PLACEME ASSIST

Capstone Project Report

MID SEMESTER EVALUATION

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ABSTRACT

The Interview Bot “PLACEME ASSIST” aims to bring a new perspective to the placement preparation and assessment through the development of an innovative and user-centric web application. This advanced solution combines modern frontend and backend technologies, machine learning algorithms, and data scraping techniques to provide a dynamic, personalized, and efficient interview experience.

The project holds strong importance during the placement season when the students need to keep practicing different kinds of technical questions and may find it difficult to get a reliable source to study. Thereby, we have included top technical questions to boost up the confidence of the user and help gear up for the interview process.

The project begins with a comprehensive investigative phase, employing various investigative techniques such as stakeholder interviews, survey, and feasibility studies. This phase seeks to understand user needs, gather requirements, assess the technical, operational and economic feasibility of the proposed solution.

Throughout the project lifecycle, continuous feedback loops and iterative processes drive improvements.
User acceptance testing validates the system's alignment with user expectations, while scalability and performance testing ensures reliability under varying user loads. Compliance with accessibility standards ensures inclusivity for all users.

In conclusion, the "Interview Bot" project merges cutting-edge technologies with meticulous investigative methodologies to create a pioneering platform that redefines interview preparation and assessment. The application's user-centric design, Al-powered personalization, and robust backend infrastructure position it as a transformative tool for both users and administrators, promising a new era of interview engagement and evaluation

DECLARATION

We hereby declare that the design principles and working prototype model of the project entitled PLACEME ASSIST - Interview Bot is an authentic record of our own work carried out in the Computer Science and Engineering Department, TIET, Patiala, under the guidance of **Dr. Rinkle Rani** during 6th semester (2023).

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Lastly, we would also like to thank our families for their unyielding love and encouragement. They always wanted the best for us and we admire their determination and sacrifice.

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LIST OF FIGURES

Figure No.	Caption	Page No.
Figure 1	System Architecture	28
Figure 2	Design Level Diagrams -Level 0	29
Figure 3	Design Level Diagrams - Level 1	29
Figure 4	Use Case Diagram	30
Figure 5	Swimlane Diagram	31

LIST OF TABLES

Table No.	Caption	Page No.
Table 1	List of figures	5
Table 2	List of tables	6
Table 3	List of Abbreviations	7
Table 4	Assumptions	13
Table 5	Constraints	13

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
MCQs	Multiple Choice Questions
SRS	Software Requirement Specifications
SQL	Structured Query Language
HTTPS	HyperText Transfer Protocol Secure

TABLE OF CONTENTS

ABSTRACT…… 2
DECLARATION…… 3
ACKNOWLEDGEMENT…….. 4
LIST OF FIGURES…… 5
LIST OF TABLES…… 6
LIST OF ABBREVIATIONS……7

CHAPTER…….. Page No.

1. Introduction 11-16

1.1 Project Overview

1.2 Need Analysis

1.3 Research Gaps

1.4 Problem Definition and Scope

1.5 Assumptions and Constraints

1.6 Standards

1.7 Approved Objectives

1.8 Methodology

1.9 Project Outcomes and Deliverables

1.10 Novelty of Work

2. Requirement Analysis 17-25

2.1 Literature Survey

2.1.1 Theory Associated With Problem Area

2.1.2 Existing Systems and Solutions

2.1.3 Research Findings for Existing Literature

2.1.4 Problem Identified

2.1.5 Survey of Tools and Technologies Used

2.2 Software Requirement Specification

2.2.1 Introduction

2.2.1.1 Purpose

2.2.1.2 Intended Audience and Reading Suggestions

2.2.1.3 Project Scope

2.2.2 Overall Description

2.2.2.1 Product Perspective

2.2.2.2 Product Features

2.2.3 External Interface Requirements

2.2.3.1 User Interfaces

2.2.3.2 Hardware Interfaces

2.2.3.3 Software Interfaces

2.2.4 Other Non-functional Requirements

2.2.4.1 Performance Requirements

2.2.4.2 Safety Requirements

2.2.4.3 Security Requirements

2.3 Cost Analysis

2.4 Risk Analysis

3. Methodology Adopted **26-27**

3.1 Investigative Techniques

3.2 Proposed Solution

3.3 Work Breakdown Structure

3.4 Tools and Technology

4. Design Specifications **28-33**

4.1 System Architecture

4.2 Design Level Diagrams

4.3 User Interface Diagrams

4.4 Snapshots of Working Prototype

5. Conclusions and Future Scope **34-35**

5.1 Work Accomplished

5.2 Conclusions

5.3 Environmental Benefits

5.4 Future Work Plan

APPENDIX A: References **35**

1.1 Project Overview

PLACEME ASSIST is a software bot system which plays the role of an interviewer and conducts technical Q&A sessions for the candidates. The bot asks questions to the candidate in the form of speech based on the dataset provided. In response to the same, the candidate provides the answers in form of speech and the bot records the answer and depending upon the similarities of the answers from the candidate and the answer provided in the database, the bot rewards points to the candidate. The grading algorithm takes into account factors such as accuracy of the candidate's response, the completeness of the answer and any other relevant criteria.

The movement detection part of the bot helps in preventing unfair means of conduct during the question- answering session. The bot has camera access to keep track of the candidate's movements. In case the candidate's movement has the potential of gaining an unfair advantage, the bot will alert the candidate to check upon his/her actions. Then after a particular no. of alerts the bot will disqualify the candidate.
It will play an essential and valuable role in education & co-operate industry as it will reduce the load upon the questioner to ask similar kinds of questions to multiple candidates one after the other. This will boost the confidence of the students and will help them with their preparation with their interviews. This also reduces the possibility of partiality and favoritism which we all may have faced during the course of our lives.

1.2 Need Analysis

PLACEME ASSIST project is an automated system designed to supervise and track interview sessions, replacing the traditional interviewer position played by a human. This system has been created in response to the growing demand for intellectual honesty and fairness in evaluation.

As online learning and remote education continue to grow, maintaining the same security and impartiality as conventional in-person tests becomes more challenging. Therefore, it has become increasingly significant in today's society. It provides a consistent and trustworthy monitoring system that can identify and prevent cheating and other types of academic dishonesty, thereby bridging the gap between in-person and online evaluations.

One of the key features of Placement Bot is its ability to minimize bias and human error. Human proctors are fallible and may miss instances of cheating or misunderstand procedural guidelines. However, it implements an automated process to observe the situation and ensure that every student is

evaluated fairly, while the bot allocates the tests under regulations.

Moreover, it can aid in lowering expenses and boosting productivity. Conventional human invigilators require a lot of resources, such as hiring, paying, and training. These expenses can be reduced while an automated system improves exam monitoring speed and precision.

In today's academic environment, the PLACEME ASSIST project is pertinent and essential. It helps to ensure academic integrity and fairness, minimize human errors and bias, and increase efficiency and cost- effectiveness by providing a consistent and reliable monitoring system.[1],[2]

1.3 Research Gaps

- Advanced algorithms : Investigate more advanced machine learning algorithms to enhance the personalization of interview questions based on user performance.Current algorithms have limitations in adaptability and accuracy.
- Vast Question Bank : Explore the feasibility of automation of question generation using NLP which could reduce the dependency on manual question curation.
- Apprehend Semantics: Explore more on to include the algorithm which could help in accurately comprehending the user’s understanding rather than using traditional techniques of string matching etc.

1.4 Problem Definition and Scope

Develop a placement assistant bot powered by AI with the goal of streamlining and improving the process of matching students with appropriate employment and internship opportunities. The bot should successfully fill the gap between firms looking for applicants and students looking for internships and placements. The idea of PLACEME Assist came across due to the problems faced by both the interviewers and candidates as conducting interviews of several candidates is a hectic task and takes a lot of time. It aims to help students develop their interviewing abilities, conduct mock interviews and provide feedback reports.

1.5 Assumptions and Constraints

Sr. No.	Assumptions
1.	**User Availability:** It is assumed that users will have access to a modern web browser and a stable internet connection to access the Interview Bot application.
2.	**Question Quality:** It is assumed that the questions provided for the question bank are of sufficient quality and relevance to effectively assess users' knowledge and skills
3.	**User Engagement:** It is assumed that users will actively participate in interview sessions and provide accurate answers to questions.
4.	**Data Accuracy:** It is assumed that user-provided data, such as email addresses and answers, will be accurate and truthful.
5.	**Security Awareness:** It is assumed that users will exercise caution with their credentials and follow best practices for maintaining the security of their accounts.

Constraints:

Sr. No.	Constraints
1.	**Technological Constraints:** The development of the Interview Bot is constrained by the technologies and frameworks chosen for the project. Compatibility issues and limitations of these technologies may impact certain functionalities.
2.	**Development Timeline:** The project must be completed within the allocated time frame, which may impact the depth of features and testing that can be conducted.
3.	**User Acceptance:** The success of the project relies on user acceptance and engagement. The system's effectiveness may be limited by user adoption rates.
4.	**Server and Network Stability:** The system's performance and availability are constrained by the stability of hosting servers and network infrastructure.
5.	**Scalability Considerations:** The system's scalability may be constrained by the

	underlying technologies and the hardware resources available for deployment.
6.	**Data Security Compliance:** Compliance with data security standards,such as GDPR, may impose constraints on data handling and storage practices.

1.6 Standards

1. **User Interface Design:** Follow established guidelines for user interface design, ensuring a consistent and intuitive user experience across the application.
2. **General Data Protection Regulation:** Comply with GDPR regulations when handling user data and ensure data privacy and protection.
3. **Database Security Standards:** Implement security practices to safeguard the integrity and confidentiality of stored data.
4. **Clean Code Guidelines:** Follow established coding conventions and best practices for writing clean, maintainable and readable code.
5. **Code Review Standards:** Conduct thorough code reviews to identify and rectify potential bugs, security vulnerabilities and maintain code quality.
6. **Agile Development:** Implement Agile methodologies for project management, emphasizing iterative development, collaboration and flexibility.

1.7 Approved Objectives

Main objectives for our project are as follow:

1. To study and analyze existing projects related to interview bots.

2. To generate data related to technical interviews and apply pre-processing techniques to the generated data.

3. To use appropriate algorithms to accurately evaluate candidate's responses in an efficient manner.

4. To design and develop the bot which involves selecting appropriate tools and technologies for its development.

5. To test the invigilator bot using real-world inputs.

1.8 Methodology

A. To generate data related to interview bot and apply pre-processing techniques to the generated data:
   1. Collect data that will be used to train and test the bot's performance. Quality and relevance of the data collected will directly impact the accuracy and effectiveness of the bot.
   2. Cleaning and transforming the data to make it suitable for analysis and modeling. Pre-processing techniques could include removing irrelevant data, filling in missing values etc.
   3. Use an automated system to conduct interview sessions, such as a chatbot or AI-based system that can understand and respond to candidates' responses.
   4. Train the system with a large dataset of responses to improve its accuracy over time.

B. To use appropriate algorithms to accurately evaluate candidate's responses in an efficient manner:
   1. Use machine learning algorithms to analyze and evaluate candidates' responses.
   2. Use a standardized rubric for evaluating responses to ensure consistency and fairness.
   3. Topic Modeling will be employed to extract the essence of the response and match against the source material. Subsequently, an accuracy score will be computed to evaluate the degree of similarity between the two.

C. To offer a user-friendly interface for candidates and administrators to interact with the system:
   1. Design the system in a way that is intuitive and easy to use.
   2. Implement a web app using a responsive design approach to ensure that the system is accessible across different devices and screen sizes

D. To provide a comprehensive and detailed report of the candidate's performance, providing useful insights for further study and preparation:
   1. Develop a report that includes a summary of the candidate's performance, an overall score, and a breakdown of scores for each section.
   2. Provide detailed feedback on the candidate's strengths and weaknesses, along with recommendations for further study and preparation.
   3. Incorporate visual aids such as charts and graphs using Matplotlib, Seaborn and Report Lab to help candidates understand their performance better.
   4. Make the report available to candidates and administrators through the user-friendly interface.

1.9 Project Outcomes and Deliverables

1. The bot will make the interview process more efficient, will be beneficial to corporate industries, as it will reduce the burden on questionnaires and increase the quality of the assessment process.
2. The bot's grading algorithm takes into account various criteria such as accuracy, completeness, and relevance, which reduces the possibility of bias and favoritism and its ability to provide instant feedback to candidates
3. The bot will boost the confidence of candidates and improve their intellect and confidence in self, as they will be able to interact with the bot in a more relaxed and natural way.

1.10 Novelty of Work

1. **Multi-Type Questionnaire:** Integrating multiple question types like MCQs, Fill-ups, True/False, One words and One Liners within a single interview session provides a comprehensive assessment of the user's knowledge and skills.
2. **Automated Scoring And Reporting:** The automated report generation feature streamlines the assessment process, providing instant feedback to users.
3. **User Interface:** Designing user-friendly interface to enhance the user experience and minimizing unnecessary inputs from the users.
4. **Admin Panel:** Including the admin panel for question bank management, the admin can include more questions based on the current trend making it more reliable.
5. **Performance and Scalability:** Ensuring the system's performance under concurrent sessions for smooth user experience. Implementing measures to maintain responsiveness.
6. **Security Measures:** Prioritizing the need to protect the user data through integrating the authorization and authentication of users.
7. **Continuous improvement:** Building a feedback loop to refine questions, improve user experience and enhance scoring accuracy.

2.1 Literature Survey

Automated exam proctoring, also known as invigilation, has gained immense popularity in recent years, especially with the rise of online learning. One of the critical components of bot is face detection, which helps to verify the identity of the test-taker and monitor their activities during the exam. This literature survey aims to provide an overview of invigilation bots that use face detection technology.

1. VIRTUAL INVIGILATION

A remote proctoring model built with Python and numerous modules illustrated how digital form invigilation may be implemented using audio, video, and various anti-cheating approaches in this project. This model comprises checking and recording the candidate's suspicious motion, background noises, and candidate validation. It intends to conduct a remote examination without physical invigilation, and the recorded snaps and noises can be analyzed to determine whether the candidate used unfair means or cheated. [4]

Tools and Libraries used:

- NumPy
- PyAudio
- OpenCV

Components used in Hardware:

- Webcam: To record video footage.
- Computer: To run the code and store data required.
- Microphone: To record audio

Robot recruiters are chatbots that can perform AI-led video interviews on their own, assisting businesses in expanding the job prospect pool and ensuring consistency in hiring methods. [5]

Tools and Libraries used:

- Natural Language Processing
- TensorFlow
- Scikit-learn
- Speech-to-Text
- Text-to-Speech

Components used in Hardware:

- Webcam: To record the video of a candidate during the time of examination.
- Computer: To process the video and audio.
- Cloud computing resources: To handle multiple interviews at the same time.

4. FACE DETECTION

Biometric security includes facial recognition. Voice recognition, fingerprint recognition, and retina or iris recognition are examples of biometric software. The technology is mostly utilized for security and law enforcement, although there is growing interest in other applications. [3]

- OpenCV
- Dlib
- PyTorch
- TensorFlow

Components used in Hardware:

- Cameras: To capture images and video.
- Display Devices: To show the output of face detection or facial landmark points.
- Storage devices: To store the captured data.

- Processing Units: To run the algorithms and process the video or image data.

2.1.1 Theory Associated With Problem Area

In this section, we delve into the theoretical framework that underpins the interview preparation and assessment domain. This includes concepts and theories relevant to educational technology, assessment methodologies, and user engagement.

2.1.2 Existing Systems and Solutions

We conduct an exploration of the landscape of existing interview preparation and assessment systems. By analyzing various solutions available, we gain insights into the functionalities, limitations, and innovations that have been applied to address similar challenges. This section delves into the research findings present in the literature related to interview preparation platforms and Al-driven assessment tools. We extract valuable insights and trends from research papers, articles, and case studies.

2.1.3 Research Findings for Existing Literature

This section delves into the research findings present in the literature related to interview preparation platforms and Al-driven assessment tools. We extract valuable insights and trends from research papers, articles, and case studies.

2.1.4 Problem Identified

By analyzing the existing systems and literature, we identify the gaps and challenges that exist within the interview preparation and assessment domain. This section outlines the specific problems we aim to address through the development of our Interview Bot.

2.1.5 Survey of Tools and Technologies Used

We conduct a comprehensive survey of the tools and technologies that have been utilized in similar projects. By examining the technological landscape, we gain a deeper understanding of the potential options available for building and enhancing our Interview Bot. By structuring these sections in this way, we ensure a systematic exploration of the project's background, the existing solutions, the research findings, the specific problem areas, and the technological context in which our Interview Bot will be developed.

2.2 Software Requirement Specification

2.2.1 Introduction

2.2.1.1 Purpose

The purpose of this document is to provide a comprehensive overview of the requirements for the development of an Interview Bot- PlaceMe Assist, a software application designed to conduct interview sessions with users, present multiple-choice questions (MCQs), true/false questions, fill-in-the-blank questions, one-word answer questions and one-liner questions, and generate reports based on user responses.

2.2.1.2 Intended Audience and Reading Suggestions

This SRS is intended for various stakeholders involved in the development, testing, deployment of the interview bot application.

1. **Development Team:** Software Developers are responsible for designing,coding,testing and implementing the interview bot system.
2. **System Architects and Designers:** They can consult this document to learn more about the project's high-level architecture, components, and data management features.
3. **User and stakeholders:** Clients can use this document to gain insights of the project's scope,objectives and functionalities.

2.2.1.3 Project Scope

Users will be able to register and authenticate, access a question bank, take part in interview sessions, receive feedback, and read reports using the placement bot.The system will also have an admin panel for controlling user data and question banks.

2.2.2 Overall Description

By responding to various question kinds, users of the web-based application PLACEME ASSIST can participate in interview sessions.Administrators can manage question banks and user data through an admin interface, and the system provides a report based on their responses.

2.2.2.1 Product Perspective

Mock Interviews:

1. The software should include a number of interview scenarios based on various employment roles and industries.
2. Users can choose the sort of interview they wish to practice (e.g., technical, behavioral) and receive questions tailored to their preferences.
3. Users can proceed from basic to sophisticated questions by adjusting the difficulty level.
4. Mock interviews imitate real interview situations, allowing users to feel apprehensive and under pressure, much like in an actual interview.

Personalized Feedback:

1. Following each mock interview or practice session, the software should provide detailed feedback.
2. Suggestions for improvement in communication, body language, content organization, technical expertise, and other areas may be included in feedback.
3. AI-powered analysis could identify strengths and shortcomings in responses, allowing users to improve their performance.

Realistic Simulation:

1. To provide an authentic experience, the program may include video recording to capture users' replies and allow them to review their performance.
2. Response time restrictions can simulate the pace of a real interview.

Accessibility and Convenience:

1. The program should be available on a variety of platforms, including smartphones, tablets, and laptops.
2. The availability of a web and mobile application promotes user convenience.

User Support:

1. The product should provide customer help for technical concerns as well as tips on how to use the software successfully.
2. Finally, well-designed Placement Assistant Software that includes mock interviews and practice sessions with feedback enables users to gain confidence, improve their interview abilities, and raise their chances of success in a competitive job market.

2.2.2.2 Product Features

1. **User Registration and Authentication :** Accounts can be created by utilizing valid email addresses and passwords.Users can log on with their existing credentials.The ability to reset your password will be available.
2. **Question Bank Management :** Admins have the ability to add, edit, and delete questions from the

question bank.Each question will be classified according to its nature (MCQ, true/false, fill-in-the-blank, one-word).

3. **Interview Session :** Users can begin an interview session by selecting the appropriate question category.Based on the category selected, the system will present questions one at a time.Users can respond to questions based on their personality type.
4. **Scoring and Reporting :** The system will assess responses and assign grades.Each user and interview session will receive a score.At the end of the session, a report detailing the user's performance will be generated.
5. **Admin Panel :** Admins can control the categories and themes of the question bank.View registered users, their performance, and reports under user management.Administrators can examine and analyze user performance statistics.

2.2.3 External Interface Requirements

The criteria for external interfaces establish how a placement aid practice program communicates with its users, systems, and external entities. These specifications provide a smooth and user-friendly experience. The following are some important external interface requirements for PLACEME ASSIST:

Authentication and Registration:

1. Users should be allowed to create accounts with their own usernames/email addresses and passwords.
2. Secure authentication procedures, such as email verification or two-factor authentication, should be supported by the software.

User Profile:

1. Each user should have their own profile in which they may control their personal information, practice history, and preferences.
2. Users should be allowed to edit their profiles, post profile photos, and change their contact information.

Practice Selection:

1. Users should have the option of choosing the type of practice they want to do, such as mock interviews, coding challenges, or case studies.
2. Users should be able to select the difficulty level and industry relevance of the practice sessions through the interface.

Analysis and feedback:

1. Users should receive thorough feedback on their performance after finishing a practice session.
2. The feedback should be delivered in a clear and understandable manner, emphasizing both strengths and places for growth.

Progress Monitoring:

1. Users should be able to track their progress over time, including success rates, skill upgrades, and completion history.
2. Visual representations such as graphs or charts can help people understand their progress.

Audio and Video Capture:

1. Users should be able to start, pause, and stop recording if the software records video or audio during practice sessions.
2. Users should be allowed to review recorded sessions and, if necessary, remove them.

2.2.3.1 User Interfaces

- The software should have an easy-to-use interface with straightforward navigation.
- To assist users through various capabilities, user interface elements should be correctly labeled and structured.
- The user interface should be responsive and adaptable to various screen sizes and devices.

2.2.3.2 Hardware Interfaces

- **Webcam:** The system requires a webcam to record video footage of the candidate during the interview or exam session.
- **Speaker:** A Speaker is needed to listen to audio during the interview or exam session.
- **Display Devices:** The system should have a display device to show the output of face detection or facial landmark points.
- **Storage Devices:** Storage devices are required to store the captured data, including video footage and audio recordings.
- **Processing Units:** Sufficient processing units are necessary to run the algorithms and process the video or image data effectively.

2.2.3.3 Software Interfaces

It requires integration with various software components and interfaces, including:

- **User Interface:** The system should have a user-friendly interface that allows candidates to interact with the bot easily. The interface should be intuitive and responsive, accessible across different devices and screen sizes.
- **Database:** The system needs a suitable database to store and manage candidate data, interview questions, and performance records. SQL is the chosen database technology for this project.
- **Web Scraping:** Python libraries, such as BeautifulSoup, are used for web scraping to collect

primary data, including various types of interview questions.

- **AI and Machine Learning:** Python libraries, such as speech-recognition and fuzzy-wuzzy, are utilized for algorithm development and machine learning tasks.

2.2.4 Other Non-functional Requirements

- **Performance** : Concurrent interview sessions should be supported by the system without causing considerable performance reduction.User interactions should be handled within [accepted time limits].
- **Security** : Passwords for users should be securely hashed and kept. HTTPS should be used to encrypt data transit between the client and server. Authentication should be required for admin panel access.
- **User :** The user interface should be simple and easy to use. Each question type should be given specific guidelines throughout the interview.
- **Reliability :** The system should be available 24 hours a day, seven days a week, with minimal downtime for maintenance. Data integrity must be maintained, and backups must be performed on a regular basis.

2.2.4.1 Performance Requirements

It has the following performance requirements:

- **Concurrent Interview Sessions:** The system should support multiple interview sessions simultaneously without significant performance degradation.
- **User Interaction Responsiveness:** User interactions, such as answering questions or navigating through the interface, should be handled within an acceptable time limit to ensure a smooth user experience.

2.2.4.2 Safety Requirements

It incorporates safety measures to ensure the security and well-being of the candidates:

- **Privacy Protection:** The system should respect candidates' privacy and not invade their personal space. It should only capture and store data necessary for the interview or exam session.
- **Movement Detection:** The bot includes a movement detection feature to prevent candidates from using unfair means or cheating during the exam. It alerts candidates if their movements have the potential to gain an unfair advantage.

2.2.4.3 Security Requirements

- **Password Security:** User passwords should be securely hashed and stored to protect user accounts from unauthorized access.
- **Data Encryption:** HTTPS should be used to encrypt data transmission between the client and server to ensure the confidentiality and integrity of user data.
- **Authentication:** Authentication should be required for admin panel access to prevent unauthorized access to sensitive information.

2.3 Cost Analysis

- **Development Resources:** The cost of acquiring hardware and software resources required for development, including computers, webcams, microphones, and necessary software licenses.
- **Maintenance and Support:** The cost of ongoing maintenance, updates, and technical support for the system.

2.4 Risk Analysis

It involves identifying and analyzing potential risks that may impact the project's success. Some of the risks to consider include:

- **Technical Constraints:** Compatibility issues and limitations of chosen technologies and frameworks may impact the functionality and performance of the system.
- **Development Timeline:** The project must be completed within the allocated time frame, and any delays or unforeseen challenges may affect the project's success.
- **User Acceptance:** The success of the project relies on user acceptance and engagement. The system's effectiveness may be limited by user adoption rates.
- **Server and Network Stability:** The system's performance and availability are dependent on the stability of hosting servers and network infrastructure.
- **Scalability Considerations:** The system's scalability may be constrained by the underlying technologies and the hardware resources available for deployment.

3.1 Investigative Techniques

- **Stakeholders view and surveys :** Surveys and feedback from potential users can help in gathering the insights into the needs and expectations. This will help in identifying features and functionalities.
- **Feasibility study :** Perform a feasibility study to access the technical, operational and economic feasibility of the project. The work done on literature survey will help in distinguishing the project with the existing project.'
- **Prototyping :** Create prototypes to visualize the flow and interactions of the application.
- **Use Case Scenarios :** Building use case scenarios that outline different types of users and their interaction with the application. This will help in defining the system's functional requirements and user flows.

3.2 Proposed Solution

The proposed solution envisions the development of an Interview Bot which leverages the combination of modern technologies to provide a comprehensive, user-friendly and AI-powered interview experience. The application will utilize various tools and frameworks to offer an engaging experience for users.

Key Features and Functionalities:

- **User Registration and Authentication** : Users can create accounts using email addresses and passwords. Security will be improved by implementing authentication
- **Question Bank management** : Admins can update the question bank based on the current market trend and depending upon the feedback of the user.
- **Interview Session** : The user will be asked various question types like MCQ's, Fill-ups, true/false, one word, one liners using speech to make the interview a realistic experience.
- **Scoring and Grading** : Depending upon the answers spoken by the user. It will be graded based on the string matching and allocate marks based on it.
- **Report Visualization** : The report will be generated in real-time to review the performance without a delay.
- **Database** : The data is being collected using web scraping and stored in a suitable database to ensure efficient retrieval and management.

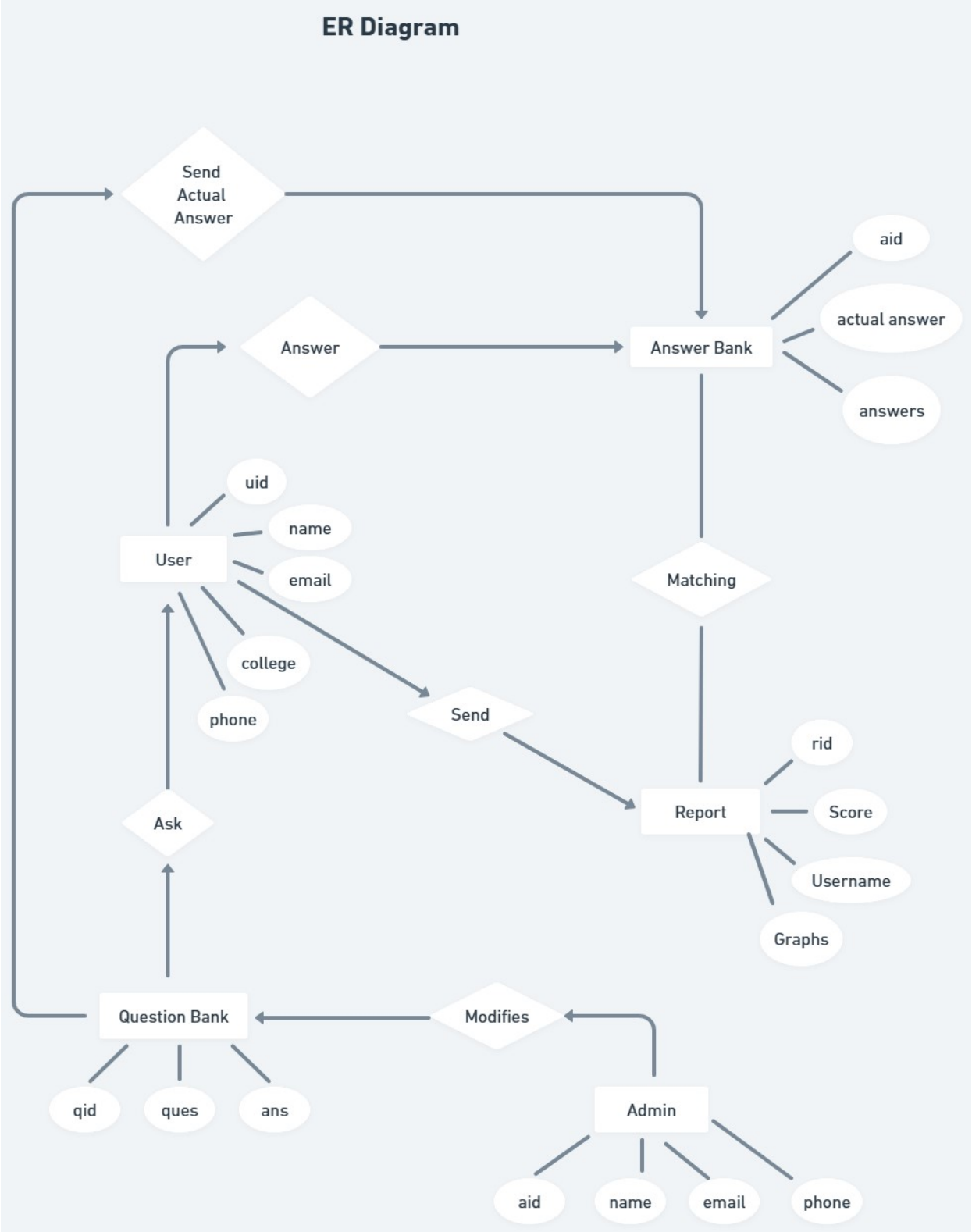
3.3 Work Breakdown Structure

1. **Planning:**
    - Setting the project's objective and outline.
    - Identifying the stakeholders and their roles.
    - Establishing the timeline and work plan.
    - Creating project documentation.
2. **Designing:**
    - Gathering and analyzing the requirements.
    - Designing the system architecture, Use case diagrams, Activity Diagram and DFDs.
    - Defining the project's features and functionalities.
3. **Development:**
    - Database : collected primary data which is various types of questions by implementing crawlers using python libraries for web-scraping.
    - Frontend : The score of each candidate will be stored and will be displayed in the form of visual graphs.
    - Backend : Creating a function in python to interview the user.

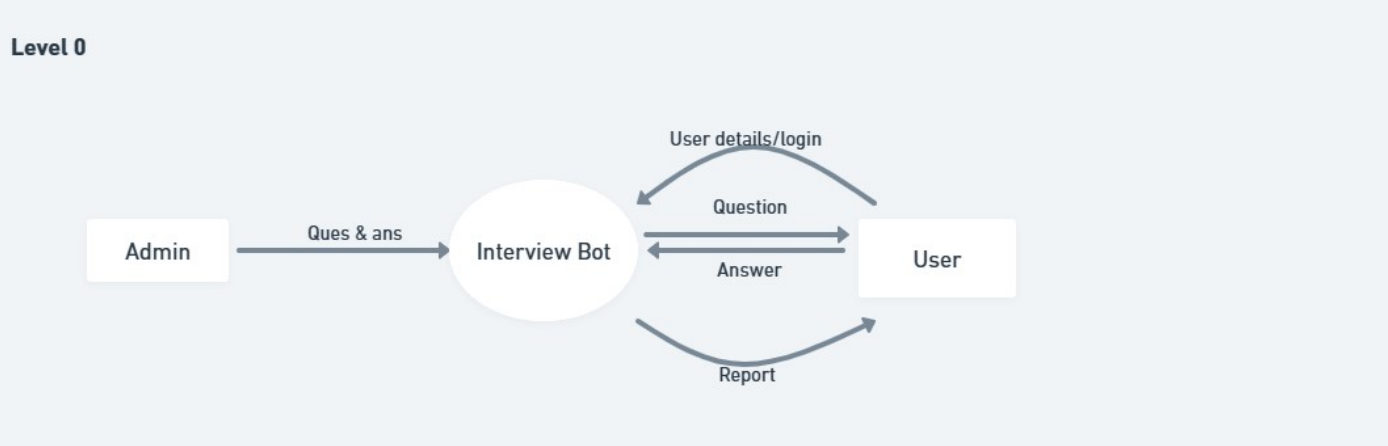
3.4 Tools and Technology

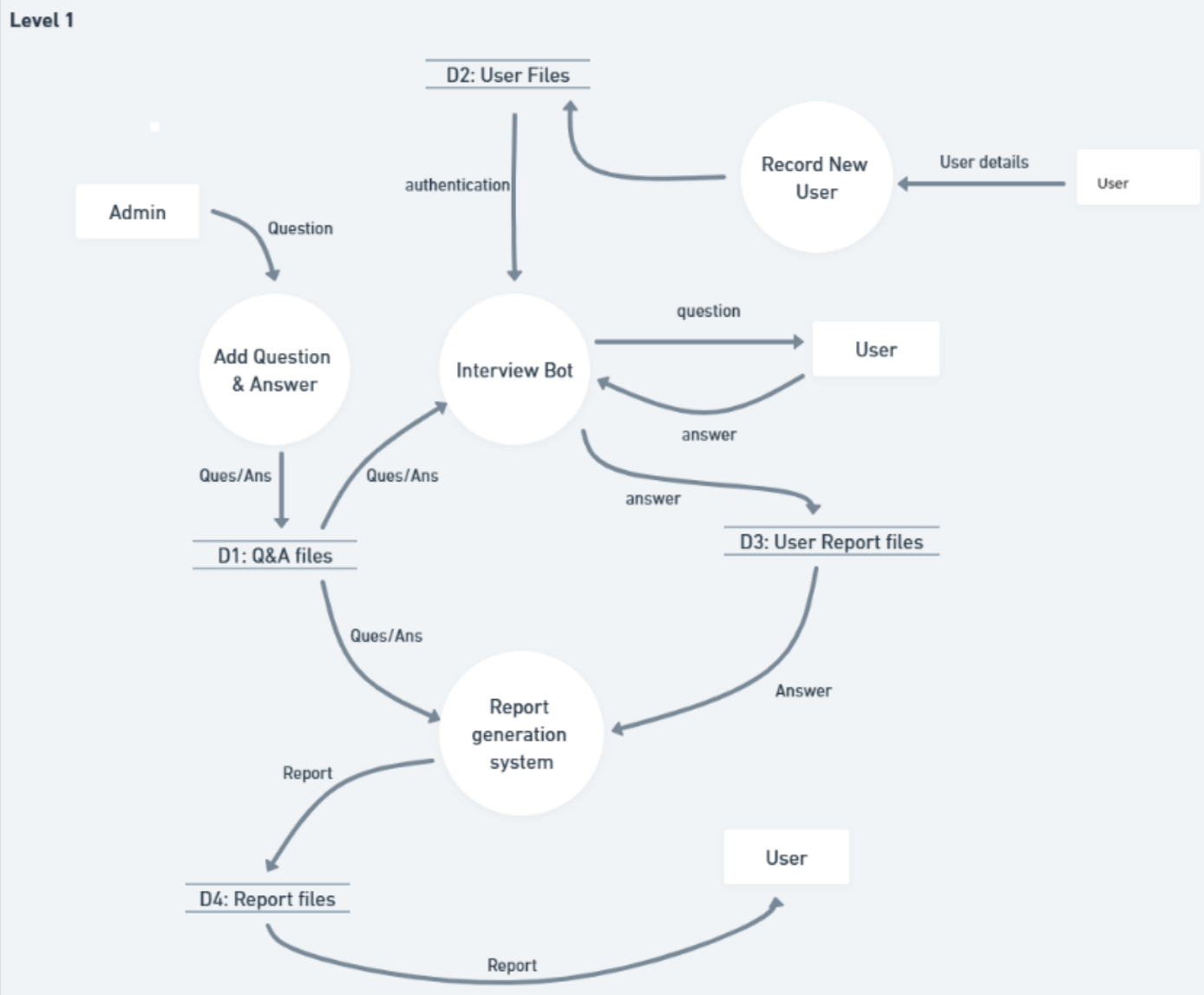
- Frontend: HTML, CSS, JS, ReactJS, StreamLit
- Backend : Python
- DataBase: SQL
- Web Scraping : Python libraries (e.g. BeautifulSoup)
- AI and Machine Learning : Python libraries (e.g. speech-recognition, fuzzy-wuzzy) for algorithm development
- Deployment : Cloud Hosting

4.1 System Architecture



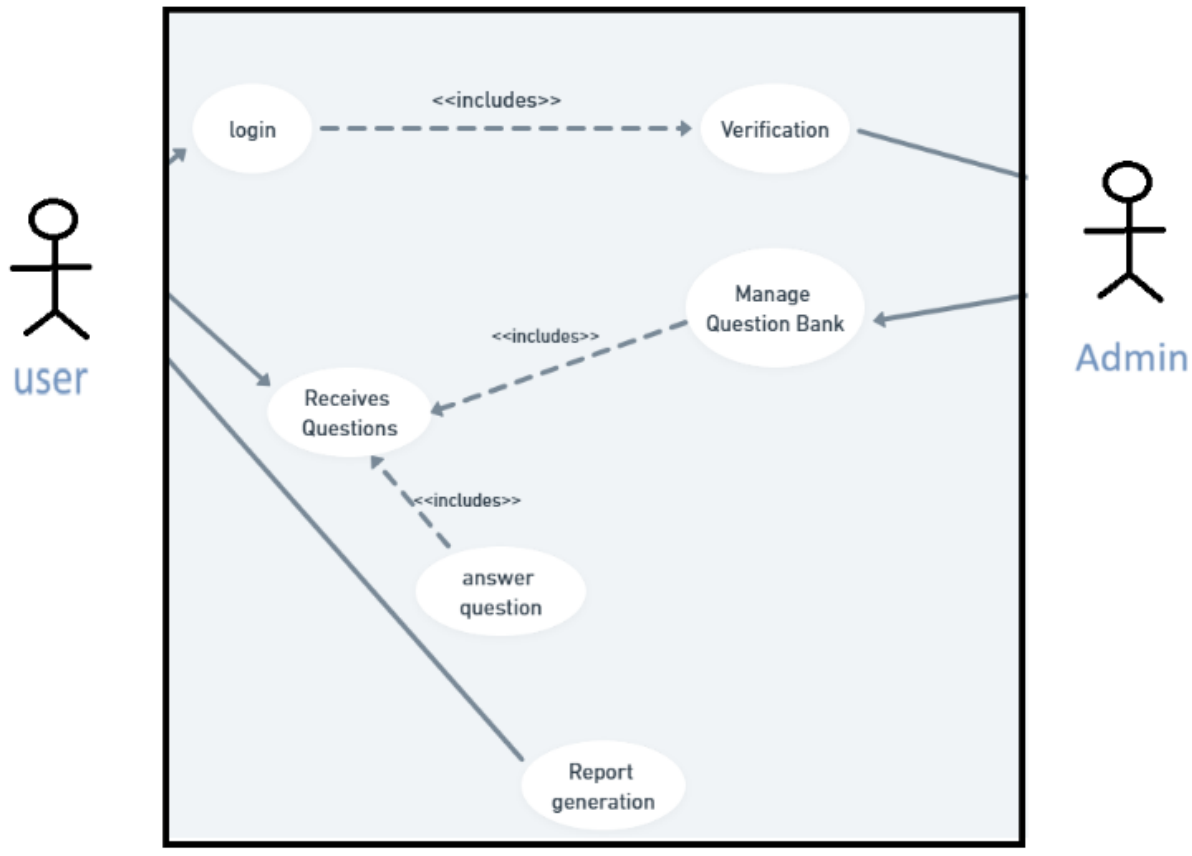
4.2 Design Level Diagrams



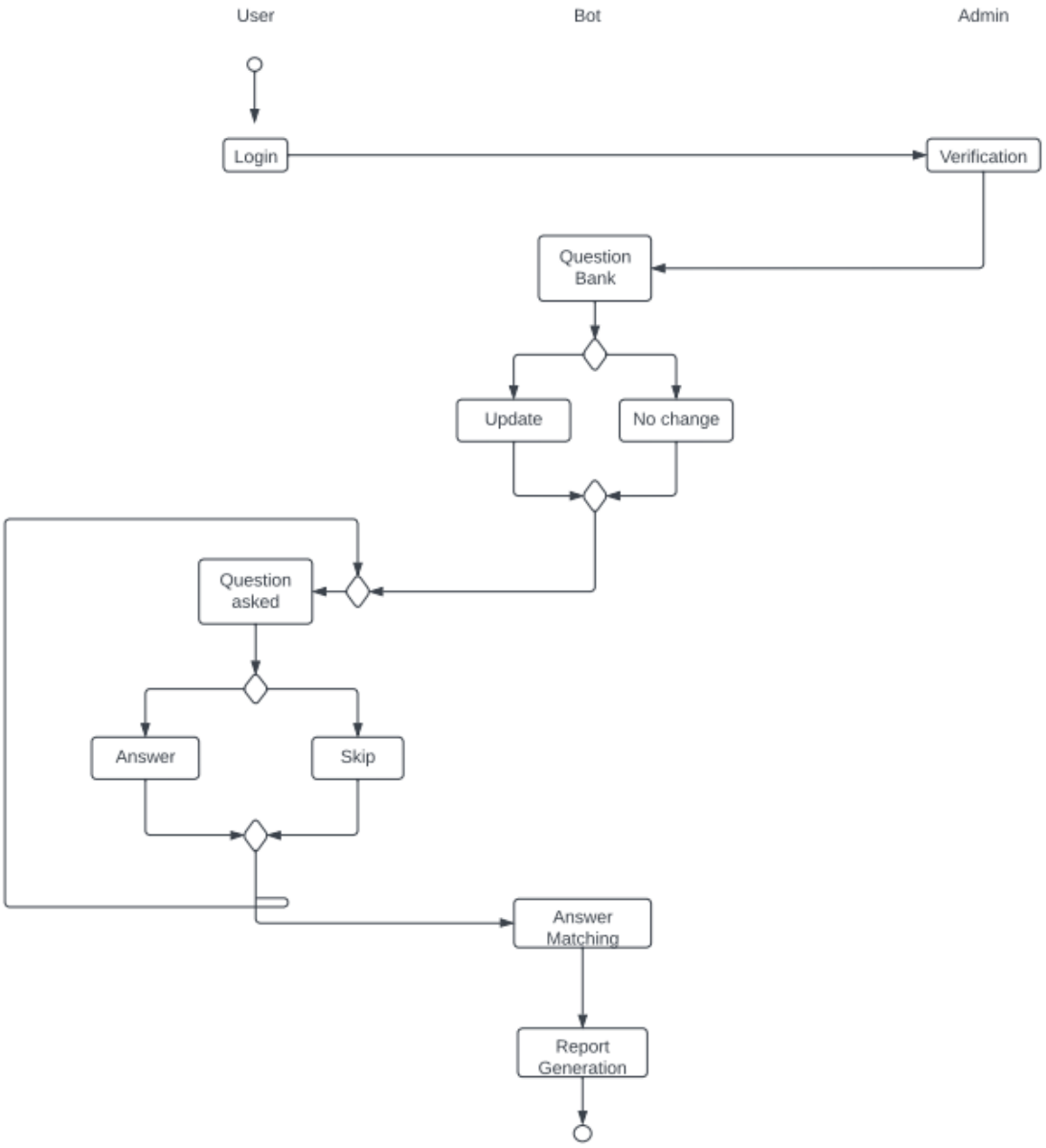


4.3 User Interface Diagrams

Use Case Diagram:



Swimlane Diagram:



4.4 Snapshots of Working Prototype

```
welcome to the test environment
Please only speak the option in terms of option A option B option C option D
 The time complexity to calculate the number of edges in a graph whose information in stored in form of an adjacency matrix is
Option A
O(V)
Option B
O(E2)
Option C
O(E)
Option D
O(V2)
listening
option A
a
incorrect
The correct answer is :
D
```

```
PS D:\OneDrive\Desktop\capstone> python -u "d:\OneDrive\Desktop\capstone\main.py"
                                      question  ... difficulty_level
0                   Java Source Code is compiled into   ...                5
1                             Enums were introduced in?  ...                3
2             Default, public , protected, private are?  ...                5
3     Which of the following is used to interpret a...  ...               10
4     HTML based Java Documentary help can be acces...  ...                8
..                                             ...  ...              ...
177   The  project builds on top of pandas and matp...  ...                9
178   Which of the following makes use of pandas an...  ...                8
179                                Why ndim is used?  ...                3
182   Which of the following indexing capabilities ...  ...               11
183                  Which of the following is false?  ...                3

[159 rows x 8 columns]
                                      question                                             answer  difficulty_level
0                            What is a Data Structure?    Data structure is a way that specifies how t...                3
1      What are linear and non linear data Structures?  Linear Data Structure:  If all the elements ar...                6
2             How Linked list is different from array?    Differences between array and linked list ar...                5
3         What are the criteria of algorithm analysis?    Algorithms are analyzed on the basis of 2 fa...                4
4     What are the operations that can be performed...    Following operations can be performed -     ...                5
..                                                ...                                                ...              ...
217      What is Round Robin CPU Scheduling Algorithm?  Round Robin is a CPU scheduling mechanism whos...                6
218      What is Disk Scheduling in Operating Systems?  Operating systems use disk scheduling to plan ...                5
219   What is the importance of Disk Scheduling in ...  - One Input or Output request may be fulfilled...                6
220   What are the Disk Scheduling Algorithms used ...  The Disk Scheduling Algorithms used in Operati...                7
221   What is Monitors in the context of Operating ...  A feature of programming languages called moni...                5

[206 rows x 3 columns]
```

	question	answer	difficulty_level
0	The state transition initiated by the user pro...	Block	8
1	An operating system contains 3 user processes ...	Four	17
2	Which of the operating system write through ca...	DOS	4
3	Most popular 16-bit operating system is	MS-DOS	6
4	To access the services of operating system the...	System calls	7
5	Which Module give control of the CPU to the pr...	Dispatcher	9
6	What else is a command interpreter called?	Shell	4
7	Which services is not supported by the operati...	Compilation	6
8	In which year the first Operating System was d...	1950	6
9	Real Time Operating System is an example of a	Process Control	6
10	What is the systematic process of moving the C...	Context Switching	8
11	BIOS (Basic Input Output System) is used by	Operating System	7
12	If a process fails, most operating system writ...	Log file	8
13	What does OS X has?	hybrid kernel	4
14	The operating system maintains a dash table th...	frame	17
15	he dash presents a uniform device-access inter...	Device drivers	15
16	Hard real time operating system has dash jitte...	Less	13
17	For real time operating systems, interrupt lat...	Minimal	8
18	The dash program initializes all aspects of th...	bootstrap	15
19	Network operating system runs on	Server	4

	question	answer	difficulty_level
0	Threads within the same process can share data...	True	9
1	A user-level process cannot modify its own pag...	True	7
2	Immediately after a process has been forked, t...	False	17
3	Hyper-threading refers to the situation in whi...	False	13
4	The scheduler is the part of an Operating Syst...	False	8
5	The best way to correct virtual memory thrashi...	False	15
6	Most PC operating systems do not support multi...	False	7

```
welcome to the test environment
Please only speak the option in terms of option A option B option C option D
 If an error occurs, what interpreter do?
Option A
terminateprogram
Option B
stopsexecution
Option C
readsthewholeprogramevenifitencounterserrors
Option D
givewarning
listening
```

5.1 Work Accomplished

This section outlines the significant milestones and accomplishments achieved during the project's execution. Key achievements include the successful completion of web scraping activities, resulting in a robust database of interview questions. Additionally, the integration of text-to-speech functionality allows for a more immersive user experience. The successful implementation of user input retrieval and accurate score calculation demonstrates the core functionalities of the Interview Bot.

5.2 Conclusions

This section outlines the significant milestones and accomplishments achieved during the project's execution. Key achievements include the successful completion of web scraping activities, resulting in a robust database of interview questions. Additionally, the integration of text-to-speech functionality allows for a more immersive user experience. The successful implementation of user input retrieval and accurate score calculation demonstrates the core functionalities of the Interview Bot.

5.3 Environmental Benefits

While not directly applicable in this context, it's important to acknowledge any potential environmental benefits. Aspects such as the efficient use of computational resources, streamlined data retrieval techniques, and digital access to interview preparation materials could indirectly contribute to reduced paper waste and resource conservation.

5.4 Future Work Plan

Sr No.	Activity	Month	Feb	March	Apr	May	Aug	Sep	Oct	Nov
1	Identification,formulation and planning of Project	Plan								
		Actual								
2	Research Work	Plan								
		Actual								
3	Dataset Preprocessing & Model Building	Plan								
		Actual								
4	Hardware Integration	Plan								
		Actual								
5	Data visualization	Plan								
		Actual								
6	Web Service	Plan								
		Actual								
7	Results Evaluation	Plan								
		Actual								
8	Final Report	Plan								
		Actual								

APPENDIX A: References

[1] "A comparison of online proctoring tools and their impact on exam integrity and student experience" by Weiwei Cai and Brian Bosworth:
https://olj.onlinelearningconsortium.org/index.php/oli

[2] "Design and Implementation of a Remote Proctoring System for Online Examinations":
https://ieeexplore.ieee.org/document/8995026

[3] GitHub - ageitoev/face recognition
https://github.com/ageitgey/face recognition

[4] GitHub - chadokarvijay/Virtual-Invigilation
https://github.com/chadokarvijay/Virtual-Invigilation

[5] GitHub - jibinmathew69/RecruitmentBot: An example recruitment chat bot
https://github.com/jibinmathew69/RecruitmentBot