

FrameFuse: Smart Video Segmentation Engine



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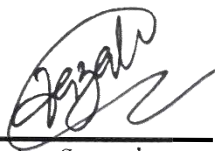
Certification

This is to certify that **Syed Ashhar Hassan, 2020f-BCS-025, Muhammad Faizan Qureshi, 2020f-BCS-032 Sahil Shoukat, 2020f-BCS-001, and Mustafa Ahmed Naqvi, 2020f-BCS-003** are actively working on final project **FrameFuse: Smart Video Segmentation Engine**, at the **Sir Syed of Engineering and Technology**, to fulfill the partial requirement of the degree **Computer Science Department**.

External Examiner

Name of Examiner

Designation

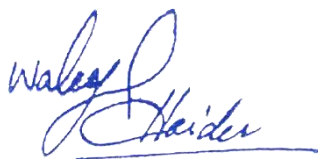


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Project Title (FrameFuse: Smart Video Segmentation Engine)

Sustainable Development Goals

(Please tick the relevant SDG(s) linked with FYDP)

SDG No	Description of SDG	SDG No	Description of SDG
SDG 1	No Poverty	SDG 9	Industry, Innovation, and Infrastructure ✓
SDG 2	Zero Hunger	SDG 10	Reduced Inequalities
SDG 3	Good Health and Well Being	SDG 11	Sustainable Cities and Communities
SDG 4	Quality Education ✓	SDG 12	Responsible Consumption and Production
SDG 5	Gender Equality	SDG 13	Climate Change
SDG 6	Clean Water and Sanitation	SDG 14	Life Below Water
SDG 7	Affordable and Clean Energy	SDG 15	Life on Land
SDG 8	Decent Work and Economic Growth	SDG 16	Peace, Justice, and Strong Institutions
		SDG 17	Partnerships for the Goals



Range of Complex Problem Solving			
	Attribute	Complex Problem	
1	Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues.	
2	Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models.	
3	Depth of knowledge required	Requires research-based knowledge much of which is at, or informed by, the forefront of the professional discipline and which allows a fundamentals-based, first principles analytical approach.	
4	Familiarity of issues	Involve infrequently encountered issues	
5	Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering.	
6	Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs.	
7	Consequences	Have significant consequences in a range of contexts.	
8	Interdependence	Are high level problems including many component parts or sub-problems	
Range of Complex Problem Activities			
	Attribute	Complex Activities	
1	Range of resources	Involve the use of diverse resources (and for this purpose, resources include people, money, equipment, materials, information and technologies).	
2	Level of interaction	Require resolution of significant problems arising from interactions between wide ranging and conflicting technical, engineering or other issues.	
3	Innovation	Involve creative use of engineering principles and research-based knowledge in novel ways.	
4	Consequences to society and the environment	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation.	
5	Familiarity	Can extend beyond previous experiences by applying principles-based approaches.	

Abstract

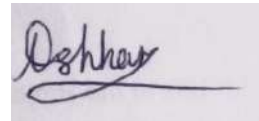
The project aspires to create a cutting-edge automated video segmentation application, providing users with a streamlined platform to upload offline videos or share online video links. Employing sophisticated content analysis techniques, the application aims to discern keywords and topics within the videos, facilitating the generation of concise and targeted video segments. This intricate process involves leveraging natural language processing (NLP) for speech-to-text conversion, object recognition, scene detection, and sentiment analysis. By automating the segmentation process, users can efficiently obtain shorter, more focused video clips that align with the identified content themes.

A pivotal feature of the application involves empowering users with creative tools to enhance their segmented videos. This includes the provision of suggested titles and hashtags derived from the extracted keywords, fostering the optimization of content for discoverability. Additionally, users are presented with related content suggestions from the internet, further enriching their video creation experience.

Social media integration is paramount, enabling users to seamlessly share their segmented videos on popular platforms. The application ensures customization options for users to tailor the appearance of their content, including the incorporation of captions, overlays, and transitions.

Undertaking

I certify that the project **FrameFuse: Smart Video Segmentation Engine** is our work. The work has not, in whole or in part, been presented elsewhere for assessment. Where material has been used from other sources it has been properly acknowledged/ referred.



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We are also thankful to our friends and families whose silent support led us to complete our project.

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Chapter 1

Introduction

The project aims to develop an innovative automated video segmentation application. The application allows users to upload offline videos or share links to online videos, and through advanced content analysis, it identifies keywords and topics to generate shorter, focused video segments. Users receive suggested titles, hashtags, and related content from the internet based on extracted keywords, empowering them to create compelling and discoverable video content.

Statement of the problem

The project aims to tackle the challenge of creating an efficient and automated video segmentation tool by addressing several key components:

- 1. Content Overload:** In today's digital landscape, the abundance of online video content makes it arduous for users to swiftly locate relevant and informative segments within lengthy videos.
- 2. Time-Consuming Manual Segmentation:** Current video segmentation methods often demand manual effort, which proves time-consuming and lacks scalability. This poses challenges for content creators and educators, hindering their ability to efficiently extract and share the most informative parts of their videos.
- 3. Optimization for User-Uploaded Videos:** Users uploading their videos might lack expertise in video optimization, including title and hashtag selection. This deficiency can significantly impact the discoverability and engagement of their content.
- 4. Discoverability on YouTube:** As users heavily rely on YouTube for video discovery, they face difficulties finding content closely aligned with their interests or exploration themes.
- 5. Content Analysis Challenges:** Researchers and analysts encounter hurdles in efficiently analyzing large volumes of video content to identify recurring themes and trends.

Goals/Aims & Objectives

The primary objective of this project is to develop an automated video segmentation tool capable of dividing videos into shorter segments based on recurring keywords and themes. To achieve this overarching goal, the project has specific objectives:

1. **Automated Video Segmentation:** Develop algorithms to identify recurring keywords/themes in videos, creating informative segments based on these elements.
2. **User-Friendly Interface:** Design an intuitive interface for seamless video uploading, link provision, and user interaction with the segmentation tool.
3. **Recommendation System for Titles and Hashtags:** Implement a system suggesting effective titles and hashtags for user-uploaded videos to enhance searchability and engagement.
4. **Related Content Suggestion:** Provide users with recommendations for related videos from YouTube links that share common keywords, aiding content discovery.

Motivation

The proposed video segmentation application brings significant benefits to users and the content ecosystem of creators, educators, and researchers. Key advantages include:

1. **Time Efficiency:** Automated segmentation saves users substantial time compared to manual identification and cutting of segments within videos.
2. **Content Optimization:** For creators, title and hashtag recommendations boost video discoverability on platforms like YouTube, potentially increasing views and engagement.
3. **Content Discovery:** Keyword-based segments facilitate quick access to specific information within lengthy videos, enhancing content discovery.
4. **Enhanced Learning Experience:** Educators can use the application to segment educational videos, aiding student engagement with specific topics and improving the learning experience.
5. **Research Efficiency:** Analysts can efficiently analyze large video volumes to identify recurring themes, enhancing research capabilities.
6. **User-Friendly Interface:** Accessible to users with varied technical expertise due to its intuitive interface.

Methods

Related Content Suggestions: Recommends related videos for YouTube links, keeping users engaged with relevant content.

1. **Automated Analysis:** Automates identification of recurring keywords/themes in videos, reducing manual labor in content analysis.

2. **User Engagement:** Segmentation and content optimization can boost user engagement for creators, increasing subscriptions or followers.

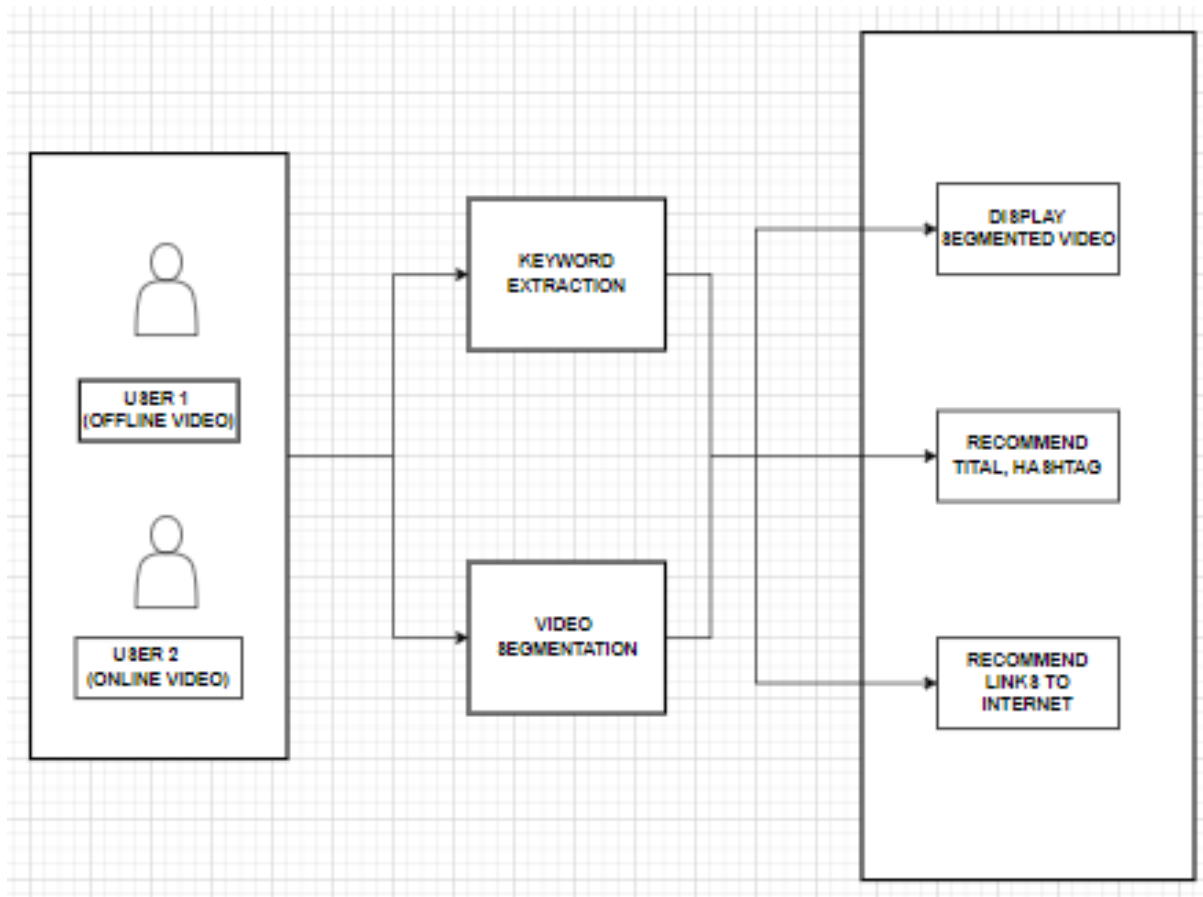
3. **Scalability:** Handles diverse video types, catering to a broad range of users and content genres.

4. **Continuous Improvement:** Agile development allows for ongoing enhancement based on user feedback, ensuring effectiveness and relevance.

5. **Data Insights:** The application's database stores valuable content and user interaction data for analytics and insights.

Chapter 2

Architectural Diagram



Chapter 3

3.1 Proposed Solution/Results & Discussion

Your proposed solution should relate the current situation to a desired result and describe the benefits that will accrue when the desired result is achieved. So, begin your proposed solution by briefly describing this desired result.

Activity	Optimistic (a)	Most Likely (m)	Pessimistic (b)	Expected (Te)
Requirements analysis and design	<1 Month	1 Month	>1 Month	1 Month
Model and Software Development	7 Month	10 Month	11 Month	9 Month
Testing, Deployment and Document	< 1 Month	1 Month	>1 Month	1 Month

Table 1: PERT Activity Time estimate table

Conclusion & Recommendation

In conclusion, the proposed innovative automated video segmentation application addresses critical challenges in the contemporary digital landscape, offering a comprehensive solution for users dealing with content overload, time-consuming manual segmentation, and optimization issues. The project's objectives, outlined systematically, focus on the development of an efficient tool that combines automated video segmentation with user-friendly features, content recommendations, and scalability.

The literature review and comparative analysis underscore the uniqueness of the project, positioning it favorably against existing tools like Adobe Premiere Pro, Wondershare Filmora, and YouTube. The project stands out with its combination of automated segmentation, keyword-based recommendations, and user interface enhancements.

The chosen project development methodology, encompassing key milestones and technical deliverables, ensures a structured and systematic approach to project execution. The cost estimation, work division, and references further contribute to the project's transparency, feasibility, and grounding in relevant research.

The identified benefits of the project underscore its potential impact on time efficiency, content optimization, enhanced learning, and research capabilities. With a user-friendly interface, continuous improvement mechanisms, and scalability, the application promises to be a valuable asset for content creators, educators, and researchers alike.

The provided references from academic literature indicate a solid foundation in research, incorporating proven methodologies and insights to enhance the effectiveness of the automated video segmentation application.

In essence, the project, with its well-defined objectives, comprehensive features, and structured development plan, holds the promise of revolutionizing the way users engage with and create video content, addressing contemporary challenges in a dynamic digital environment.

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