Summarizing Audio Files in Python Project Report

# Abstract:

The "Summarizing Audio Files in Python" project utilizes Python and libraries like Flask, MoviePy, SpeechRecognition, and Summarizer to efficiently process audio content, covering extraction, transcription, speech recognition, and text summarization. MoviePy aids in extracting audio from videos, SpeechRecognition converts audio to text, and Summarizer generates meaningful summaries. The project extends to real-time scenarios, allowing users to record and summarize spoken words through microphones. Despite facing challenges in audio processing and real-time transcription, the system successfully navigates these complexities. The report concludes by highlighting achievements, showcasing sample outputs, and discussing future enhancements for refinement. The project addresses the need for audio information extraction and summarization, offering a versatile solution with core features and real-time capabilities. The abstract provides a concise overview of objectives, features, outcomes, and potential future developments.

# Problem Description:

The "Summarizing Audio Files in Python" project addresses the challenge of efficiently extracting and summarizing information from audio sources. With a focus on video files and real-time microphone recordings, the project encounters several key problems:

1. **Audio Extraction:** Extracting audio from video files poses a challenge due to different formats and codecs. Ensuring compatibility and accurate extraction is crucial for subsequent processing.
2. **Real-time Transcription:** Achieving accurate and real-time transcription of spoken words from microphone recordings requires overcoming latency issues and ensuring the system can adapt to diverse speaking styles and accents.
3. **Speech Recognition Accuracy:** The accuracy of converting audio to text, a critical step in the summarization process, is influenced by variations in pronunciation, background noise, and language nuances.
4. **Text Summarization:** Generating concise and meaningful summaries from transcribed text is a complex natural language processing task. Ensuring the summaries capture essential information while remaining coherent and contextually accurate is challenging.
5. **Microphone Recording Stability:** Real-time recording from microphones demands stability and robust error handling to account for potential disruptions, ensuring a seamless user experience.
6. **Integration Complexity:** Integrating multiple libraries (Flask, MoviePy, SpeechRecognition, Summarizer) and managing their interactions adds a layer of complexity, requiring careful synchronization and error handling.

# Software Requirements:

The project aims to overcome these challenges to deliver a robust and user-friendly solution for summarizing audio content from various sources. Addressing these issues will enhance the system's accuracy, reliability, and overall performance, providing users with an effective tool for extracting valuable insights from audio data.

1. **Python 3.x:** The project is developed using Python, and compatibility with Python 3.x is essential for running the application.
2. **Flask:** A web framework for Python, Flask is used to create the web interface for user interaction. Ensure the Flask library is installed to enable web functionalities.
3. **MoviePy**: This library is employed for video editing tasks, particularly for extracting audio from video files. Install MoviePy to handle video-related operations.
4. **SpeechRecognition:** For converting audio to text, the SpeechRecognition library is utilized. Ensure it is installed to enable accurate and efficient transcription.
5. **Summarizer:** The Summarizer library is crucial for generating concise and meaningful text summaries. Install this library to enable the summarization functionality.
6. **Librosa:** If background noise reduction is a part of the project, Librosa, a Python package for music and audio analysis, may be required.
7. **PyAudio:** For microphone-related functionalities, such as real-time recording, PyAudio is utilized. Install this library to enable microphone integration.
8. **NumPy, SciPy:** These scientific computing libraries may be used for various audio processing tasks. Ensure they are installed for compatibility.
9. **FFmpeg**: Required for video/audio processing tasks, including handling different video/audio formats. Install FFmpeg to ensure proper video file processing.
10. **Subprocess Module**: As the project involves subprocess calls, the Subprocess module is essential. It is part of the Python standard library.
11. **Wave Module**: The Wave module is used for handling WAV audio files. It is part of the Python standard library.

# Hardware Requirements:

* Computer or server capable of running Python scripts
* Microphone (for microphone audio recording functionality)
* Internet connection (for YouTube video summarization and download)
* Speakers or headphones (for playback if needed)

These requirements cover the basic hardware components necessary for the functionality of your "Summarizing Audio Files in Python" project. Adjustments may be made based on the specific hardware capabilities and use cases. Let me know if you have any specific hardware requirements or considerations to include!

# Folder Creation:

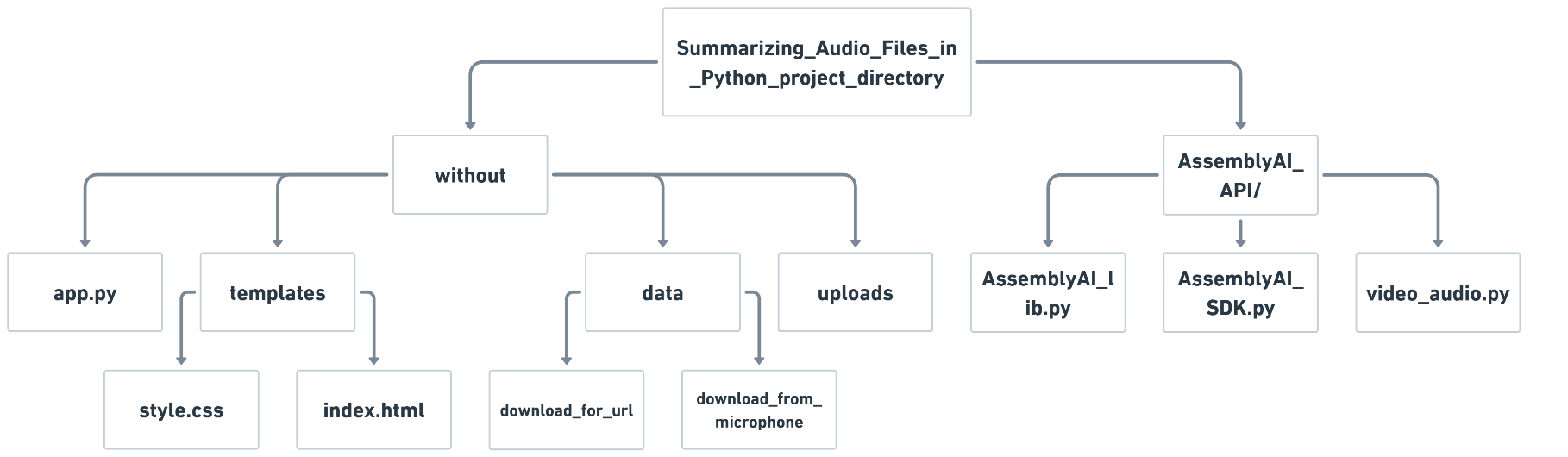


Figure 1: Directory Structure for Summarizing Audio Files in Python Project.

## Flow Chart

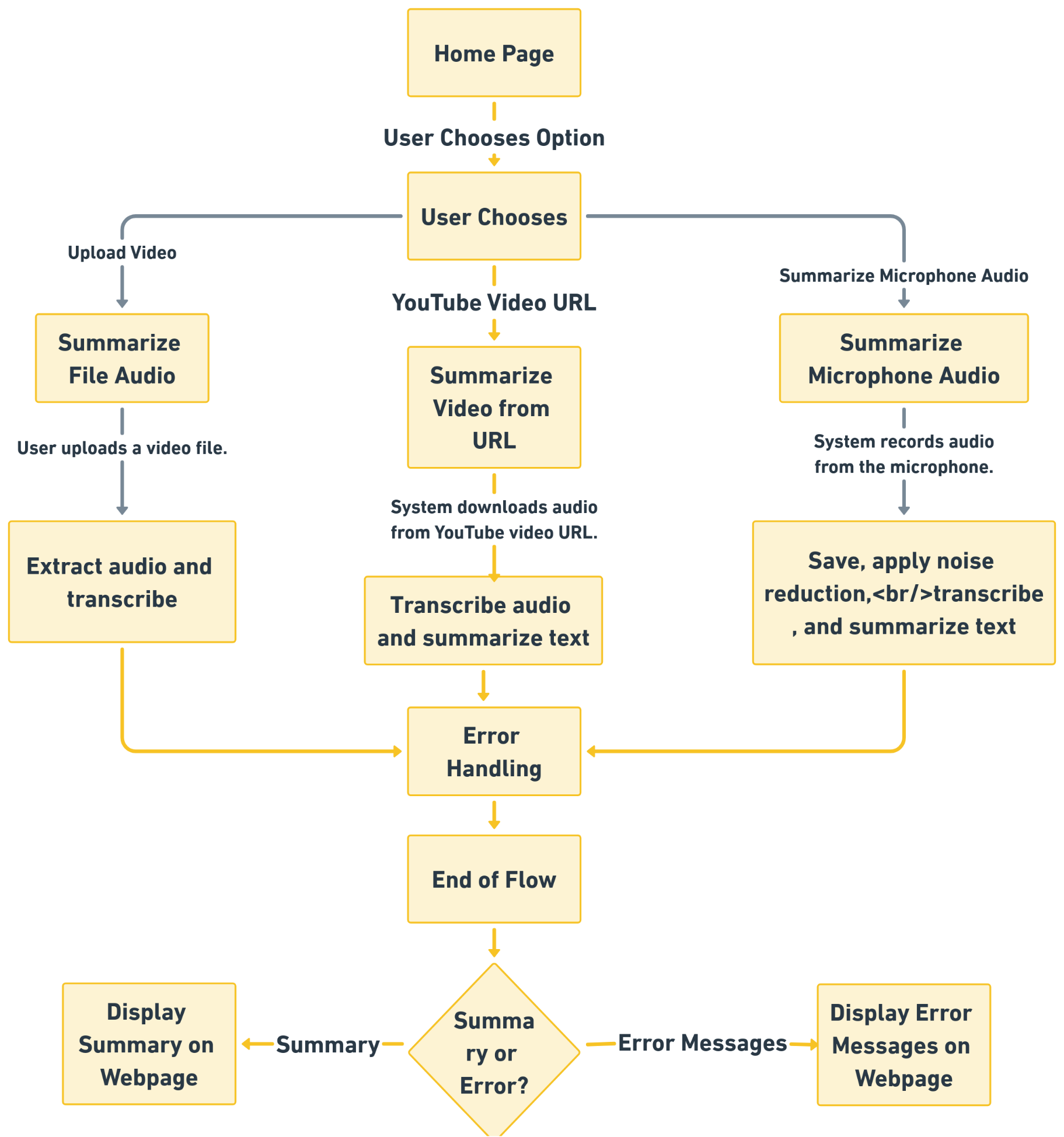


Figure 2: Audio Summarizer Processing Flow

# Step-By-Step process to get Download FFmpeg:

# Step-1: open [https://ffmpeg.org/download.html#build-windows](https://ffmpeg.org/download.html%23build-windows) in browser

# Step-2: Select your operation system (for me it is window)

# 

# Step-3: click on windows builds from gyan.dev (first option)

# step-4: you will be redirected to the new page click ffmpeg-git-full.7z then you can the file is downloaded in your directory

# 

# Step-5: download 7-Zip: [https://7-zip.org/download.html](https://www.youtube.com/redirect?event=video_description&redir_token=QUFFLUhqa0R3a0NDUTcxUmNqbHNuSGtRWHJOb1BzdFEtUXxBQ3Jtc0tuUGpCLVNIek1pLXpBOUt3TXpKM3NyUFBBSGQ4c1NkRHE3cjYwYkRCNTc5REZpYlhOUU94TjJ5SmYxWUhMWnFwc0tHckxyVjV2c25ZMjFHUE5oS0N1ZUUxZHZ1LUJqbXFsNEFMSlZNMnVXU21VTTkyZw&q=https%3A%2F%2F7-zip.org%2Fdownload.html&v=IECI72XEox0)

# 

# Step-6: After installing create a new folder new with name ffmpeg

# 

# Step-7: Open the 7-zip and go this dir C:\Users\Sivamani\Downloads\ffmpeg-2023-11-05-git-44a0148fad-full\_build\ffmpeg-2023-11-05-git-44a0148fad-full\_build\bin\ copy and paste the files into the newly create folder

# 

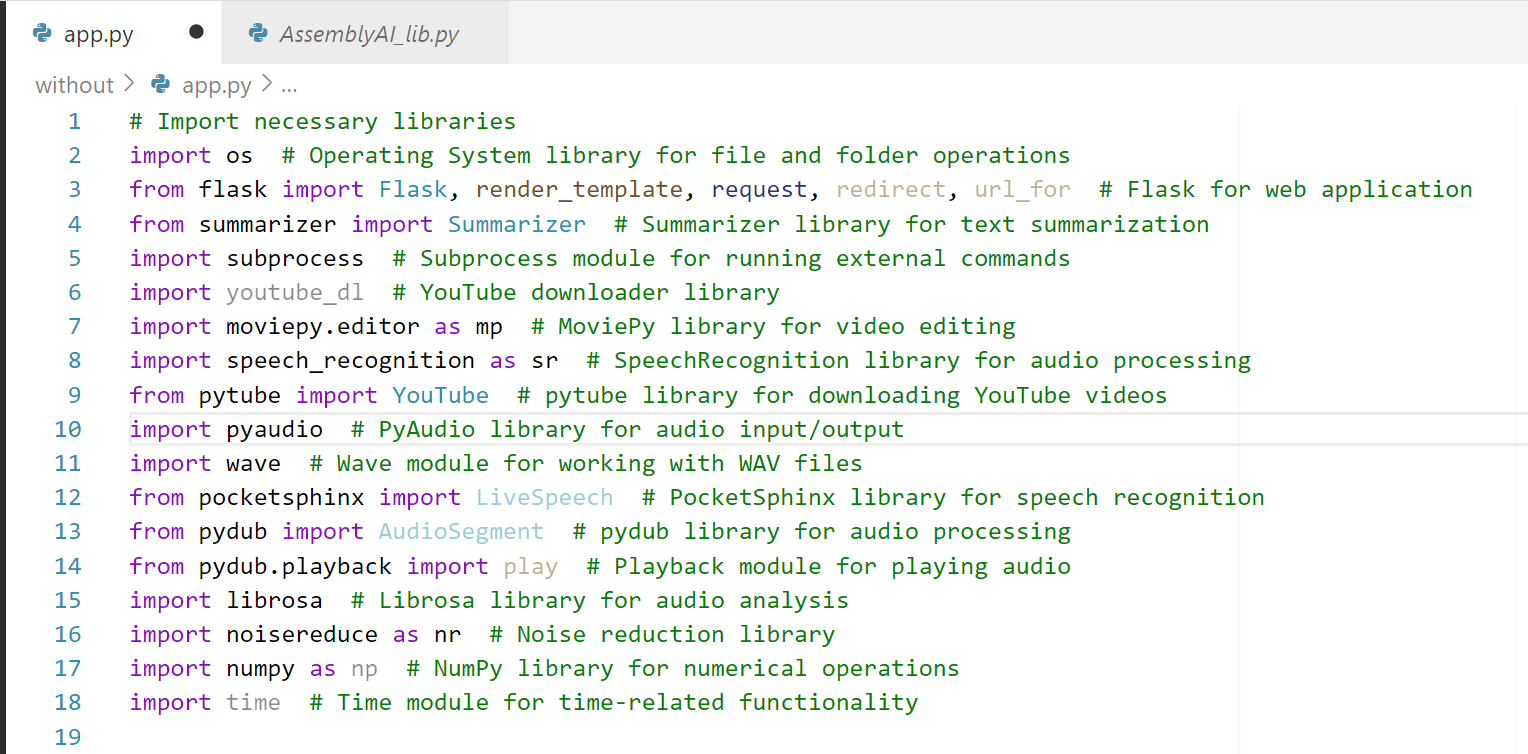
# Step-8: Add the path of the newly create folder to the environment variables

# 

# To test ffmpeg is running you type ffmpeg -version in cmd

# Codes with Explanation:

## Web Application (app.py):



**1. os (Operating System):**

* + File Operations: Manages files and directories, allowing the creation, deletion, and checking of file existence.
  + Path Handling: Facilitates constructing and manipulating file paths for cross-platform compatibility.
  + Directory Creation: Creates directories for organizing files and ensuring a structured project layout.

**2. Flask:**

* + Web Framework: Powers the web application, defining routes for different functionalities.
  + HTTP Handling: Manages HTTP requests and responses for communication between the server and client.
  + Template Rendering: Integrates HTML templates to render dynamic content on web pages.
  + Web Development: Simplifies the creation of web applications with a flexible and modular design.

**3. Summarizer:**

* + Natural Language Processing: Implements advanced NLP techniques for extracting key information from text.
  + Abstractive Summarization: Generates concise summaries that capture the essence of the input text.
  + Pretrained Models: Utilizes pre-trained models to understand and summarize content effectively.
  + Text Complexity Handling: Adapts to various text structures, making it suitable for diverse content types.

**4. subprocess:**

* + External Command Execution: Interacts with the system shell to execute external commands or programs.
  + Process Management: Enables the running of ffmpeg commands for audio and video processing.
  + Error Handling: Captures and handles errors or output generated during external command execution.
  + Shell Commands: Executes system commands to perform tasks outside the Python environment.

**5. youtube\_dl:**

* + YouTube Video Download: Downloads videos from YouTube based on user-provided URLs.
  + Video Format Options: Allows specifying video and audio format preferences during the download.
  + Metadata Retrieval: Extracts metadata information about the video, such as title and duration.
  + Download Progress Tracking: Provides options for tracking the progress of video downloads.

**6. moviepy.editor:**

* + Video Editing: Edits videos by extracting audio, cutting clips, and performing various transformations.
  + Audio Extraction: Extracts audio content from video files for further processing.
  + Format Conversion: Converts video files to different formats and handles various video codecs.
  + Timeline-Based Editing: Utilizes a timeline model for intuitive video editing operations.

**7. speech\_recognition:**

* + Speech Recognition: Transcribes spoken words from audio files or microphone input.
  + Multiple Recognition Engines: Supports various speech recognition engines, including Google Web Speech API.
  + Audio Source Handling: Manages different audio sources, such as files, microphones, or audio streams.
  + Language Specification: Allows specifying the language of the spoken content for accurate transcription.

**8. pytube:**

* + YouTube Video Download: Downloads YouTube videos and audio streams for offline access.
  + Quality Control: Provides options to choose video quality, resolution, and audio format.
  + Playlist Handling: Supports downloading entire playlists or individual videos from YouTube.
  + Video Information: Retrieves details about YouTube videos, such as title, author, and duration.

**9. pyaudio:**

* + Audio Recording: Captures audio from the microphone or other input sources in real-time.
  + Sampling Parameters: Allows customization of audio sampling parameters, including sample rate and format.
  + Stream Management: Manages audio streams for recording and playback.
  + Cross-Platform Support: Provides a consistent interface for audio input across different operating systems.

**10. wave:**

* + WAV File Handling: Reads and writes WAV audio files, a widely used format for uncompressed audio.
  + Audio Metadata: Manages metadata information such as number of channels, sample width, and frame rate.
  + Frame-Level Access: Allows access to individual audio frames for processing and analysis.
  + Compatibility: Ensures compatibility with audio processing libraries that support the WAV format.

**11. pocketsphinx:**

* + Speech Recognition Engine: Implements a lightweight and efficient speech recognition engine.
  + Offline Speech Recognition: Enables speech recognition without the need for an internet connection.
  + Continuous Speech Recognition: Supports continuous listening for processing longer speech segments.
  + Customization: Allows customization of language models for improved recognition accuracy.

**12. pydub:**

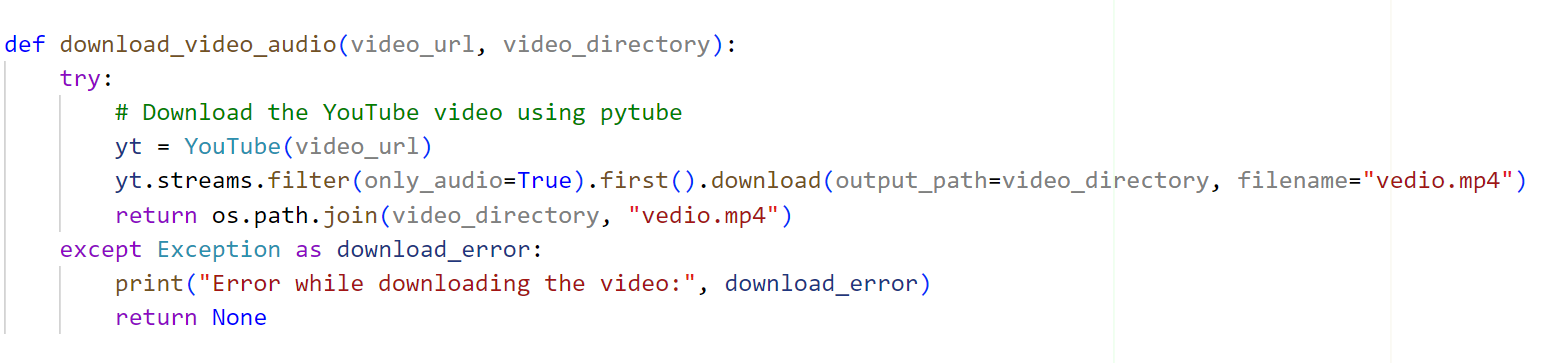
* + Audio Manipulation: Provides a high-level interface for manipulating audio data.
  + Format Conversion: Converts between different audio formats, allowing seamless integration with other libraries.
  + Audio Playback: Facilitates playing audio directly within the Python environment.
  + Effects and Filters: Applies various effects and filters to modify audio characteristics.

**13. librosa:**

* + Audio Analysis: Analyzes audio data for tasks such as feature extraction and visualization.
  + Noise Reduction: Applies algorithms for reducing noise in audio signals.
  + Time-Frequency Representation: Generates spectrograms and other time-frequency representations.
  + Compatibility: Integrates seamlessly with other audio processing libraries.

**14. noisereduce:**

* + Noise Reduction: Implements algorithms for reducing noise in audio signals.
  + Adaptive Filtering: Adapts to varying noise conditions for effective noise reduction.
  + Signal Processing: Utilizes signal processing techniques to enhance audio quality.
  + Real-Time Applications: Applicable to real-time audio processing scenarios.



This function downloads the audio from a YouTube video using the pytube library.

**1. Input:**

* video\_url: The URL of the YouTube video.
* video\_directory: The directory where the downloaded video will be saved.

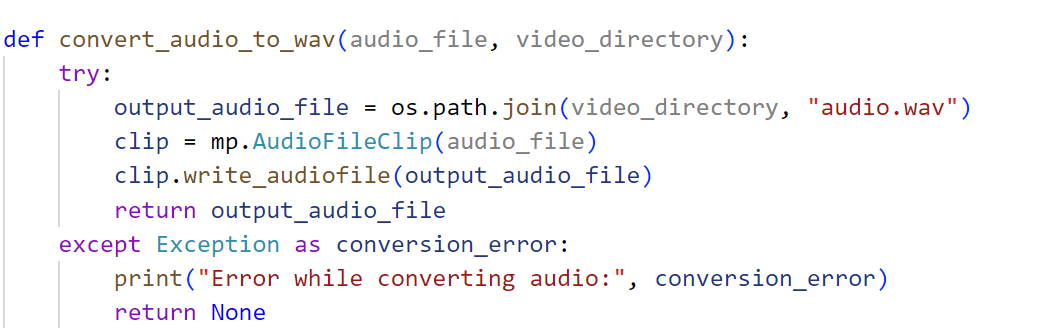
**2. Process:**

* It creates a YouTube object from the provided video URL using the pytube library.
* Filters the available streams to include only the audio streams (only\_audio=True).
* Chooses the first audio stream (assuming it's the best quality) and downloads it.
* The downloaded audio is saved as "vedio.mp4" in the specified video\_directory.

**3. Output:**

* Returns the file path of the downloaded audio ("vedio.mp4") if successful.
* If an error occurs during the download, it prints an error message and returns None.

In essence, this function encapsulates the process of fetching the audio content from a YouTube video, making it ready for further processing in the audio summarization pipeline.



This function converts an audio file to the WAV format using the moviepy library.

**1. Input:**

* + - audio\_file: The path to the input audio file that needs to be converted.
    - video\_directory: The directory where the converted audio file will be saved.

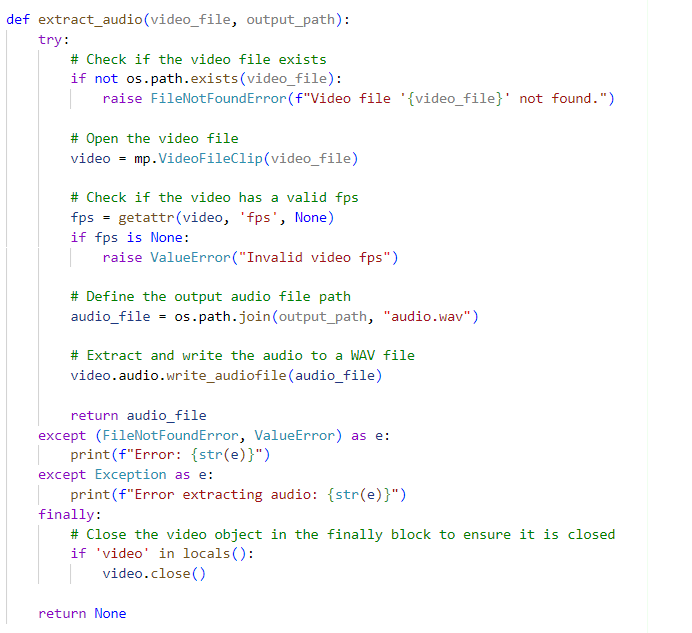
**2. Process:**

* + - It defines the output path for the converted audio file as "audio.wav" in the specified video\_directory.
    - Utilizes moviepy's AudioFileClip to create an audio clip from the input audio file.
    - Writes the audio clip to the WAV format file specified in the output path.

**3. Output:**

* + - Returns the file path of the converted audio ("audio.wav") if successful.
    - If an error occurs during the conversion, it prints an error message and returns None.

This function is part of the pipeline to ensure uniformity in the audio file format for further processing, specifically preparing the audio content for transcription and summarization.

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This function extracts the audio from a video file using the moviepy library.

**1. Input:**

* + - video\_file: The path to the input video file from which audio will be extracted.
    - output\_path: The directory where the extracted audio file will be saved.

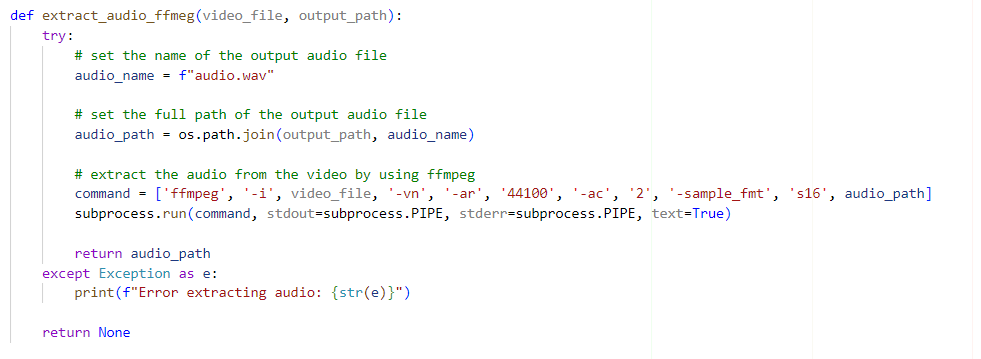
**2. Process:**

* + - Checks if the input video file exists; if not, raises a FileNotFoundError.
    - Opens the video file using moviepy and checks if it has a valid frames per second (fps) attribute. If not, raises a ValueError.
    - Defines the output path for the extracted audio file as "audio.wav" in the specified output\_path.
    - Extracts and writes the audio from the video to a WAV file using moviepy's audio writing functionality.

**3. Output:**

* + - Returns the file path of the extracted audio ("audio.wav") if successful.
    - If an error occurs during the extraction, it prints an error message and returns None.

This function is a crucial step in the audio processing pipeline, providing the audio content needed for transcription and subsequent summarization. It ensures that the audio is extracted uniformly from various video sources for consistent further processing.



This function extracts audio from a video file using the FFmpeg command-line tool.

1. Input:

* + - video\_file: The path to the input video file from which audio will be extracted.
    - output\_path: The directory where the extracted audio file will be saved.

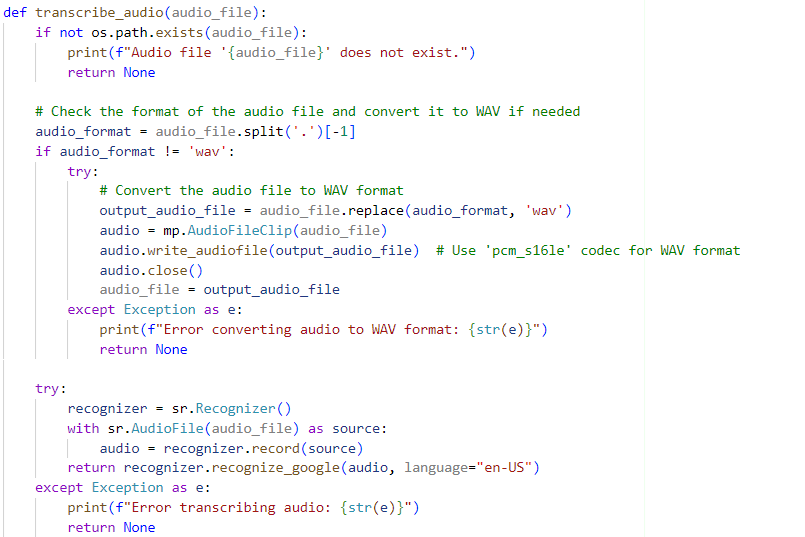
2. Process:

* + - Defines the name of the output audio file as "audio.wav."
    - Constructs the full path of the output audio file by joining the specified output\_path and the predefined audio name.
    - Uses the FFmpeg command-line tool to execute a command for audio extraction. The command includes:
* -i: Input file (the video file).
* -vn: Disable video recording.
* -ar 44100: Set audio sample rate to 44100 Hz.
* -ac 2: Set audio channels to stereo.
* -sample\_fmt s16: Set the audio sample format to 16-bit.
  + - The output audio file path.

3. Output:

* + - Returns the file path of the extracted audio ("audio.wav") if the extraction is successful.
    - If an error occurs during the extraction, it prints an error message and returns None.

This function provides an alternative method for extracting audio, utilizing FFmpeg's capabilities. It is a robust approach to handling various video formats and extracting high-quality audio for further processing.



This function transcribes the content of an audio file into text using Google's speech recognition service.

1. Input:

* + - audio\_file: The path to the input audio file that needs to be transcribed.

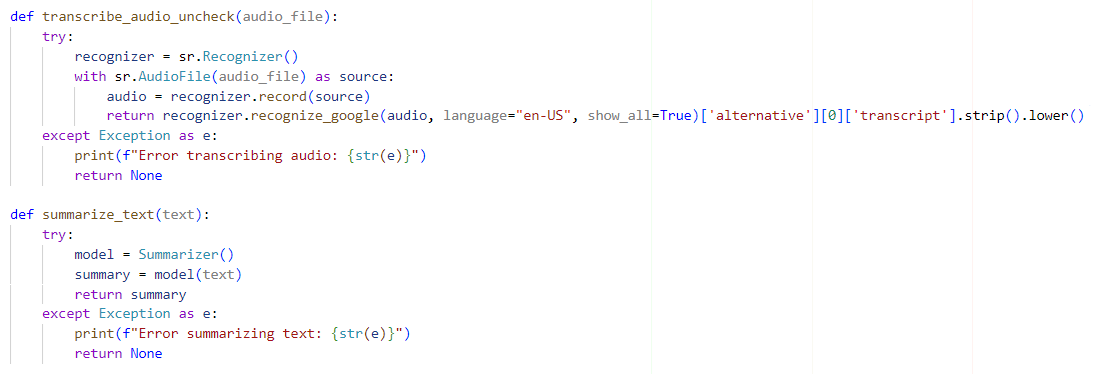
2. Process:

* + - Checks if the specified audio file exists. If not, it prints an error message and returns None.
    - Checks the format of the audio file, and if it's not in WAV format, it attempts to convert it.
    - Creates an output audio file with a ".wav" extension using MoviePy library.
    - Uses the SpeechRecognition library (recognizer) to transcribe the audio.
    - Reads the audio file using sr.AudioFile.
    - Records the audio from the file.
    - Sends the recorded audio to Google's speech recognition service using recognizer.recognize\_google.
    - Specifies the language as "en-US" (English, United States).

3. Output:

* + - Returns the transcribed text if the process is successful.
    - If there are errors during the transcription, it prints an error message and returns None.

This function ensures that the input audio file is in the required WAV format for accurate transcription. It leverages the SpeechRecognition library for interfacing with Google's speech recognition service, providing a straightforward way to convert spoken words into text.



**transcribe\_audio\_uncheck Function**

This function performs an unchecked transcription of the content of an audio file into text using Google's speech recognition service. It returns the transcribed text without checking for errors.

**1. Input:**

* + - * audio\_file: The path to the input audio file that needs to be transcribed.

**2. Process:**

* + - * Uses the SpeechRecognition library (recognizer) to transcribe the audio.
      * Reads the audio file using sr.AudioFile.
      * Records the audio from the file.
      * Sends the recorded audio to Google's speech recognition service using recognizer.recognize\_google.
      * Specifies the language as "en-US" (English, United States).
      * Uses show\_all=True to retrieve alternative transcriptions.
      * Extracts the first alternative's transcript, converts it to lowercase, and removes leading/trailing whitespaces.

**3. Output:**

* + - * Returns the transcribed text if the process is successful.
      * If there are errors during the transcription, it prints an error message and returns None.

**summarize\_text Function**

This function generates a summary of the provided text using the Summarizer model.

**1. Input:**

* + - * text: The input text that needs to be summarized.

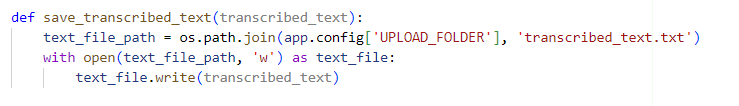
**2. Process:**

* + - * Uses the Summarizer library (model) to generate a summary of the input text.

**3. Output:**

* + - * Returns the generated summary if the process is successful.
      * If there are errors during the summarization, it prints an error message and returns None.

These functions contribute to the core functionality of summarizing spoken words into concise text summaries. The first function focuses on transcription, while the second one handles the summarization process.



This function saves the transcribed text to a text file.

**1. Input:**

* + - * transcribed\_text: The text that needs to be saved.

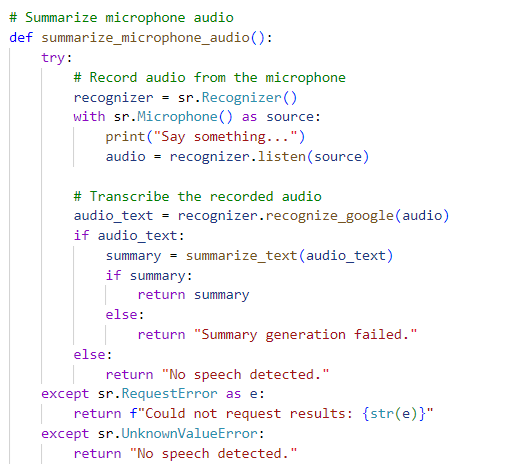
**2. Process:**

* + - * Constructs the full path to the text file using the app.config['UPLOAD\_FOLDER'] (upload folder defined in the Flask app).
      * Opens the text file in write mode ('w').
      * Writes the transcribed text to the file.

**3. Output:**

* + - * Saves the transcribed text to a text file with the name 'transcribed\_text.txt' in the specified upload folder.

This function is crucial for persisting the transcribed text, providing a record of the content that has been transcribed during the application's operation.



This function captures audio from the microphone, transcribes the spoken words using Google's Speech Recognition, and then generates a summary of the transcribed text using the summarize\_text function.

**1. Process:**

* + - * Initializes a Recognizer object from the speech\_recognition library.
      * Opens the microphone as a source for audio input using the with sr.Microphone() as source block.
      * Prints a prompt to the user to say something.
      * Listens to the audio input and records it.
      * Uses Google's Speech Recognition (recognizer.recognize\_google(audio)) to convert the recorded audio to text (audio\_text).
      * If audio text is detected:
      * Generates a summary of the transcribed text using the summarize\_text function.
      * Returns the summary if successful.
      * If summary generation fails, returns an appropriate message.
      * If no speech is detected, returns a corresponding message.

**2. Output:**

* Summary of the transcribed audio if successful.
  + - * Messages indicating failure in case of no speech detected or summary generation failure.

This function provides real-time summarization of spoken words from the microphone, making the application interactive and user-friendly.

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**Flask Routes and summarize\_video\_audio:**

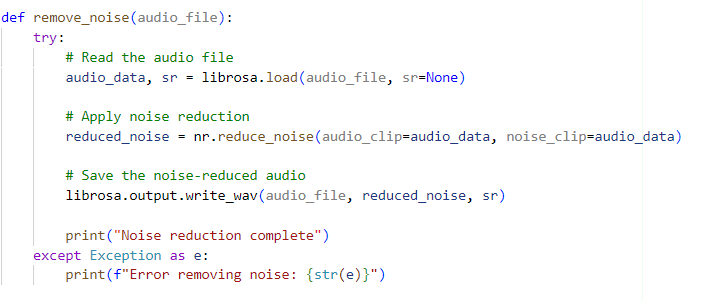
**1. Route:**

* + - * Maps to the home page of the application.
      * Renders the HTML template located at 'index.html' using the render\_template function.
      * Provides the user with the main interface for the Audio Summarizer.

**2. summarize\_video\_audio Route:**

* + - * Handles POST requests triggered when the user submits a YouTube video URL for summarization.
      * Creates a directory (data\_folder) for storing downloaded content if it doesn't exist.
      * Retrieves the YouTube URL from the submitted form data.
      * Calls the download\_video\_audio function to download the YouTube video as audio to the specified directory.
      * Calls the extract\_audio\_ffmeg function to extract audio from the downloaded video using ffmpeg.
      * Transcribes the extracted audio using the transcribe\_audio\_uncheck function.
      * Generates a summary of the transcribed text using the summarize\_text function.
      * Returns the generated summary if successful.
      * Provides appropriate error messages if any step fails (e.g., video download failure, audio conversion failure, or transcription failure).

These routes establish the core functionality of the Audio Summarizer, allowing users to interact with the application through the web interface and submit YouTube video URLs for summarization.



**Noise Reduction Function**

* + - * Function Name: remove\_noise

**Steps:**

1. Read Audio File:

* + - * Uses the librosa.load function to read the audio file.
      * Obtains the audio data and the sample rate (sr) from the loaded audio file.

2. Apply Noise Reduction:

* + - * Utilizes the nr.reduce\_noise function from the noisereduce library.
      * Applies noise reduction to the audio clip (audio\_data) using the same clip as the noise reference (noise\_clip = audio\_data).

3. Save Noise-Reduced Audio:

* + - * Writes the noise-reduced audio back to the original audio file using librosa.output.write\_wav.
      * The sr parameter ensures that the saved audio has the same sample rate as the original.

4. Prints Status:

* + - * Prints "Noise reduction complete" if the process is successful.

5. Error Handling:

* + - * Catches and handles exceptions, printing an error message if any issues occur during the noise reduction process.

**Note:**

* + - * The noisereduce library is used for noise reduction, taking advantage of its functionality to enhance the quality of the audio by reducing unwanted background noise.



The **summarize\_microphone\_audio\_route** function is a comprehensive process designed to capture, process, and summarize audio recorded from a microphone. Here's a breakdown of its key functionalities:

**1. Recording Parameters:**

Defines parameters such as audio format, channels, sampling rate, chunk size, and recording duration using the pyaudio library.

**2. Record Microphone Audio:**

* + - * + Utilizes pyaudio to capture audio from the microphone.
        + Records audio for a specified duration, saving it as a WAV file.

**3. Create Data Folder:**

* + - * + Checks for the existence of a designated data folder for microphone recordings.
        + Creates the folder using os.makedirs if it doesn't exist.

**4. Set Filename and Path:**

* + - * + Establishes the filename and full path for the recorded audio file within the designated data folder.

**5. Record Audio:**

* + - * + Calls the record\_microphone\_audio function, responsible for managing the audio recording process.

**6. Remove Background Noise:**

* + - * Applies the remove\_noise function from the librosa and noisereduce libraries to enhance audio quality by reducing background noise.

**7. Transcribe Audio:**

* + - * Uses the transcribe\_audio function, powered by the speech\_recognition library, to convert the recorded audio into textual content.

**8. Summarize Transcribed Text:**

* + - * Leverages the summarize\_text function, employing the Summarizer library, to generate a concise summary of the transcribed text.

**9. Check and Return Results:**

* + - * Verifies the success of transcription and summarization processes.
      * Returns the generated summary if successful; otherwise, provides informative error messages for failed steps.

**Note:** This function encapsulates the entire workflow, showcasing the integration of various libraries to achieve the desired outcome of summarizing audio content recorded from a microphone.



This route, /**summarize\_file\_audio**, handles the summarization process for audio files uploaded by users. Here's an overview of the key steps:

**1. Uploaded File Handling:**

Retrieves the uploaded file from the request using request.files['video\_upload'].

**2. Save Uploaded File:**

Saves the uploaded file to the designated "uploads" folder, creating the folder if it doesn't exist.

The file path is then stored in the variable video\_file\_path.

**3. Process Uploaded Video File:**

Checks if the video\_file\_path is valid.

Creates a data folder for processing uploaded files if it doesn't exist.

Calls the extract\_audio function to extract audio from the video file.

**4. Transcribe Audio:**

Uses the transcribe\_audio function to convert the extracted audio to text.

**5. Save Transcribed Text:**

Saves the transcribed text to a file using the save\_transcribed\_text function.

**6. Summarize Transcribed Text:**

Applies the summarize\_text function to generate a summary of the transcribed text.

**7. Result Handling:**

Checks the success of transcription and summarization processes.

Returns the generated summary if successful; otherwise, provides error messages for failed steps.

**8. Run the Application:**

If this script is executed as the main program, the Flask application is run with debugging enabled.

This route allows users to upload video files, extracts audio, transcribes the audio to text, generates a summary, and provides the summary as the output.

## Index.html(For home page)



This HTML code defines the structure of a web page for the "Audio Summarizer" application. Here's a breakdown of its components:

**1. Document Type Declaration:**

- <!DOCTYPE html> specifies the HTML version used in the document.

**2. HTML Structure:**

- The HTML document is wrapped in <html> tags.

**3. Head Section:**

- Contains metadata and links to external resources.

- Title: "Audio Summarizer."

- Stylesheets:

"style.css" for custom styles.

Bootstrap 4.5.0 CSS.

Font Awesome for icons.

**4. Body Section:**

- <body> contains the main content of the page.

**5. Container Division:**

- <div class="container"> wraps the entire content for styling.

**6. Page Title:**

- <h1> displays the title "Audio Summarizer."

**7. File Upload Form:**

- <form> for uploading video files.

- "Upload Video" label and a file input with the ID "video\_upload."

- Submit button labeled "Summarize Video."

**8. YouTube Video URL Form:**

- <form> for summarizing YouTube videos.

- "YouTube Video URL" label and a text input with the ID "youtube\_url."

- Submit button labeled "Summarize YouTube Video."

**9. Microphone Audio Form:**

- <form> for summarizing microphone audio.

- Submit button labeled "Summarize Microphone Audio" with a microphone icon.

**10. Result Display:**

- <div class="result"> for displaying the summary.

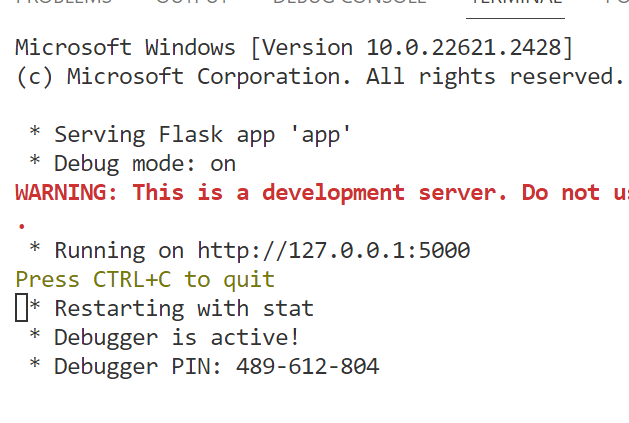
- <h3> for the "Summary" heading.

- <p> to display the actual summary fetched from the Flask application ({{ result }}).

This HTML structure provides a user interface for interacting with different audio summarization features. The forms allow users to upload video files, input YouTube video URLs, and summarize microphone audio, with the results displayed on the page.

**Output:**

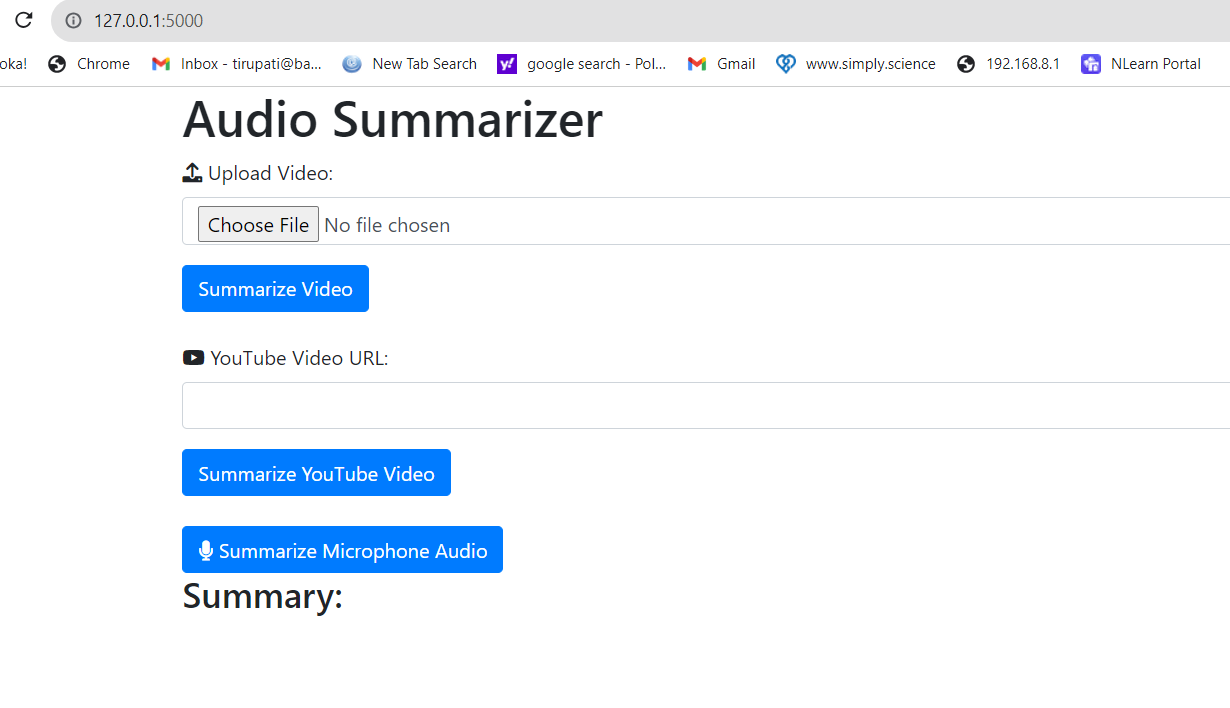
**Compile:** C:/Users/Sivamani/AppData/Local/Microsoft/WindowsApps/python3.11.exe "c:/Users/Sivamani/OneDrive/Desktop/Summarizing Audio Files in Python/without/app.py"



Open your web browser and type "<http://127.0.0.1:5000>" in the address bar. Press Enter, and it will redirect you to the "index.html" page, prompting you to enter an ID.

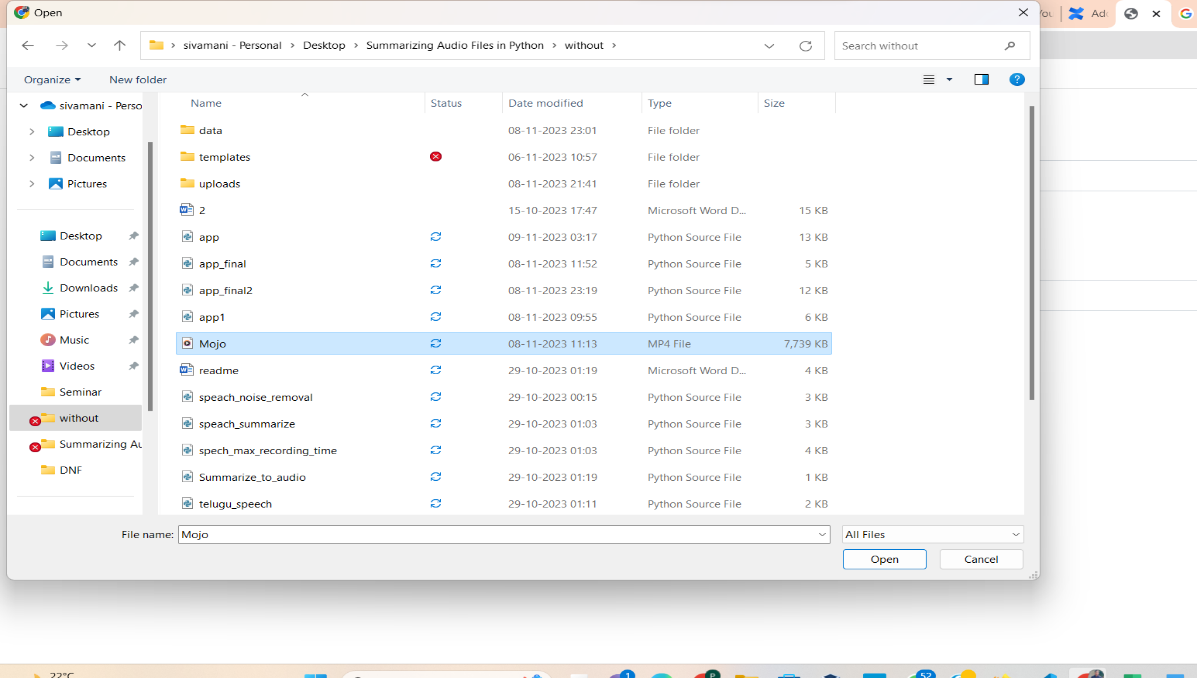
# RUN:

## Redirects to index.html

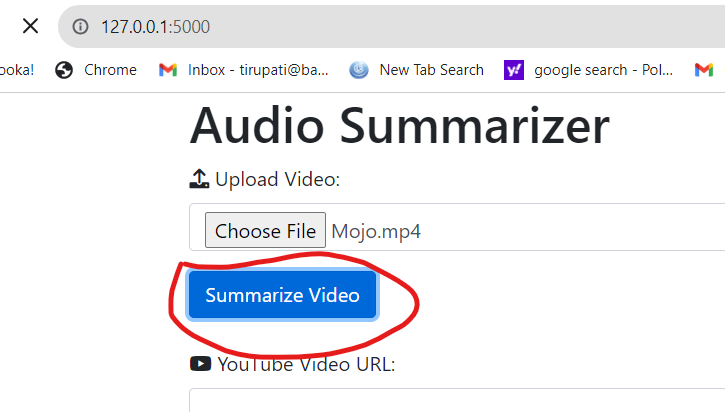
****

**Next You can upload a file by selecting "Choose File" and selecting the audio or video file you want to summarize**

1. Choose a video file from your device by clicking "Choose File" and selecting the desired video file from your directory.



1. Click on Summarize Video



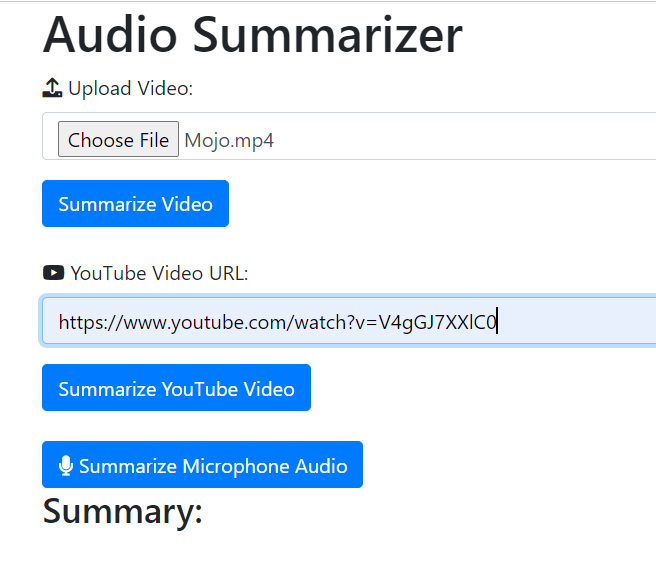
1. Output: The summarize of the upload file will be display on the new website page



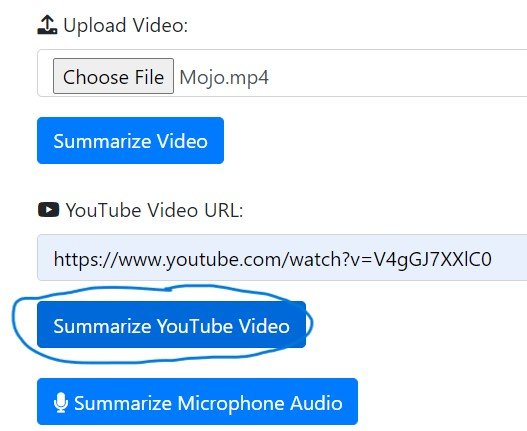
1. Then Return to the Home Page

**Paste a YouTube video URL into the provided field and click "Summarize YouTube Video" to generate a summary.**

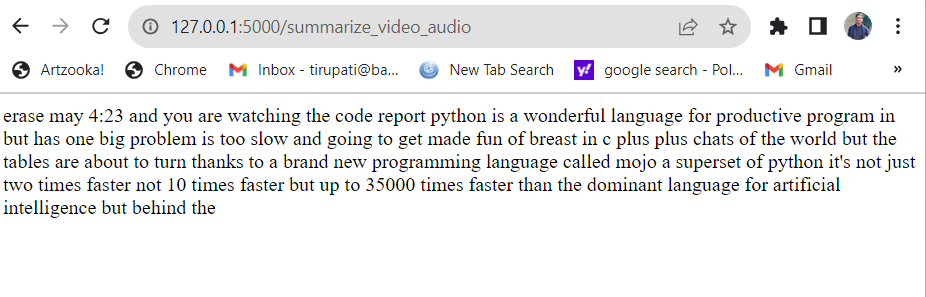
1. Paste the url of any vedio

****

1. Click on the Summarize the youTube video

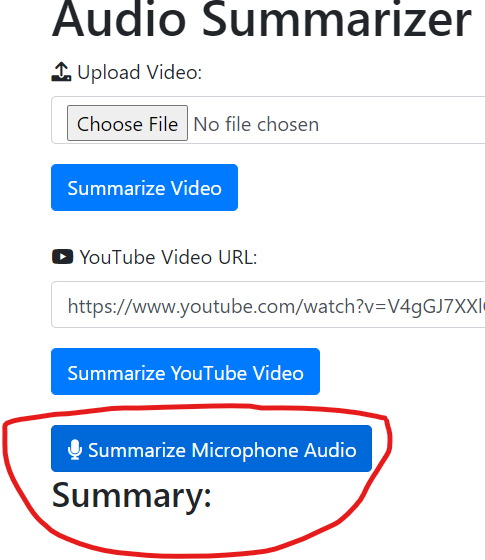


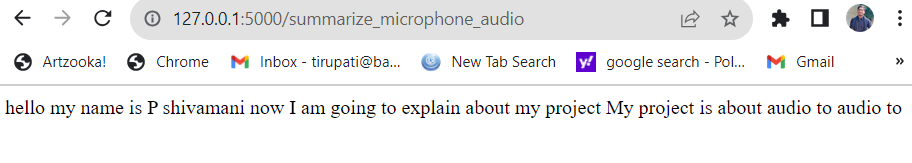
1. Output: The summarize of the upload file will be display on the new website page

****

1. Then Return to the Home Page

**Click "Summarize Microphone Audio" and speak into your microphone. The system will transcribe and summarize your spoken words.**

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****

# Performance Analysis:

# Efficient Audio Processing:

# The code efficiently processes audio from various sources (YouTube, microphone, uploaded files) using libraries like moviepy, pydub, and librosa.

# Leveraging these libraries allows for quick and effective audio extraction, format conversion, and noise reduction.

# Dependency on Free Services:

# By using Google's SpeechRecognition service for audio transcription without the need for an API key, your code simplifies the setup process for users.

# The absence of API keys reduces the burden on developers and end-users, making it more user-friendly.

# Low Bandwidth Consumption:

# The summarization process directly operates on the local machine, eliminating the need for extensive internet bandwidth.

# Users can enjoy audio summarization without substantial data consumption, enhancing the accessibility of the application.

# Versatile Summarization:

# The integration of the Summarizer library provides a versatile approach to text summarization.

# Users can summarize transcribed text from various sources, giving them flexibility in the choice of input.

# Real-time Microphone Summarization:

# The code supports real-time summarization of audio from the microphone, offering users an immediate summary of spoken content.

# This feature enhances the usability of the application for tasks like note-taking or quick content summarization.

# No API Key Management:

# Omitting the use of API keys eliminates the need for users to manage and secure their keys.

# This design choice simplifies the user experience and contributes to a more straightforward application setup.

# User-Friendly Web Interface:

# The integration with Flask provides a user-friendly web interface, making it easy for users to interact with the application.

# Clear instructions and prompts in the command line enhance the overall user experience.

# Error Handling and Feedback:

# The code includes error handling mechanisms, providing descriptive error messages in case of failures.

# Feedback messages guide users on potential issues, ensuring a smoother interaction.

# Flexible File Handling:

# The code accommodates both microphone input and uploaded files, offering users flexibility in selecting their preferred audio sources.

# Open-source and Collaborative:

# The code's structure and use of popular libraries make it open-source and potentially suitable for collaboration.

# Contributions and enhancements from the community can further improve the application.

# Contributions and Community Enhancements:

# Your contributions are valued! This repository is open to collaboration, and we welcome contributions from the community. Whether you're interested in fixing bugs, adding new features, improving documentation, or enhancing overall performance, your input can make a significant impact.

# How You Can Contribute:

# Bug Fixes and Feature Requests:

# Identify and report bugs through the GitHub Issues section.

# Suggest new features or improvements that align with the project's goals.

# Code Contributions:

# Fork the repository and create a new branch for your changes.

# Implement bug fixes, features, or optimizations.

# Submit a pull request, and our maintainers will review and merge qualified contributions.

# Documentation Improvements:

# Enhance project documentation to make it more accessible to users and contributors.

# Provide examples, explanations, or clarifications where needed.

# Testing and Feedback:

# Test the application in different environments or scenarios.

# Provide constructive feedback on your experience, helping us improve usability and reliability.

# Community Support:

# Engage in discussions on GitHub Issues and Pull Requests.

# Share your experiences, troubleshoot problems, and assist fellow contributors and users.

# Guidelines for Contributions:

# To ensure a smooth collaborative process, please adhere to the following guidelines:

# Follow the code style and structure established in the repository.

# Clearly describe your changes in the pull request and provide context on the problem or feature.

# Be open to feedback and willing to iterate on your contributions.

# By fostering an inclusive and collaborative community, we aim to continually enhance the capabilities and usability of this audio summarization application. Thank you for considering contributing to our project! 🚀

# [Contribute Now](https://github.com/sivamaniPITTALA/Summarizing-Audio-Files-in-Python)

# Conclusion:

In this project, developed an Audio Summarizer web application using Flask, providing users with a convenient platform to summarize audio content from various sources. The application seamlessly integrates functionalities like video file uploads, YouTube video URL summarization, and real-time microphone audio summarization.

By leveraging powerful libraries such as pytube, moviepy, speech\_recognition, and noisereduce, our application achieves robust audio processing, including extraction, transcription, and noise reduction. The clean and intuitive user interface, designed with HTML and CSS, enhances user experience with responsive design and consistent styling.

In summary, our Audio Summarizer demonstrates the effective fusion of web development and audio processing technologies, offering a versatile tool for users to extract insights from diverse audio formats. This project serves as an excellent showcase of Python's capabilities in creating user-friendly applications for audio content analysis.