Home Page

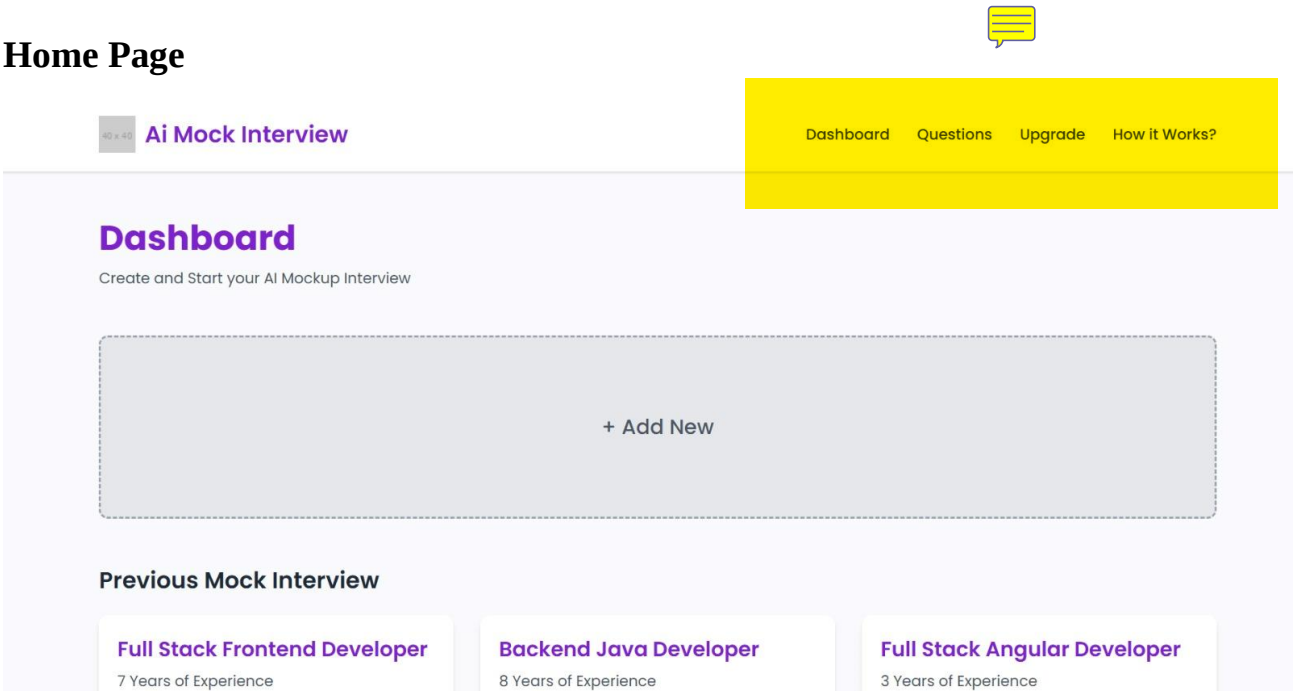

Figure 4.3 Screenshot of Home Page

User Profile

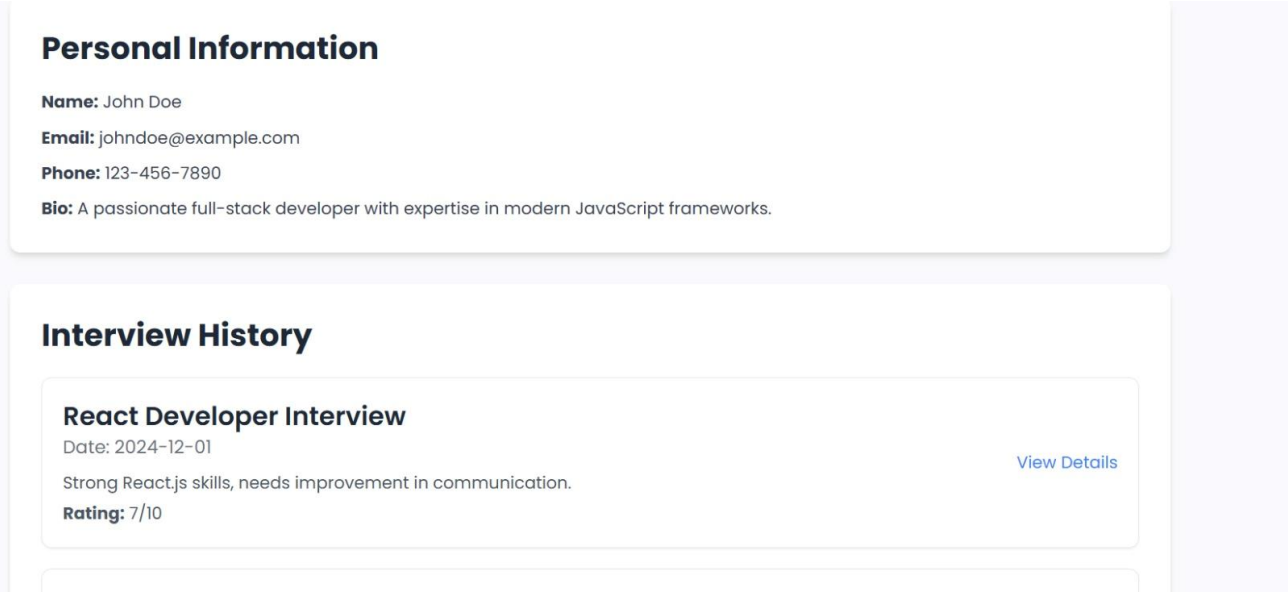

Figure 4.4 Screenshot of User Profile

Start Interview

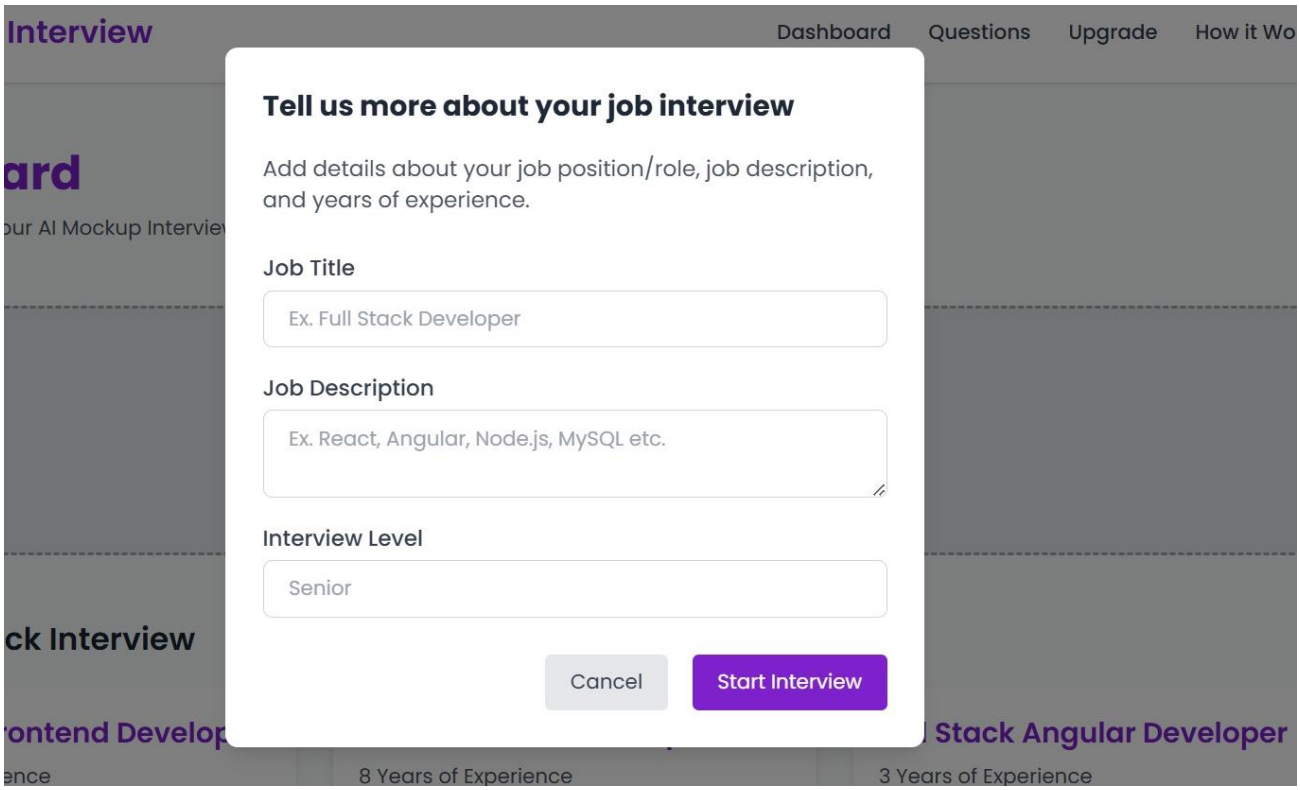

Figure 4.5 Screenshot of Start Interview

Get Started

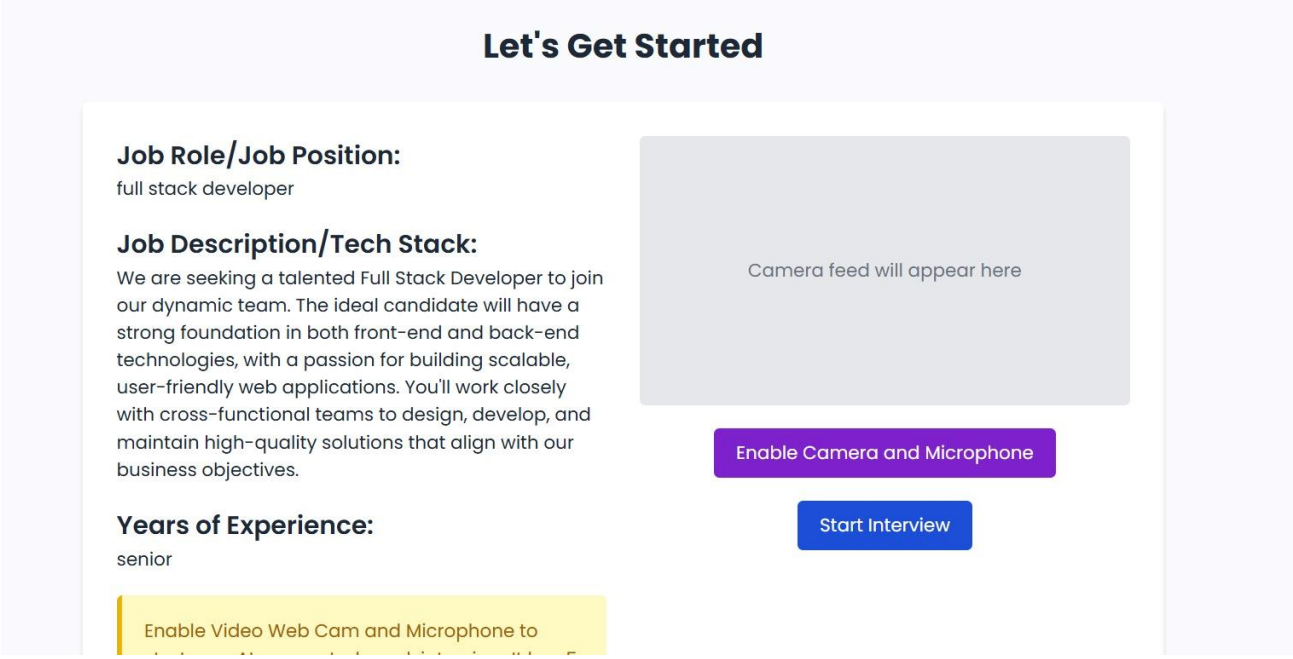

Figure 4.6 Screenshot of Get Started

Questions Page

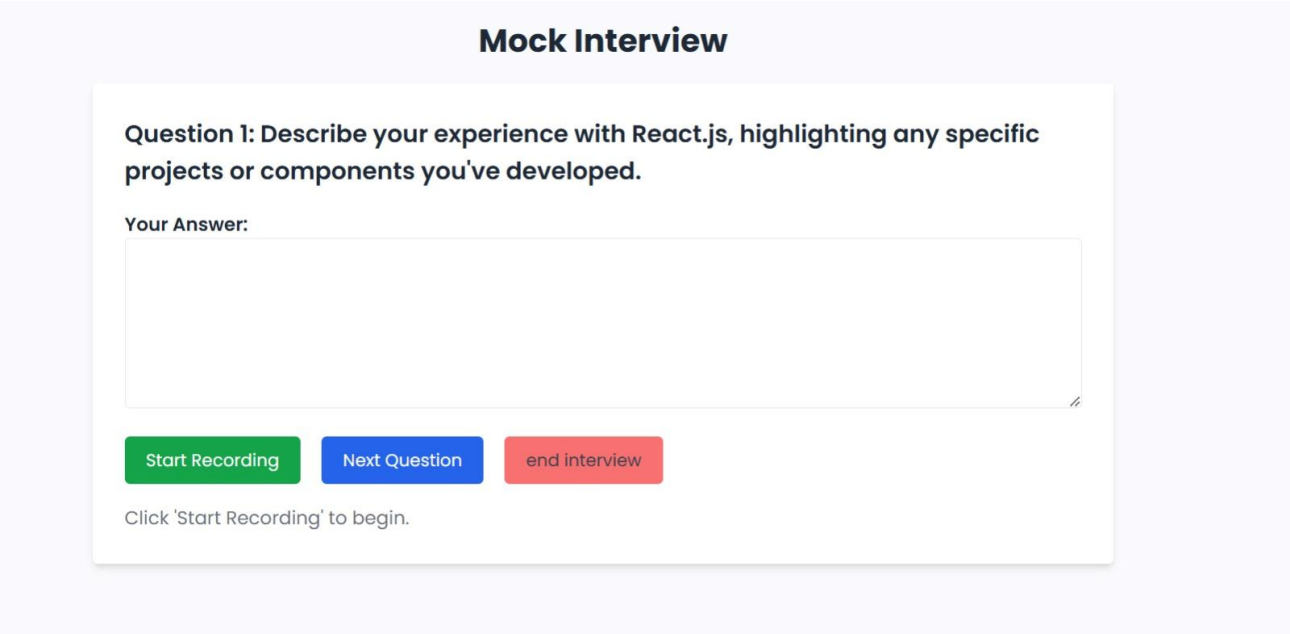

Figure 4.7 Screenshot of Questions Page

Initial Report

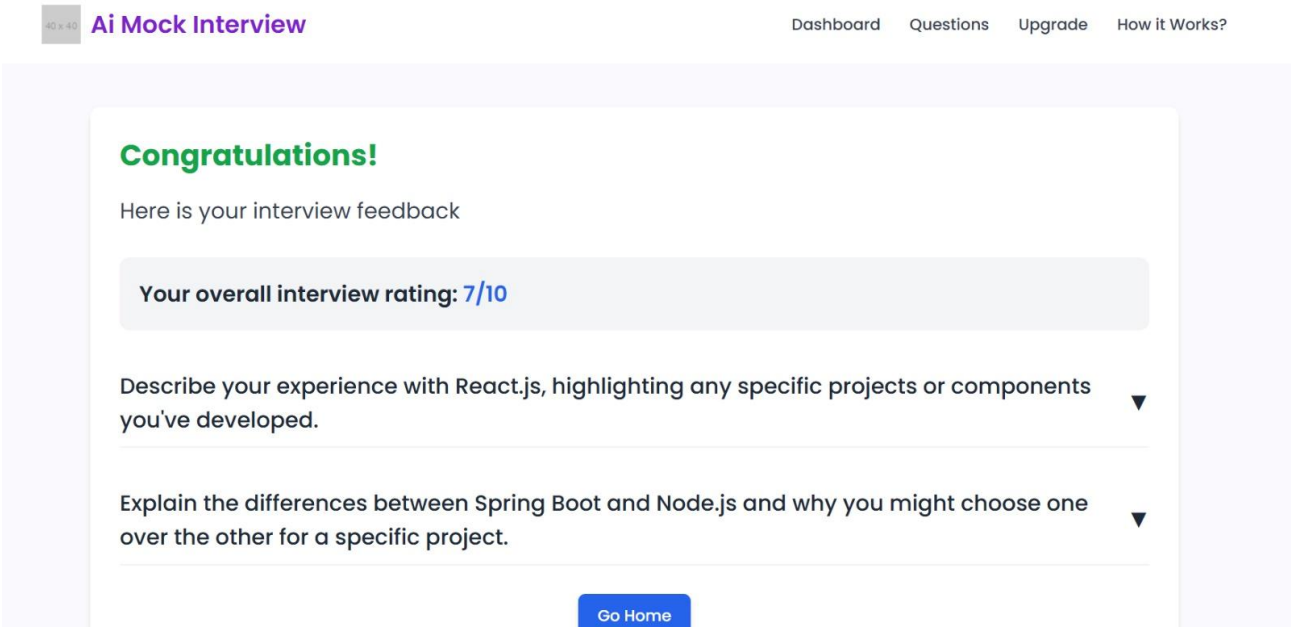

Figure 4.8 Screenshot of Initial Report

Final Report

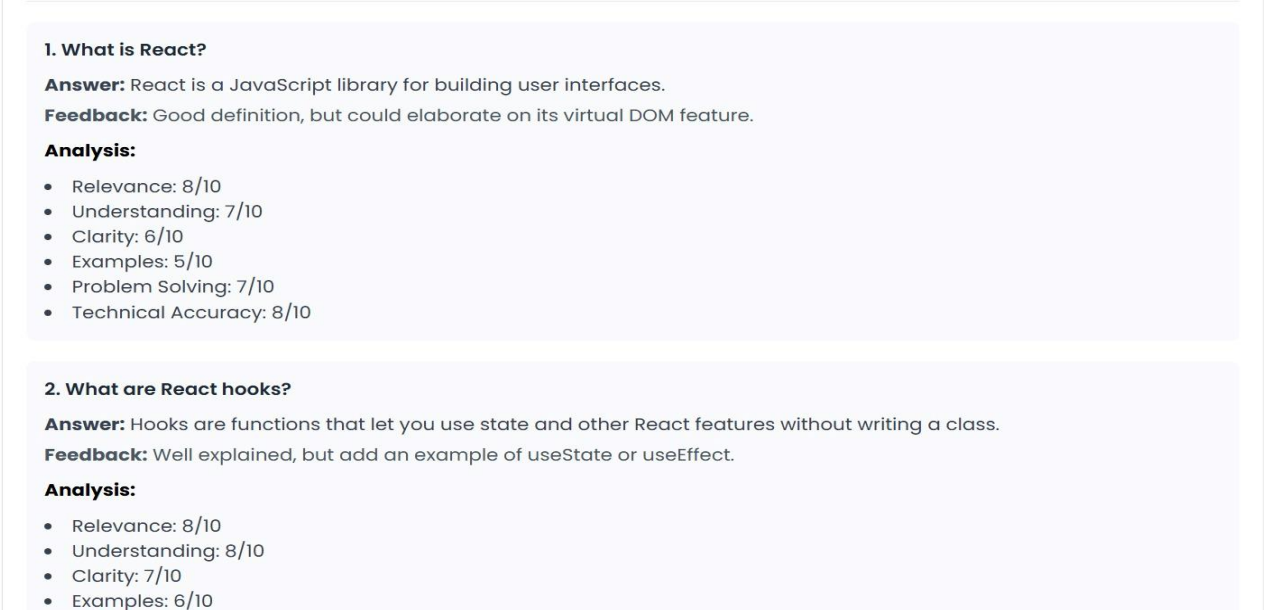

Figure 4.9 Screenshot of Final Report

4.4 Benefits of selected Model

- The software will be generated quickly during the software life cycle
- It is flexible and less expensive to change requirements and scope
- Thought the development stages changes can be done
- This model is less costly compared to others
- A customer can respond to each building
- Errors are easy to be identified

4.5 Limitations of selected Model

- It requires a good planning designing.
- Problems might cause due to system architecture as such not all requirements collected up front for the entire software lifecycle.
- Each iteration phase is rigid and does not overlap each other.
- Rectifying a problem in one unit requires correction in all the units and consumes a lot of time.

4.6 Use Case Diagram

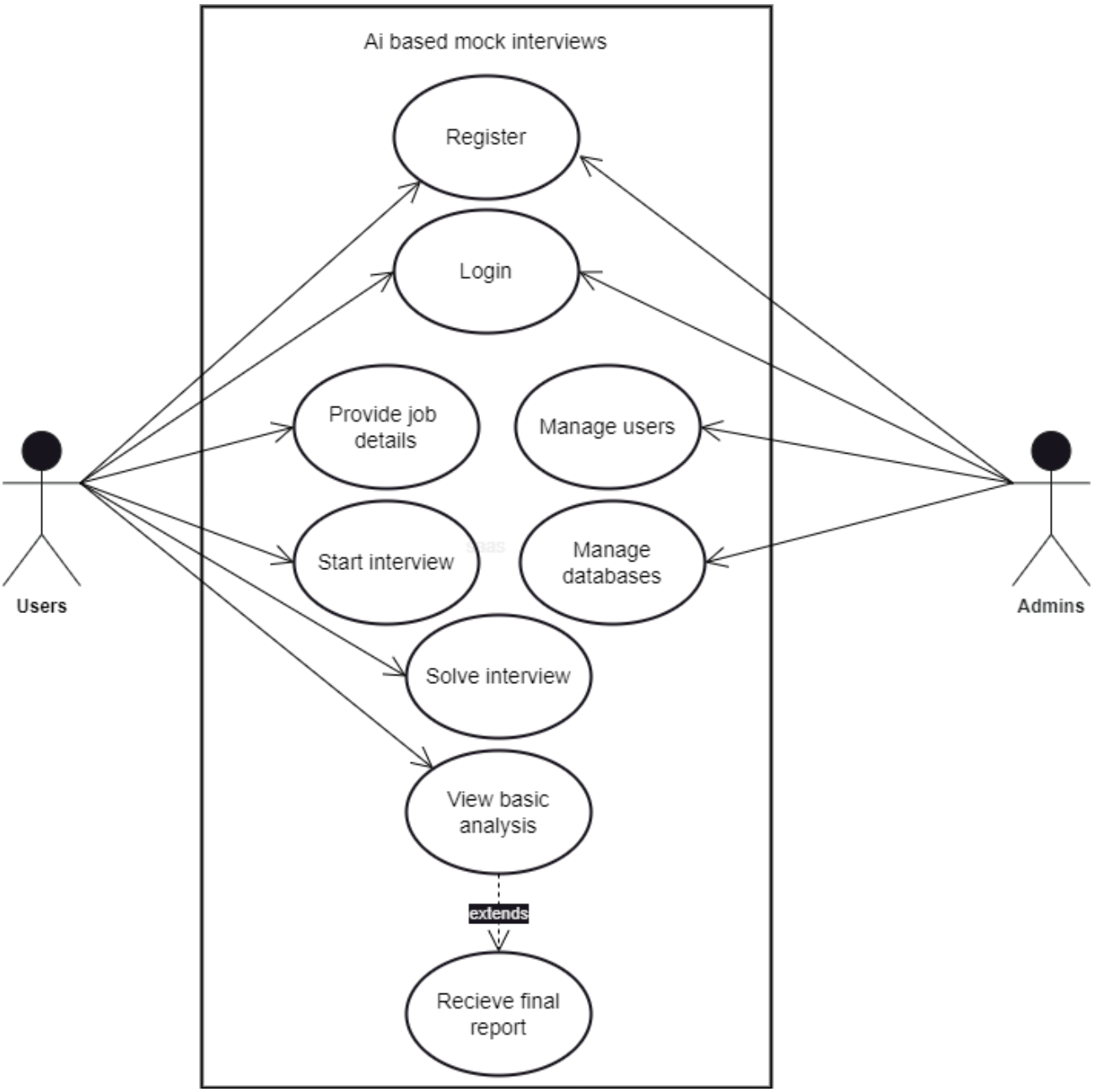

Figure 4.10 Use Case Diagram

4.7 Activity Diagram

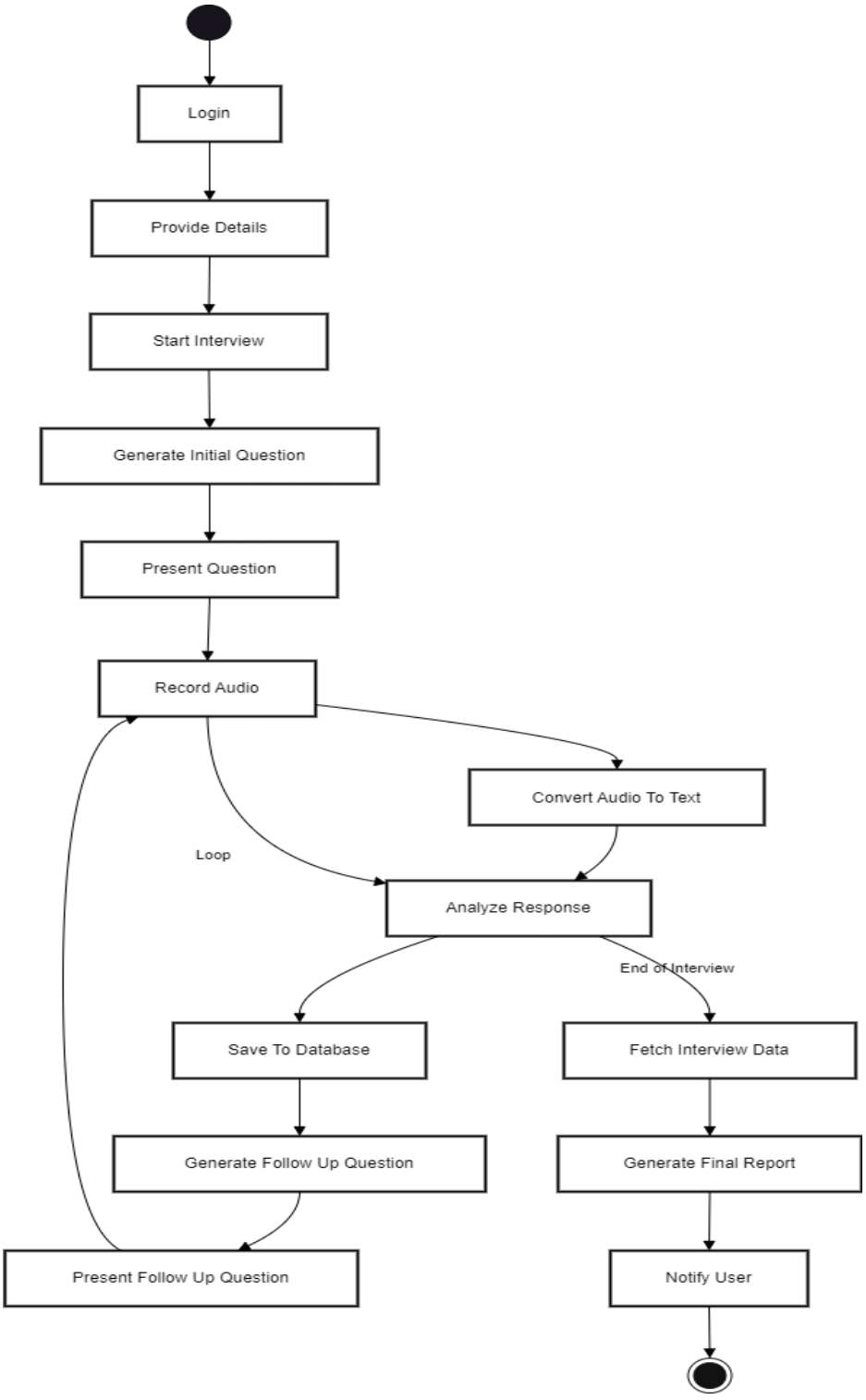

Figure 4.11 Activity Diagram

4.8 Sequence Diagram

Sign Up

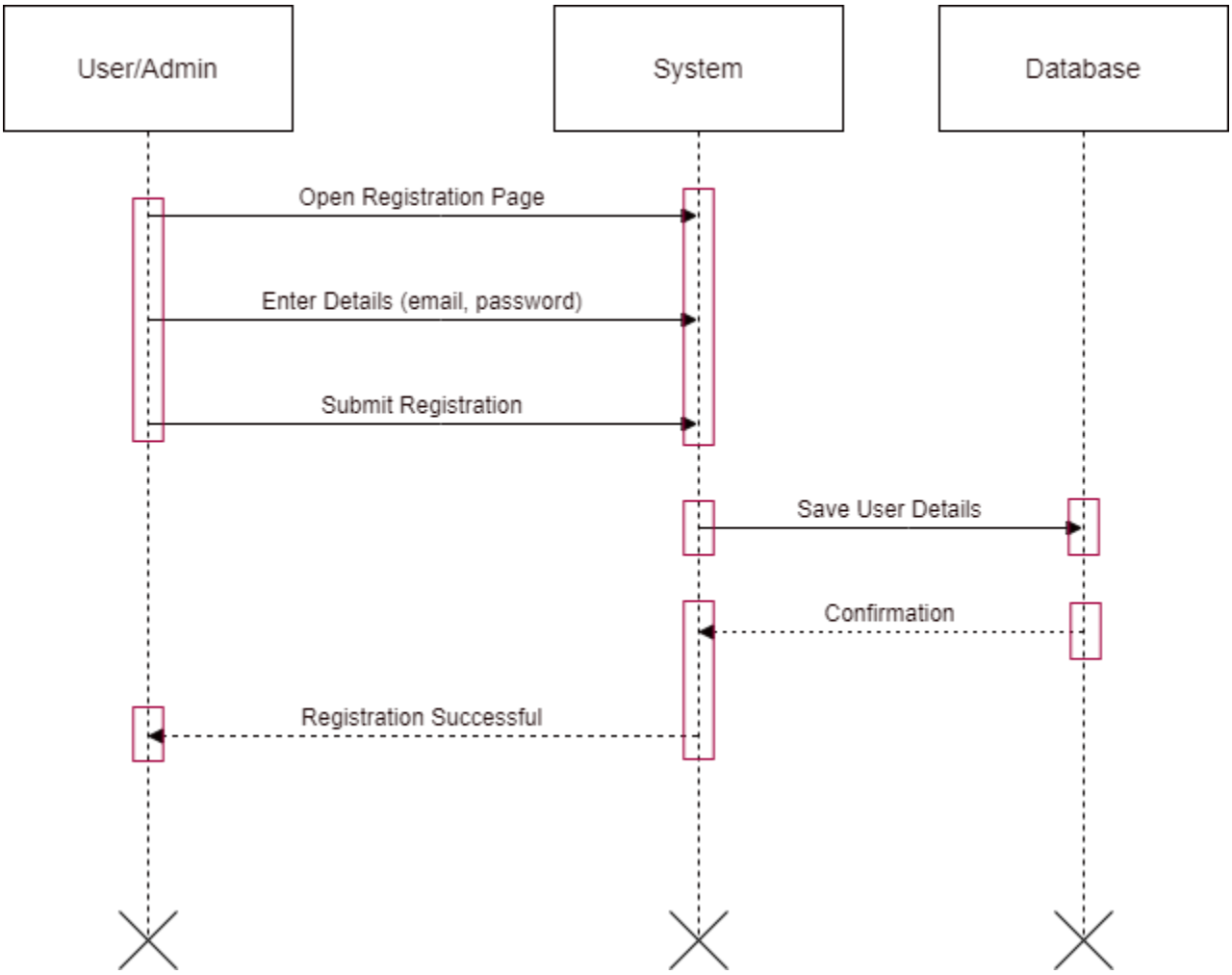

Figure 4.12 Sequence Diagram for Sign Up

Login

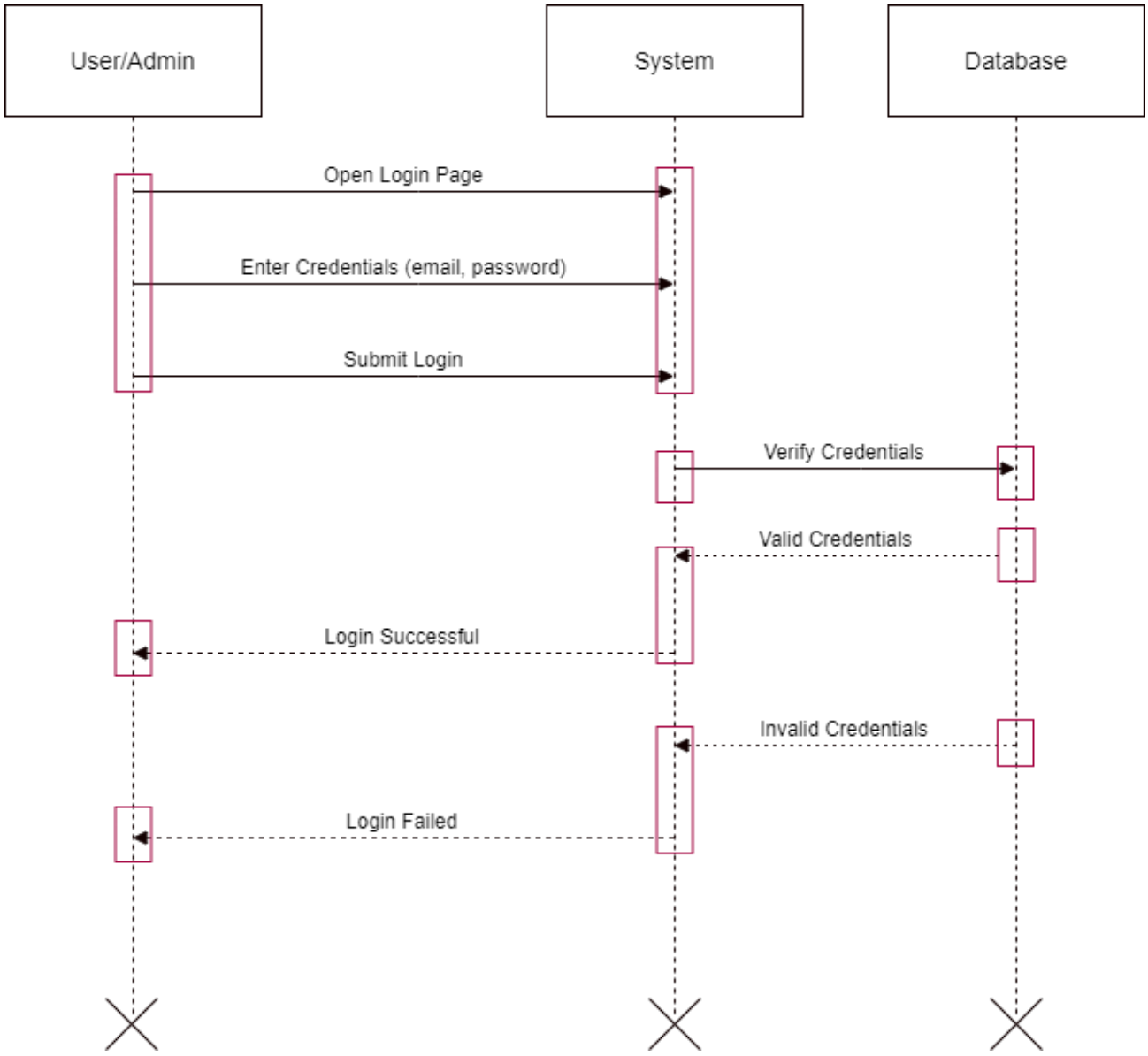

Figure 4.13 Sequence Diagram for Login

Interview Process

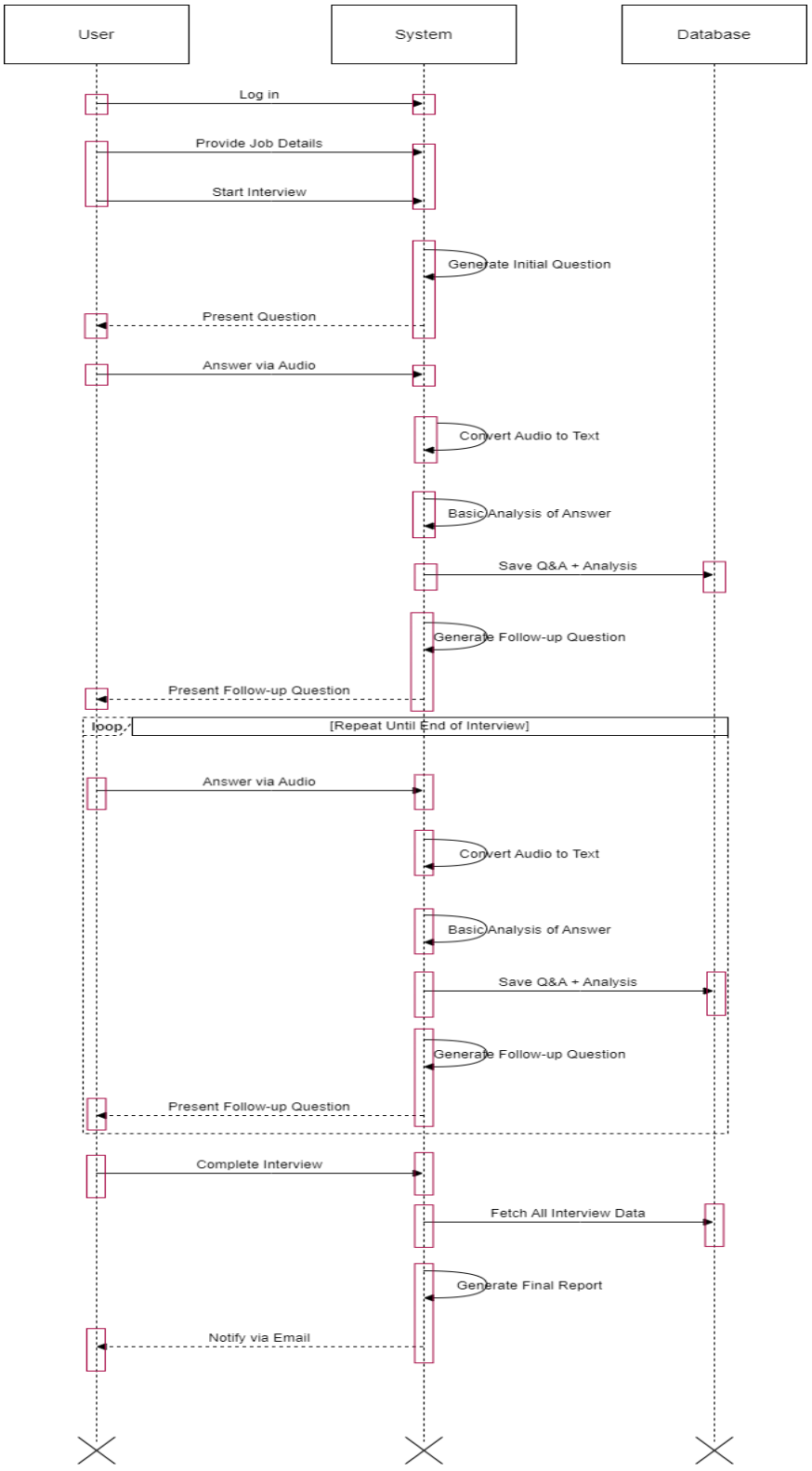

Figure 4.14 Sequence Diagram for Interview Process

4.9 Class Diagram

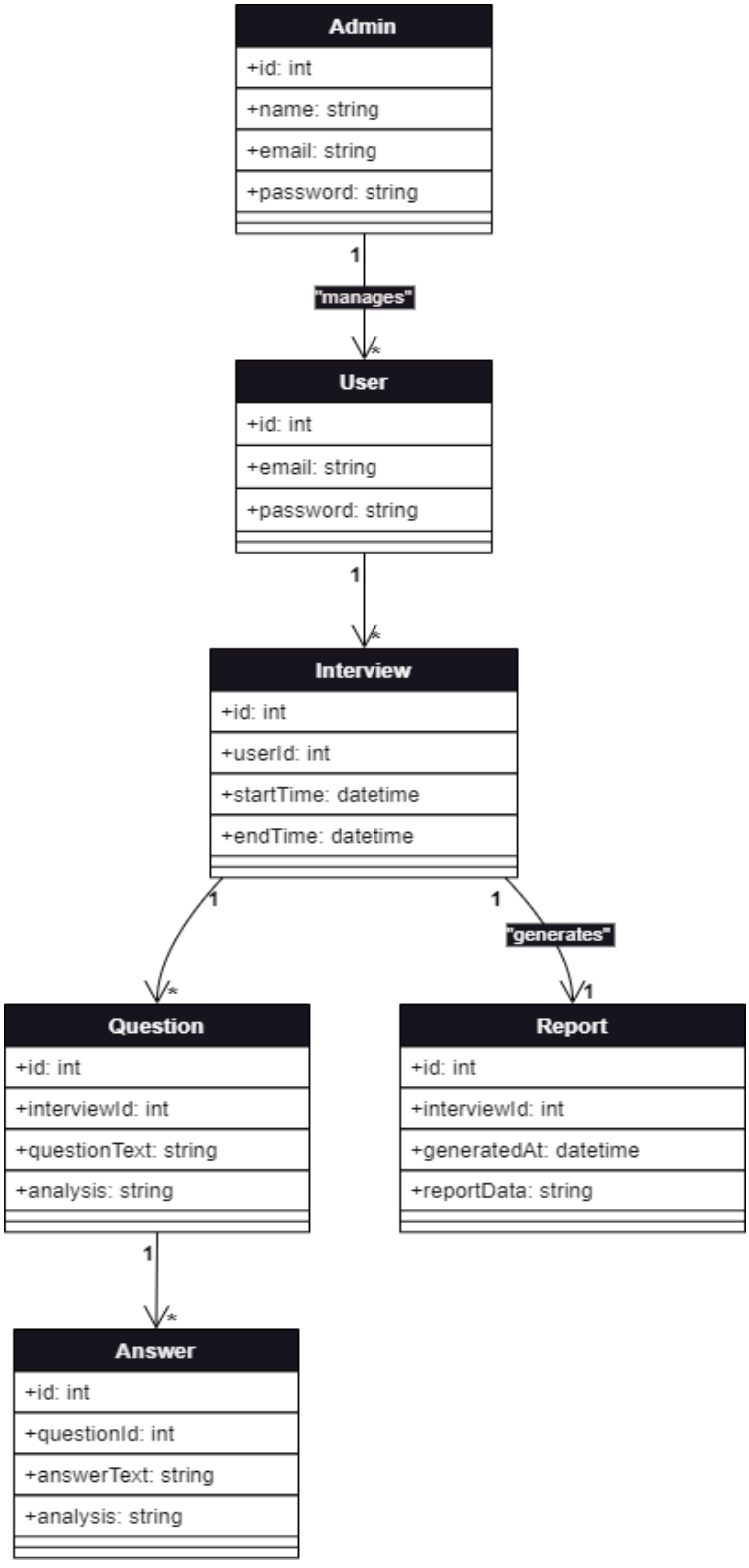

Figure 4.15 Class Diagram

4.10 ERD Diagram

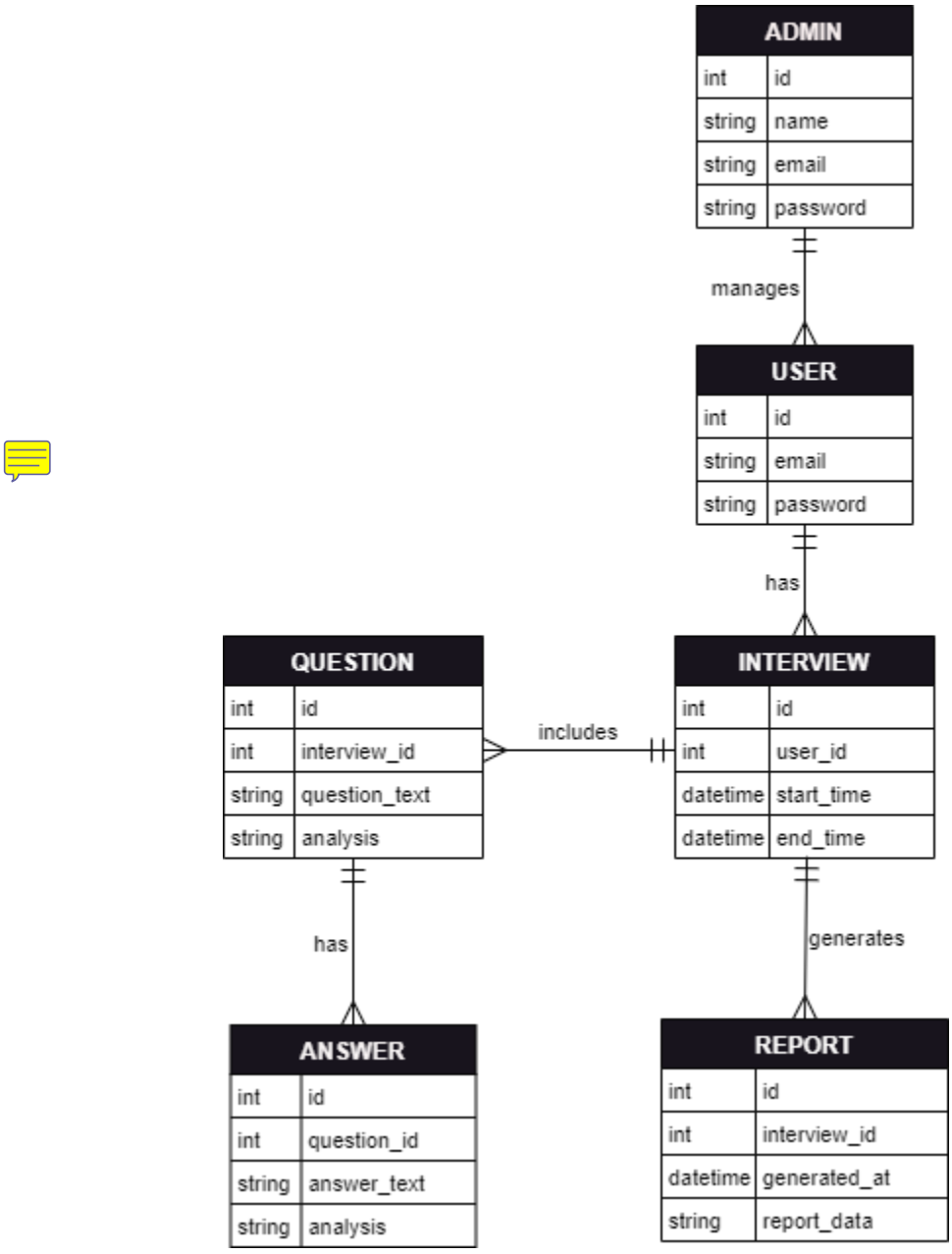

Figure 4.16 ERD Diagram