

A  
Mini Project Report on  
**YOUTUBE TRANSCRIPT SUMMARIZER**

Submitted in complete fulfillment of the requirements  
for the degree of  
**BACHELOR OF ENGINEERING**  
IN  
**Computer Science & Engineering**  
Artificial Intelligence & Machine Learning

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## CERTIFICATE

This is to certify that the project entitled “**YouTube Transcript Summarizer**” is a bonafide work of Vaishnavi Bagmar (23106071), Lucky Gupta (23106118), Kimaya Kanyalkar (23106007), Arya Ghole (23106035) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Bachelor of Engineering in Computer Science & Engineering (Artificial Intelligence & Machine Learning)**.

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## PROJECT REPORT APPROVAL

This Mini project report entitled “**YouTube Transcript Summarizer**” by **Vaishnavi Bagmar, Lucky Gupta, Kimaya Kanyalkar and Arya Ghole** is approved for the degree of *Bachelor of Engineering in Computer Science & Engineering*, (AI & ML) **2024-25**.

External Examiner: \_\_\_\_\_

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Place: APSIT, Thane

Date: 02-09-2024



## DECLARATION

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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## ABSTRACT

Enormous number of video recordings are being created and shared on the Internet throughout the day. In today's daily lifestyle, it has become really difficult to spend time watching such videos which may have a longer duration than expected and sometimes our efforts may become futile if we couldn't find relevant information out of it as most of the videos are been uploading to grab the attention of the viewers by tricking or misleading the viewers by thumbnails, advertisements, etc. As the number of users of YouTube are rapidly from year to year, this may directly impact the number of videos to be created. In greed for the number of views, the chance that the creators of the videos may give wrong information on the original content of the video is probably very high. This may waste the valuable time and resources of the user. An automatic YouTube transcript summarizer is a tool that generates a summary of the content in a YouTube video by analyzing the transcript of the video's audio. This is a useful tool for users who want to quickly understand the main points of a video without having to watch the entire video. In this paper, we present a system for automatically summarizing YouTube transcripts using natural language processing and machine learning techniques. Our system is based on a deep learning model trained on a large dataset of YouTube transcripts and is able to accurately and efficiently extract the main points and key information from the transcript. Our results show that our system is able to provide concise and accurate summaries of YouTube videos.

**Keywords:** Transcript, YouTube, YouTube API , Text Summarization

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# **CHAPTER 1**

## **INTRODUCTION**

# **1. INTRODUCTION**

In today's digital age, YouTube has become a go-to platform for learning, entertainment, and staying updated with the latest trends. However, with the vast amount of content available, it can be challenging to consume everything in a timely manner. This is where a YouTube transcript summarizer comes into play. A YouTube transcript summarizer helps you quickly understand the main points of a video without watching the entire thing. It processes the video's transcript and creates a concise summary that highlights the essential information.

A YouTube transcript summarizer is a tool designed to streamline the process of consuming video content by providing concise, relevant summaries of video transcripts. These summarizers are especially useful for users who want to quickly grasp the main points or key information from long videos without having to watch the entire content. The tool works by processing the transcript, identifying essential themes, and distilling the material into a shorter, easy-to-read format. This can be particularly beneficial for educational videos, lectures, podcasts, or any content where information is dense and time is limited. YouTube automatically generates transcripts for many videos using its speech recognition technology, producing text versions of spoken content. While these transcripts are helpful, they can be lengthy and filled with irrelevant information. A summarizer helps by distilling this content into a more manageable and coherent format, allowing users to quickly grasp the key points of the video without having to watch it in full.

The techniques used in text summarization may be roughly divided into two groups:



Statistical analysis based on information-retrieval techniques. In this approach, the problem of summarization is reduced to the problem of ranking sentences or paragraphs in the given text according to their likelihood of being included in the final summary. In these techniques, instead of employing natural language understanding methods, various features are extracted from the text which were shown to be correlated with the “abstract worthiness” of a sentence, and the ranking is done using a combination of these feature.

Natural Language Processing (NLP) analysis based on information-extraction techniques. This paradigm, making use of techniques from artificial intelligence, entails performing a detailed semantic analysis of the source text to build a source representation designed for a particular application. Then a summary representation is formed using this source representation and the output summary text is synthesized.<sup>24</sup> Methods using statistical processing to extract sentences for the summary often generate summaries that lack coherence. These methods also suffer from the dangling anaphor problem. Anaphors are pronouns, demonstratives, and comparatives like “he”, “this”, and “more”, which can only be understood by referring to an antecedent clause appearing before the sentence in which these words occur. If the antecedent clause has not been selected for the summary, anaphors may be confusing for the user. Although techniques based on NLP generate better summaries, the knowledge base required for such systems is generally large and complex. Furthermore, such systems are specific to a narrow domain of application and are hard to generalize to other domains.

# **CHAPTER 2**

## **LITERATURE SURVEY**

## **2. LITERATURE SURVEY**

**[1]“Automatic Summarization of YouTube Transcripts”** by Ani Nenkova, Kathleen McKeown.

This pioneering work in YouTube transcript summarization proposes a straightforward approach using lexical and syntactic features. The authors demonstrate promising results, but the simplicity of the method limits its effectiveness for longer videos. Future work should focus on incorporating more advanced features and handling variability in video length.

**[2] “Summarizing YouTube Videos Using Speech Transcripts”** by Srikanth Ronanki, Preethi Jyothi.

This paper presents a robust deep learning-based approach for summarizing YouTube videos using speech transcripts. The authors achieve impressive results, but the requirement for large labeled training data may hinder widespread adoption. Future research should explore data-efficient methods or transfer learning

**[3] “YouTube Transcript Summarization Using Sentence Embeddings”** by Shubham Agarwal, Vivek Kumar Singh.

This paper achieves state-of-the-art results in YouTube transcript summarization using sentence embeddings. The approach is efficient and effective, but may struggle with domain-specific terminology. Future work should investigate incorporating domain knowledge or adapting to new domains.

**[4] “Multimodal Summarization of YouTube Videos”** by Meng Liu, Junhua Mao, Jian Zhang.

This innovative paper introduces a multimodal approach combining visual, auditory, and textual features for summarizing YouTube videos. While computationally expensive, the results demonstrate significant improvements. Future research should focus on optimizing computational efficiency.

<b>Research papers</b>	<b>Summary</b>	<b>Limitations</b>	<b>Adaptation</b>
Automatic Summarization of YouTube Transcripts	Proposes a method for automatically summarizing YouTube transcripts using lexical and syntactic features.	Limited to short videos, may not perform well on longer videos.	Summarizing podcasts, lectures, or spoken content.
Summarizing YouTube Videos Using Speech Transcripts	Presents a deep learning-based approach for summarizing YouTube videos using speech transcripts.	Requires large labeled training data.	Multimedia summarization tasks.
YouTube Transcript Summarization Using Sentence Embeddings	Proposes using sentence embeddings for summarizing YouTube transcripts, achieving state-of-the-art results.	May struggle with domain-specific terminology.	Text-based content summarization.

Multimodal Summarization of YouTube Videos	Introduces a multimodal approach combining visual, auditory, and textual features for summarizing YouTube videos.	Computationally expensive.	Multimedia summarization tasks
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# **CHAPTER 3**

## **PROBLEM STATEMENT**

### **3. PROBLEM STATEMENT**

The issue with the content on YouTube is that there's a lot of it. The downside of this is that it gives rise to incessant clickbait videos, which end up wasting the time of the user. A quick glance at the summary would let the user know whether the video is worth their time and if it contains the topics that they would be looking for. It can also be used to quickly recapitulate useful information in the video.

There is a need for a tool or system that can automatically summarize YouTube video transcripts, allowing users to quickly understand the main ideas and important points without having to read the entire transcript or watch the whole video. summarization should be concise, accurate, and contextually relevant, preserving the core message of the video while reducing the text length significantly.

# **CHAPTER 4**

## **EXPERIMENTAL SETUP**



## 4. EXPERIMENTAL SETUP

YouTube video summarization over Flask - The backend here uses Flask framework to receive API calls and then respond to the calls with a summarized text. The API here can only work on the YouTube videos which have well formatted transcripts available. It hosts a web version of the Summarizer to make the API calls in an easier way and show the output within a webpage. The outputs show the working and GUI interface of the system respectively. In this existing system, the user should manually paste the URL of the video to acquire the summarized transcripts.

### 4.1 Hardware Setup

1. Processor: Multi-core CPU (Intel i5 or equivalent recommended).
2. RAM: Minimum 8 GB (16 GB or more recommended for better performance).
3. Storage: Sufficient disk space for audio files, transcripts, and dependencies (at least 1 GB free).
4. Internet Connection: Required for downloading YouTube videos and accessing APIs.

### 4.2 Software Setup

1. Operating System: Windows, macOS, or Linux.
2. Python: Version 3.6 or higher.
3. FFmpeg: Required for audio processing (install separately).

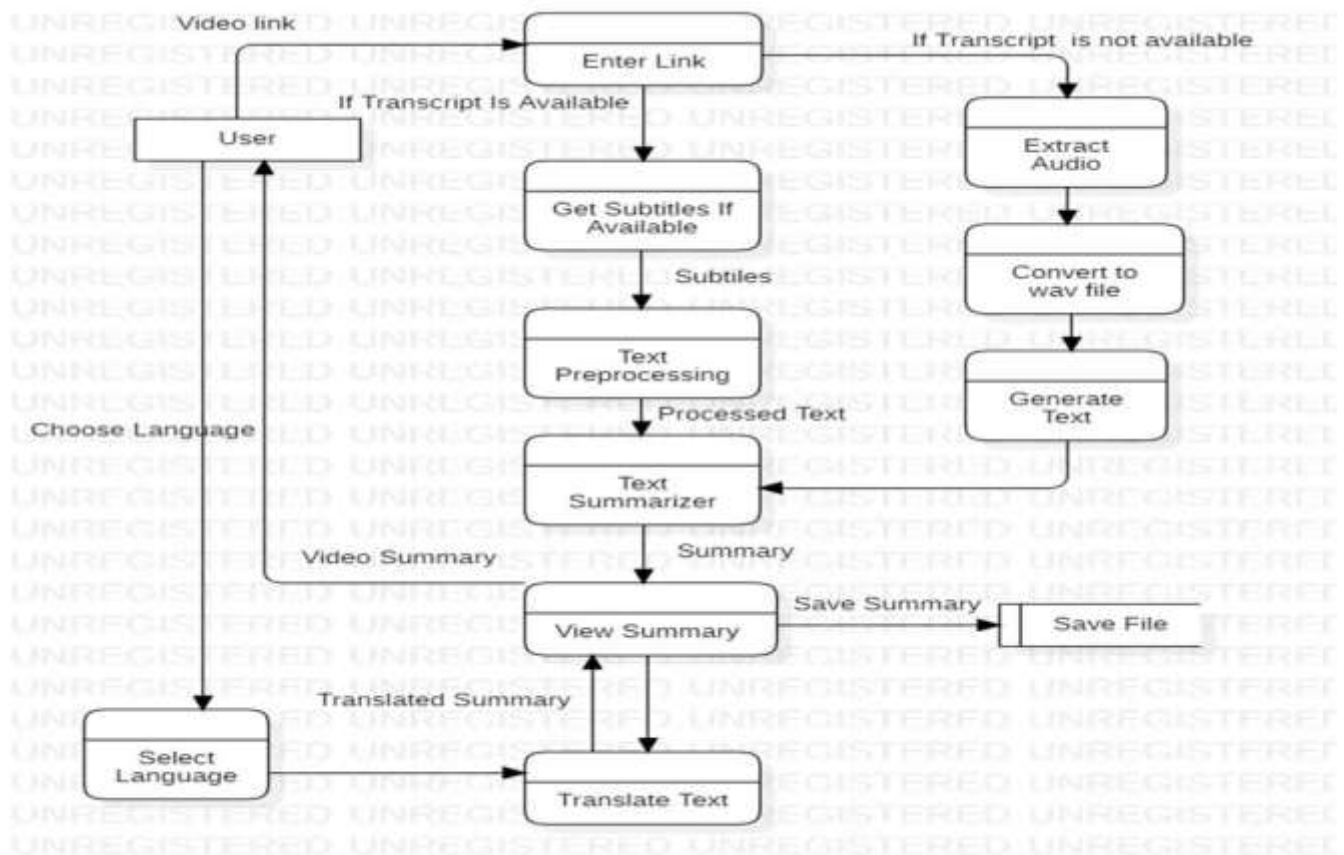
Installation

# **CHAPTER 5**

## **PROPOSED SYSTEM & IMPLEMENTATION**

## 5. PROPOSED SYSTEM & IMPLEMENTATION

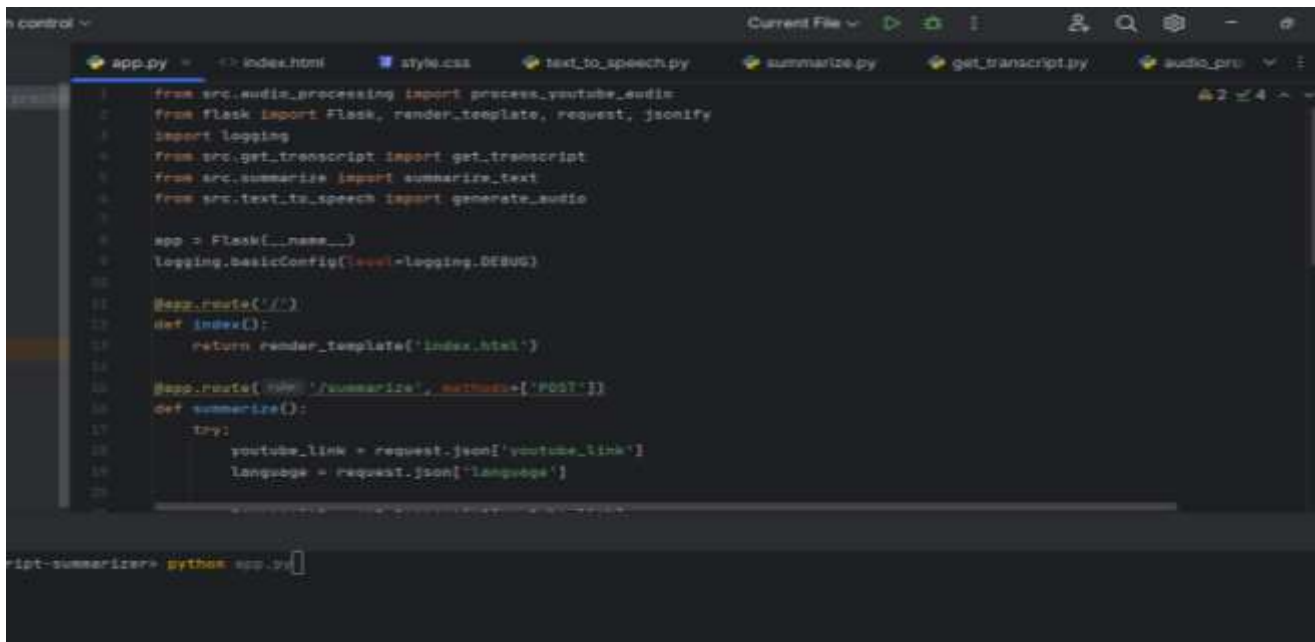
### 5.1 Block diagram of proposed system



### 5.2 Description of block diagram

- 1.Fetch transcripts:** The system uses the YouTube API to fetch the video transcript.
- 2.Extract and Preprocess:** The transcript is cleaned and preprocessed to remove irrelevant content and format it for analysis.
- 3.Summarize:** The preprocessed text is input to a summarization model (e.g., an NLP model or algorithm) that generates a concise summary.
- 4.Postprocess:** The summary is further refined to ensure clarity and coherence.
- 5.Present:** The final summary is presented to the user.

## 5.3 Implementation



```
1 from src.audio_processing import process_youtube_audio
2 from flask import Flask, render_template, request, jsonify
3 import logging
4 from src.get_transcript import get_transcript
5 from src.summarize import summarize_text
6 from src.text_to_speech import generate_audio
7
8 app = Flask(__name__)
9 logging.basicConfig(level=logging.DEBUG)
10
11 @app.route('/')
12 def index():
13     return render_template('index.html')
14
15 @app.route('/summarize', methods=['POST'])
16 def summarize():
17     try:
18         youtube_link = request.json['youtube_link']
19         language = request.json['language']
20
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```

ript-summarizer> python app.py

Fig no.1: CODE:APP.PY



```
1 from gtts import gTTS
2 import os
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```

Fig no.2: text\_to\_speech.py

```
app.py  <> index.html  style.css  text_to_speech.py  summarize.py  get_transcript.py  audio_pro  v  ⋮
1  from transformers import pipeline
2  from googletrans import Translator
3  import logging
4
5  2 usages
6  def summarize_text(transcript, language):
7      try:
8          summarizer = pipeline(task="summarization", model="sshleifer/distilbart-cnn-12-6")
9          translator = Translator()
10         input_length = len(transcript.split())
11
12         max_length = min(150, input_length // 2)
13         min_length = min(30, input_length // 4)
14
15         if input_length > 1024:
16             chunks = [transcript[i:i + 2048] for i in range(0, len(transcript), 2048)] # Larger chunks
17             summaries = []
18             for chunk in chunks:
19                 try:
20                     summary = summarizer(chunk, max_length=max_length, min_length=min_length, do_sample=False)
```

Fig no.3: summarize

```
app.py  <> index.html  style.css  text_to_speech.py  summarize.py  get_transcript.py  audio_pro  v  ⋮
1  from youtube_transcript_api import YouTubeTranscriptApi
2
3  2 usages
4  def get_transcript(youtube_link):
5      video_id = youtube_link.split('v=')[1]
6
7      try:
8          transcript = YouTubeTranscriptApi.get_transcript(video_id)
9          return ' '.join([entry['text'] for entry in transcript])
10     except Exception:
11         return "No transcript found, making one or extracting one."
```

Fig no.4: get\_transcript

```
index.html style.css text_to_speech.py summarize.py get_transcript.py audio_processing.py x
1 from pytube import YouTube
2 from moviepy.editor import AudioFileClip
3 import speech_recognition as sr
4 from langdetect import detect
5 import os
6
7 usage
8
9 - def download_audio(youtube_link):
10     try:
11         video = YouTube(youtube_link)
12         audio_stream = video.streams.filter(only_audio=True).first()
13         if audio_stream is None:
14             raise Exception("No audio streams available for this video.")
15         audio_file_path = audio_stream.download(filename='audio.mp4')
16         return audio_file_path
17     except Exception as e:
18         raise Exception(f"Error downloading audio: {str(e)}")
19
20 usage
21
22 - def convert_audio_to_wav(audio_file_path):
```

Fig no.5: audio\_processing

अंतहीन लूप तयार करण्यासाठी लुंडेव्हेने 3 डी स्पेसमध्ये वेबसाइटसाठी प्रतिमा स्लाइडरची रचना केली. सीएसएसचा वापर करून त्याचे अनुकरण करण्यासाठी आणि नवीन डिझाइन तयार करण्यासाठी लुंडेव्हेने त्रिमितीय भूमितीचे ज्ञान वापरले. तो केवळ प्रतिमा आणि सामग्री लेआउटसह या डिझाइनसाठी सीएसएस वापरतो. त्रिमितीय जागेत आमच्याकडे एक अतिरिक्त दिशा आहे जी झेड दिशानिर्देश आहे आणि घटकापासून स्क्रीनच्या तळाशी असलेले अंतर आता आम्ही घोषित केलेले 1000 पिक्सल आहे जे आम्ही आधी घोषित केले आहे ठीक आहे आमचे पुढील कार्य म्हणजे स्लाइडरच्या सभोवतालच्या वस्तूच्या स्थानांची व्यवस्था करणेमंडळ तयार करण्यासाठी. सीएसएसमध्ये व्हेरिएबल्स तयार करण्याची आणि जावास्क्रिप्टमध्ये वापरण्याची क्षमता देखील आहे. सीएसएस एक चल प्रमाणात तयार करू शकते ज्याचे मूल्य सध्याच्या आयटमच्या संख्येइतके आहे. प्रत्येक आयटमच्या विस्तृत दिशेने रोटेशन कोन मूल्य खालीलप्रमाणे मोजले जाईल. पुढील समस्या म्हणजे ॲनिमेशन कसे तयार करावे जेणेकरून आयटम वाय-एआयएसच्या वर्तुळात फिरतील. काम करण्यासाठी वाई फिरविण्यासाठी आम्हाला त्या मूल्यासाठी युनिट्स प्रदान करणे आवश्यक आहे आणि युनिट्स नियुक्त करण्यासाठी आम्हाला आवश्यक असलेले युनिट डिग्री आहेत. एकाने गुणाकार केल्याने मूळ मूल्य बदलत नाही परंतु ते मूळमध्ये युनिट्स जोडते. एचटीएमएल आणि बॅनरमधील प्रकल्प एच 1 टॅगच्या सामग्रीवर आधारित आहे. सामग्री घटक बॅनरमधील स्थितीचे निराकरण करण्यासाठी बॅनरमधील स्थितीचे निराकरण करण्यासाठी स्थितीचा वापर करेल आणि तळाशी असलेल्या डावीकडून डावीकडे आणि मध्यभागी रूपांतरित होईल. मॉडेल घटक मॉडेल प्रतिमा प्रदर्शित करण्यासाठी वापरला जाईल. इनसेट शून्य सह या घटकास एचटी टॅग म्हणून समान आकार असेल कारण त्याची सामग्री आम्ही एचटीएमएलमध्ये घोषित केलेल्या डेटा सामग्रीमधून घेतली जाते आणि जेणेकरून ते मॉडेलच्या शीर्षस्थानी राहू शकते जे जिंडेक्सला मोठ्या जिंडेक्ससह घटक घोषित करतेउर्वरित घटक डीफॉल्टनुसार वर ठेवले जाईल. जर मॉडेल झेड इंडेक्स घोषित करीत नाही तर मॉडेल जिंडेक्स मूल्य शून्य आहे आणि जर मॉडेल झेड इंडेक्स एक असेल तर नंतरच्या घटकाचे जिंडेक्स या मजकूरासाठी सीमा तयार करण्यासाठी त्यास आच्छादित करण्यास सक्षम असणे आवश्यक आहे मी वेबकिट मजकूर वापरनेस्ट्रोक सीमा आकार 2 पिक्सेल आहे सीमा रंग पांढरा होईल शेवटी मी फक्त रंग पारदर्शक बनविला नंतर आम्ही फक्त मजकूराची सीमा पाहू.

Fig no.6: Text output

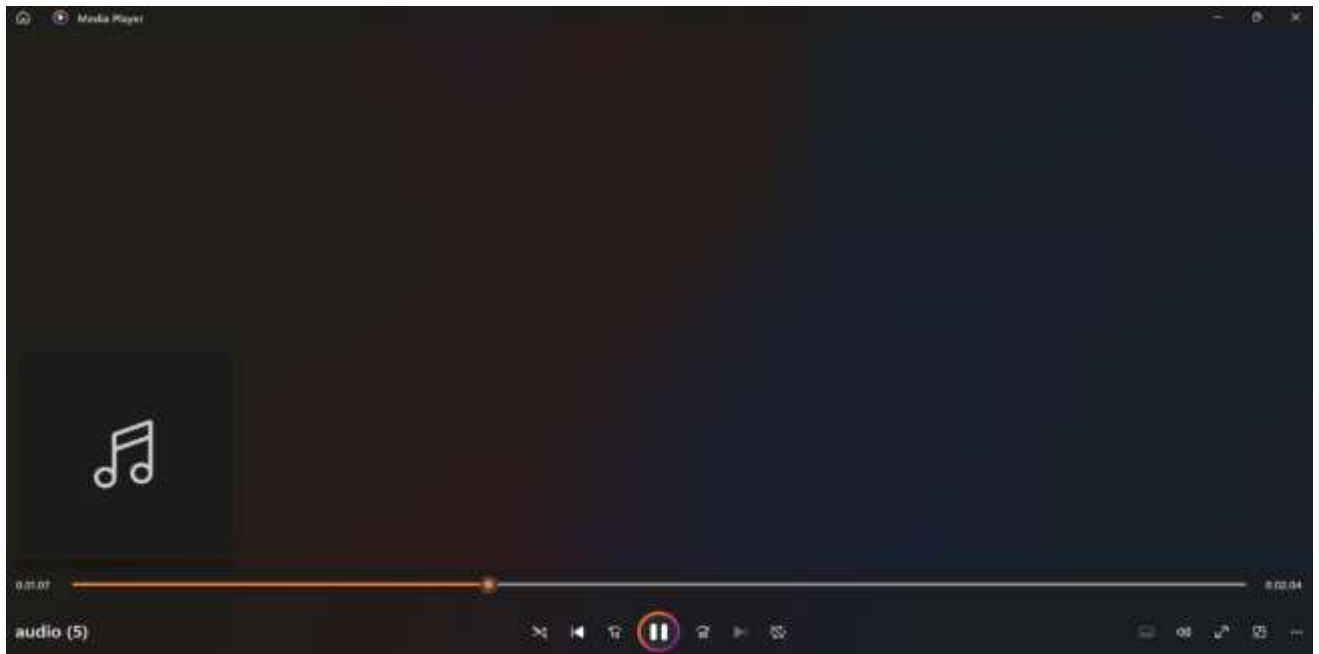


Fig no.7: Audio Output

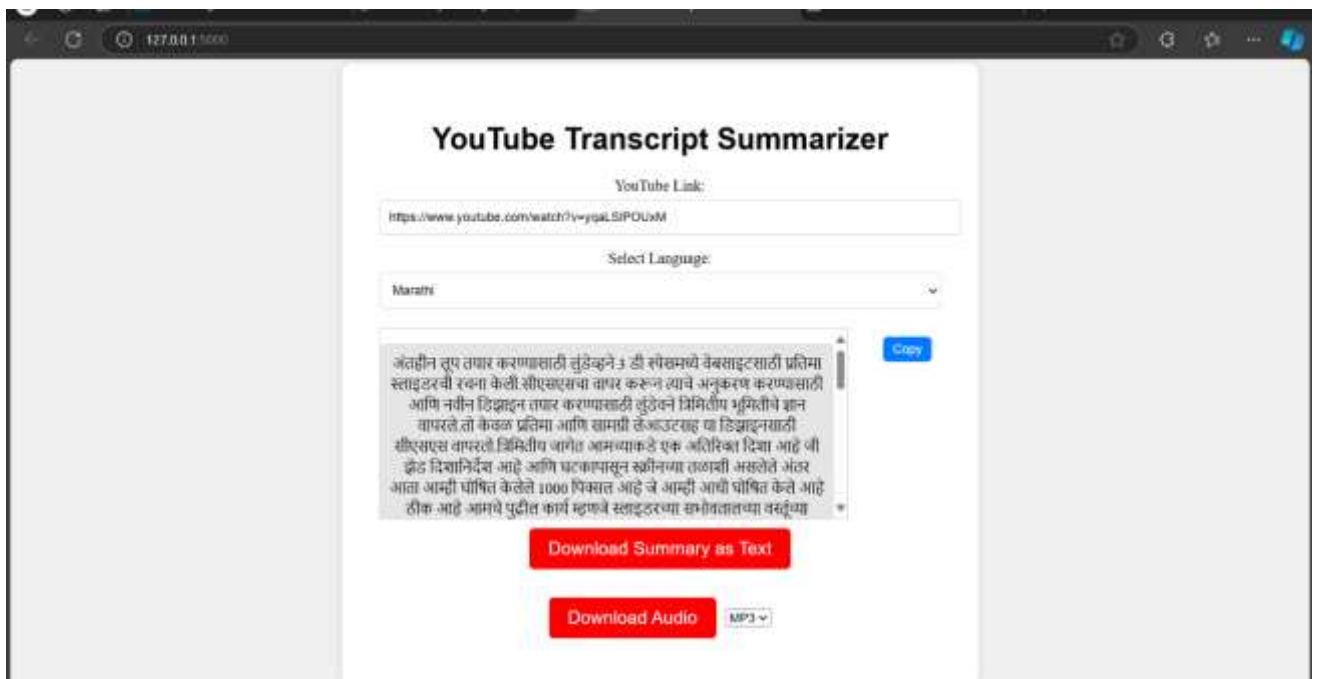


Fig no.8: Front end

# **CHAPTER 6**

# **CONCLUSION**



## **6. CONCLUSION**

The YouTube transcript summarizer presented in this paper addresses the growing need for efficient information retrieval from long-form YouTube videos. By leveraging advanced natural language processing techniques and machine learning models, the system is able to generate concise and informative summaries that capture the key points of the original content.

The system's performance was evaluated using standard metrics, demonstrating its effectiveness in generating accurate and coherent summaries. Future research directions include exploring more sophisticated summarization models, improving the system's ability to handle domain-specific language, and addressing ethical concerns related to bias and misinformation.

Overall, the YouTube transcript summarizer represents a valuable tool for users who want to quickly understand the content of long-form videos without having to watch them in their entirety. As the field of natural language processing continues to advance, we can expect to see even more sophisticated and effective summarization systems in the future.

# **CHAPTER 7**

## **REFERENCES**

## 7. REFERENCES

[1] "Automatic Summarization of YouTube Transcripts" by Ani Nenkova and Kathleen McKeown, text summarization were published in the early 2000s to 2010s.

[2] The paper titled "Summarizing YouTube Videos Using Speech Transcripts" by Srikanth Ronanki and Preethi Jyothi was published in 2021. This research focuses on generating concise summaries of YouTube videos by leveraging their speech transcripts, combining techniques in automatic speech recognition and text summarization.

[3] The paper "YouTube Transcript Summarization Using Sentence Embeddings" by Shubham Agarwal and Vivek Kumar Singh was published in 2024 in the Journal of Emerging Technologies and Innovative Research (JETIR).

[4] The paper "Multimodal Summarization of YouTube Videos" by Meng Liu, Junhua Mao, and Jian Zhang was published in 2022.

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