



CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE, INDIA

Colloquium

A Career Guidance Support AI system Web Project



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MISSION

CHRIST is a nurturing ground for an individual's holistic development to make effective contribution to the society in a dynamic environment

VISION

Excellence and Service

CORE VALUES

Faith in God | Moral Uprightness
Love of Fellow Beings
Social Responsibility | Pursuit of Excellence



Please introduce your project

- In today's dynamic job market, individuals often face challenges in navigating career paths and making informed decisions regarding their professional development.
- The overwhelming amount of available information makes it difficult for users to find relevant and personalized advice, leading to suboptimal career choices and job dissatisfaction.
- To address these challenges, we propose an intelligent, AI-driven career guidance platform that offers personalized, data-driven insights and recommendations.



What are the objectives?

Personalization:

Provide customized career guidance based on individual user profiles, preferences, and goals.

Interview Preparation:

Use an AI-driven interview bot to conduct mock interviews tailored to the user's resume and career goals. Offer feedback and grading on interview performance, if feasible, to help users improve their skills.

Multimodal Support:

Implement a chatbot for both text and image queries to provide comprehensive support and enhance user engagement.

Research Paper Recommendations:

Utilize machine learning models to recommend relevant research papers based on user queries, supporting continuous learning and professional development.



What are the objectives?

- **Multilingual Chatbot : Ask in your Lingo .** We will build a chatbot specific to career related queries that is capable of answering in every language. (This project scope includes 5 languages.)

- **Other Modules :** We also plan to create other learning support modules such as aptitude preparation, career personality test, a warmup session to interview and Coursera course recommendation system etc to make the website scope wiser.



What are the limitations of the existing systems?

❑ Jobscan:

- Uses AI to optimize resumes for Applicant Tracking Systems (ATS).
- Provides insights on job descriptions and keywords.
- Tailors resumes for specific roles.

❑ CareerBuilder:

- Offers a career change program with personalized mentoring.
- Provides job placement assistance and career coaching.

❑ Limitations of Existing Systems:

Jobscan: Focuses solely on resume tracking and related functionalities.

CareerBuilder: Primarily offers mentoring and job placement assistance, with limited scope



What are the limitations of the existing systems?

Year of Implementation	AI Name	Techniques/Algorithm	Gap or Drawback
2018	Pymetrics	Neuroscience-based Games, ML	Limited scope of assessment, potential biases in games
2019	HireVue	Video Interview Analysis, AI, ML	Potential bias in AI algorithms, privacy concerns
2020	MyInterview	AI Video Analysis, NLP, ML	Limited language support, privacy and data security issues
2021	Talview	Behavioral Insights, AI, ML	High dependency on video quality, potential bias issues
2022	InterviewStream	Video Interviewing, AI Analysis	Requires strong internet connection, potential bias in evaluations
2023	Vervoe	Skill Assessment, AI Scoring	May not cover all skill types accurately, potential biases
2018	JobPal	Chatbot, NLP, ML	Limited conversation complexity, potential language support issues
2023	Iris.ai	AI, NLP, Research Paper Recommendation	May struggle with niche topics, requires large data sets for accuracy

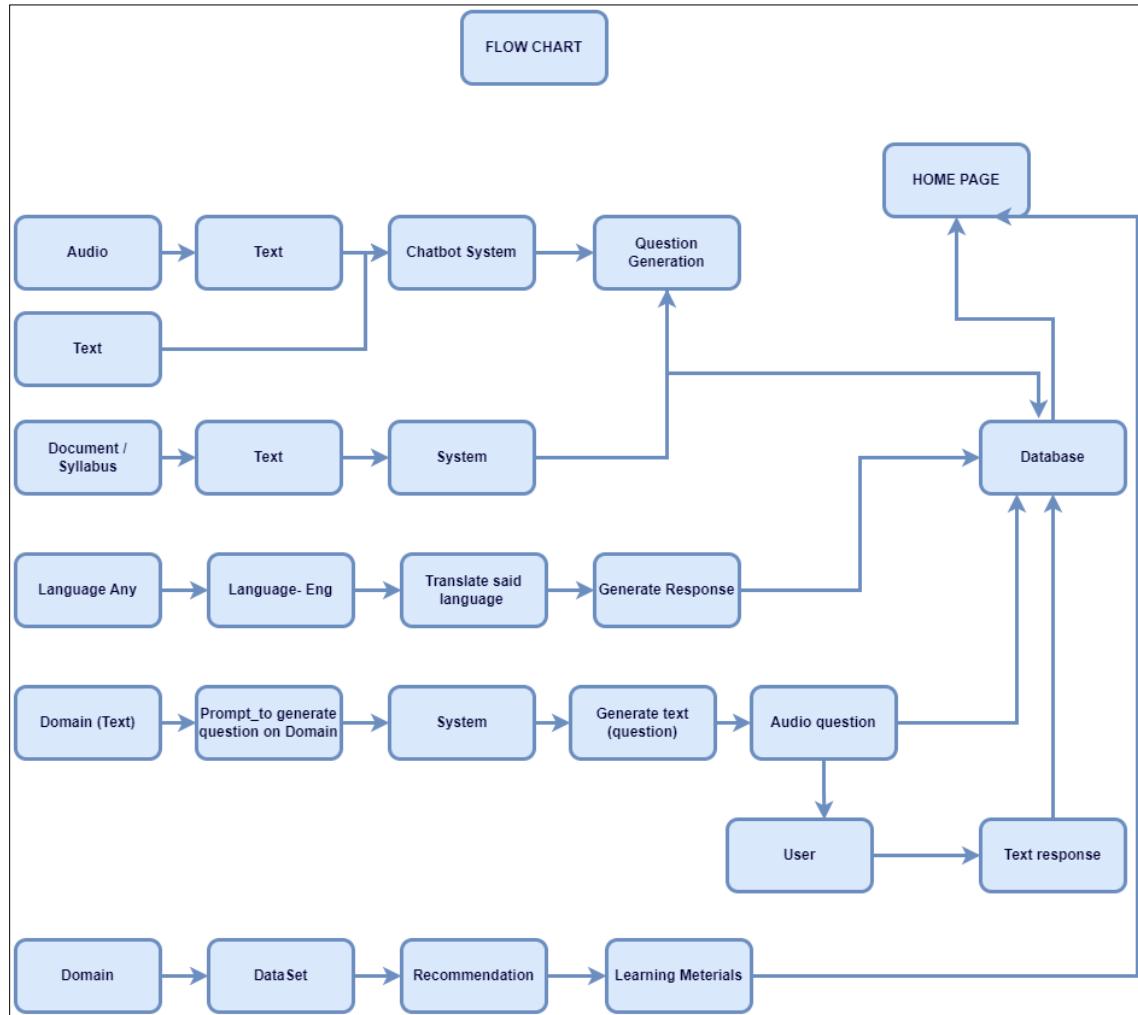


Then what is the uniqueness of your project?

- Our system offers a module for document scanning and answering related questions, but it also integrates other modules, providing a more wider career support experience beyond just resumes.
- AI-generated mock interview practice.
- Multilingual for broader scope.
- Grading and feed back.
- Research paper and material recommendations including online courses.



Explain the flow of your project.





Elucidate on the software/hardware requirements

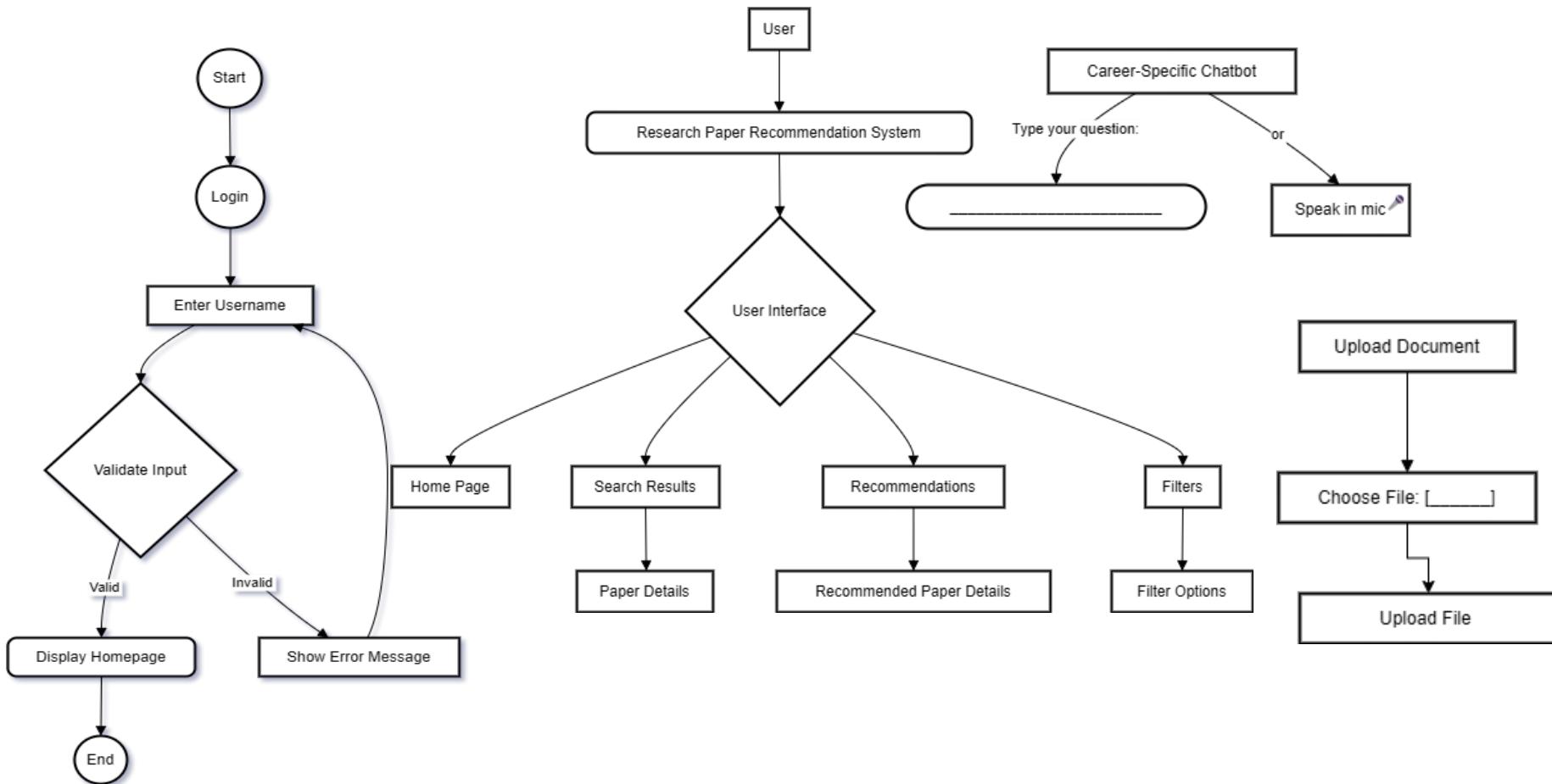
Requirement	Characteristics
Software	GPU cloud based notebook running environments- Google Colab, Kaggle, Gradio, Streamlit, Huggingface Interface Support. HTML, CSS, JS , backend PHP support savings in txt/csv formats, Python Flask
Hardware	Cloud systems required not supported in hardware. For end users: atleast 2 GB RAM, internet connectivity.

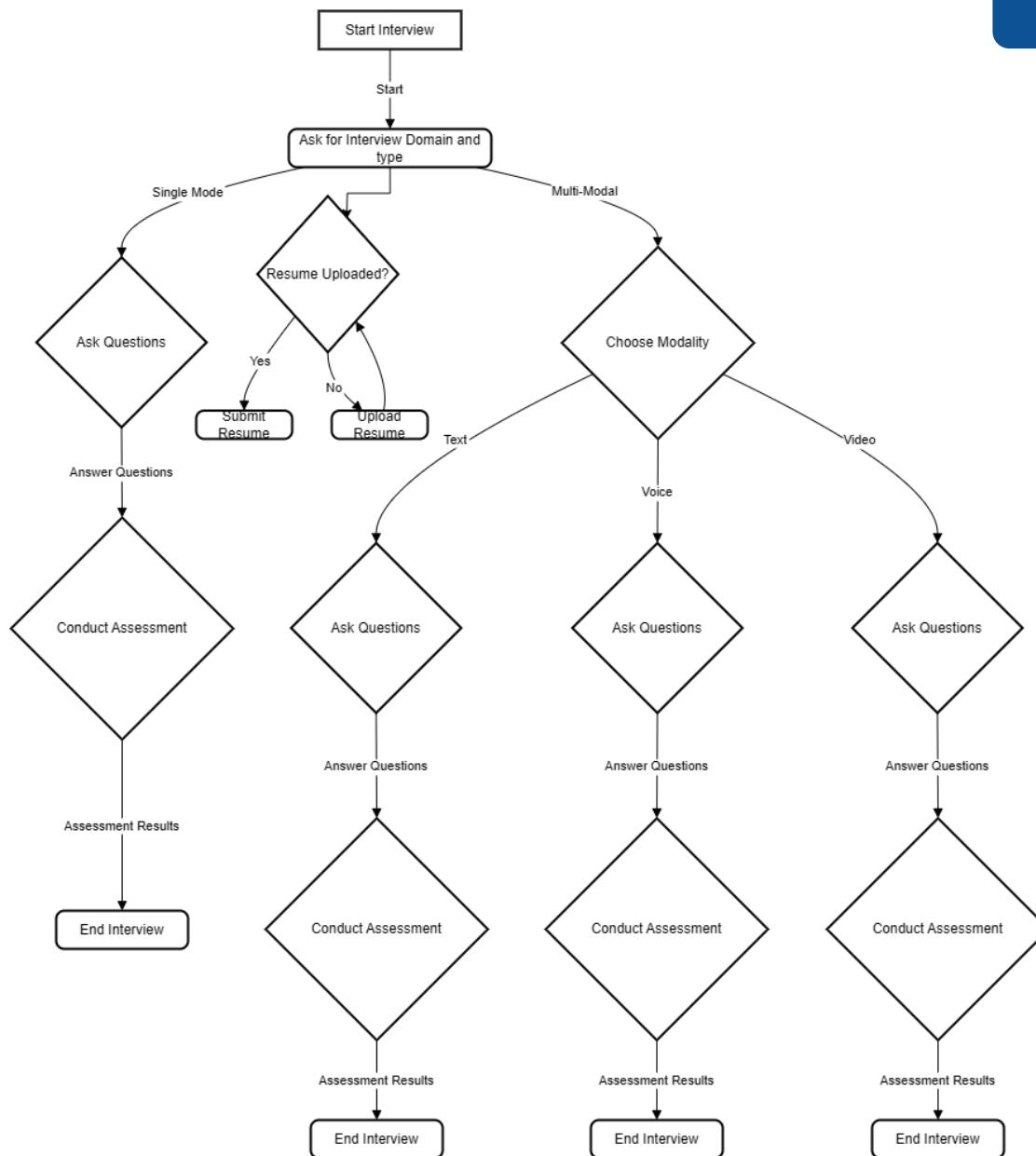
Functional requirements

Requirement ID	Requirement
M1_FR1	Document Summarization
M1_FR2	Carrier Specific Chabot
M1_FR3	Language Learning Support
M1_FR4	Interview Bot
M2_FR5	Material Recommender

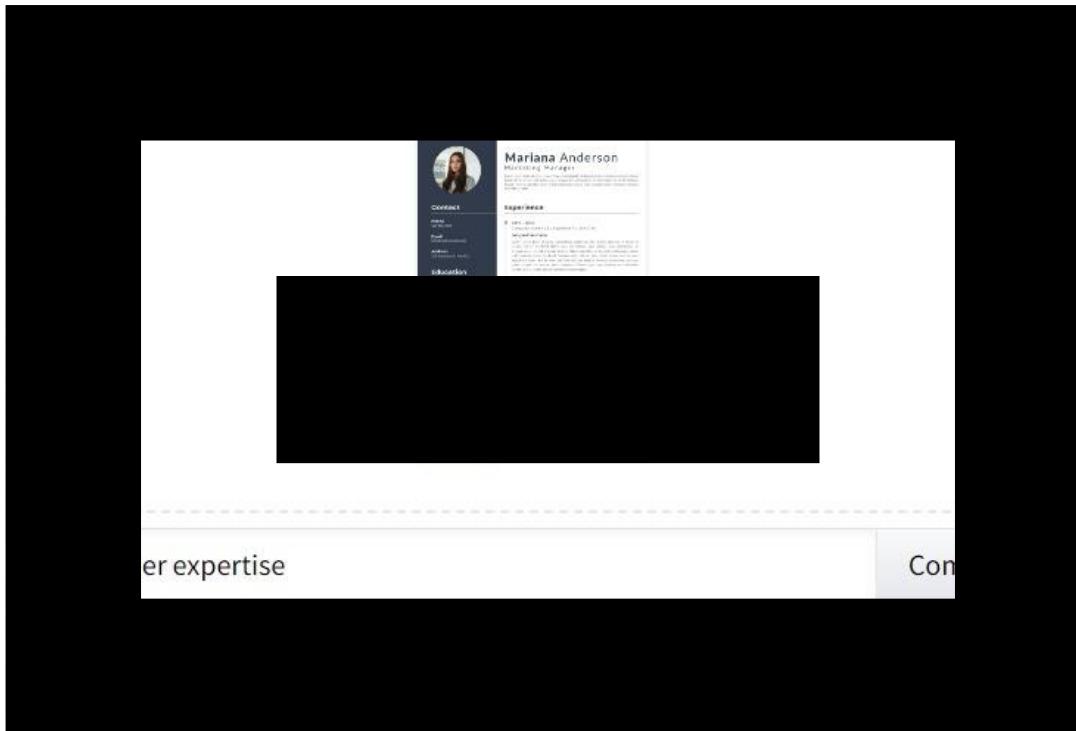


Explain the human machine interface





DEMO Interface



DEMO Interface

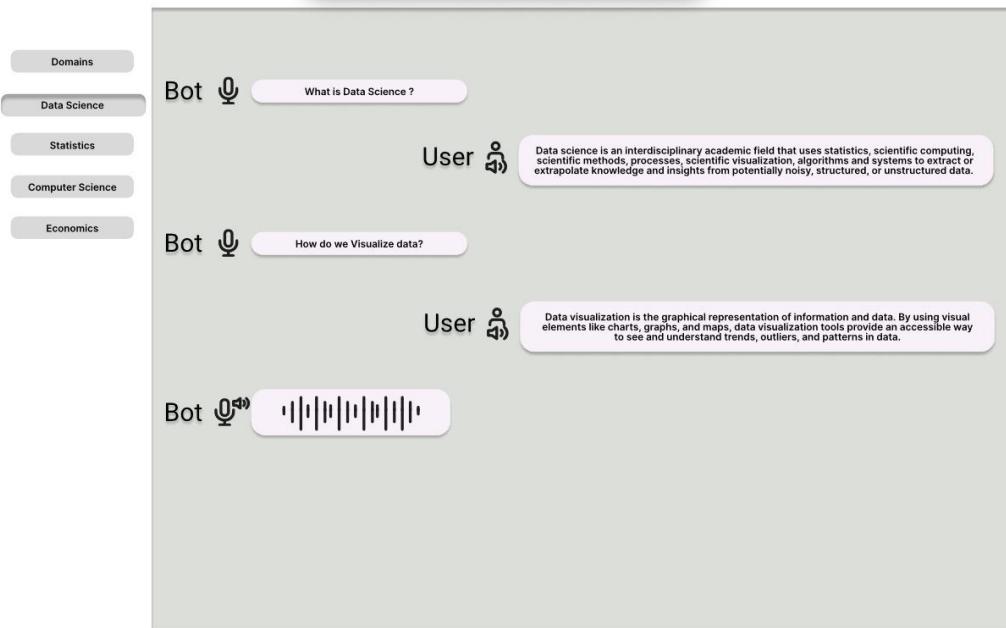
The screenshot displays a user interface for a demo application. On the left, there is a section for audio recording with a "Record Audio" button, a "Record" button, and a microphone icon. Below it is a "Text Input" field containing the text "Give me 5 interview questions about data science". At the bottom are "Clear" and "Submit" buttons. On the right, under the heading "Processed Audio", is a "Transcription" field with the same input text. Below it is a "Response" field containing a numbered list of five interview questions:

1. Can you explain the concept of data science to someone who has no background in the field?
2. What are some of the key tools and programming languages used in data science, and why are they important?
3. Can you share an example of a data science project you worked on, and the impact it had on the business or organization?
4. How do you approach cleaning and preparing data for analysis, and what are some common challenges you have encountered in this process?
5. Can you discuss the importance of data visualization in data science and provide an example of a visualization technique that you have used in your work?

At the bottom right of the response area is a "Flag" button.

DEMO Interface

INTERVIEW BOT



Choose your preferred domain:

Statutory Audit

You are:

A Fresher

Upload Resume

Choose file Shivam Palan Resume.pdf

Start

End Interview And Give Me Feedback

This panel contains several input fields and buttons. It includes dropdown menus for 'Choose your preferred domain' (set to 'Statutory Audit') and 'You are' (set to 'A Fresher'). There is also a 'Choose file' button with the path 'Shivam Palan Resume.pdf'. At the bottom, there are two large buttons: a blue one labeled 'Start' and a red one labeled 'End Interview And Give Me Feedback'.



What about the expected outcomes?

1. Document Summary Report:

Key Points: Summary points extracted from the document.

Questions & Answers: User queries and corresponding answers.

2. Chatbot Response Screen:

User's Question: The query entered by the user.

Chatbot's Answer: The response generated by the chatbot.

3. Language Translation Screen:

Native Text: Text input by the user in their native language.

Translated answer : The native text of the answer

4. Interview Practice Report:

Domain: The selected domain for the interview practice.

Questions & Answers: List of questions asked and user's responses.

Feedback: Automated feedback on user's performance.

5. Material Recommendations Report:

Domain: The domain for which materials are recommended.

Recommended Resources: List of suggested resources.



Share interfaces and its working for each module

The interface shown here helps the user to record audio or give prompt as text and generate responses.

The interface consists of two main sections: a left panel for input and a right panel for processing.

Left Panel:

- Record Audio:** A button with a microphone icon and a red "Record" button.
- Text Input:** A text area containing the prompt: "Give me 5 interview questions about data science".
- Buttons:** "Clear" and "Submit" (highlighted in orange).

Right Panel:

- Processed Audio:** A placeholder for recorded audio.
- Transcription:** A text area showing the transcription of the prompt: "Give me 5 interview questions about data science".
- Response:** A list of five interview questions:
 1. Can you explain the concept of data science to someone who has no background in the field?
 2. What are some of the key tools and programming languages used in data science, and why are they important?
 3. Can you share an example of a data science project you worked on, and the impact it had on the business or organization?
 4. How do you approach cleaning and preparing data for analysis, and what are some common challenges you have encountered in this process?
 5. Can you discuss the importance of data visualization in data science and provide an example of a visualization technique that you have used in your work?
- Flag:** A button at the bottom of the response section.



Share interfaces and its working for each module

- This module used two types of input prompts wav file audio or text prompt.
- The text prompt is directly processes through the generative pretrained model.
- The audio prompt is first converted to text prompt using face book transcription model and then processed through the generative model.



Models Used for the Chatbot

- For audio transcription facebook/wav2vec2-large-960h-lv60-self
- The large model pretrained and fine-tuned on 960 hours of Libri-Light and Librispeech on 16kHz sampled speech audio. Model was trained with [Self-Training objective](#).
- When using the model make sure that your speech input is also sampled at 16Khz.



Models Used for the Chatbot

- For text generation **microsoft/Phi-3-mini-4k-instruct**
- The **Phi-3-Mini-4K-Instruct** is a **3.8B** parameters, lightweight, state-of-the-art open model trained with the **Phi-3** datasets that includes both synthetic data and the filtered publicly available websites data with a focus on high-quality and reasoning dense properties.
- The model belongs to the **Phi-3** family with the **Mini** version in two variants **4K** and **128K** which is the context length (in tokens) that it can support.



How was the interface made?

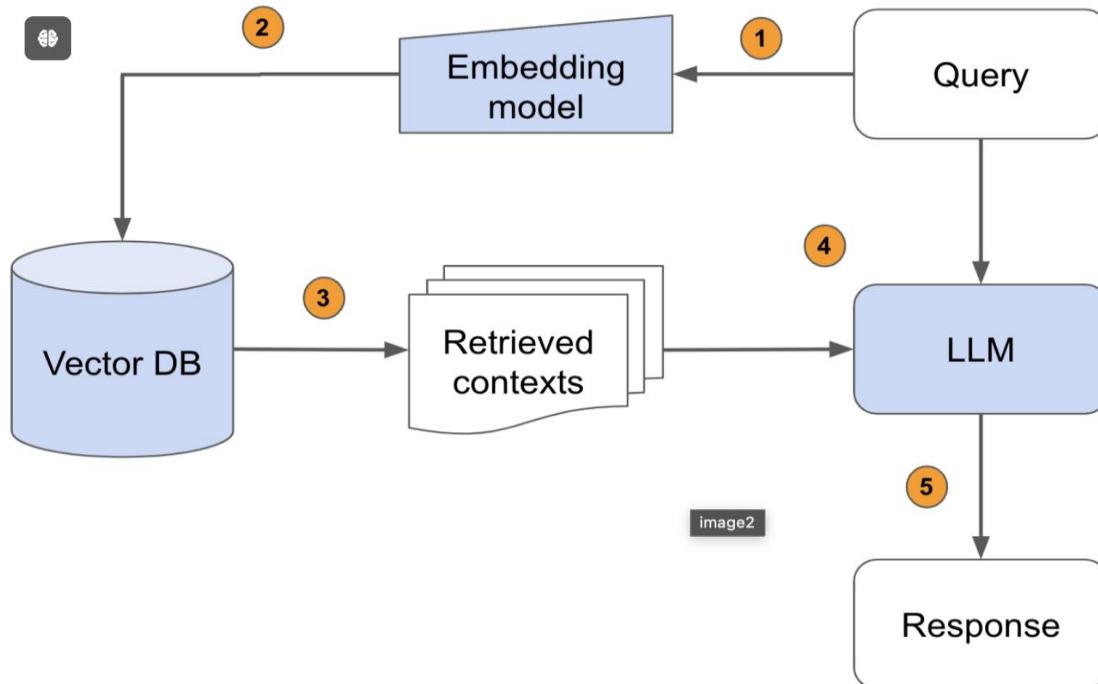
- The interface was build in **gradio** which is **huggingface** tool to build interfaces using large language models.
- The code uses live link for interface later we can upload the interface in huggingface spaces to host it.
- Here is the interface launch snippet.

```
# Create Gradio interface
iface = gr.Interface(
    fn=process_input,
    inputs=[
        gr.Audio(label="Record Audio", type="filepath"),
        gr.Textbox(label="Text Input")
    ],
    outputs=[
        gr.Textbox(label="Processed Audio"),
        gr.Textbox(label="Transcription"),
        gr.Textbox(label="Response")
    ],
    live=False
)

if __name__ == "__main__":
    iface.launch(share=True)
```



How the workflow happens?





How does your paper reader looks like?

Document-based Q&A System

Upload a document and enter your question. The system will provide an answer based on the document.

Upload Document X

2309.05519v2.pdf 6.7 MB ↓

Enter your question

give me summary of this paper

Clear Submit

output

The paper "2309.05519v2" discusses the use of multimedia (text, image, video, and audio) in education. The authors argue that multimedia can enhance learning outcomes by providing a more engaging and interactive learning experience. They also suggest that multimedia can help to reduce cognitive load and improve retention of information. The paper presents several examples of how multimedia can be used in education, including the use of text and image, text and image with video, and text and image with audio. The authors conclude that multimedia has the potential to revolutionize education by providing a more effective and efficient learning experience.

Flag

Models Used for the Chatbot

Model Name: meta-llama/Llama-2-7b-chat-hf

- The LLaMA-2-7B-Chat is a conversational AI model from Meta, featuring 7 billion parameters. It's optimized for generating human-like dialogue, making it ideal for chatbots, virtual assistants, and other interactive applications.

Embedding Model Name: sentence-transformers/all-mptnet-base-v2

- The all-mptnet-base-v2 is a high-performance embedding model from the Sentence-Transformers library. It produces dense, semantically rich embeddings suitable for tasks like semantic search, clustering, and text similarity.



How was the interface made?

- The interface was build in **gradio** which is **huggingface** tool to build interfaces using large language models.
- The code uses live link for interface later we can upload the interface in huggingface spaces to host it.
- Here is the interface launch snippet.

```
def create_gradio_interface():
    iface = gr.Interface(
        fn=process_input,
        inputs=[
            gr.File(label="Upload Document", type="filepath"),
            gr.Textbox(label="Enter your question")
        ],
        outputs="text",
        title="Document-based Q&A System",
        description="Upload a document and enter your question. The system will provide an answer based on the document."
    )
    return iface

if __name__ == "__main__":
    iface = create_gradio_interface()
    iface.launch(share=True, debug=True)
```



What about the research paper recommendation?

```
# PRINT THE RECOMMENDATIONS
for i in range(1, 6):
    print(f"Recommendation {i}:\n{df['title'][indices[i]]}\n")
    print("=====\\n")
```

```
Enter a sentence: speech recognition and modelling
Sample:
speech recognition and modelling

Recommendation 1:
Automatic Speech Recognition in Sanskrit: A New Speech Corpus and
Modelling Insights

Recommendation 2:
A Transfer Learning Method for Speech Emotion Recognition from Automatic
Speech Recognition

Recommendation 3:
Modelling word learning and recognition using visually grounded speech

Recommendation 4:
Speech frame implementation for speech analysis and recognition

Recommendation 5:
Speech-enhanced and Noise-aware Networks for Robust Speech Recognition
```



=====



What about the research paper recommendation?

Extracting Research Papers data from Arxiv dataset

Using **Universal Sentence Encoder** to extract embeddings of Research Abstracts

Training a K Neighbors Classifier to find similar research papers





What is the output of your multilingual bot like?

Enter your prompt: ভারতে ডেটা সায়েন্সের ভবিষ্যত কো?

Detected language: bn

Translated to English: What is the future of data science in India?

Loading checkpoint shards: 100%

2/2 [00:03<00:00, 1.58s/it]



Special tokens have been added in the vocabulary, make sure the associated word embeddings are fine-tuned or trained.

Your input_length: 474 is bigger than 0.9 * max_length: 500. You might consider increasing your max_length manually, e.g. translator(..., max_length=400)

Response in English: <|user|>

What is the future of data science in India?<|end|>

<|assistant|>

The future of data science in India looks promising and poised for significant growth. India has a large population, a growing middle class, and a strong focus on education and technology, making it an ideal environment for data science and analytics to thrive. Here are some key factors that contribute to the positive outlook for data science in India:

1. Demand for Data Science professionals: As businesses increasingly rely on data-driven decision-making, the demand for data scientists and analysts is growing. According to the World Economic Forum, India is expected to have the highest demand for data science professionals by 2025.

-
-
-

Response in bn: ভারতে ডেটা বিজ্ঞান ভবিষ্যত কী? ভারতে ডেটা বিজ্ঞান পেশাদারদের চাহিদাঃ যবসায়গুলি ডেটা-চালিত সিদ্ধান্ত গ্রহণের উপর আরও বেশি নির্ভর করে, ডেটা বিজ্ঞান ও বিশ্লেষকদের জন্য ভবিষ্যতটি প্রতিশ্রূতিক্রিয় এবং উল্লেখযোগ্য বৃদ্ধির জন্য প্রস্তুত। ভারতে একটি বড় জনসংখ্যা, ক্রমবর্ধমান মধ্যবিত্ত শ্রেণী এবং প্রযুক্তির উপর জোরালো মনোনিবেশ রয়েছে। এটি ডেটা বিজ্ঞান এবং বিশ্লেষণের জন্য একটি আদর্শ পরিবেশ তৈরি করে। এখানে কিছু মূল কারণ রয়েছে যা ভারতে ডেটা বিজ্ঞানকে ইতিবাচকভাবে দেখায়ঃ 1. ডেটা বিজ্ঞান পেশাদারদের চাহিদাঃ যবসায়গুলি ডেটা-চালিত সিদ্ধান্ত গ্রহণের উপর আরও বেশি নির্ভর করে, ডেটা বিজ্ঞান এবং বিশ্লেষকদের জন্য চাহিদা বাড়ছে। বিশ্ব অর্থনৈতিক ফোরামের মতে, ভারতে ডেটা বিজ্ঞান, একটি ক্রমবর্ধমান মধ্যবিত্ত শ্রেণী এবং শিক্ষার উপর জোরালো মনোনিবেশ রয়েছে। 2. সরকারি উদ্যোগঃ ভারত সরকার ডেটা বিজ্ঞান এবং বিশ্লেষণের জন্য একটি আদর্শ পরিবেশ চালু করেছে। ডিজিটাল ইন্ডিয়া পেশাদাররা উদাহরণ ব্রহ্মপুর, ডিজিটাল ডেটা বিজ্ঞান এবং ডেটা অ্যাক্সেসকে উত্সের জন্য ইতিবাচক দৃষ্টি আকর্ষণ করে। ডেটা বিজ্ঞান এবং তথ্য প্রযুক্তির জন্য ডেটা বিশ্লেষকদের জন্য একটি বড় সুযোগ তৈরি করে। ভারত সরকার বিনিয়োগের জন্য ডেটা প্রযুক্তির প্রয়োগের চাহিদা বাড়তে জাতীয় নীতিটি আরও বেশি। ভারত সরকারিদা বৃদ্ধি করেছে, ডেটা বিজ্ঞান এবং প্রযুক্তির জন্য একটি বড় বিনিয়োগের জন্য একটি বড় সুযোগ তৈরি করে। ভারত সরকার বিনিয়োগের জন্য একটি বড় বিনিয়োগের জন্য একটি বড় বিনিয়োগের লক্ষ্য তৈরি করে।



Explain the other modules

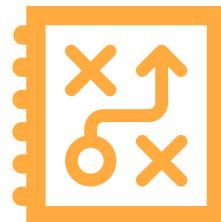
Course Compass : Online Course Recommender

- Using Beautiful soup for web scraping
- Content based filtering algorithm to recommend similar courses
- Cosine similarity



Personality Test (Fun element)

- Uses Myers Briggs indicator to categorize the inputs of users to major personality types.



Aptitude Ace: Aptitude Testing platform

- Contains quiz on topics such as maths, probability, vocabulary, time and work,etc



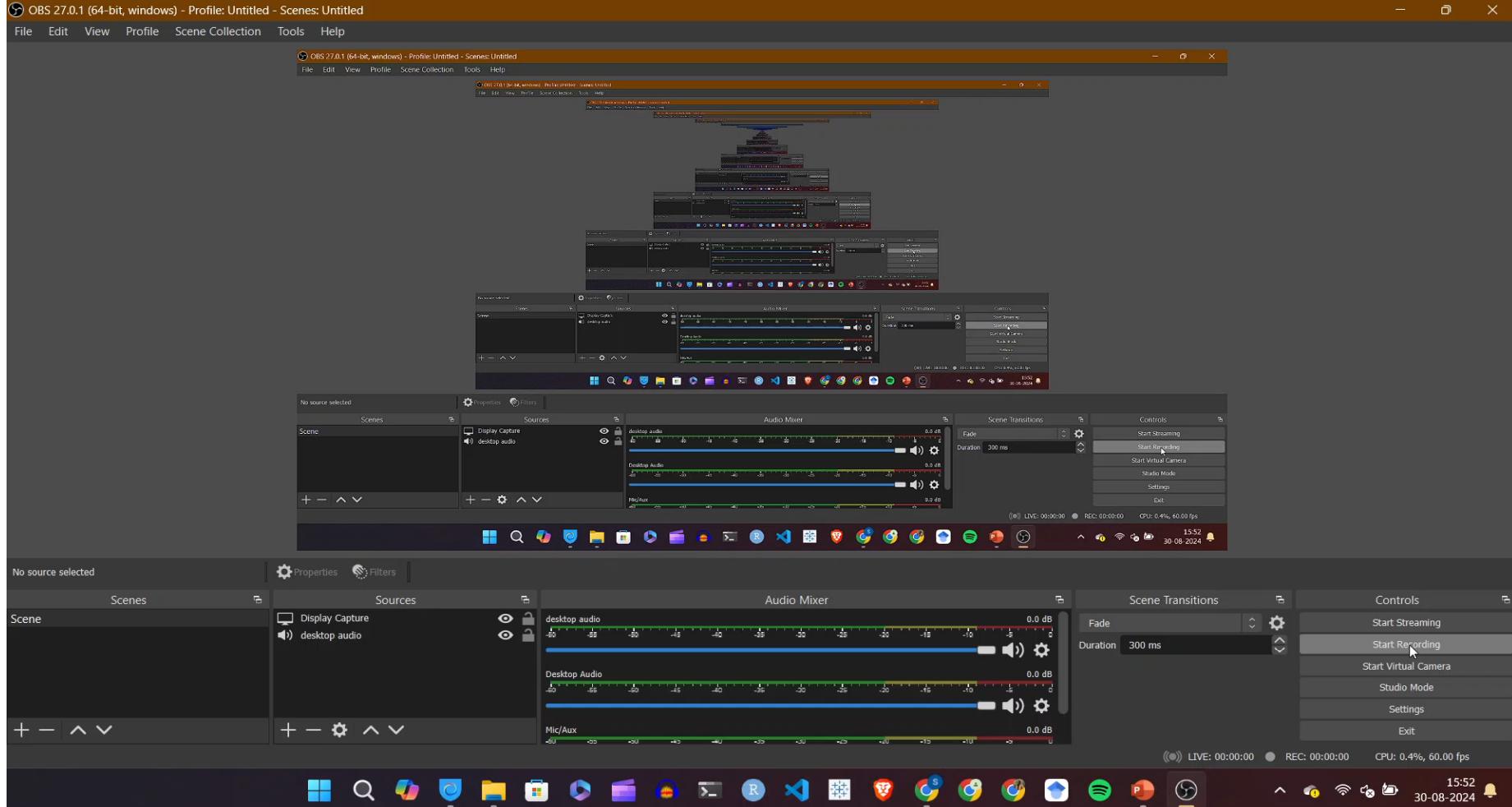
Interview warmup

- Inspired from Google *interview warmup*.
- *Audio powered interview simulation*
- Generic questions, critical thinking, situational questions etc.
- Time to answer also stored for analysis and dashboard.



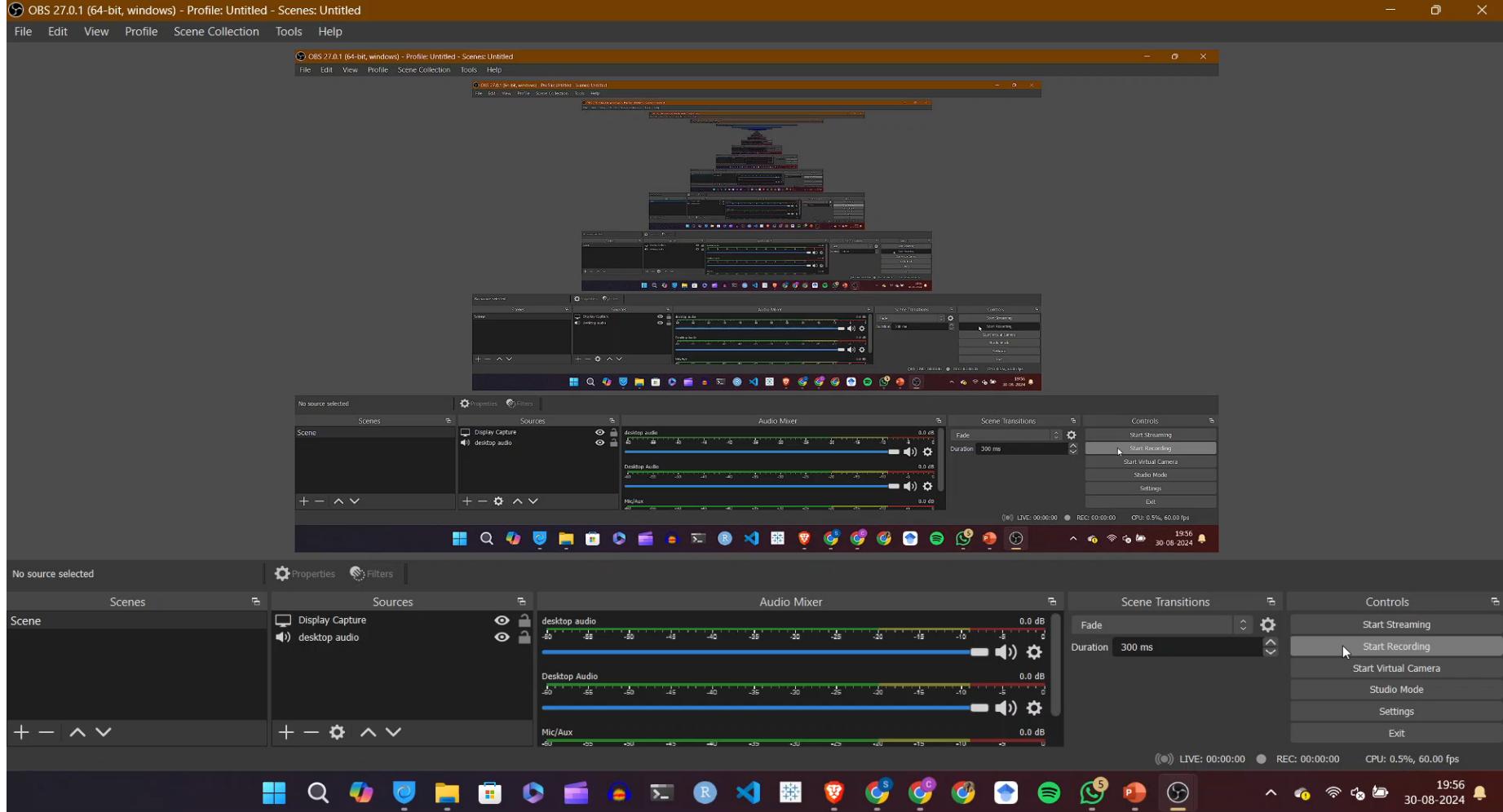


DEMO SNAPSHOTS OF WEBSITE – HOME PAGE



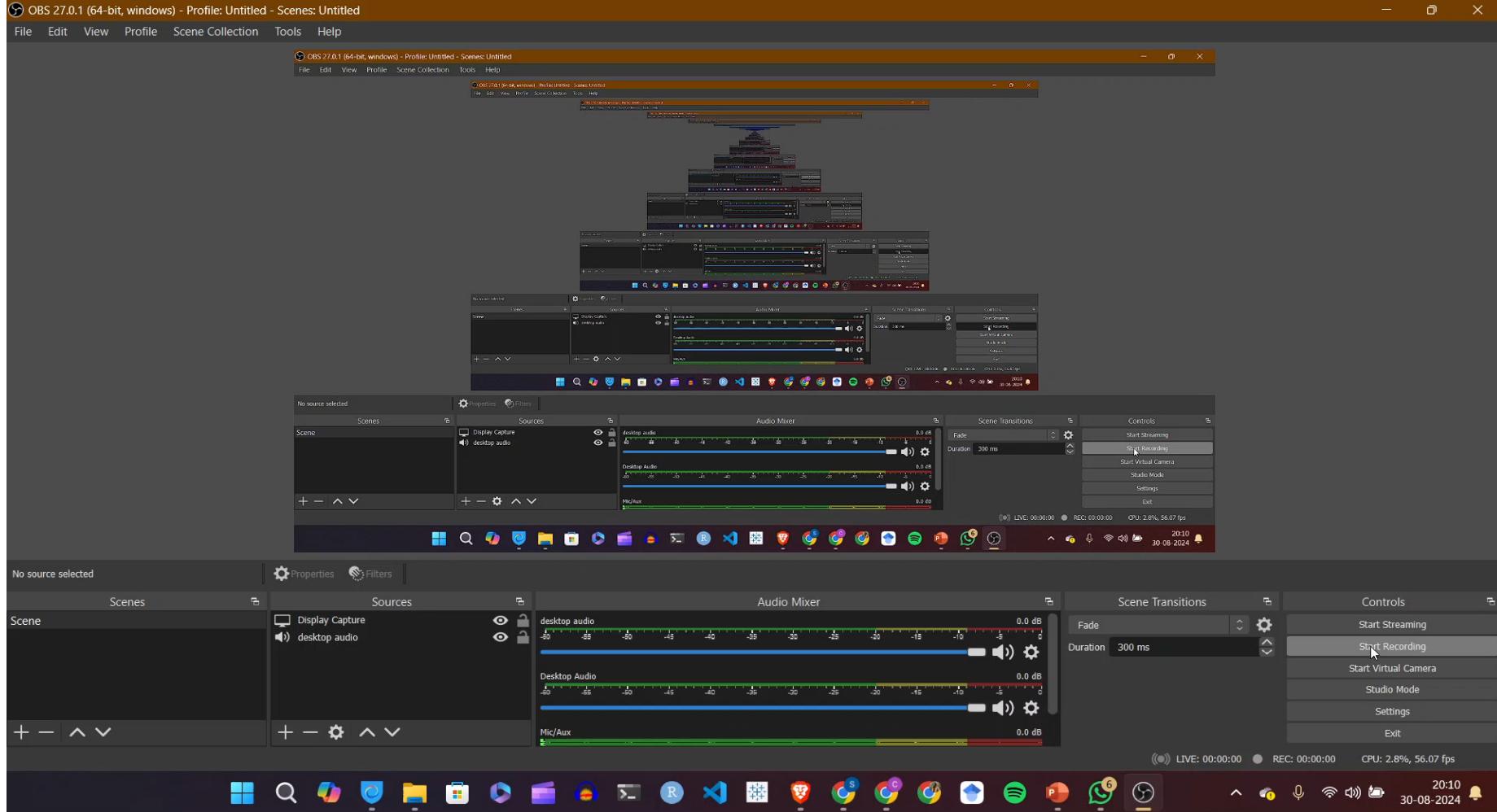


DEMO SNAPSHOTS OF WEBSITE – COMPONENT 1





DEMO SNAPSHOTS OF WEBSITE – COMPONENT 1





DEMO SNAPSHOTS OF WEBSITE – COMPONENT 2

The screenshot displays the OBS Studio application window. At the top, there's a title bar with the text "OBS 27.0.1 (64-bit, windows) - Profile: Untitled - Scenes: Untitled". Below the title bar is a menu bar with File, Edit, View, Profile, Scene Collection, Tools, and Help. The main interface consists of several panels:

- Scenes Panel:** Shows a list of scenes with "Scene" selected. It includes a "Properties" tab and a "Filters" tab.
- Sources Panel:** Shows a list of sources with "Display Capture" and "desktop audio" selected. It includes a "Properties" tab and a "Filters" tab.
- Audio Mixer:** A central panel showing three audio tracks: "desktop audio" (green), "Desktop Audio" (blue), and "Mic/Aux" (red). Each track has volume faders and solo/mute buttons.
- Scene Transitions:** A panel on the right showing a "Fade" transition set to a duration of 300 ms.
- Controls:** A panel on the far right with buttons for Start Streaming, Start Recording, Start Virtual Camera, Studio Mode, Settings, and Exit. The "Start Recording" button is highlighted.
- System Taskbar:** At the bottom, it shows the Windows taskbar with various pinned icons like File Explorer, Edge, and Mail, along with the system clock (17:06) and date (30-08-2024).

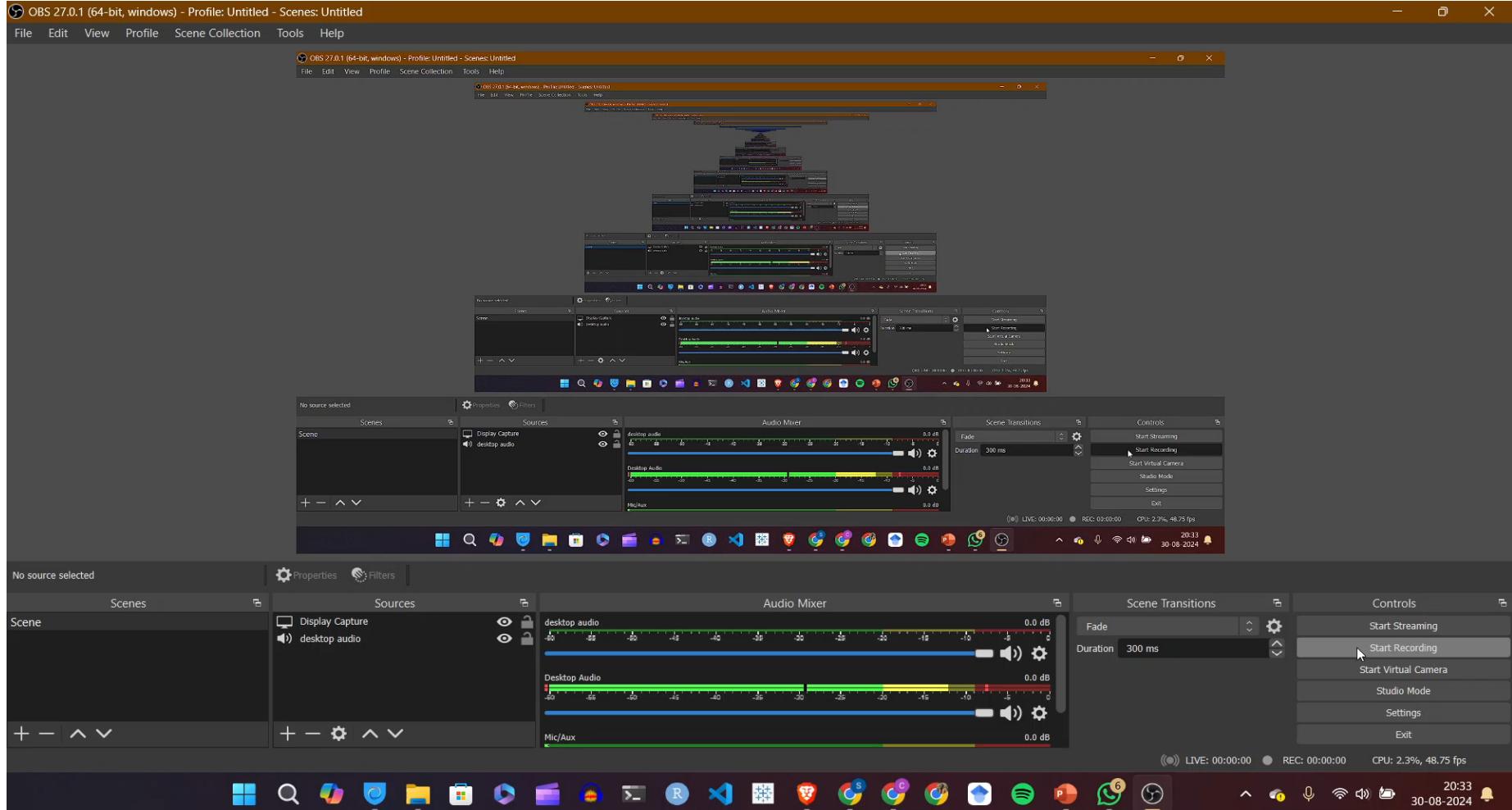


DEMO SNAPSHOTS OF WEBSITE – COMPONENT 3

The screenshot displays the OBS Studio application running on a Windows operating system. The main window shows a complex arrangement of video and audio tracks in the preview area. The left side features the 'Sources' panel with 'Display Capture' and 'desktop audio' selected. The bottom section includes the 'Audio Mixer' and 'Scene Transitions' panels. The 'Controls' panel on the right shows buttons for 'Start Streaming', 'Stop Recording', and other functions. The taskbar at the bottom is visible, showing various open applications like Microsoft Edge, Spotify, and file explorers.

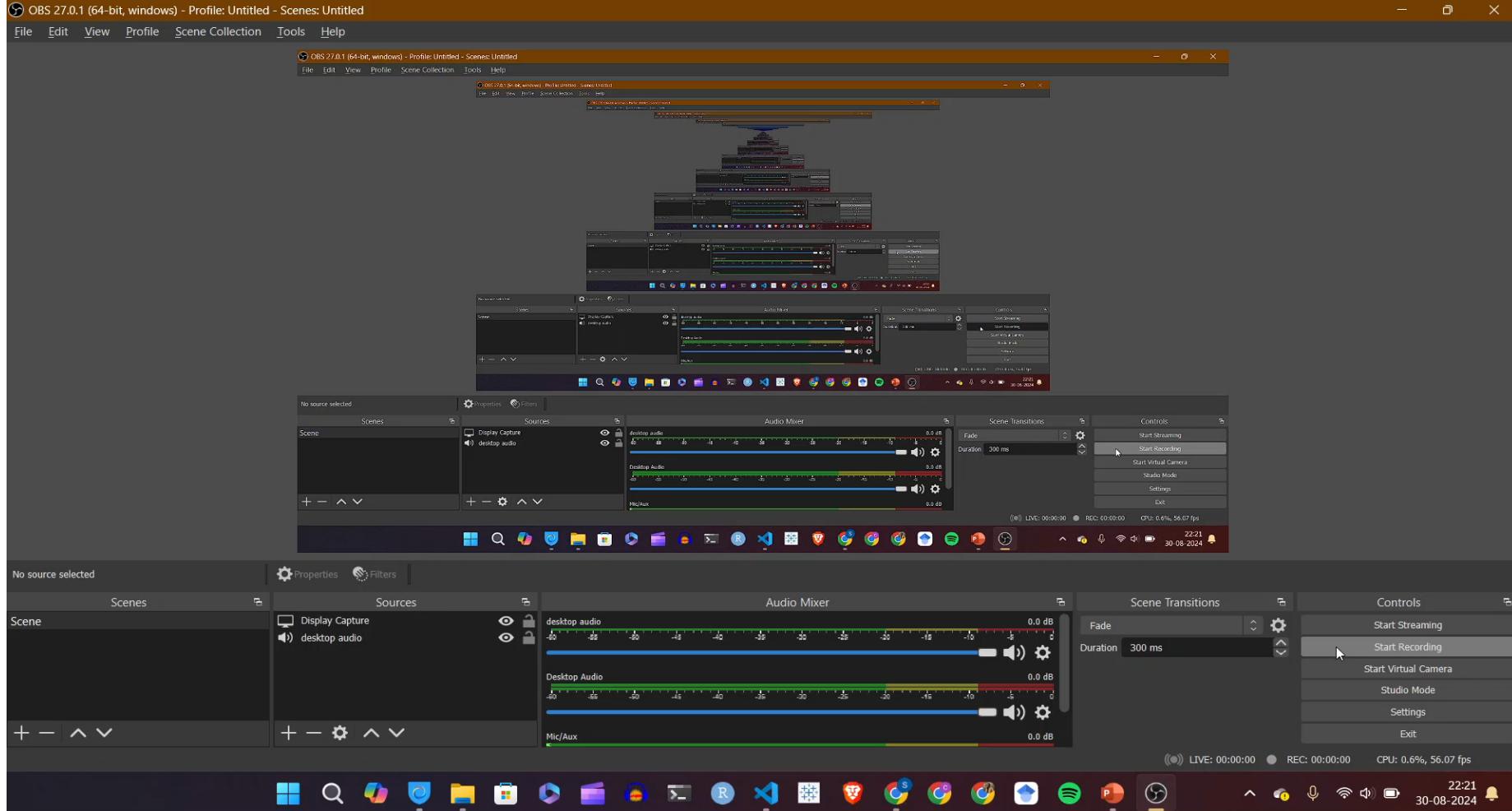


DEMO SNAPSHOTS OF WEBSITE – COMPONENT 4



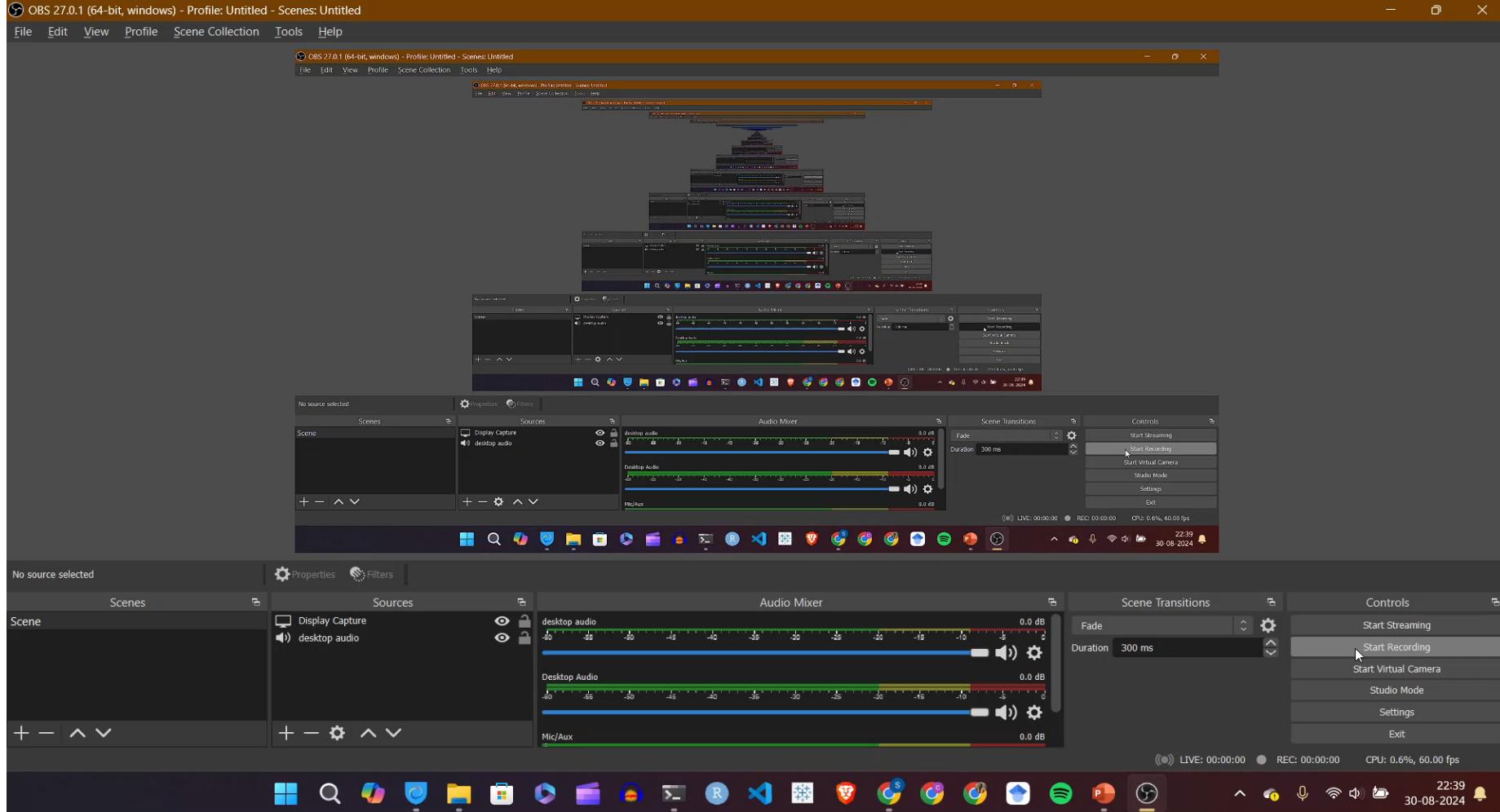


DEMO SNAPSHOTS OF WEBSITE – COMPONENT 5





DEMO SNAPSHOTS OF WEBSITE – COMPONENT 6





DEMO SNAPSHOTS OF WEBSITE – COMPONENT 7

The screenshot displays the OBS Studio application running on a Windows operating system. The main window shows a complex arrangement of video and audio tracks in the preview area, with numerous layers of video frames visible. The source list on the left includes 'Display Capture' and 'desktop audio'. The audio mixer at the bottom has three channels: 'desktop audio', 'Desktop Audio', and 'Mic/Aux', all set to 0.0 dB. The controls panel on the right shows 'Start Streaming' and 'Start Recording' buttons, along with other options like 'Studio Mode', 'Settings', and 'Exit'. The taskbar at the bottom features the Windows Start button, a search icon, and various pinned application icons. The system tray shows the date as 30-08-2024 and the time as 23:04.



DEMO SNAPSHOTS OF WEBSITE – COMPONENT 8

The screenshot shows a web browser window with the following details:

- Tab Bar:** Welcome to Colaboratory - X | RAG_SYSTEM_DEMO.ipynb - X | Document-based Q&A System | +
- Address Bar:** 6e1f4908200fbb11c5.gradio.live
- Toolbar:** Standard browser controls (Back, Forward, Stop, Refresh) and various icons.
- Bookmark Bar:** Free Online Picture... | HackerRank | Competitive Progra... | LeetCode - The W... | Stack Overflow -... | SQL Tutorial | (643) How To Inst... | PL/SQL tutorial | L...
- Content Area:**
 - Document-based Q&A System:** The main title.
 - Upload Document:** A dark blue box with "Upload Document" at the top, followed by "Drop File Here" with an upward arrow icon, "- OR -", and "Click to Upload" with a camera icon.
 - Enter your question:** A text input field labeled "Enter your question".
 - Output:** A dark blue box labeled "output" containing a text input field.
 - Buttons:** "Clear" (gray), "Submit" (orange), and "Flag" (gray).
- Bottom:** "Use via API" and "Built with Gradio".



DEMO SNAPSHOTS OF WEBSITE – COMPONENT 9

Document-based Q&A System

Upload a document and enter your question. The system will provide an answer based on the document.

Upload Document

2309.05519v2.pdf

6.7 MB

Enter your question

brief summary of this paper?

Clear

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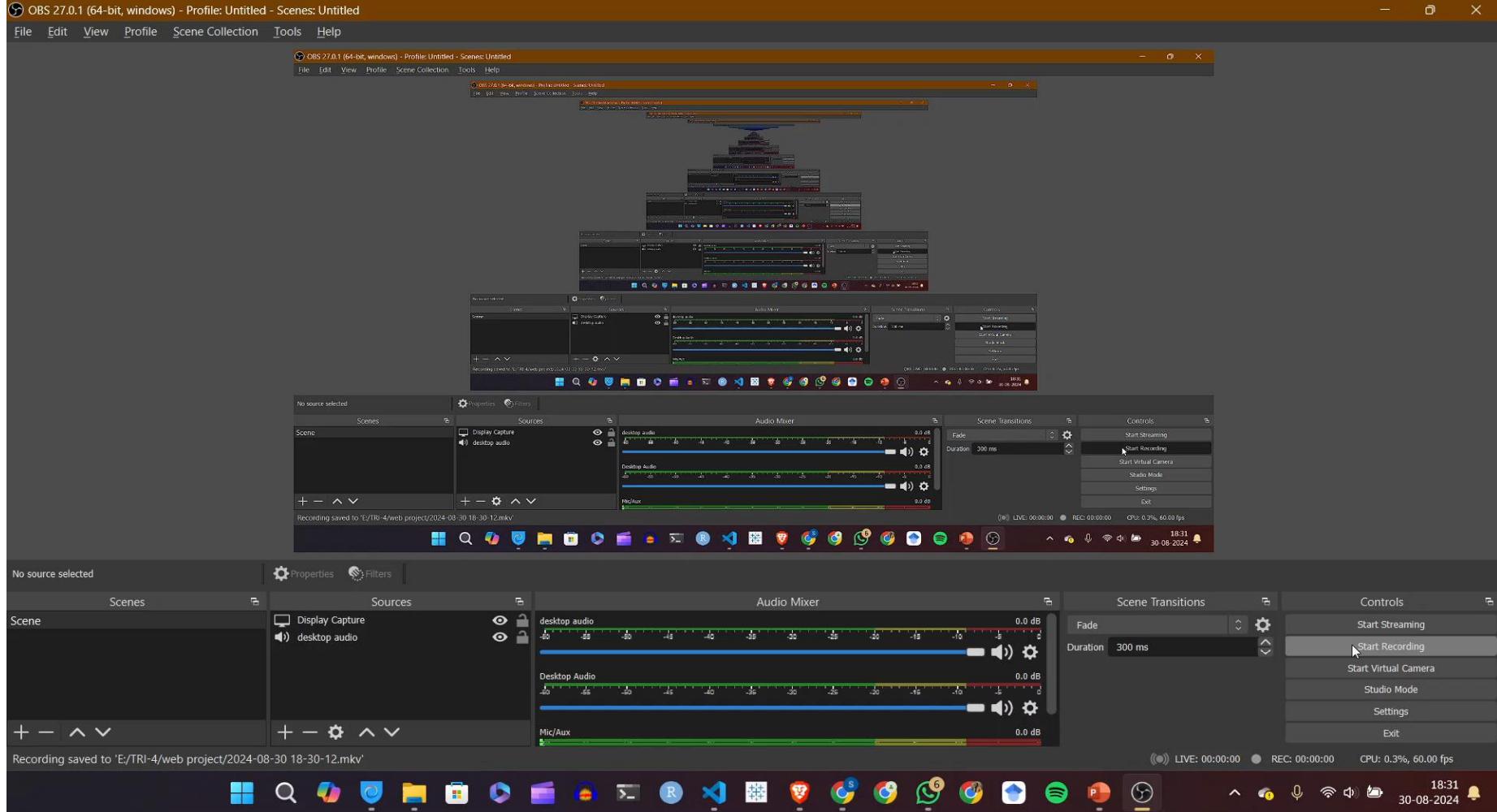
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Based on the context information provided, the paper appears to be a research paper on the use of multimedia (text, image, video, and audio) in educational materials. The paper provides examples of how multimedia can be used to enhance learning outcomes, including the use of text and images to convey information and the use of video and audio to provide additional context and engagement. The paper also discusses the potential benefits of using multimedia in educational materials, such as increased student engagement and motivation, and improved learning outcomes. Overall, the paper provides a brief overview of the use of multimedia in educational materials and highlights its potential as a tool for improving learning outcomes.

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DEMO SNAPSHOTS OF WEBSITE – COMPONENT 10





Describe your project roles

Soham Chatterjee

- Oversee project progress, coordinate team, handle material recommendation.
- Full Stack Developer: Develop front-end and back-end, ensure system security and performance, integrate material recommendation, collaborate on interview bot.

Ritwika Dasgupta

- Develop and maintain chatbot, integrate modules, conduct code reviews, collaborate on interview bot.
- Develop AI algorithms for chatbot, ensure responsiveness, train and validate models, collaborate on interview bot.

Sayantan Ray

- Develop document summarizer, ensure accuracy and efficiency, integrate summarizer, collaborate on interview bot.
- Develop AI algorithms for summarizer, ensure data processing accuracy, conduct data analysis, collaborate on interview bot.

CONCLUSION

- The design document outlines a detailed architectural framework and blueprint for the COLLOQUIUM AI-driven career guidance platform.
- It covers comprehensive system specifications, including hardware and software requirements.
- Intricate internal communications and human-machine interfaces are detailed for seamless platform operation.
- Design constraints and system integrity are addressed to ensure a secure, scalable, and efficient platform.
- The platform's ability to adapt to future advancements and challenges is emphasized.

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Colloquium : Thank you. If you have any questions, feel free to ask.

