

# Youtube Transcript Summarizer

Dhruv Gupta\*, Kunal Mirchandani\*\*, Taha Vaghela\*\*\*, Vidit Dave\*\*\*\*,

Prof. Ruchita Sharma\*\*\*\*\*

\*(B.Tech CSE, MIT Art,Design and Technology University, Pune

Email: [dhruv1255@outlook.com](mailto:dhruv1255@outlook.com))

\*\* (B.Tech CSE, MIT Art,Design and Technology University, Pune

Email: [kunalm1870@gmail.com](mailto:kunalm1870@gmail.com))

\*\*\* (B.Tech CSE, MIT Art,Design and Technology University, Pune

Email: [tahavaghela72@gmail.com](mailto:tahavaghela72@gmail.com))

\*\*\*\* (B.Tech CSE, MIT Art,Design and Technology University, Pune

Email: [viditdave2410@gmail.com](mailto:viditdave2410@gmail.com))

\*\*\*\*\* (Assistant Professor, MIT Art,Design and Technology University, Pune

Email: [ruchita.sharma@mituniversity.edu.in](mailto:ruchita.sharma@mituniversity.edu.in))

\*\*\*\*\*

## Abstract:

Due to the proliferation of internet video content, especially on sites like YouTube, viewers are frequently presented with long videos that cover a wide range of subjects. The YouTube Transcript Summarizer tool presented in this project uses natural language processing (NLP) to provide succinct and insightful summaries of YouTube video transcripts. When a video link is entered, the program obtains the transcript, analyzes the content to extract important details, and displays a condensed synopsis that emphasizes the most important parts. With the help of the time-saving summarizer, users may grasp the main points of a video without having to watch it through to the end. It can be used in a variety of contexts, including news, entertainment, and education, when viewers want to quickly understand long movies. This application, which was developed utilizing natural language processing (NLP) techniques such as sentence segmentation, keyword extraction, and abstractive or extractive summarizing, gives users choice by providing them with either thorough or brief summaries, depending on their preferences. Potential uses for the YouTube Transcript Summarizer include automatic indexing, content suggestion, and instructional resources. It may also be connected with well-known platforms to improve accessibility even more, making it a useful tool for researchers, students, and casual visitors.

**Keywords — YouTube Transcript Summarizer, Natural Language Processing (NLP), Video Summarization, Transcript Analysis, Keyword Extraction, Sentence Segmentation, Educational Resources.**

\*\*\*\*\*

## I. INTRODUCTION

The content shown in videos has come up as the main source of education and entertainment. There are a lot of videos on websites and social media platforms like YouTube, Instagram etc. for covering entertainment and education. Users on these platforms do have much time and patience to

watch long form of content, but are interested in some certain part of it only. As a result, there is a need of a tool which provides a short and detailed information of the content available in long form without even watching the whole content in no time.

The need for such tools is met by the YouTube Transcript Summarizer which summarizes the

transcript of the videos. This tool summarizes the transcript on the basis of extraction of key points using Natural Language Processing (NLP) techniques. This process will make the user more productive and save their time on their desired video of choice for understanding the content.

Since watching these long videos take up a lot of time entirely, which becomes a liability over Students, working professional and researchers for being more productive, instead this tool can be helpful. This tool provides a good summarization of the transcript of the selected YouTube video, which helps in understanding the concept shown in the video.

### i. Motivation

1. **Expanding Video Content:** There are billions of hours of content in form of videos which is difficult to watch by a single user due to less time.
2. **Time Orderliness:** Many of the viewers/users use these kinds of tools to save their time by grasping the main insights of the content.
3. **Increased Demand for Quick Information:** Due to easy approach of insights from long videos of content, students, working professionals and researchers need this tool.
4. **Content Attainability:** The content shown or being told in the long videos can be made more understandable through summarization.
5. **Increased Productiveness:** This tools allow users to get a gist of various topics in less time, making them more productive and effective.
6. **Knowledge of various field:** A varied knowledge of fields like education, business, finance can be understood by summarizing the content to key points.
7. **NLP Advancements:** The development of these kind of efficient summarization tools which are fast and fueled up with customizations and latest technology innovations is possible by the usage of natural language processing (NLP) techniques.

### ii. Literature survey

1. □ [1] **El-Kassas, W.S., Salama, C.R., Rafea, A.A. and Mohamed, H.K.** (2021) - *Automatic text summarization*: In this research paper we can find a number of summarization methods through analysis. But not much about summarization of video transcripts.
2. □ [2] **Fu, T.J., Tai, S.H., and Chen, H.T.** (2019) - *Attentive and adversarial learning for video summarization*: The research paper tells about adversarial and attention learning used to create a summarization model, but consumes a lot of power for the same.
3. □ [3] **Biswas, P.K., and Iakubovich** (2022) - *Extractive summarization of call transcripts*: Uses an extractive summarization model to show the viability of transcript summarization of calls. It might not show subtleness of spoken languages.
4. □ [4] **Vybhavi, A.N.S.S., Saroja, L.V., Duvvuru, J. and Bayana, J.** (2022) - *Video transcript summarizer*: This paper tells us about the process behind transcript summarization but cannot handle all kinds of information of videos well.
5. □ [5] **Sheth, H., Vishwakarma, K., Shaikh, S., Sonawane, P. and Hirlekar, V.** (2023) - *YouTube Video Transcript Summarizer using NLP*: The researchers tell us about the development of Video transcript summarization using NLP but the model cannot give information about all videos.
6. □ [6] **Panthagani, V.B., Duggempudi, V.D.R., Kommera, N.L. and Vakkalagadda, N.,** (2024) - *YouTube Transcript Summarizer*: This research paper tell us about transcript summarization model and how successful it is while suggestion. However, it cannot handle really long transcripts.
7. □ [7] **Kumari, P.V., Keshava, M.C., Narendra, C., Akanksha, P. and Sravani, K.** (2022) - *YouTube Transcript Summarizer Using Flask and NLP*: The researchers tell us about the development of YouTube transcript summarizer using NLP and flask which is very effective, but it lacks multi-language support.

### iii. System

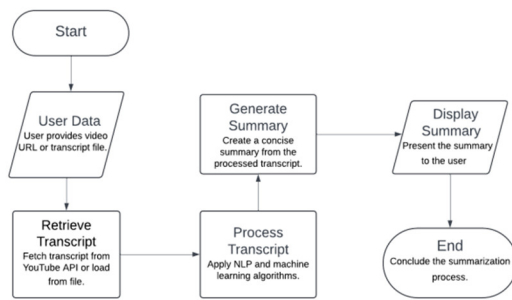


Fig. 1 System Architecture

## II. DESCRIPTION

The project Youtube Transcript Summarizer uses Natural Language Processing (NLP) techniques to output an effective way of summarizing lengthy YouTube videos. This project aims to present the core concepts of videos in long-form like educational videos, podcasts, tutorials etc. to the users to grasp it and save time. The main process begins with extracting transcript using YouTube API and scraping methods[6]. Once obtained, it undergoes several processes and is cleaned for ensuring more accurate input for summarization model[5].

Both abstractive and extractive summarization techniques are used in this project. Abstractive method involves creating new sentences that pass on near-to-original meaning of the content, while extractive methods focuses on finding and extracting most accurate and significant sentences from transcript for the creation of summary[3].

To enhance the quality of the summary, various ML models are being used[2]. To handle large amount of lines in the transcript, the architecture of the system is designed efficient for the same[7].

This projects helps researchers, professionals, students and many more who highly rely on

video content for learning, by saving their time and providing quality summary of the content for them[8]. To ensure high quality accuracy in the summarization, we have used NLP tools like SpaCy and NLTK[11].

To create a greater impact on the market and making it available to everyone, this project can be deployed on AWS which will help in handling huge amount of traffic and large-scale transcripts processing[7]. By using cloud solutions, we can securely store and manage large datasets of transcripts[8]. Use of CI/CD pipeline will ensure regular updates and improvement in summarization process[11].

## III. METHODOLOGY

### 1. Transcript Retrieval:

Transcript is obtained using youtube-transcript-api or other scraping methods. For creating the summary, the transcript should be in text form for making it more processable, also considering when the transcript is not found, the system should throw an error.

### 2. Preprocessing the Transcript:

Unnecessary content like repetitive content, timestamps and filler words, should not included in the summary. Ensure the users customization is being followed and the summary should be provided with most accurate and clearer content.

### 3. Keyword Extraction and Topic Identification:

For finding re-occurring phrases and words in the transcript, we aim to use keyword extraction techniques like TF-IDF and RAKE. Topic modeling methods like Latent Dirichlet Allocation (LDA) can be used for identifying primary themes of the videos.

### 4. Summarization Process:

**Extractive Summarization:** To produce a cogent summary, choose important sentences or phrases straight from the transcript using scoring algorithms (such as frequency-based or cosine similarity).

**Abstractive Summarization:** To produce summaries that are more brief and human-like, use deep learning models (such as BERT and GPT-based models) to rephrase and condense the information in the transcript.

5. **Post-Processing:**

Edit the synopsis to ensure that it is fluent and grammatically correct. Prioritize the most crucial points first and organize the summary to guarantee logical flow.

6. **User Interface & Output:**

Create a straightforward user interface that allows users to enter a YouTube video link and instantly obtain a synopsis. Depending on user preferences, offer options for either detailed or brief summaries. You can also include features like the ability to export the summary to a text file.

7. **Evaluation and Fine-Tuning:**

Take user feedback to improve the quality of summary, adjusting NLP models as necessary to increase accuracy and relevance, and compare the summarizer's performance with human-generated summaries using metrics like ROUGE or BLEU scores.

#### IV. PROPOSED OUTCOMES

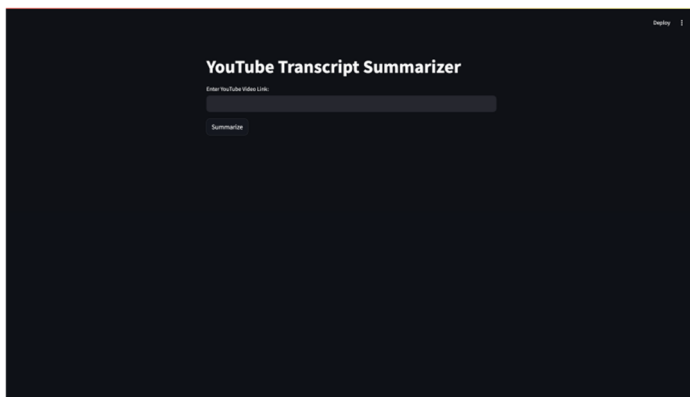


Fig. 2 Dashboard

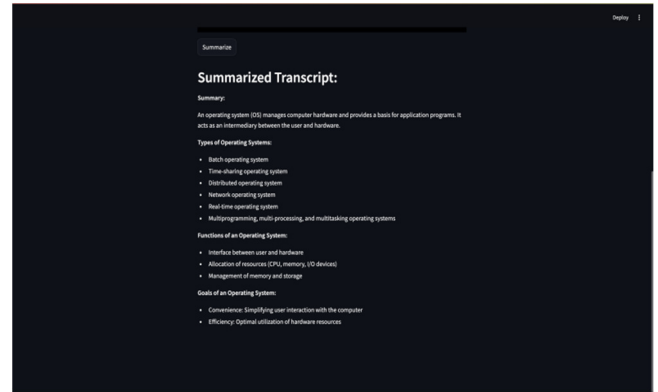


Fig. 3 Summarized Text

#### V. FUTURE SCOPE

##### 1. Improved Summarization Precision and Detection of Nuances

- a. **Contextual Understanding:** Use sophisticated natural language processing (NLP) models (such as transformers like BERT or GPT) to better capture humor, sarcasm, emotional tone, and context. This will result in summaries that are more in line with the original content of the video.
- b. **Customizable Summarization Levels:** To accommodate various purposes, let users choose the level of detail they desire in summaries (such as bullet points, succinct summaries, or thorough descriptions).
- c. **Language Nuance Recognition:** Enhance the model to better manage idioms, cultural allusions, and other language patterns.

##### 2. Multilingual Support

- a. **Automatic Translation and Summarization:** Make multilingual summarizing possible by enabling the translation and summation of transcripts in several languages, which opens up content to a wider audience.
- b. **Native Language Processing:** Provides excellent accuracy and

preserves linguistic subtleties by supporting summarization in several languages without only depending on translation to English.

### 3. Customizable and Interactive User Interface

- a. **Customized Summaries:** Number of words can be provided by the user for a specified amount of words in their summary. The user can also translate in their desired language as a choice but originally getting the summary in English.
- b. **Search within Summaries:** Users can look into specific and detailed words and content within the summary which can make the understanding of the user more refined which will be very helpful.

## VI. CONCLUSIONS

This project aims to take lengthy transcripts and process it to create an accurate and upto the point, concise summaries. For creating accurate summaries, the system needs to assess key points which are very important for shaping the summary, this can made possible using NLP techniques, without even users to watch the whole video. In a way to save time for the users, this tool in the end will increase their productivity and efficiency.

Scalability, accessibility and reliability can be ensured by using cloud technologies which will make this tool more significant. To process large datasets of transcripts, handle huge traffic and deliver the content to users at any location, the cloud-based architecture will come into play . Updating and improving the summarization techniques, this setup would help in doing this. Using the cloud stroage, the users can save and organize the summaries for later. YouTube Transcript Summarizer, is a scalable and reliable tool for summarization as it uses top-of-the-line summarization tools combined with cloud technologies to output concise summaries for the users.

## VII. ACKNOWLEDGMENT

We are highly appreciative and thankful to Prof. Ruchita Sharma for valuable advice and help throughout the development of this project. We are grateful to open-source community and developers of NLP techniques, API's, which are backbone for this project's implementation.

For deploying and testing our application, we acknowledge the support of the cloud service providers which make this tool more scalable and available. This project wouldn't have been possible without the contribution of all individuals and organisations involved.

## VIII. REFERENCES

- [1] El-Kassas, W.S., Salama, C.R., Rafea, A.A. and Mohamed, H.K., 2021. Automatic text summarization: A comprehensive survey. *Expert systems with applications*, 165, p.113679.
- [2] Fu, T.J., Tai, S.H. and Chen, H.T., 2019, January. Attentive and adversarial learning for video summarization. In *2019 IEEE Winter Conference on applications of computer vision (WACV)* (pp. 1579-1587). IEEE.
- [3] Biswas, P.K. and Iakubovich, A., 2022. Extractive summarization of call transcripts. *IEEE Access*, 10, pp.119826-119840.
- [4] Vybhavi, A.N.S.S., Saroja, L.V., Duvvuru, J. and Bayana, J., 2022, March. Video transcript summarizer. In *2022 International mobile and embedded technology conference (MECON)* (pp. 461-465). IEEE.
- [5] Sheth, H., Vishwakarma, K., Shaikh, S., Sonawane, P. and Hirlekar, V., 2023. YouTube Video Transcript Summarizer using NLP. *Grenze International Journal of Engineering & Technology (GIJET)*, 9(2).
- [6] Panthagani, V.B., Duggempudi, V.D.R., Kommera, N.L. and Vakkalagadda, N., 2024, January. Youtube Transcript Summarizer. In *2024*

- 5th International Conference on Mobile Computing and Sustainable Informatics (ICMCSI) (pp. 891-898). IEEE.
- [7] Kumari, P.V., Keshava, M.C., Narendra, C., Akanksha, P. and Sravani, K., 2022. Youtube Transcript Summarizer Using Flask And Nlp. *Journal of Positive School Psychology*, 6(8), pp.1204-1209.
- [8] Kumar, J., Vashistha, R., Lal, R. and Somanir, D., 2023, July. YouTube Transcript Summarizer. In *2023 14th International Conference on Computing Communication and Networking Technologies (ICCCNT)* (pp. 1-4). IEEE.
- [9] Panthagani, V.B., Duggempudi, V.D.R., Kommera, N.L. and Vakkalagadda, N., 2024, January. Youtube Transcript Summarizer. In *2024 5th International Conference on Mobile Computing and Sustainable Informatics (ICMCSI)* (pp. 891-898). IEEE.
- [10] Panthagani, V.B., Duggempudi, V.D.R., Kommera, N.L. and Vakkalagadda, N., 2024, January. Youtube Transcript Summarizer. In *2024 5th International Conference on Mobile Computing and Sustainable Informatics (ICMCSI)* (pp. 891-898). IEEE.
- [11] Shaik, R., Bargat, S. and Ghode, S., 2023. Article and YouTube Transcript Summarizer Using Spacy and NLTK Module. *SSGM Journal of Science and Engineering*, 1(1), pp.126-131.
- [12] Biswas, S. and Patel, A.K., 2022. YouTube Transcript Summarizer To Summarize the content of YouTube.
- [13] Ilampiray, P., Thilagavathy, A., Nithin, A.S. and Raj, I., 2023. Video Transcript Summarizer. In *E3S Web of Conferences* (Vol. 399, p. 04015). EDP Sciences.
- [14] Sheth, H., Vishwakarma, K., Shaikh, S., Sonawane, P. and Hirlekar, V., 2023. YouTube Video Transcript Summarizer using NLP. *Grenze International Journal of Engineering & Technology (GIJET)*, 9(2).
- [15] Ilampiray, P., Thilagavathy, A., Nithin, A.S. and Raj, I., 2023. Video Transcript Summarizer. In *E3S Web of Conferences* (Vol. 399, p. 04015). EDP Sciences.