

# **SUMMARISATION OF YOUTUBE VIDEO USING TRANSFORMERS AND API**

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE AWARD OF THE DEGREE

OF

MASTER OF SCIENCE

IN

**MATHEMATICS**

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## **CANDIDATE'S DECLARATION**

I, (Utkarsh Kapoor), 2K20/MSCMAT/32, student of M.Sc. Mathematics, hereby declare that the project Dissertation titled “Summarisation of Youtube video using Transformers and API” which is submitted by me to the Department of Applied Mathematics, Delhi Technological University, Delhi in partial fulfilment of the requirement for the award of the degree of Master of Science, is original and not copied from any source without proper citation. This work has not previously formed the basis for the award of any Degree, Diploma Associateship, Fellowship, or other similar title or recognition.



Place: Delhi

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## **CERTIFICATE**

I hereby certify that the Project Dissertation titled “Summarisation of Youtube video using Transformers and API ” which is submitted by Utkarsh Kapoor, 2K20/MSCMAT/32 of Department of Applied Mathematics, Delhi Technological University, Delhi in partial fulfillment of the requirement for the award of the degree of Master of Science, is a record of the project work carried out by the students under my supervision. To the best of my knowledge, this work has not been submitted in part or full for any Degree or Diploma to this University or elsewhere.



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## **ABSTRACT**

In present scenario , e-platforms are becoming more and more popular for any productive content , where Youtube can be considered as one of the biggest platforms to provide such kind of content where a student may refer to it to have a better grip over a concept , someone can refer to it to know about his/her favourite bollywood star , or maybe what's going on in the life of his/her favourite politician and many more content is available on Youtube in form of videos and shorts.

Youtube is one of the most popular social media platforms nowadays. It is excellent for personal use, and can also be used by businesses to build a brand . YouTube is for everyone, whether you are an aspiring founder or the CEO of an organization with a large budget video campaign.

Although its user base ranges from young to old, YouTube is more popular with young people who prefer a variety of content, interactive features, and instant gratification of YouTube video content over regular television. Many use it for entertainment purposes, to learn how to do something (lessons), to keep up with the latest music videos of favorite artists, and more.

YouTube is available in almost every country and over 50 languages. As with Google, all you need is a Google account to create a YouTube account and start using it. Also it is a good thing that we can watch Youtube videos in every device , Phone , Laptop , Computer , TV etc. This makes it a bit more accessible to have a good access over

But at times , it happens that we want to see a particular video but a slight problem is , that video is of very large duration , maybe 40-45 min or maybe more than that and we don't have that much amount of time to watch that full video by spending 40-45 mins. So , that is where this paper comes into the picture which allows us to provide a short summary of the youtube video which not only saves our time but also gives us crisp content which we can refer to without wasting large amount of time.

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## **ACKNOWLEDGEMENT**

I want to express my sincere gratitude to my supervisor, Dr Goonjan Jain, for her guidance and assistance in completing this project Dissertation, which allowed me to conduct extensive research and learn about many new things. Second, I want to thank all the researchers whose research papers are mentioned in the reference section, which aided in completing this Dissertation.

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## CHAPTER 1 INTRODUCTION

YouTube is the second largest platform where users search for information on a daily basis. No wonder you can watch tutorials, movies, DIY stuff and entertainment videos on YouTube videos. Thousands of users have massively switched to YouTube channels in recent years. as a revenue platform. There are many benefits of YouTube videos if you are a YouTuber.

YouTube is for everyone, whether you're an aspiring founder or the CEO of an organization with a big-budget video campaign.

Although the user base varies from young to old, YouTube is most popular among young people who prefer the variety of content, interactive features and instant gratification of YouTube video content to regular television. [1] Many use it for entertainment purposes, to learn how to do something (teaching), to keep up with the latest music videos from their favourite artists, and more.

YouTube is available in almost all countries and in more than 50 languages. Like Google, all you need to create and use a YouTube account is a Google account.



### **Fig 1.1 Figure depicting Youtube Logo**

Sometimes it happens that we are doing research or writing notes and suddenly an idea or a difficult question pops up and we don't have the cunning to solve that particular question thanks to a certain concept that we don't understand.[2]

so all of a sudden we changed Youtube for that particular concept and boom! We solved the doubt by understanding the concept of YouTube. Likewise, if we don't know the formula of a particular dish, we simply have to order the name of that dish in the Youtube search section and yes!! Once again we created our favorite dish by watching the tutorials on Youtube. Therefore, YouTube has also become an integral part of our lives, remaining part of the largest content sources, whether the content is for entertainment or educational purposes, or for productive or informative material, YouTube has served us in some way.

If you've discovered that you specialize in something, pay attention. It's the right time to start your personal channel and tease guests from all over the world. Crafting and DIY tasks are endlessly coveted, so YouTubers with thousands of fans show off their skills through the media approach to crafting tasks of great beauty, be it woodworking or Scotty Kilmer's car tricks.[3]

Express your thoughts through moving images to show how your paintings could be useful in everyday life as well. Though Youtube has to a great extent always served as a platform with some of the most prolific content, however, it happens from time to time that that particular video can vary from 20-25 min to 40-50 min or even quite a lot. hence often since most people don't have that much free time to watch videos that are 40-50 minutes long. Therefore, this document may appear there.

# Advantages of Youtube

## 1. Free to use

On Youtube , watching and uploading videos is totally free. This thing enables the user to experiment and check-out whether it works for them or not without thinking much about the expenses.

However, Youtube has recently introduced Youtube Premium , which is a paid subscription which allows the user to watch videos without advertisements. User can also play videos in the background , play videos offline and also it gives access to Youtube Music Premium allowing you to watch Youtube original series and movies.[4]

## 2. Gives user the opportunity to earn money through your videos.

From Youtube , users can earn money from the views they are getting through the videos they use to upload on their channel. Users will have to have a Google AdSense account in case when they are thinking about to earn money through videos ,

Apart from Google AdSense , there are enormous ways through which a user can earn money at platforms like Youtube . This can be carried out through the following:

- Creating affiliate Links
  - Providing Sponsorships
  - Merch and Products
  - Sales of Digital Products
  - Provide Services
- and many more

### 3. Easy to Use

Youtube can be considered as one of the most easy to use platform even if you are not that much well versed with computer . Even then as well if you don't know how to use this platform , you may refer to any tutorial guiding you how to upload a video and many more.

### 4. An easy way to share information

With YouTube, you can share a good amount of information with more people in less time. You can also share information in a fun way. This could be in the form of:

- Videos
- Music
- Comedy Sketch
- Video Animation

Just like other social media platforms such as instagram, you can now upload youtube news, surveys or post updates that can be very helpful in catching your audience , for instance, you can do a survey about what topic your audience would like to see in the coming future, which not only keeps your audience intact but also allows you to have an idea regarding what people want to see on your channel.

## 5. Backlinks are generated



**Fig 1.2 Backlink generation depiction**

Youtube can help grow your seo by creating backlinks. these backlinks can be created when you add a link to your website to your profile page and / or within the descriptions of each video you post to your channel. by seeing your website link in all different parts of your channel, this will bring out the word about your website, which will increase traffic to it. [5]

## Disadvantages of Youtube

### 1. Most of the things are public

YouTube is a more of a social media platform , which in turn allows people having no need to create an account to see any of your videos that you post on your channels. This can lead to copyright issues, and there may be problems such as privacy threats as well.

### 2. Your account can be debarred without any reason

This can occur if:

- You continue to act in a an inappropriate way by portraying behaviour of harassment , spam and sexual comments.
- Your videos are repeatedly reported for claims of copyright infringement.

YouTube has the clear right to debar your channel without any reason provided.[6]

### 3. Any advertiser can put an add on your video

Here is one of the major disadvantages of uploading videos on Youtube , making it to increase the competitive market and any type of competitor can run an add on your video , which can hurt your brand.

## CHAPTER 2 RELATED WORK

Various researches have contributed to Youtube usage and how it is contributing towards the society using various approaches. A brief review of work done formally on the same is given in this section.

Ibrahima Faye et al. [7] gave a detailed study of role of Youtube for all those students who are referring to this platform to study Mathematics . Researchers basically conducted a survey and on the basis of that survey , they mainly gave stats regarding how much role youtube plays for them . They basically designed a methodology which helped them to detect the amount of productive and informative stuff the students are finding on Youtube.

Adiya Abisheva et al. [8] mentioned a detailed information on the basis of datasets that they have regarding how many people are consuming which type of content on Youtube at which point of time in day using twitter. They mainly used algorithm of twitter to understand the ongoing on Youtube , so that they could get a glimpse of the number of people watching which type of videos on Youtube and at what point of time in a day along with for how much duration .

Eitan Altman et al. [9] layed stress on aspects involved in a video turning viral on YouTube.

They have studied audience retention measures provided by YouTube which may provide productive information for improving the quality of videos and for having a comparatively better understanding of the viewers' interests in their videos.

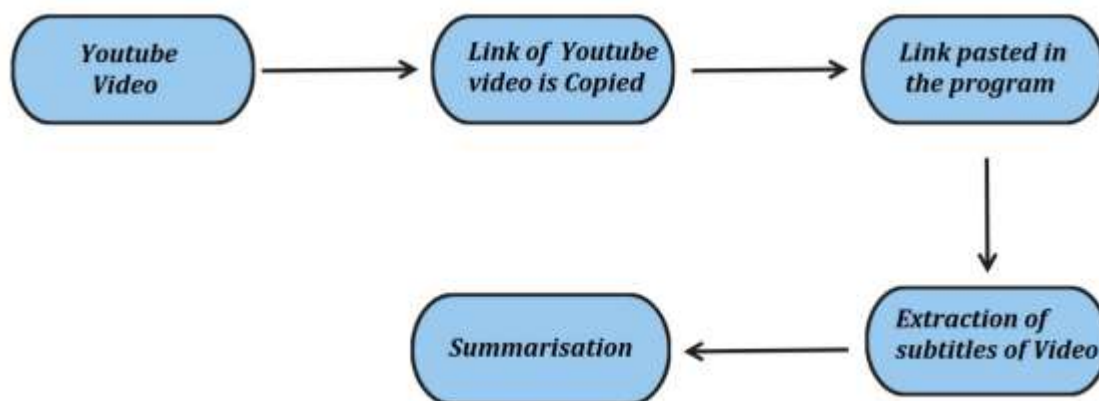


Marina Buzzi et al. [10] discussed the productive potential of Youtube user interface for alarming at the time of inappropriate content and proposing some required suggestions when needed . They mainly made an algorithm which gives signals or we can say informs or pops-up whenever some unsafe content for children is turned in for the videos or channels that are marked as unsafe by their parents or guardians. This not only helps to provide productive content to children but also allowed them not to access unsafe content.

## CHAPTER 3 PROPOSED WORK

Let us imagine that we've got to do summarisation of a very large youtube video. This is what we are going to do in this paper. We would be taking up transcript of a video of whatever size it is and to do the text summarisation on that transcript so that ultimately you have a very short text that you can share it with anybody as a summary or synopsis.

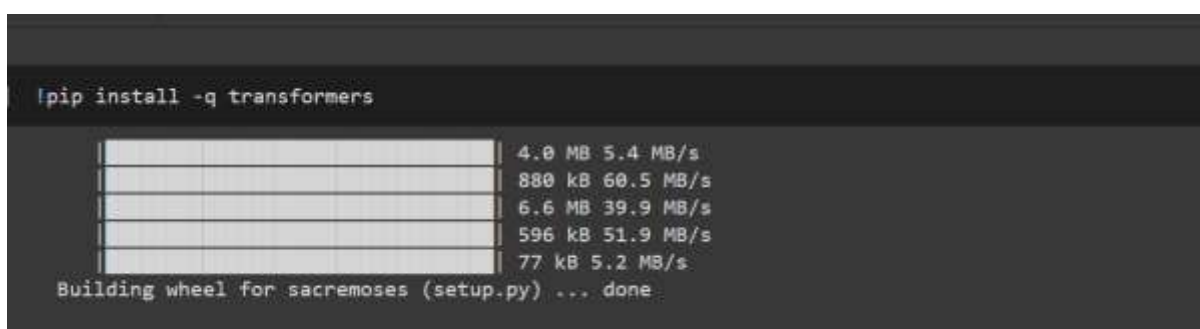
For this particular task we would be using two packages which are Transformer and youtube\_transcript\_api.



**Fig 3.1 Pictorial representation of process taking place for summarisation**

## METHODOLOGY

At first , we would be importing pipeline allowing us to do the kind of task we are going to carry out in this particular project. Here we are doing summarisation , but we can do text classification , and many more stuff from the same . But here we are mainly focusing on text classification for which we are using pipeline .



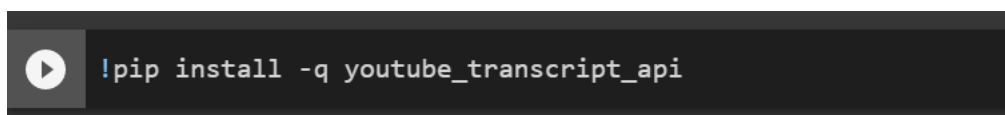
```

!pip install -q transformers

4.0 MB 5.4 MB/s
880 kB 60.5 MB/s
6.6 MB 39.9 MB/s
596 kB 51.9 MB/s
77 kB 5.2 MB/s
Building wheel for sacremoses (setup.py) ... done

```

We have now imported another package which is youtube\_transcript\_api which mainly would be picking up the subtitles from a particular video or we can say that it would be allowing us to extract the subtitles from the video.

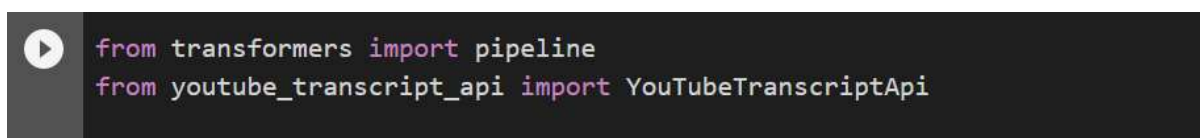


```

!pip install -q youtube_transcript_api

```

Now , we need to import pipeline from Transformers and YouTubeTranscriptApi from youtube\_transcript\_api , which would be allowing us for further stuff in programming and making us to not only detect the video from the URL which we would be using in coming program below but also it would be helping us to extract subtitles from that particular video.



```

from transformers import pipeline
from youtube_transcript_api import YouTubeTranscriptApi

```

Let us now include the URL of the video

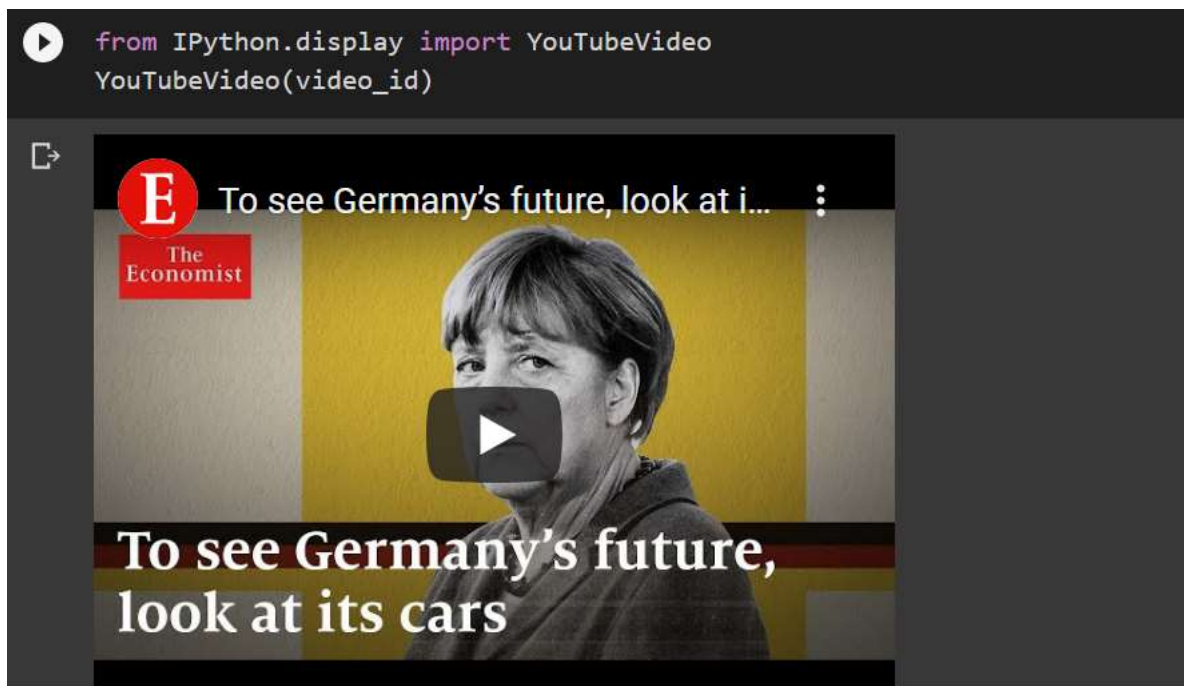
```
▶ youtube_video = "https://www.youtube.com/watch?v=A40mtyaBHFE"
```

After this , we have initially parted the URL and asked the program to call the API of the URL by including an index value as “[1]” in the code , and then we have given the name to this particular API as “video\_id”.

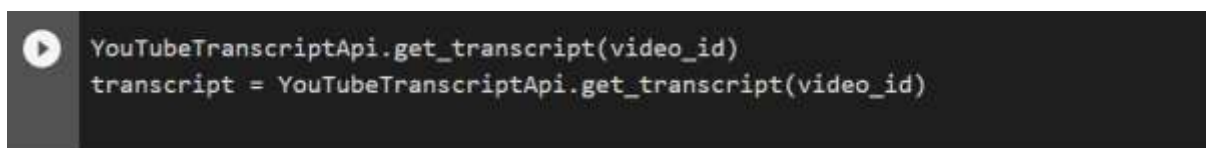
```
▶ video_id = youtube_video.split("=")[1]
```

Then we have called the API by it's name , to just display the API of the same.

```
▶ video_id  
↳ 'A40mtyaBHFE'
```



The `video_id` is then passed on as an argument in `get_transcript()` , which is going to extract the transcript and further we are going to assign a name to it as “transcript” only.



Now , for every duration when there is a caption , it is going to record it and is going to show the same to us .

```

transcript[0:5]
[
  {'duration': 4.96,
   'start': 1.52,
   'text': "for germany it's the end of an era"},
  {'duration': 5.279,
   'start': 4.4,
   'text': "and as europe's biggest economy there"},
  {'duration': 4.72, 'start': 6.48, 'text': 'are some huge challenges ahead'},
  {'duration': 3.681, 'start': 9.679, 'text': 'from its increasingly complex'},
  {'duration': 3.12,
   'start': 11.2,
   'text': 'relationship with china to climate'}]

```

After that we basically need to convert the extracted captions into a pure text .

For that , we would be iterating through the object and every time we encounter “text” we are going to take it and add it to the result object . This would finally show us the size of our result which shows 9081 lines currently in the video which we have used here for this particular optimization.

```

result = ""
for i in transcript:
    result += ' ' + i['text']
#print(result)
print(len(result))

```

9081

Once we have the text , our next objective is to summarise this text in a meaningful way so that we can use the summary or the synopsis wherever we want to share it. We would be using the Transformer’s summary pipeline , which we have already imported during the initial lines of code. We can also consider it as Pipeline summarisation , which is using BERT model with Pytorch model weighed.

```

summarizer = pipeline('summarization')
No model was supplied, defaulted to sshleifer/distilbart-cnn-12-6 (https://huggingface.co/sshleifer/distilbart-cnn-12-6)
Downloading: 100% ██████████ 1.76k/1.76k [00:00<00:00, 48.0kB/s]
Downloading: 100% ██████████ 1.14G/1.14G [00:23<00:00, 55.0MB/s]
Downloading: 100% ██████████ 26.0/26.0 [00:00<00:00, 813B/s]
Downloading: 100% ██████████ 878k/878k [00:00<00:00, 1.07MB/s]
Downloading: 100% ██████████ 448k/448k [00:00<00:00, 1.85MB/s]

```

We once have got the summarizer , we now would be using the same to get the things done , but the things are not over yet . It won't be taking the large amounts of text for once , so for that we would be dividing the whole text in chunks from the input text which we have got . So we would be doing that by taking up a particular amount of iteration (taking up 1000 lines of text) , after which we would be initiating an empty list to have the summarised text . We do have a start and an end value and we are putting up those start and end values in result , which we've already executed , and added a summarizer to the same.

Then that particular output is given a name as "out" which is then inserted as an argument in summarised . append ( ) . So , each time we do so , we are going to have the summarised text .

```

num_iters = int(len(result)/1000)
summarized_text = []
for i in range(0, num_iters + 1):
    start = 0
    start = i * 1000
    end = (i + 1) * 1000
    print("input text \n" + result[start:end])
    out = summarizer(result[start:end])
    out = out[0]
    out = out['summary_text']
    print("Summarized text\n"+out)
    summarized_text.append(out)

#print(summarized_text)

```

Thus , given below is the summarised text which we have got by applying iteration on each batch.

```

input text
for germany it's the end of an era and as europe's biggest economy there are some huge challenges ahead from its increasingly complex relationship with
Summarized text
For germany it's the end of an era and as europe's biggest economy there are some huge challenges ahead . There's one german industry that reveals a
input text
g is incredibly important in germany it represents around 18 percent of gdp and of course the car sector represents a very large part of that it's not
Summarized text
After over half a century of global dominance german car makers are now playing catch-up . In 2009 seven of the world's most valuable companies were
input text
trading partner [Music] in 1998 german trade with china was worth 16 billion dollars now it's worth over 180 billion but there's a fear that germany
Summarized text
In 1998 german trade with china was worth 16 billion dollars now it's worth over 180 billion dollars . There's a fear that germany could have
input text
acturing digitalization this is not traditionally a country that has been closely associated with digital innovation it's going to be a big challenge
Summarized text
Two-thirds of german businesses said they still regularly used a fax machine and only one in three german companies have a central digital strategy .
input text
we to do a hell of a lot more to translate the rhetoric on digitalization into the reality of fostering genuine change in this country which has been
Summarized text
Germany's car industry is a microcosm for how the country will need to radically shift traditional forms of power to be replaced for cars . oliver ill
input text
olid business foundation climate change has forced this shift to a greener future but it was american not german engineering that first realized it an
Summarized text
Sono motors is a startup based in munich that is producing an electric vehicle that is equipped with solar cells . The acion can share power with the

```

Also , we have checked the length of the summarized text which just came out to be 3152 as shown below.

```

▶ len(str(summarized_text))
3152

```

And at last converting the whole text into a string format so that it can be used further as a Summary or a synopsis.

```

▶ str(summarized_text)
[" For germany it's the end of an era and as europe's biggest economy there are some huge challenges ahead . There's one german industry that reveals a lot about the country's prospects it's cars traditionally the car industry here has been very powerful there have been open doors to german ministries to the chancellery .", " After over half a century of global dominance german car makers are now playing catch-up . In 2009 seven of the world's most valuable companies were german but in the past two decades that number has fallen to just three . In 2016 china has been germany's biggest export market since 2016 .", " In 1998 german trade with china was worth 16 billion dollars now it's worth over 180 billion dollars . There's a fear that germany could have become too reliant on the chinese market for the past 16 years angela merkel has courted china in the name of trade .", " Two-thirds of german businesses said they still regularly used a fax machine and only one in three german companies have a central digital strategy ."]

```



## CHAPTER 4 TRANSFORMERS



**Fig 4.1 Hugging face transformers**

Transformers gives heaps of pretrained fashions to carry out duties on exceptional modalities consisting of textual content, vision, and audio.

These fashions may be implemented on :

- Text, for duties like textual content classification, statistics extraction, query answering, summarization, translation, textual content generation, in over a hundred languages.
- Images, for duties like photo classification, item detection, and segmentation.
- Audio, for duties like speech reputation and audio classification.[\[11\]](#)

Here , we have used the pipeline approach of transformers which allowed us to summarise the text , though we may use the same for other multiple tasks as well , but as far as this paper is concerned since we had to get the summary of the paper , so we basically used summary of the text that's why only .

## CHAPTER 5

## YOUTUBE-TRANSCRIPT API



**Fig 5.1 Youtube transcript API**

This is a Python API that you can use to get the transcript/subtitles of a specific YouTube video. It also works for robot-generated subtitles, helps with subtitle translation and no longer requires a headless browser like other full Selenium-based answers. So once we have the text, now let's summarize the big text in a meaningful way so that we can use the synopsis or synopsis anywhere we want to share it. This can be done using the Transformer Summary pipeline.

By default, this module will always choose manually generated transcripts instead of automatically generated ones if a transcript exists in the requested language, both manually generated and generated.[12]

Here in this document, `youtube_transcript_api` not only allowed us to recognize the video from the URL provided in the program, but the API present in the URL also allowed us to extract the subtitles from the Youtube video. This allowed us to apply the summary command

## RESULT AND DISCUSSION

In this paper we presented our approach for giving a brief regarding what exactly is there in the youtube video. Here we used Transformers and youtube\_transcript\_api . Initially we used pipeline approach of Transformers which helped us to display the kind of text/task we wanted to do in this project . After which , we included the URL of the youtube video which had API in it. Now , that API helped us to extract the subtitles of the video which was considered as an ordinary text , and then a brief summary of subtitles extracted before was given.

As shown above we have basically applied or used summarisation on the API , which is present in URL of a Youtube video . Which in turn allowed us to summarise the youtube video which was carried out by summarising the transcript which was extracted from the Youtube video .

Then we have mainly iterated the whole text after dividing it into chunks so that summariser would be able to execute over the same in an efficient manner . After iteration , we appended the whole text into a single list which is then converted into string . At last , the number of words that were there in the summary thus obtained were counted using length command.

## CONCLUSION

Youtube has now become one of the biggest platforms for entertainment , study , cooking , and many more stuff like that.

Although the user base varies from young to old, YouTube is most popular among young people who prefer the variety of content, interactive features and instant gratification of YouTube video content to regular television. Many use it for entertainment purposes, to learn how to do something (teaching), to keep up with the latest music videos from their favourite artists, and more.

YouTube is available in almost all countries and in more than 50 languages. Like Google, all you need to create and use a YouTube account is a Google account.

But the only problem is at times it happens that we do not have that much amount of free time to watch a particular video . So , that is where this paper comes into the picture which allows us to provide a short summary of the youtube video which not only saves our time but also gives us crisp content which we can refer to while writing a summary or a synopsis without wasting large amount of time.

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