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# Transcript Summarizer for Youtube

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**ABSTRACT:** In today's digital age, online video content has become an integral part of our daily lives. As a result the need for efficient and time-saving tools for consuming this content has grown substantially. This project presents the development of a YouTube transcript summarizer website—a valuable solution designed to enhance the accessibility and usability of video transcripts. The objective of this project is to create a user-friendly web application that can automatically extract YouTube video transcripts and generate concise and informative summaries. By providing this tool, we aim to cater to a wide range of users, including content consumers seeking quick insights, educators in need of efficient content review, and businesses looking to streamline content management.

## I.INTRODUCTION

As a Computer Science student, you learn on a daily basis from videos, articles, documentation, and so on. A majority of learning happens through Youtube as well. PS Youtube also provides entertainment. A lot of time can be saved if you can summarize the content of the youtube videos. In this project, you will be creating a Chrome Extension which will make a request to the backend REST API where it will perform NLP and respond with a summarized version of a YouTube transcript. The YouTube videos are usually summarized through manual descriptions and thumbnails. YouTube is the second most visited website worldwide. The range of videos on YouTube includes short films, music videos, feature films, documentaries, audio recordings, corporate sponsored movie trailers, live streams, vlogs, and many other contents from popular YouTubers. YouTube users watch more than one billion hours of video every day. This project proposes the usage of a transformer package for summarizing the transcripts of the video, thereby providing a meaningful and germane summary of the video. T5 is an encoder-decoder model which is pre-trained on a set of unsupervised and supervised tasks and for which each task is converted into a text-to-text format. Our main concern is to summarize the data, so a pre-trained summarization technique is used. Keywords: Text Summarizer, Chrome Extension, HuggingFace transformers, WebAPI.

## II. USECASE SCENARIO

A. Application of Project- Discuss real-world applications of the YouTube transcript summarizer, such as aiding content consumers, researchers, or educators. Explain how this tool can be a time-saver and enhance the learning experience
B. Existing System- Provide an overview of any existing tools or services related to video transcript summarization. Mention their strengths and weaknesses
C. Proposed system- Describe in detail your YouTube transcript summarizer website, including the user interface, features, and how it will extract and summarize video transcripts.

## III. SOFTWARE SPECIFICATION

back-end uses Flask framework to receive API calls from the client and then respond with the summarized text . This API can work only on those YouTube videos which have wellformatted closed captions in it. The same backend also hosts a web version of the Summarizer to make those API calls in simple way and show the output within the webpage.

\ Units
• Use `/` (Root Endpoint): It displays a general purpose introductory webpage and also provides links to web summarizer and API information. You can go to this point [here](https://ytsum.herokuapp.com/).

• `/web/` (Web Summarizer Endpoint): It displays the web version of the summarizer tool. The webpage has input elements and a summarize button. After clicking summarize, the `API` is called and the response is displayed to the user. You can go to this endpoint by directly clicking [here](https://ytsum.herokuapp.com/web/).
• `/api/` (API Description Endpoint): The webpage at this endpoint describes basic API information in case you would like to use it. Feel free to learn and use our API in your projects.
• `/summarize/` (API Endpoint): This endpoint is for **API purposes only**. That is why, the response type of the **`GET Request`** at this endpoint is in JSON format.

### A.BACK END

APIs have revolutionized the way applications are built and there are numerous examples of APIs being used in different applications. To set up our API, we begin by creating a back-end application directory with an app.py file. This file is initialized with a basic Flask RESTful Boilerplate. We then create a virtual environment to isolate the location where all the dependencies will reside. Once the virtual environment is activated, we use pip to install the necessary dependencies, including Flask, YouTube_Transcript_API, and transformers. It is important to ensure that the content is original and not plagiarized to maintain its integrity.

### B. GET TRANSCRIPTS

In this module, we will utilize a Python API to obtain transcripts/subtitles for a specified YouTube video. The API is capable of working with automatically generated subtitles, translating subtitles, and does not require a headless browser like other Selenium-based solutions. In app.py, we define a function that takes the YouTube video ID as an input parameter and returns the parsed full transcript as the output. Since we receive the transcript in JSON format with text, start, and duration attributes, we only extract the text data from the response and return the transcript as a single string. This process allows us to obtain the complete transcript of the video.

## IV. PROJECT DESCRIPTION

The project follows a clear flowchart as shown in Figure 1. Firstly, the user opens a YouTube video and clicks on the "summarize" button in the chrome extension. This initiates a HTTP request to the back-end of the system. Subsequently, the request is made to access the transcripts using the YouTube video ID obtained from the URL. The response to this request will be a transcript of the video in JSON format. Once the transcripts are obtained in text format, the system performs transcript summarization, which involves reducing the length of the transcript while retaining the most important information. Finally, the summarized transcript is displayed on the extension

### A.PERFORM TEXT SUMMARIZATION

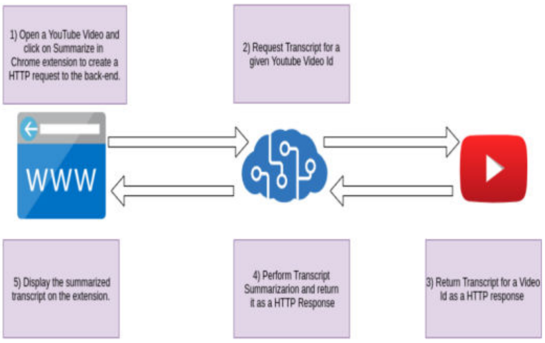
Text summarization refers to the task of condensing longer text into a shorter summary while preserving the key information and meaning of the original text. There are two main approaches used for text summarization: extractive summarization and abstractive summarization. Extractive summarization involves identifying important sentences and phrases from the original text and outputting only the necessary parts, while abstractive summarization involves generating a completely new text that is shorter than the original text, often using encoderdecoder models like Bart or T5. For this project, we will use the HuggingFace transformers library in Python to perform abstractive text summarization on the transcript obtained from the previous step. In app.py, a function is created that accepts the YouTube transcript as input and returns the summarized transcript as output. To perform the summarization, a tokenizer and a model are instantiated from the checkpoint name. The T5- specific prefix "summarize:" is added to the transcript that needs to be summarized. The PreTrainedModel.generate() method is then used to generate the summary.

### B. REST API ENDPOINT

The next step is to define the resources that will be utilized in the implementation of this backend service. As this is a straightforward application with only a single endpoint, the only resource we need to define is the summarized text. In app.py, we create a Flask API Route with a GET HTTP Request method and a 17 | Page URI of http://[hostname]/api/summarize?youtube_url=#{url}. We then extract the YouTube video ID from the YouTube URL obtained from the query parameters. After that, we generate the summarized transcript by executing the transcript generation function and the transcript summarizer function. Finally, we return the summarized transcript with an HTTP Status OK and handle HTTP exception as required.

### C. DISPLAY SUMMARIZED TEXT

To enable interaction between the extension and backend server, we need to add functionality to make HTTP REST API Calls. In popup.js, we attach an event listener to the Summarize button with the event type "click" and pass an anonymous callback function. In the callback function, we use the chrome.runtime.sendMessage method to send an action message to contentScript.js to generate the summary. We also add an event listener, chrome.runtime.onMessage, to listen for message results from contentScript.js, which will execute the outputSummary callback function. In the callback function, we use JavaScript to programmatically display the summary in the div element. We also need to inject the content script contentScript.js into a particular page and execute the script automatically. In contentScript.js, we add an event listener chrome.runtime.onMessage to listen to the message generator, which will execute the generate Summary callback function. In the callback function, we extract the URL of the current tab, make a GET HTTP request using the XML HTTP Request Web API to the backend, and receive the summarized text as a response. Then, we send an action message result with the summary payload using chrome.runtime.sendMessage to notify popup.js to display the summarized text.


1) Open a YouTube Video and click on Summarize in Chrome extension to create a HTTP request to the back-end.
2) Request Transcript for a given Youtube Video Id
WWW
5) Display the summarized transcript on the extension.
4) Perform Transcript Summarizarion and return it as a HTTP Response
3) Return Transcript for a Video Id as a HTTP response

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