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Video Information Extraction and Summarization Tool

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Abstract

The objective of this paper is to develop a user-friendly interface that allows users to obtain a summary of YouTube videos using Natural Language Processing (NLP) and Machine Learning. With a vast number of videos being uploaded to YouTube every day, finding relevant content can be time-consuming and challenging. Often, users struggle to extract meaningful information, making their search efforts unproductive. Our project addresses this issue by summarizing videos and presenting concise yet informative summaries. The abstractive summarization model processes YouTube video transcripts and generates a shortened version while retaining key information. This approach helps save time by providing a condensed yet meaningful summary of the original content. Although the implementation is still in progress, the framework and research behind the project have been outlined.

Keywords: Video Summarization, Artificial intelligence (AI), Machine Learning

1. Introduction

In today's digital era, technology plays a crucial role in societal advancement. With the rapid increase in daily internet users, searching for relevant information online has become a tedious and time-consuming task. The ease with which content creators can reach a vast audience on YouTube has led to an overwhelming amount of content. With approximately 3.7 million videos uploaded every day, finding the right video containing the required information is difficult. This often results in users encountering clickbait videos that waste their time. Many users end up watching videos that offer little to no useful information, leading to frustration.

Summarization helps in quickly identifying key points within a text or video, filtering out unnecessary content, and presenting the main ideas in a clear and engaging manner. Additionally, this model allows the summarized content to be translated into multiple languages, increasing accessibility and usability. A brief look at the summary enables users to decide whether a video is worth their time and whether it contains the information they seek. It can also be utilized to extract and present essential details concisely.

2. Literature Survey

A detailed analysis and investigation by Dr. Parul Saini, Krishan Berwal, Shamal Kashid, Ashray Saini, Alok Negi(March 2023)., Video summarization is an essential task in multimedia analysis that aims to create concise representations of video content by selecting the most informative portions. The literature

on this topic has increasingly focused on leveraging deep learning techniques, which have shown remarkable effectiveness in processing and analyzing vast amounts of visual data [1].

Abstractive Summarizer for YouTube Videos by Sulochana Devi, Rahul Nadar, Tejas Nichat, Alfredprem Lucas (2023), The model uses Natural Language Processing (NLP) and Machine Learning to generate concise summaries of YouTube video transcripts, helping users quickly find relevant information without watching the entire video. The implementation is ongoing, but the structure and studies are well-presented [2].

Video Summarization Based on Feature Fusion and Data Augmentation Computers Psallidas, Spyrou (2023), Video summarization techniques can be categorized into four main types based on their output: a collection of video frames (keyframes), video segments, graphical cues, and textual annotations. This work proposes a supervised methodology for creating brief dynamic summaries of user-generated audiovisual content, known as “video skimming” [3].

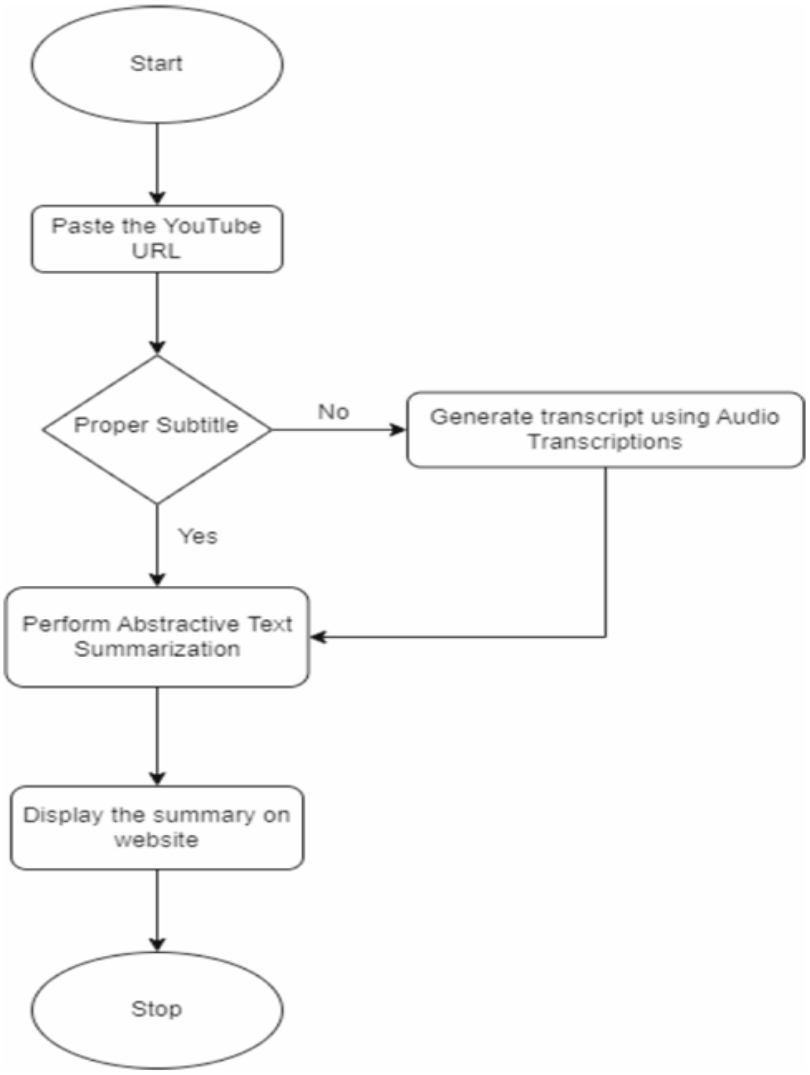
A detailed analysis and investigation by Meena, P., Kumar, H., and S.K. Yadav (2023), *A Review on Video Summarization Techniques*, explores the critical role of video summarization in multimedia analysis, aiming to create concise and informative representations of video content by selecting the most salient portions. The literature on this topic has increasingly focused on leveraging advanced techniques, including deep learning and machine learning, which have demonstrated remarkable effectiveness in processing and analyzing large volumes of visual and temporal data [4].

A detailed analysis and investigation by Tharun, S., et al. (2022), *Survey on Abstractive Transcript Summarization of YouTube Videos*, explores the growing importance of abstractive summarization techniques for generating concise and coherent summaries of YouTube video transcripts. The literature on this topic has increasingly focused on leveraging advanced natural language processing (NLP) and deep learning techniques, which have shown remarkable effectiveness in processing and analyzing unstructured textual data from video transcripts [5].

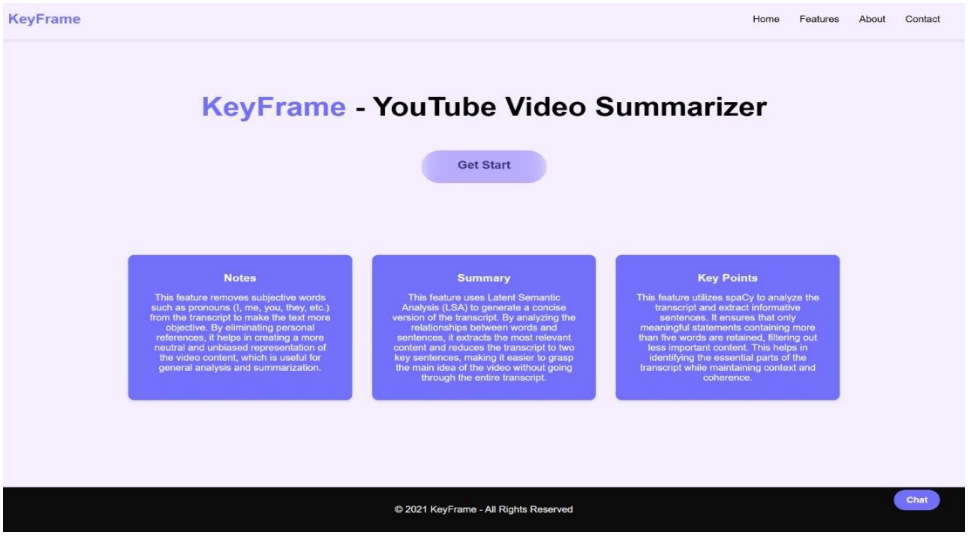
A Survey by Evlampios Apostolidis, Eleni Adamantidou, Alexandaros I. Metsai, Vasileios Mezaris, Ioannis Patras (January 2021),The authors describe existing algorithms, categorizing them based on their characteristics. They review relevant literature, highlighting the evolution of deep-learning-based video summarization techniques [9].

3. Methodology

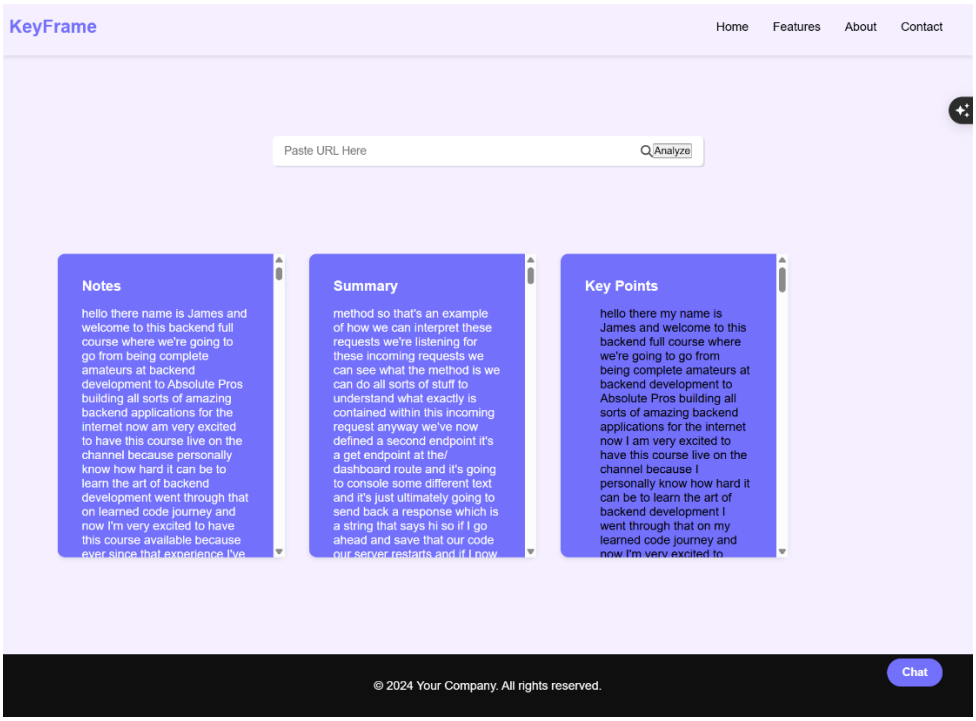
Natural Language Processing (NLP) techniques to process YouTube video transcripts efficiently. It first retrieves the transcript using YouTubeTranscriptApi and preprocesses it by neutralizing subjective words.NLP technique that extracts the most relevant sentences based on term co-occurrence. Additionally, NLP model is used for sentence segmentation, allowing the extraction of key points by identifying longer, meaningful sentences. These NLP techniques enable automated text processing, summarization, and information extraction, making it easier to analyze and comprehend video content efficiently.



4. Result



Landing Page



Main Page

5. Conclusion

This project utilizes AI and machine learning to generate summaries from video transcripts, offering a revolutionary way to consume multimedia content. By effectively extracting essential information from videos, users can save time and quickly access relevant details. Advanced methods, such as abstractive summarization and natural language processing, help produce clear and concise summaries that resemble human comprehension. Additional functionalities, including flashcard generation and chatbot integration, improve user interaction and knowledge retention. This project demonstrates the significant potential of AI and machine learning in addressing information overload in the digital era.

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