IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Intelligent Video Tag Recommendation System Improving Video Popularity

Mr. Nishant Bhumkar[1], Mr. Avadhut Khamkar[2], Ms. Ashwini Ghodake[3], Ms. Khushboo Songra[4], Ms. Sonam Borhade[5]
Students, Department of Computer Engineering[1,2,3,4]
Faculty, Department of Computer Engineering[5]
Sinhgad Institute of Technology and Science, Narhe, Pune, Maharashtra, India

Abstract: *A successful marketing activity requires attracting high social popularity to their contents, since higher popularity usually indicates stronger influence, more fame and higher revenue. In this, we focus on the question of how to improve popularity of videos sharing on websites like YouTube in mobile computing environment. Obviously, composing high quality titles and tags is beneficial for viewers to discover videos of their interests and increase their tendency to watch more videos. However, it is not an easy task for uploaders,which is especially true since the screen is tight for most mobile devices. To this end, this proposes a novel hybrid method based on multi-modal content analysis that recommends keywords for video uploaders to compose titles and tags of their videos and then to gain higher popularity. The method generates candidate keywords by integrating techniques of textual semantic analysis of original tags and recognition of video content. On one hand, taking the original keywords of a video as input, the method obtains most relevant words from WordNet and related video titles gathered from the three top video sharing sites (YouTube, Yahoo Video, Bing Video). On the other hand, through recognizing video content with deep learning technology,the method extracts the entity name of video content as candidate keywords. Finally, a TFSIM algorithm is proposed to rank the candidate keywords and the most relevant keywords are recommended to uploaders for optimizing the titles and tags of their videos.*

Keywords: WorNet Processing, Object Detection, Machine Learning, YouTube Processing,TFSIM Algorithm.

I. INTRODUCTION

Understanding of interests of users and how they behave are valuable for a variety of communities such as researchers, marketers, politicians, and so on. Intelligent Video Tag Recommendation Method for Improving Video Popularity in Mobile Computing Environment artifificial intelligence, network analysis, statistics, time series analysis, and natural language processing.

1.1 Overview

This section discusses the relevance of this project with respect to the real world. Big data generated from social media and smart mobile devices has been regarded as a key to obtain insights into human behavior and been extensively utilized for launching marketing activities. A successful marketing activity requires attracting high social popularity to their contents, since higher popularity usually indicates stronger influence, more fame and higher revenue. Composing high quality titles and tags is beneficial for viewers to discover videos of their interests and increase their tendency to watch more videos. However, it is not an easy task for uploaders, which is especially true since the screen is tight for most mobile devices.

1.2 Motivation

The motivation behind selecting this project is as follows. It is very difficult task for uploaders to get the popularity and views on the youtube. For that there should be best video tags, title and video description .With the widespread usage of social media platforms and mobile devices, more more people are interested in interacting, sharing, and collaborating through online social media, causing the amount of data generated by the social media grows exponentially.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

1.3 Problem Definition and Objectives

The motivation behind selecting this project is as follows. It is very difficult task for uploaders to get the popularity and views on the youtube. For that there should be best video tags, title and video description .With the widespread usage of social media platforms and mobile devices, more more people are interested in interacting, sharing, and collaborating through online social media,causing the amount of data generated by the social media grows exponentially.

1.4 Objectives

The specific objectives of the proposed work are:

1. Generating the candidate keywords using WordNet Processing.
2. Generating the candidate keywords from Object detection from given video input.
3. Generating the candidate keywords from YouTube Processing.
4. All collected collected candidate keyword rank using ranking algorithm TF-SIM.

1.5 Project Scope and Limitations

No matter what project methodology you choose, it will require you first and foremost to define the scope of the project. The scope states what the objectives of the project are and what goals must be met to achieve success.

What Is Project Scope? Understanding Scope Statements and Scope Creep Project Planning for PMs / By Linda Richter / Project Management What Is Project Scope?

No matter what project methodology you choose, it will require you first and foremost to define the scope of the project. The scope states sxc.hu, team, duchessa what the objectives of the project are and what goals must be met to achieve success. You can define project scope by identifying your goals, objectives, tasks, subphases, resources, budget, and scheduling. Defining the project scope outlines the parameters or limitations of the project and spells out what is excluded. That includes project byproducts that are non-goals.

The scope must make clear to those involved exactly what product or service will be delivered. It is not intended to expand on methodologies or stakeholder purpose and motivation. How to Write a Scope Statement, by Bright Hub's Eric Stallworth, is a step-by-step guide to this process.

II. LITERATURE SURVEY

This chapter gives better insights on the project through the analysis done on various research papers. Social "In recent years, mobile computing becomes more and more popular, as reported by Percient, 58 percent of web visits were from mobile devices. With the widespread usage of social media platforms and mobile devices, more and more people are interested in interacting, sharing, and collaborating through online social media, causing the amount of data generated by the social media grows exponentially. Undoubtedly, the social media and mobile computing have considerably changed people's daily lifestyle and the advertisement model as well. Understanding of interests of users and how they behave are valuable for a variety of communities such as researchers, marketers, politicians, and so on. Big data analytics and cognitive computing are developed to satisfy this need by combining technologies from multiple disciplines such as artificial intelligence, network analysis, statistics, time series analysis, and natural language processing.

In 2019,Rengie Zhou [1] approach a "In this paper, we focus on the question of how to improve popularity of videos sharing on websites like YouTube in mobile computing environment. Obviously, composing high quality titles and tags is beneficial for viewers to discover videos of their interests and increase their tendency to watch more videos. However, it is not an easy task for uploaders, which is especially true since the screen is tight for most mobile devices"

In 2019, Yen-Lia-Chen, Chia-Ling-Chang[2] ''Predicting the popularity of videos on video sharing sites is important for the formulation of online advertising strategies and commercial marketing. The predicted popularity value can help the system decide which videos to recommend to users and determine the recommended order of related videos."

In 2020, James Davidson, Benjamin Liebeld [3] "When it comes to searching online, massive information is available, it is really hard to provide relevant information to users based on their interest. Although while searching for data based on user inputs, they need to search the entire database, which is also very frustrating and time-consuming. Video consumption becoming essential in most users' life. On the most video platforms, users get their recommended videos based on some algorithms, calculations, implicit feed-backs, watch, search behaviors and search history."

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

In 2019 Can Li,Ling Xu,Meng Yan,Yan Lei [4] , Software information sites (e.g., StackOverflow, Freecode, etc.) are increasingly essential for software developers to share knowledge, communicate new techniques, and collaborate. With the rapid growth of software objects, tags are widely applied to aid developers' various operations on software information sites. Since tags are freely and optionally selected by developers, the differences in background, expression habits, and understanding of software objects among developers may cause inconsistent or inappropriate tags. To alleviate the problems of tag synonyms and tag explosion, we propose TagDC, i.e., a composite Tag recommendation method with Deep learning and Collaborative filtering. TagDC consists of two complementary modules: the word learning enhanced CNN capsule module (TagDC-DL) and the collaborative filtering module (TagDC-CF). It can improve the understanding of software objects from different perspectives. Given a new software object, TagDC can calculate a list of the combined confidence probabilities of tags and then recommend TOP-K tags by ranking the probabilities in the list. We evaluated our TagDC on nine datasets with different scales. The experimental results show that TagDC achieves a better effectiveness against two state-of-the-art baseline methods (i.e., TagCNN and FastTagRec) with a substantial improvement.

Can li , ling xu [5] in 2020, In recent years, deep learning has garnered considerable interest in many research helds such as computer vision and natural language processing, owing not only to stellar performance but also the a Sractive property of learning feature representations from scratch. enfluence of deep learning is also pervasive, recently demonstrating its e ectiveness when applied to information retrieval and recommender systems research. In 2019 ,Min Tin and Jun Yu [6] , In this paper we test this question by applying both the latest deep learning approaches and some traditional approaches on tag recommendation task for software information sites. This is a typical Software Engineering automation problem where intensive data processing is required to link disparate information to assist developers.

In 2019, Xueting Wang [7] , Yiwei Zang In this paper we propose a method that can enhance the social popularity of a post (i.e., the number of views or likes) by recommending appropriate hash tags considering both content popularity and user popularity. A previous approach called Folk PopularityRank(FP-Rank) considered only the relationship among images, tags,and their popularity.

In 2020 Maryam Khanjan Najafabadi , [8] This paper aims to introduce a novel tag recommendation algorithm that can analyze the relation between words in a text associated with target object using word embedding. In fact, we involve grammatical relations between words in a text or sentence with focus on feature learning methods.

In 2020, Yuan Zang , Shufeng [9] In this paper the context of media integration, videos standardization plays a crucial role in understanding video content for video recommendation services. The multi-text video contains a lot of text information. The text analysis method can be used to extract the video keywords to assist the personalized recommendation of the video.

In 2019, Alexander Lehman [10]This paper has two main contributions: First, an approach to solve this typical problem in a learning video environment by tagging problematic positions to provide additional information regarding the specific problem and second, an extension of the approach to socialize such an learning environment by using problem tagging to recommend learning videos regarding a specific problem, recommended by other learners -x005F-x000Fto speed up DQG facilitate the learning process IRUeach learner. In 2019, Hafeez Ur Reman [11] this work, we propose a novel approach that integrates the video scene ontology with CNN (Convolutional Neural Network) for improved video tagging. Our method captures the content of a video by extracting the information from individual key frames. The key frames are then fed to a CNN based deep learning model to train its parameters.

In 2019, Wei Ding , Junfeng Tian [12] we propose the largest View Vector Subsequence (VVS) algorithm for reducing the computational cost of FoV-tagged videos. VVS uses the movement distances and the viewable direction distances to support the simplified vector-based similarity measurement. We demonstrate the superiority of our approach by comparing it with the Longest Common Subsequences (LCSS) and our prior work (LCVS).

2.1 Summary

Table. 2.1 shows the summary of the Literature Review conducted with the help of various research papers.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Table 2.1: Literature Review

Sr. No	Paper Name/Year	Author Name	Strengths	Limitations
1	An Intelligent Video Tag Recommendation Method for Improving Video Popularity in Mobile Computing Environment(2018)	RENJIE ZHOU DONGCHEN XIA,JIAN WAN , AND SANYUAN	TF-SIM algorithm proposed to rank candidate keywords	No any
2	Early pre-diction of the future popularity of uploaded videos(2019)	Yen-Liang Chen, Chia-Ling Chang	Predicting the popularity of videos on video sharing sites is important for the formulation of online advertising strategies and commercial marketing	Sentiment analysis on the video need to improved
3	The YouTube Video Recommendation System.(2020)	James Davidson, Benjamin Liebald, Junning Liu.	The system recommends personalized sets of videos to users based on their activity on the site.	No any
4	A tag recommendation method for software information sites with a combination of deep learning and collaborative filtering.(2020)	Can Li, Ling Xu, Meng Yan, Yan Lei.	We propose a composite Tag recommendation method with deep learning.	No any
5	User-Click-Data-Based Fine-Grained Image Recognition via Weakly Supervised Metric Learning.(2020)	MIN TAN, JUN YU, ZHOU YU, and FEI GAO	we first propose a click-featurebased querymerging approach to merge queries with similar semantics and construct a compact click feature	No any
6	Is deep learning better than traditional approaches in tag recommendation for software information sites.	Pingyi Zhou, Jin Liu,Xiao Liu .	There are deep learning methods that can achieve better performance than traditional approaches used for the task recommend and end.	No any
7	User aware folk popularity rank: User popularity based Tag recommendation that can enhance social popularity.(2019)	Xueting Wang,Yiwei Zang, Thoshihiko Yamasaki	By recommending appropriate hash tags considering both content popularity and user popularity. This proposed method can increase the social popularity by considering the social and user popularity.	No any

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

8	Tag recommendation model using feature learning via Word embedding.(2020)	Maryam Khanjan Najafabadi, Madhavan Balan Nair, Azlinath Mohamed	Improvements to previous research methods with gains of up to 10 percent in precision using real data from Movielens dataset.	No any
9	Technical Analysis of Multi-Text video standardisation based on Tag-System.(2020)	Yuan zang, Shufeng	Results suitable for personalized recommendation are obtained.	Need of improving accuracy, optimizing word segmentation ability, and solving polysemous problems.
10	Solution based video recommendation in learning video Environments.(2019)	Alexander lehman	Augmenting a learning video platform with analytic measurement tools to support the learner at emerging learning obstacles	Need improvement
11	Deep Learning based Approach for precise video tagging (2019)	Hafeez Ur Rehman	Method for ac-curate video tagging using convolution neural network by utilizing the video based action ontology.	Improvement in semantic similarity based measures
12	VVS:Fast Similarity Measuring of FoV-Tagged Videos	WEI DING , JUN-FENG TIAN, YONSIK LEE , ANGSOO YANG	Method that can measure the similarity of FoVtagged videos in two dimensions	No any

III. Software Requirements Specification

The second chapter described the study of different papers and documents related to the proposed work. It specified the summary of each paper. In the table 2.2, the highlights and observations in each paper were specified which guided the chapter three in mentioning the requirements. The third chapter is Software requirement specification. The points included in this chapter are functional requirements, non-functional requirements, hardware and software requirements, external requirements, system requirements. This chapter also includes the software development lifecycle model which is to be used.

3.1 Assumptions and Dependencies

- User provides correct input format.
- System gives correct tag recommendation after processing videos.
- A Correct Input Video.
- A Correct Input Keyword.

3.2 Functional Requirements

This requirement describes the basic functionality of proposed system. This system possess functionality as summarized.
System Feature 1

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

This system will provide accurate object detection.

System Feature 2
This system recommends best tags.

System Feature 3
This system help You Tuber providing best tags.

External Interface Requirements
User Interfaces

1. Upload Video
2. Enter Keyword

Hardware Interfaces

- Processor: Above 1.5GHZ
- Hard Disk: 80GB
- RAM: 2GB

Software Interfaces

1. OS-Windows
2. Language-Python
3. IDE: PyCharm , VScode

Communication Interfaces

- Browser
- Internet/WiFi

Nonfunctional Requirements

Non-functional requirements are requirements which specify criteria that can be used to judge the operation of a system, rather than specific behaviors. This should be contrasted with functional requirements that specify specific behavior or functions. Typical nonfunctional requirements are reliability, scalability, and cost. Other terms for non-functional requirements are ”constraints”, ”quality attributes” and ”quality of service requirements”.

1. **Reliability:** If any exceptions occur during the execution of the software it should be caught and there by prevent the system from crashing.
2. **Scalability:** The system should be developed in such a way that new modules and functionalities can be added, thereby facilitating system evolution.
3. **Accuracy:** System should correctly execute process; display the result i.e. exact detection of disease. System should be able to suggest accurate pesticides.

Performance Requirements

- The performance of the functions and every module must be well.
- The overall performance of the software will enable the users to work efficiently.
- It will recommends best tags.

Security Requirements

- The software is user friendly while using it.
- The system Shall use secure sockets in all

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Software Quality Attributes

- The software is user friendly while using it.
- Image Quality in real time environment is clear (Noise free).
- Top 15 Keyword will suggested.

System Requirements

Software Requirements

- Windows 7 and above 3.5.3(Server Side)
- Language – Python
- Libraries
  - Numpy
  - Pandas
  - OpenCV
  - Matplotlib
  - Scikit Learn (f) Keras
  - Tensorflow
  - Html Requests
  - Tkinter
  - nltk
  - genism
- Client Side
- OS-Windows
- Language-Python
- IDE: PyCharm , VScode

Hardware Requirements

- Processor: Above 1.5GHZ
- Hard Disk: 80GB
- RAM: 2GB

Analysis Models: SDLC Model to be applied

The Waterfall Model shown in fig 3.1 is a sequential design process, often used in Software development processes; where progress is seen as flowing steadily download through the phase of conception, Initiation, Analysis, Design, Construction, Testing, Production/Implementation, and Maintenance. There are 5 Phase of the waterfall model:

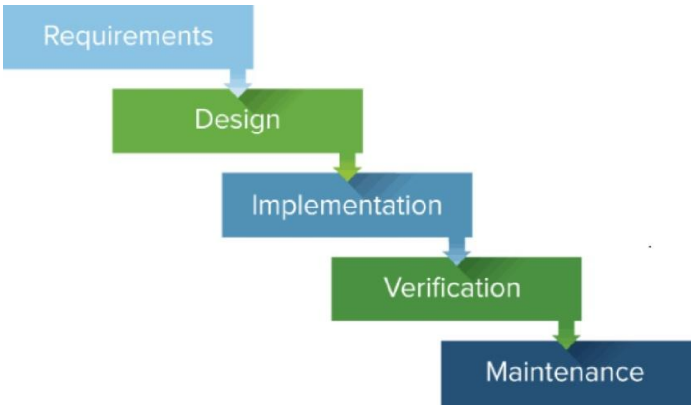

Figure 3.1: Waterfall Model

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Requirement Gathering and analysis

All the functional and nonfunctional requirements of the project were identified Interaction with the users and all other stakeholders of the project were conducted to identify all the requirements starting from important features like maintaining audit trail, etc. to the very basic features like the look and the feel of user interface.

System Design

The initial step was project design. The project was designed mainly in two parts: In first part, system captures an image from video . In second part, application gives appropriate suggestion of Best top 15 Keywords.

Implementation

In this stage system is developed according to module wise.

Verification

This stage all developed software are installed and they are tested with different way against system requirements.

Maintenance

According to software's new version and there use them need to update.

IV. SYSTEM DESIGN

The third chapter described the study of Software requirement specification. It included functional requirements, non-functional requirements, hardware and software requirements, external requirements, system requirements. This SRS needed to be represented into pictorial form for better understanding. This chapter is about system design. The system design consists of architecture and the system implementation flow. It includes diagrams like system architecture, data flow diagram, use case diagram, activity diagram, class diagram. These diagrams help in understanding the functioning of the system.

4.1 System Architecture

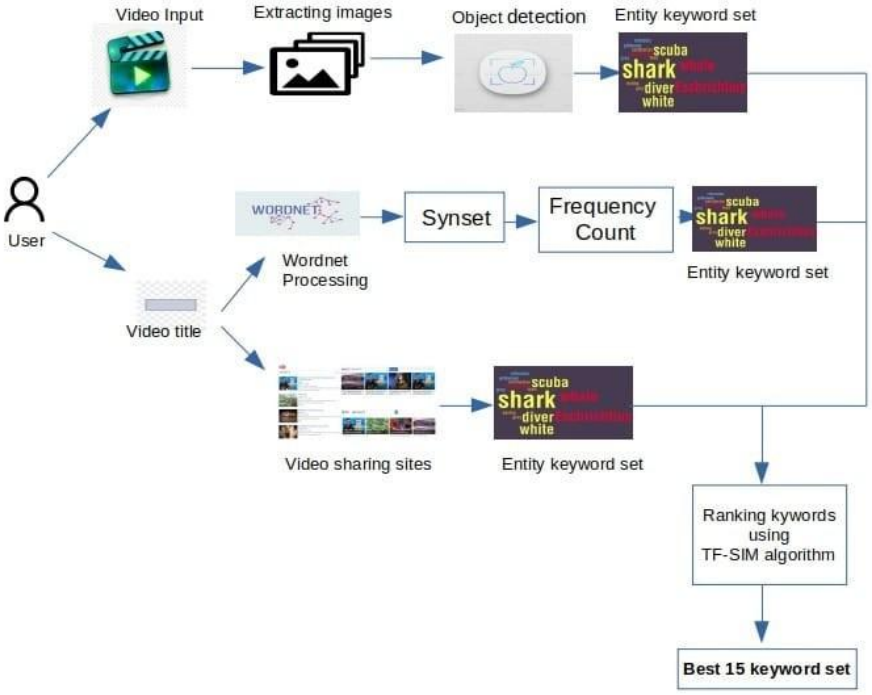

Figure 4.1: System Architecture

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

System architecture is the conceptual model that defines the structure, behavior, and more views of a system. System architecture of our project is System design defines the system architecture. It also describes the modules and Interfaces "Intelligent Video Tag Recommendation System" is design with the help of technologies like Deep learning, Web Scraping, NLP(Natural Language Processing) , OpenCV etc. In which taking video and text keyword as an input. we detecting the objects from the video by using object detection module. Then using the YouTube module and Wordnet we will get the semantically similar words. After getting the tags from all three modules i.e Object detection, YouTube Processing and Wordnet we are ranking them on the basis of their semantic similarity using the TF-SIM Algorithm. Then Finally the user will get the top Twenty Keywords as a best tags. The architecture of the system is as shown in Figure 4.1.

4.2 Mathematical Model

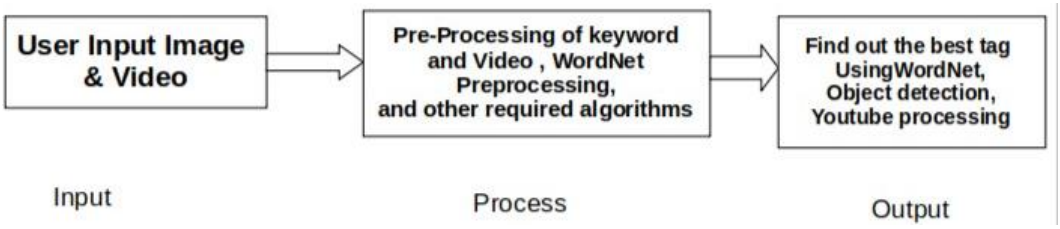

Figure 4.2: Mathamatical Model

Set Theory:

S = s, I, O, F, e, V

Where s = Start of program I = I1, I2

I1 =basic keyword I2 = video input O = O1

O1=Find out most related tags F= F1

F1= Disease detection E=end of program

V = Failures and success conditions. Success if:

- if basic keyword is most related.
- if given video is given correctly then it will find correct object.
- Most related tags will be find out with best accuracy. Failure if:
- More time consumption by the system.
- Hardware failure.
- Software failure.
- Improper network connection. Space Complexity:

The space complexity depends on slide-summary and desired-shot .More the hashed data means more is the space complexity.

Time Complexity

If system has n records then, the time complexity of checking the records is O(1) in best case and O(n) in worst case.

E=end of program

T = Failures and success conditions.

Data Flow Diagrams

A data-flow diagram (DFD) is a way of representing a flow of a data of process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Data flow diagram level 0:

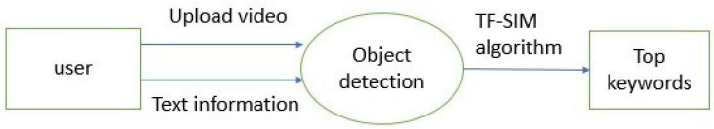

Figure 4.3: DFD Level 0

Data flow diagram level 1:

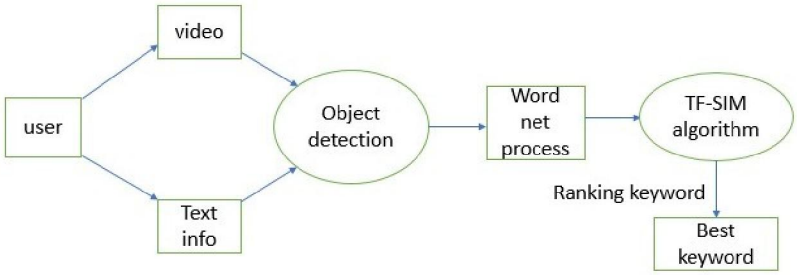

Figure 4.4: DFD Level 1

UML Diagrams

Class Diagram

Class diagram is a type of structure diagram that shows the structure of the classes, attributes, operations and relationship among them. Given below is the class diagram of the proposed system which shows classes as shown in following figure 4.6.

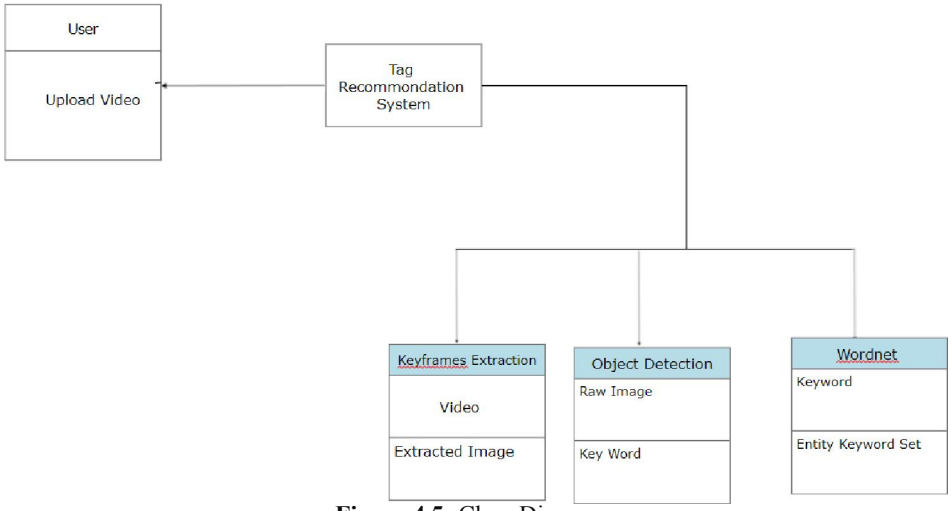

Figure 4.5: Class Diagram

Use Case Diagram

The Use Case Diagram of Intelligent video tag recommendation system is shown in the above figure. There will be one primary actor or one secondary actor. The primary actor is User and the use cases like upload video, Display bounding box, Extracting image , process image ,Entity Keyword set and recommend top keywords to the use .On the other side the secondary actor database select the database.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

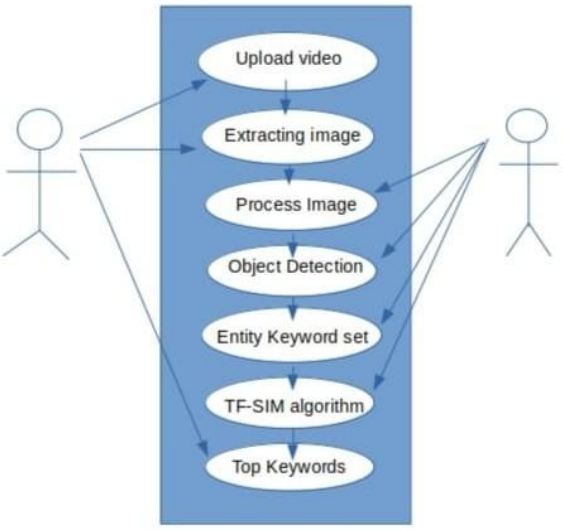

Figure 4.6: Use case Diagram

Sequence Diagram

The Sequence diagram of the system is shown in the above fig 4.3.2. Here The user takes the images or video as input. Then by capturing the images, images are processing. After that extract the frames from the images and detect the text and object from that frame. It will draw the bounding boxes around the detected object and getting keyword set from using TF-SIM ALGORITHM we suggest ung best tags.

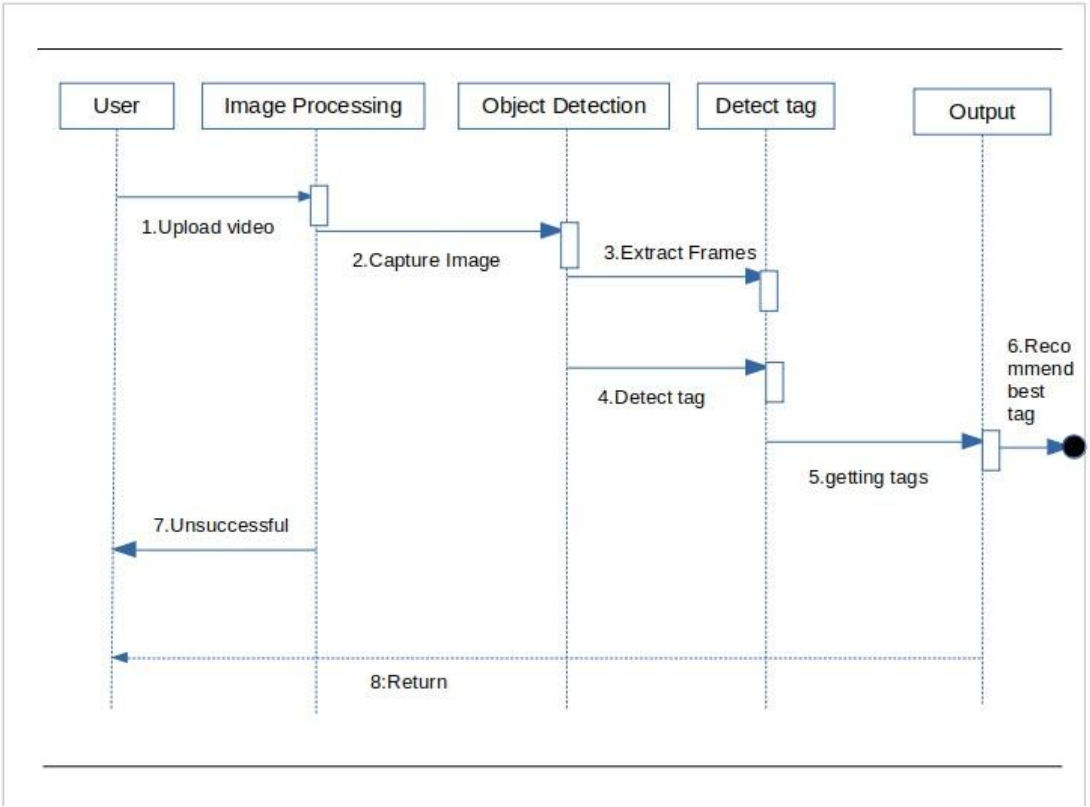

Figure 4.7: Sequence Diagram

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Activity Diagram

The Activity Diagram of the video tag recommendation system is shown in below figure. As per the figure, the input video are the first activity from which a couple of videos images are going to be captured. After that frames are extracted from the captured images and then detected. Then from that extracted frame object will be dectected and entity key set will generated keywords. Then using TF-SIM algorithm generated keyword will be rank and top most keywords suggest the user.

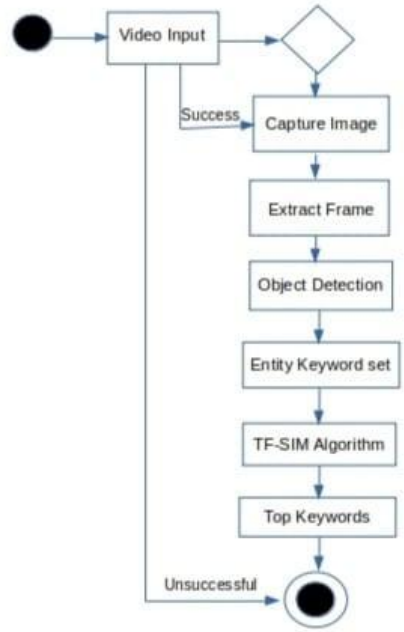

Figure 4.8: Activity Diagram

V. PROJECT PLAN

- Requirements: In this phase of project all the requirements were gathered which help in finding out exact need of copyright holder, commercial checker and administrator.
- Designing: UML diagrams depicting an abstract of overall system were designed in this phase . System design helps in specifying hardware and system requirements and helps in finding and defining overall system architecture.
- Coding: Actual core part of coding was done in this phase which focus developing the modules by independent coding which were then tested and integrated with the rest of the system. The modular development provided the scope for individual and independent programming.
- Integration and Testing: In this phase all the units developed in the coding phase were integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
- Deployment Phase: In this phase once the functional and non-functional testing is done , the project is deployed and running.

Project Estimate

Cocomo (Constructive Cost Model) is a regression model based on LOC, i.e number of Lines of Code. It is a procedural cost estimate model for software projects and often used as a process of reliably predicting the various parameters associated with making a project such as size, effort, cost, time and quality. It was proposed by Barry Boehm in 1970 and is based on the study of 63 projects, which make it one of the best-documented models. The key parameters which define the quality of any software products, which are also an outcome of the Cocomo are primarily Effort and Schedule:

- Effort: Amount of labor that will be required to complete a task. It is measured in person-months units

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

- Schedule: Simply means the amount of time required for the completion of the job, which is, of course, proportional to the effort put. It is measured in the units of time such as week months. Different models of Cocomo have been proposed to predict the cost estimation at different levels, based on the amount of accuracy and correctness required. All of these models can be applied to a variety of projects, whose characteristics determine the value of constant to be used in subsequent calculations. These characteristics pertaining to different system types are mentioned below. Boehm's definition of organic, semidetached, and embedded systems
- Organic – A software project is said to be an organic type if the team size required is adequately small, the problem is well understood and has been solved in the past and also the team members have a nominal experience regarding the problem.
- Semi-detached – A software project is said to be a Semi-detached type if the vital characteristics such as team-size, experience, knowledge of the various programming environment lie in between that of organic and Embedded. The projects classified as Semi-Detached are comparatively less familiar and difficult to develop compared to the organic ones and require more experience and better guidance and creativity. Eg: Compilers or different Embedded Systems can be considered of Semi-Detached type.
- Embedded – A software project with requiring the highest level of complexity, creativity, and experience requirement fall under this category. Such software requires a larger team size than the other two models and also the developers need to be sufficiently experienced and creative to develop such complex models.

- All the above system types utilize different values of the constants used in Effort Calculations. Types of Models: COCOMO consists of a hierarchy of three increasingly detailed and accurate forms. Any of the three forms can be adopted according to our requirements. These are types of COCOMO model
- Basic COCOMO Model The first level, Basic COCOMO can be used for quick and slightly rough calculations of Software Costs. Its accuracy is somewhat restricted due to the absence of sufficient factor considerations.

The basic COCOMO model estimates the software development effort using only lines of code.
E = a(KLOC)b New line Where, E is the efforts applied by person in months, a = 3.0 and b = 1.12 , then KLOC=2.25 Hence Efforts = 3.0 (1.8)1.12, E = 5.79 Person-month E = 6 Person-month Total of 6 Person-Month are required to complete the project successfully.
D = cb(E)db Where, D = Development time in chronological months, cb = 2.5 and db = 0.35, and E =6 Person-Month Hence, Development Time= 2.5 (1.8)0.35 D = 3.07 months The approximate duration of project is 3 months. P = E/D Where, P = Number of persons to accomplish project. Hence, Number of Persons required completing the project P
= 6/3 P = 2 persons Therefore 2 persons are required to successfully complete the project on schedule.
Intermediate COCOMO Model Intermediate COCOMO takes these Cost Drivers into account and Detailed COCOMO additionally accounts for the influence of individual project phases, i.e in case of Detailed it accounts for both these cost drivers and also calculations are performed phase wise henceforth producing a more accurate result. These two models are further discussed below •Detailed COCOMO Model In detailed cocomo, the whole software is divided into different modules and then apply COCOMO in different modules to estimate effort and then sum the effort.

Reconciled Estimates

Cost Estimate

The model followed is the Constructive Cost Model(COCOMO) for estimating the effort required in completing the project. Like all the estimation models, the COCOMO Model requires sizing information. This information can be specified in the form of •Object Point

Function Point

Lines of source Code (KLOC) for our project, This work uses the sizing information in the form Lines of Source Code. Total lines of code for our project, KLOC =1.8K (approx.). •Cost of each person per month,Cp=Rs.11,000/(Perperson-month) So, C= 3*cp = 3×11000 = 33,000/Therefore, the cost pf project is 33,000+10000(cost of camera approx) = 43,000/(approx).

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Project Resources

Resources Include:

1. Python
2. Object Detection
3. WordNet
4. YouTube Processing
5. TF-SIM

Risk Management

Software risk is referred as potential problem that may threaten the Software project. Risks can be known as well as unknown in our project Risk can also arise in our project/software are as follows:

1. Internal database damage.
2. Multiple object not detected.
3. Slow detection time.

Project Schedule

Project Task Set

Sr. No.	TASK	DURATION (in weeks)
1.	Information Gathering	4 Weeks
2.	Requirement Analysis	2 Week
3.	Design and Algorithm Analysis	3 Weeks
4.	Coding	8 Weeks
5.	Testing	3 Week
6.	Deployment and Maintenance	2 weeks

Figure 5.1: Task Duration

Task Network

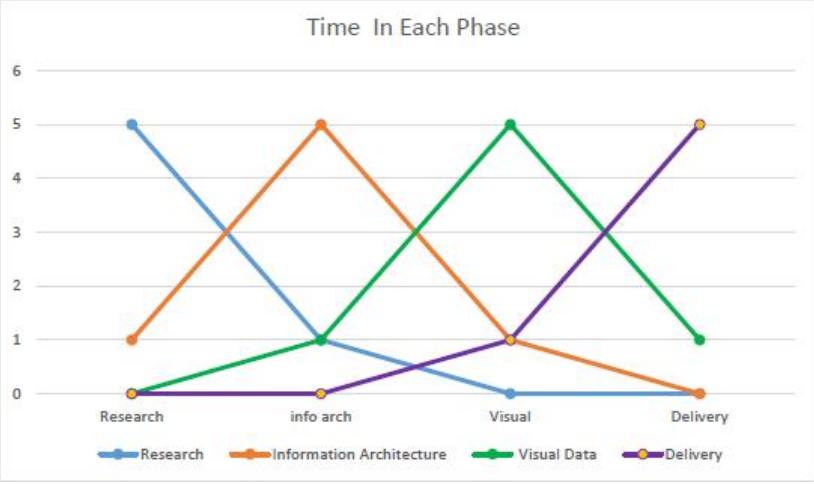

Figure 5.2: network

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Timeline Chart

Sr. No.	Activity	Month Wise Project Work										
		June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
1.	Research Topics & Finalize Project Title											
2.	Requirement Gathering											
3.	Literature Survey											
4.	Mathematical Modelling											
5.	Feasibility Testing											
6.	UML Diagrams											
7.	Database Design											
8.	GUI Design											
9.	Functionality Implementation											
10.	Testing & Debugging											
11.	Finalizing Report											

Figure 5.3: Timeline chart

Team Organization

Team Structure

Prof. Ms. Sonam Borhade Project Guide

Ashwini Ghodake, Avadhut Khamkar, Khushboo Songra, Nishant Bhumkar, Model Analysis, Designing, Planning And Testing.

Management, Reporting and Communication

All the members contributed equally in the project and all the segments received appropriate attention from all the members consisting aspects of project designing, implementation and testing etc. In this chapter, looked at the project plan including budget along with Identified risks. In the next chapter, we will take a look at the implementation of the project and the tools used in making the system.

VI. PROJECT IMPLEMENTATION

6.1 Overview of Project Modules

Module 1 : WordNet Processing

The paper proposes a method for suggesting keywords that are relevant to video content. Firstly, based on the original title and tags of a video, the collection of candidate keywords relevant to a video is suggested through querying WordNet and extracting relevant keywords from titles and tags of related videos searched from the mainstream video sharing websites. Since, search engines usually retrieved the most popular videos that match with the input keywords. Thus, in this way, we

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

can not only guarantee the semantic relevance but also the popularity of the candidate keywords. Secondly, the method applies deep learning driven video content analysis technology to identify the entity names from video content and combine them into the set of candidate keywords.

Module 2: TF-SIM Ranking

A novel algorithm TF-SIM is proposed for ranking the collection of candidate keywords relevant to a video. On one hand, the algorithm considers the frequency of a keyword by calculating the number of occurrences of the keyword in the candidate keywords; On the other hand, the algorithm uses the NGD formula to calculate the semantic similarity between the keyword and the original video keywords.

Module 3: You Tube Processing

The proposed method is evaluated in a real scenario. A set of 50 videos and their original titles and tags were collected from the Internet. Then, the titles and tags were optimized using the keywords recommended by our method and other two baseline methods, and then were assigned to a copy set of the 50 videos, respectively. The four sets of videos with their corresponding titles and tags were uploaded into four new YouTube accounts, respectively. The comparative experimental results show that the titles and tags optimized using our method can effectively boost the social popularity and extend viewing time of a video.

Figure 6.1: Scattered plot

6.2 Tools and Technologies Used

Tools used

1. NLTK (Natural Language Toolkit)
2. CV2 (OpenCV)
3. RE (Regular Expression)
4. urllib.request
5. Beutiful Soup
6. Numpy
7. Gensim

Technologies Used

1. NLTK is a leading platform for building Python programs to work with human language data. It provides easy-to-use interfaces to over 50 corpora and lexical resources such as WordNet, along with a suite of text processing libraries for classification, tokenization, stemming, tagging, parsing, and semantic reasoning, wrappers for industrial-strength NLP libraries, and an active discussion forum.
2. By using OpenCV we are going to detect an object from the given video input. OpenCV is tool which is used for face detection ,object detection,mostly in image processing.
3. By using RE i.e. Regular Expression we are going to be Specify exact format of links by using which we are going to be find out tags on you tube,etc.
4. The urllib.request module defines functions and classes which help in opening URLs (mostly HTTP) in a complex world — basic and digest authentication, redirections, cookies and more.
5. Beautiful Soup is a tool that makes it easy to scrape information from web pages. It sits atop an HTML or XML parser, providing Pythonic idioms for iterating, searching, and modifying the parse tree.
6. NumPy is a tool for the Python programming language, adding support for large, multidimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.
7. Gensim is implemented in Python and Cython for performance. Gensim is designed to handle large text collections using data streaming and incremental online algorithms, which differentiates it from most other machine learning software packages that target only inmemory processing.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Algorithm Details

Algorithm 1: WordNet Processing

1. Here one basic keyword will be input for this algorithm.
2. In First step we are going to remove stopwords from the given keyword by checking, is given input containing the stopwords or not.
   tokens without stopword=word for word in text-tokens if not word in stopwords.words()
3. whatever keyword are there in tokens without stopwords,that tokens we are passing to find synsets(synonyms) of that tokens.
   for syn in wordnet.synsets(tokens):
   for l in syn.lemmas():
   synonyms.append(l.name())

Algorithm 2: Object Detection

1. Here Video file will be an input, Here we have trained the model by using DNN algorithm for object detection purpose.
2. we are loading the trained model.
3. we are loading here classes list
4. we are initializing the camera by using
   cap=cv2.VideoCapture(video-input)
5. after that by using loop we are performing object detection. while(True): ret,frame=cap.read()
   (class-id,score,bboxes)=model.detect(frame)
   for class-id,score,bbox in zip(class-id,score,bboxes):
   (x,y,w,h)=bbox
   class-name=classes[class-id]
   cv2.putText(frame,class-name,(x,y-10),cv2.FONT-HERSHEY-PLAIN,2,(280,0,50),2)
   cv2.rectangle(frame,(x,y),(x+w,y+h),(280,0,50),3)
   keyword.append(class-name)
6. this we are collecting object from object detection as keyword.

Algorithm 3: You Tube Processing

1. We are goind to pass the basic keyword which is input from the user to the you search for that purpose we are making an url.
2. we are passing that url to urlopen function which in urllib.request module.
3. After that we are collecting the 5 sites links related to that keyword.
4. we are passing that link to one function for collecting the meta data of that video. Metadata i.e. tag ,titles ,views count ,etc
5. From that we are collecting the tags.

Algorithm 4: TF-SIM algorithm

1. whatever collected keyword means collected keyword from WordNet Processing,collected keywords from Object detection,collected keywords from you tube processing that keywords will be input for this algorithm, and basic keyword which is input from the user.
2. we are checking given input having an stopwords or not .
3. if it contaning stopword we will remove that stopwords.
4. Preprocessing the given collected keywords, including basic input keyword also.
5. we are loading here glove model. GloVe:it maps words into numerical vectors — points in a multi-dimensional space so that words that occur together often are near each other in space.it is an unsupervised machine learning algoriithm.
   glove = api.load(”glove-wiki-gigaword-50”)

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

similarity-index = WordEmbeddingSimilarityIndex(glove)

6. Building the term Dictionary using TF-idf model. dictionary = Dictionary(corpus+[query]) corpus=collected keywords and query=input basic keyword tfidf = TfidfModel(dictionary=dictionary)
7. Creating the term similarity matrix similarity-matrix = SparseTermSimilarityMatrix(similarity-index, dictionary, tfidf) query-tf=tfidf[dictionary.doc2bow(query)] index=SoftCosineSimilarity(tfidf[[dictionary.doc2bow(document) for document in corpus]],similaritymatrix) doc-similarity-scores=index[query-tf] doc-similarity-scores = index[query-tf]
8. Output the sorted similarity score and documents sorted-indexes = np.argsort(doc-similarity-scores)[::-1] for idx in sorted-indexes: tag-list.append(f'documents[idx]')
9. This output will be our final output which best tags based top scores rank tags.

VII. Software Testing

Type of Testing

Following types of testing is carried out for Intelligent Video Tag Recommendation System.

Unit Testing

Unit testing, also known as Module Testing, focuses verification efforts on the module. The module is tested separately and this is carried out at the programming stage itself. Unit Test comprises of the set of tests performed by an individual programmer before integration of the unit into the system. Unit test focuses on the smallest unit of software designthe software component or module. Using component level design, important control paths are tested to uncover errors with in the boundary of the module.

Integration Testing

It is a systematic technique for constructing the program structure while at the same time conducting tests to uncover errors associated with in the interface. It takes the unit tested modules and builds a program structure. All the modules are combined and tested as a whole. Integration of all the components to form the entire system and an overall testing is executed.

System Testing

Tests to find the discrepancies between the system and its original objective, current specifications and system documentation. The system software is tested as a whole. It verifies all elements mesh properly to make sure that all system functions and performance are achieved in the target environment. The focus areas are: System functions and performance. System reliability and recoverability (recovery test). System behavior in the special conditions (stress and load test). System user operations (acceptance test/alpha test). Hardware and software integration collaboration. Integration of external software and the system.

Output Test

Output of test cases compared with the expected results created during design of test cases. Asking the user about the format required by them tests the output generated or displayed by the system under consideration. Here, the output format is considered into two ways, one is on screen and another one is printed format. The output on the screen is found to be correct as the format was designed in the system design phase according to user needs.

Test cases and Test Results

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Table 7.1: Test Cases

Test Case ID	Test Scenario	Test Steps	Prerequisite	Expected Result
TC0	Check the input upload feature of the system	1. Select the video file from the local system.2. Type the Input keyword. 3. Upload the Image and Keyword using the 'Upload' Button.	1. Image Must be Present in the system System must be connected to the internet	1. Image and keyword must get uploaded successfully 2. Processing must get started in back- end.
TC1	Check the Help Button on UI	1. Press the Help button on UI	System Must connected to internet.	User guide about the system must be displayed.
TC2	Check the Exit Button on UI	1. Press the Exit button on UI	System Must connected to internet	User must get exited from the system
TC3	Check the 'Previous' button on UI.	Press the previous button on result page of the UI.	1. System must have a internet connectivity. 2. User must be on the result display page.	User must get redirected to the Home page
TC4	Object Detection check	1.Upload the video through UI.2.Check back-end process	1.User must upload the video. 2. system must have an internet connectivity.	System should detect the correct objects from the video.
TC5	YouToube processing and Wornet Check	1.Upload the video through UI.2.Check back-end process	1.User must upload the Keyword. 2. system must have an internet connectivity.	System should Provide semantic similar key- words as output.

Table 7.2: Test Results

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Test Case ID	Test Scenario	Expected Result	Actual Result
TC0	Check the input upload feature of the system	1. Image and keyword must get uploaded successfully 2. Processing must get started in back-end.	1.Image and keyword was uploaded successfully 2. Processing got started in backend.
TC1	Check the Help Button on UI	User guide about the system must be displayed.	User guide about the system was displayed.
TC2	Check the Exit Button on UI	User must get exited from the system	User exited from the system
TC3	Check the 'Previous' button on UI.	User must get redirected to the Home page	User got redirected to the Home page.
TC4	Object Detection check	System should detect the correct objects from the video.	System detected the correct objects from the video.
TC5	YouToube processing and Wornet Check	System should Provide semantic similar keywords as output.	System Provided semantic similar keywords as output.

VIII. RESULTS

Outcomes

- Intelligent Video Tag Recommendation System is implemented successfully.
- The Video upload and Basic keyword upload is working with proper condition.
- WordNet Processing in backend is also working properly.
- Object Detection from video input is also working properly
- You Tube Processing i.e. Collecting meta data from the video sharing sites is working successfully.

Screen Shots

Video Tag Recommendation System Input page 1

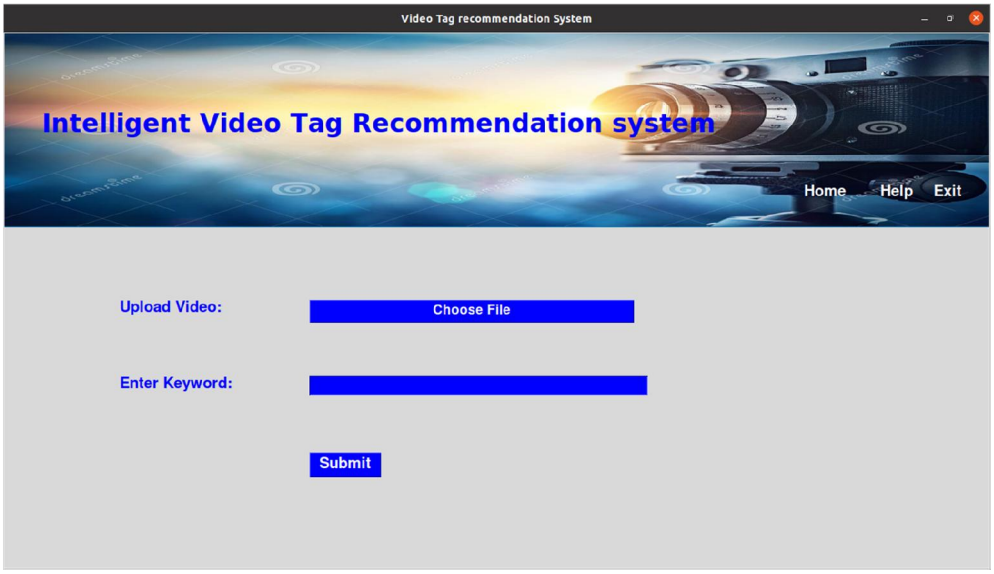

Figure 8.1: Video Tag Recommendation System Input page

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

In Figure 8.1 This is our first front page, on this page user has to be upload an video give an one basic keyword, after that user has to be click on submit button. There another buttons are there as Home,Help,Exit. By clicking on Home button user will direct on front page. By clicking on Help page user will direct on Help. On clicking Exit button user can close the application.

Video Tag Recommendation System Input page 2

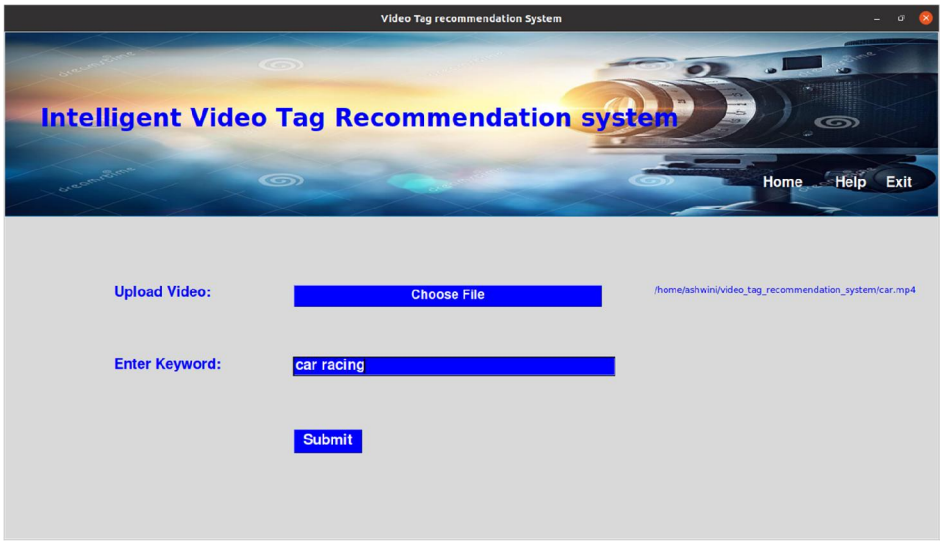

Figure 8.2: Video Tag Recommendation System Input page

In Figure 8.2 On this first page we have uploaded video here one basic keyword.

Video Tag Recommendation System Background Processing

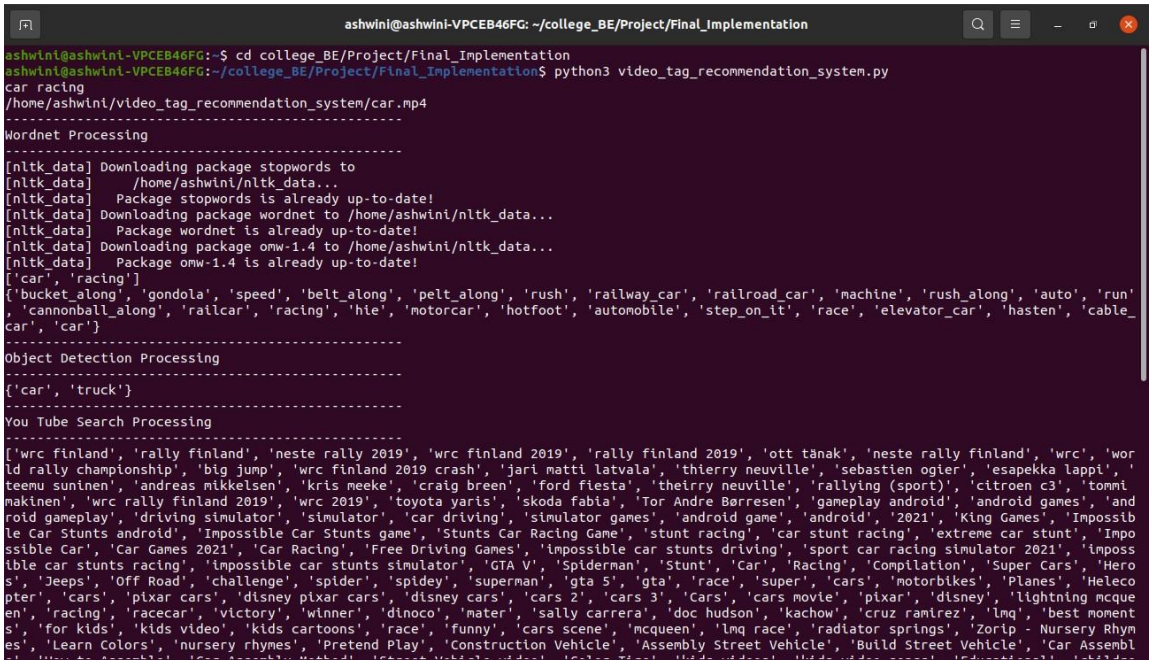

Figure 8.3: Video Tag Recommendation System Background Processing

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

Figure 8.3, Figure 8.4, This is background processing, In which we are going from different stages like WordNet processing, Object detection, You Tube processing, TF-SIM algorithm
,etc.

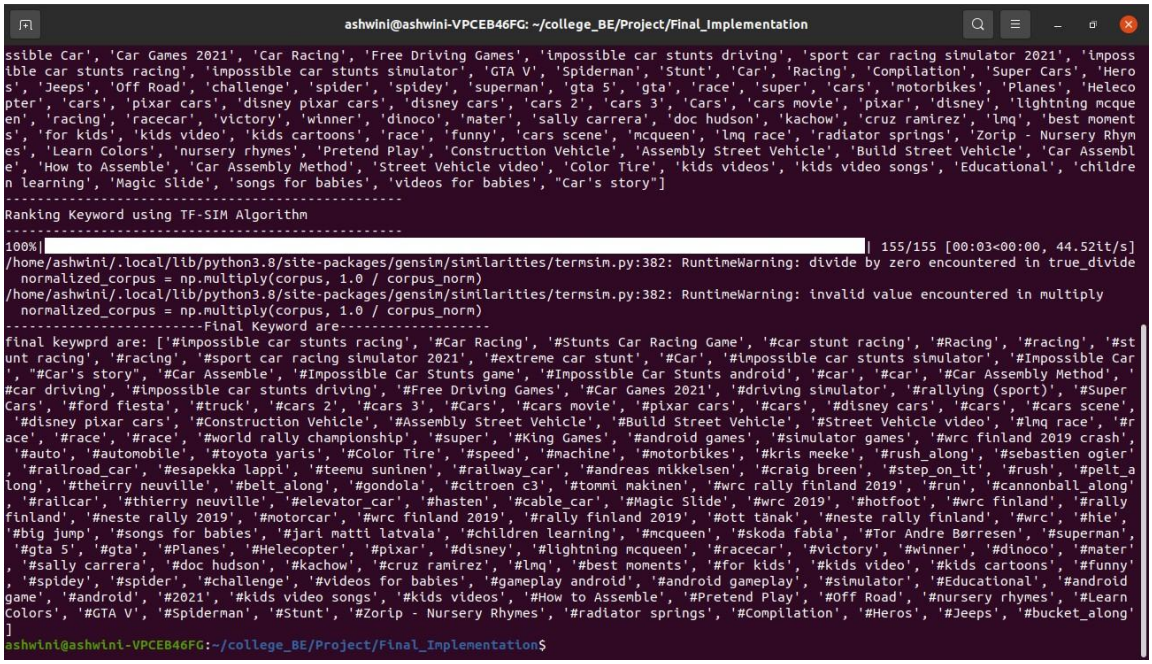

Figure 8.4: Video Tag Recommendation System Background Processing

In Figure 8.5 we have displayed the final output as tags which will increase video popularity. There will 25 tags we have suggested. On this page also there will be option for user as Home,Help Exit . If we click on the Home button it will direct to the Front page , If we click on Help ,It will direct to the help page if we click on exit it will close the application.

Figure 8.5: Video Tag Recommendation System Final Output

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 2, Issue 3, May 2022
Impact Factor: 6.252

In the Figure 8.6 this is help page on which we have given instructions about how to use this application .

Figure 8.6: Video Tag Recommendation System Help Page

IX. CONCLUSION

Conclusions

Social media platforms such as YouTube, Facebook, offer great opportunities for people to entertain, interact, and advertise. Big data analytics is being developed to help researchers and marketers understand interests of users for gaining higher popularity and generate more revenue through social media.

Future Work

In future work we can generate the video title and video description.

Applications

- Best Tag suggestion with 25 Keyword.

REFERENCES

[1]. J.Davidson," The YouTube video recommendation system,"in proc.4th ACM Conf.Rec:Syst, Barcelona, spain,20210,pp.293-296.

[2]. Y.L.Chen and C.L.Chang,"Early prediction of the future popularity of uploaded video,"expert syst,Barcelona,spain,2020,pp.293-296.

[3]. M.Tan,J.Yu,F.Gao,Y.Rui,and D.Tao,"user-click-databased ne-grained image recognition via weekly supervised metric learning," ACM Trains Multimedia Comput.Commun.Appl.vol.14,no.70,2019,pp.123.

[4]. Renje Zhou, Dongchen Xia, Jian Wan,and Sanyuan Zhang,"Intelligent Video Tag Recommendation Method for Improving Video Popularity in Mobile Computing Environment,"2019,FB2102101.

[5]. P .Zhou, Jin Liu, Xian Liu, "Is Deep Learning Better than Traditional Approaches in Tag Recoomendation for Software Information Sites,"2019.

[6]. Hafeez Ur Rehman,"Deep Learning Based Approach for Precise Video Tagging",2019.

[7]. Alexander lehman,"Problem Tagging and Solution Based Video Recommendation in Learning Video Environment",2019.

[8]. Yuan Zang,Shufeng,"Technical Analysis of Multi-Text Video Standardisation Based on Tag System,2020.