AMRUTVAHINI COLLEGE OF ENGINEERING, SANGAMNER

DEPARTMENT OF COMPUTER ENGINEERING

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Project Synopsis

on

"YouTube Transcript Summarizer using Machine Learning and Natural Language Processing"

BE Computer Engineering

BY

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- **Title: "YouTube Transcript Summarizer using Machine learning and Natural Language Processing"**

- **Domain :**

  Machine Learning and Natural Language Processing

  Machine learning (ML) and Natural Language Processing (NLP) are two closely related fields within the Artificial Intelligence (AI). They involve the development and application of algorithms and techniques that enable computers to understand and process human language.

- **Sub Domain :**

  Speech Recognition: Convert the audio from YouTube videos into text using automatic speech recognition (ASR) systems. This step is crucial to generate the transcript that will be summarized.

  Text Preprocessing: Clean and preprocess the transcript text by removing noise, punctuation, stop words and special characters Tokenize the text into words or sub word units for further processing.

  Text Summarization: Implement extractive or abstractive summarization techniques to condense the transcript into a shorter version while retaining the key information. Extractive methods involve selecting important sentences directly from the transcript, while abstractive methods involve generating new sentences that capture the essence of the content.

- **Objectives:**

  1. To study and analyze machine learning and NLP algorithms.
  2. To study a summarization algorithm that accurately captures the main points, ideas,and context of the video's content.
  3. To design model to get transcript text based summery of YouTube video.
  4. To implement proposed algorithms of transcript summarizer.
  5. To measure and compare proposed system result with existing system results.

- **Abstract:**

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 speech. 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 project, we present a system for automatically summarizing YouTube transcripts using natural language processing and machine learning techniques.

Our system is based on a machine learning model trained by summarizing algorithms on real time videos of YouTube and model is able to accurately and efficiently extract the main points and key information for the transcript. Our results show that our system is able to provide concise and accurate summaries via speech recognition, text preprocessing and text summarization within YouTube videos.

- **Keywords:**

Machine Learning, Summarizing Algorithms, Transcript, YouTube, Natural Language Processing, Speech Recognition, Text Preprocessing, Text Summarization.

- **Problem Definition:**

YouTube transcript summarizer involves Machine Learning (ML) and Natural Language Processing (NLP) algorithms that can automatically generate effective and coherent summaries of the spoken content in YouTube videos. The goal is to save viewer's time by providing them with an efficient way to grasp the main points, key ideas, and relevant information from a video without having to watch the entire video.

- **List of Modules:**

1. Text Summarization Algorithm
2. Text preprocessing
3. Natural language processing libraries
4. Transcript Extraction
5. YouTube API Integration

- **Current Market Survey:**

  Exploring the research we figured out that summarization of YouTube videos would better work with NLP modules. After conducting the literature survey, we discovered that there are many libraries in NLP to summarize text using SpaCy, gensim. The method that is used for generating the transcript from YouTube videos includes libraries and transformers namely PyTube and Hugging sound. This is mainly because for the text summarization a depth wise parameter called cosine similarity is used which improves similarity by focusing on the important keywords from the text.

  Real-time audio extraction will be used to filter it from the video and then using Speech Recognition Model of hugging sound text gets generated, and depending on the text the user will be provided summary using NLP library called SpaCy which is designed to build systems for information extraction.

  Gathering user feedback and using it to make continuous improvements to the summarization algorithm could lead to a better user experience over time. Ensuring that the tool respects copyright and privacy laws, as well as addressing potential concerns related to bias or misinformation in the summaries, would be crucial outcomes for a responsible project.

- **Scope of the Project:**

  1. Real-time summarization can be useful for live events or news broadcasts.Future research can focus on developing summarizers that can summarize the transcript in real-time.
  2. Different users may have different preferences for the type of summary they want. Future research can focus on developing summarizers that can generate personalized summaries based on the user's preferences.
  3. There is a need for better evaluation metrics to measure the quality of the summaries generated by the transcript summarizer. Future research can focus on developing new evaluation metrics that can provide more insights into the quality of summary.
  4. This model arranges the important key points discussed in parliament meeting and other government planning meetings.

5. This idea is extended to make a system that will automatically generate summary of online video lectures.

- **Literature Survey:**

Sr. No.	Authors	Title	Description
1	A. N. S. S. Vybhavi, L. V. Saroja, J. Duvvuru and J. Bayana,	Video Transcript Summarizer [2022]	The suggested method involves retrieving transcripts from the video link provided by the user and then summarizing the text by using Hugging Face Transformers and Pipelining.
2	P. Nagaraj, V.Muneeswaran., B. Rohith, B. Sai Vasanth, G. Veda Varshith Reddy and A. Koushik Teja	Automated YouTube Video Transcription to Summarized Text Using Natural Language Processing,	This paper proposes video transcription using python language along with flask environment. The videos for faster reclamation and quick surfing of videos so that druggies can select the more applicable videotape for viewing as per their demand.
3	R. Sudhan, D. R. Vedhaviyassh and G. Saranya,	Learning to Summarize YouTube Videos with Transformers: A Multi-Task Approach [2023]	This paper show results that system is able to provide concise and coherent summaries via text preprocessing and text summarization of Natural Language Processing within YouTube video's contents.

Table 1: Literature Survey

- **Software and Hardware Requirement of the Project:**

  Software:

  1. Operating system : Windows 10
  2. Coding Language : Python 3.8
  3. Python IDE: PyCharm
  4. Browser

  Hardware:

  1. System: Intel i5 Processor.
  2. Hard Disk: 500 GB.
  3. Monitor: 15" LED.
  4. Input Devices: Keyboard, Mouse.
  5. RAM : 8 GB
  6. Internet

- **Contribution to Society:**
  Contribution of a YouTube transcript summarization project can be beneficial to society as it is saving viewer's time. It can help people out to summarize the contents of video without having to watch the entire video. Summarizing transcripts could aid individuals with hearing impairments, language barriers or those looking for quick information. It's a valuable and essential tool for educational purpose as students will get key points of entire video in the form of summary.

- **Probable Date of Project Completion:** January 2024

- **Outcome of the Project:**

    1. Understood the machine learning and NLP algorithm.
    2. Understood the summarizer algorithm which is used for transcription of video content.
    3. Understood the designing of model o get transcript text based summary of YouTube Video.
    4. Implemented the algorithm for transcript summarizer.
    5. Measured and compared the obtained results with previous system results.