Software Requirements Specification

for

Video Streaming Platform

Version 1.0 approved

Prepared by:

Gopal
Manish S Balekundri
Sumukha MK
Udbhav P Saboji

Pes University
Ring road campus, Banashankari 3rd stage
Bengaluru
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Revision History

Name	Date	Reason For Changes	Version

Video Streaming platform	06/02/2021	SRS building	01

1. Introduction

1.1 Purpose

The purpose of this document is to deliver detailed instructions, descriptions and requirements of an online streaming platform. It describes the purpose, features, scope and use of the system,the interfaces of the system, and constraints that it must operate.

1.2 Intended Audience

This system is a broad platform that has multiple users and uses. It has widespread demography intended to be viewed by people of all age groups, particularly viewed more often by younger visitors aged 18 to 24.
We can find blacksmiths, prop makers, artists, DIYers, gamers, game developers, hackers, PC specialists, movie and film producers, product reviewers, vloggers, comedians, tutorials, health professionals, religious persons, musicians and many more, people who intend to make a create and share a video are the audience of this system.

1.3 Product Scope

This system will be an online video streaming platform for uploading and sharing of videos by the users. Millions of users around the world make accounts on the platform that will allow them to upload their videos or view various videos with preferred filters already existing. Through this platform, users can upload video, stream video, share videos and even download them.

1.4 References

1. https://digiday.com/media/demographics-youtube.(describes the demography of video streaming platforms (youtube)).
2. https://creatoracademy.youtube.com/.(describes the features of youtube platform)
3. https://en.wikipedia.org/wiki/YouTube

2. Overall Description

2.1 Product Perspective

We have to build the system from scratch. It allows the users to upload, stream, share, review, rate, like and comment on videos and even subscribe to other channels. Every user is allowed to upload videos, so the user is here either to upload their domain-specific videos or to stream already existing videos. The system contains a wide variety of user-generated or corporate generated videos. Available content includes TV show clips, music videos, reaction videos, educational videos, live streams, movies, recordings and other content videos.

2.2 Product Functions

The system signs in a user with credentials. It allows the user to create their personal channel, search for and watch videos of interests, upload videos, like/share/comment on other videos, subscribe to other channels and users. Create a playlist to organise videos and group videos together. It even allows the user to create their community of followers and raise funds.

2.3 User Classes and Characteristics

The system attracts a wide range of users, users of all age groups. Also attracts an even split of male and female audiences. We aim for the younger visitors to spend more time on this platform although the streaming content is not biased for just them, but the younger visitors are more susceptible to streaming and sharing videos over the internet. The users on the platform can be bifurcated either as a viewer or a publisher, the viewer searches for content to stream, the publisher publishes their domain-specific videos. It also has corporates to manage and publish ads over the videos that provide revenue for the publishers.

2.4 Operating Environment

The platform is operational by any system that has the most up-to-date browser (Ex: newest version Google Chrome, Firefox, MS Edge, Safari, or Opera), operating system, and a decent internet connection (with 500+ kbps).
Minimal requirements: For PC/Laptop

- RAM: 128mb with 64mb video card
- Space: 80Gb Hard Drive
- Core: Pentium IV 500Mhz or more

- Cache: 512kb

For Android/IOS

- RAM: 128mb with 64mb video card.
- Space: 500mb
- Cache: 200kb

For streaming few premium videos on platforms -- like movies, TV shows, and livestreams -- require a faster connection and greater processing power for optimal streaming speeds. Here's what it needs:

- Newest version of Google Chrome, Firefox, MS Edge, or Safari
- Operating system: Windows 7+, Mac OS X 10.7+, or Ubuntu 10+
- Internet connection with 1+ Mbps

2.5 Design and Implementation Constraints

Designing a user interface which is robust and easy to use is a challenge. Storing and handling large amounts of data can be a challenge. When the application is getting large number of hit requests, balancing the load can be a challenge and here hardware constraints can come into role.Hardware Constraints include configuration characteristics, what devices are to be supported, how they are to be supported, and communication protocols, any applicable characteristics or limits on primary and secondary memory or memory storage, any hardware interfaces that are to be supported by the software, including logical structure, physical addresses, expected behavior, etc.Taking care of intuitive navigation that involves placing elements where people expect to see them and developing a convenient menu structure and simple content search.Additionally by providing the accessibility of viewing videos across all location and across all devices will give a good experience to the user.

2.6 Assumptions and Dependencies

The demography of viewers depends on the content type of the videos, so we assume that the publishers upload videos with different contents i.e., it adds to the number of publishers with different domains and that we get enough ad corporates so that the publishers' videos are funded. We assume that the user has minimal software requirements as specified above to use this platform.

3. External Interface Requirements

3.1 User Interfaces

The platform shall be very user friendly and easy to use. Video publishers or viewers shall not face any difficulties while navigating through different areas in the platform. Alerts and pop up will be implemented wherever necessary to keep the users and publishers in the right track. For example, a publisher will be alerted when he tries to upload a .mp3 file rather than a video file.Providing accurate search results is one of the goals.

The system will provide an easy interface for the publishers to upload and modify videos , engage with their subscribers. Interface to analyse the videos uploaded, which includes details of the reach of the uploaded video, ad revenue,watch time, shall also be implemented.

3.2 Software Interfaces

The system uses the Dynamic Adaptive Streaming over HTTP protocol an adaptive bit-rate HTTP-based streaming solution optimizing the bitrate and quality for the available network. Supports MOV, MPEG4, AVI, WMV, MPEG PS, FLV, 3GPP WebM, MP4 and other formats for video and MP3, linear PCM, AAC, FLAC, Vorbis, Opus, and Dolby Digital formats for audio. MP4 video format along with H. 264 video codec and AAC audio codec gives a high-quality video and a small file size. System uses AI and data analysis to provide a personalised content to the users based on their activities and also creates a page of trending videos with a higher number of views in a short time. The user can upload videos with duration as long as 12 hours and more but can be at most 128gb in size. The system uses speech recognition technology to auto generate captions but since this is not accurate enough, it even has several options of manually entering captions for greater accuracy. There is also an option to stream at multiple quality levels. The system offers users the ability to view its videos on web pages outside their website. Each video is accompanied by a piece of HTML that can be used to embed it on any page on the Web.

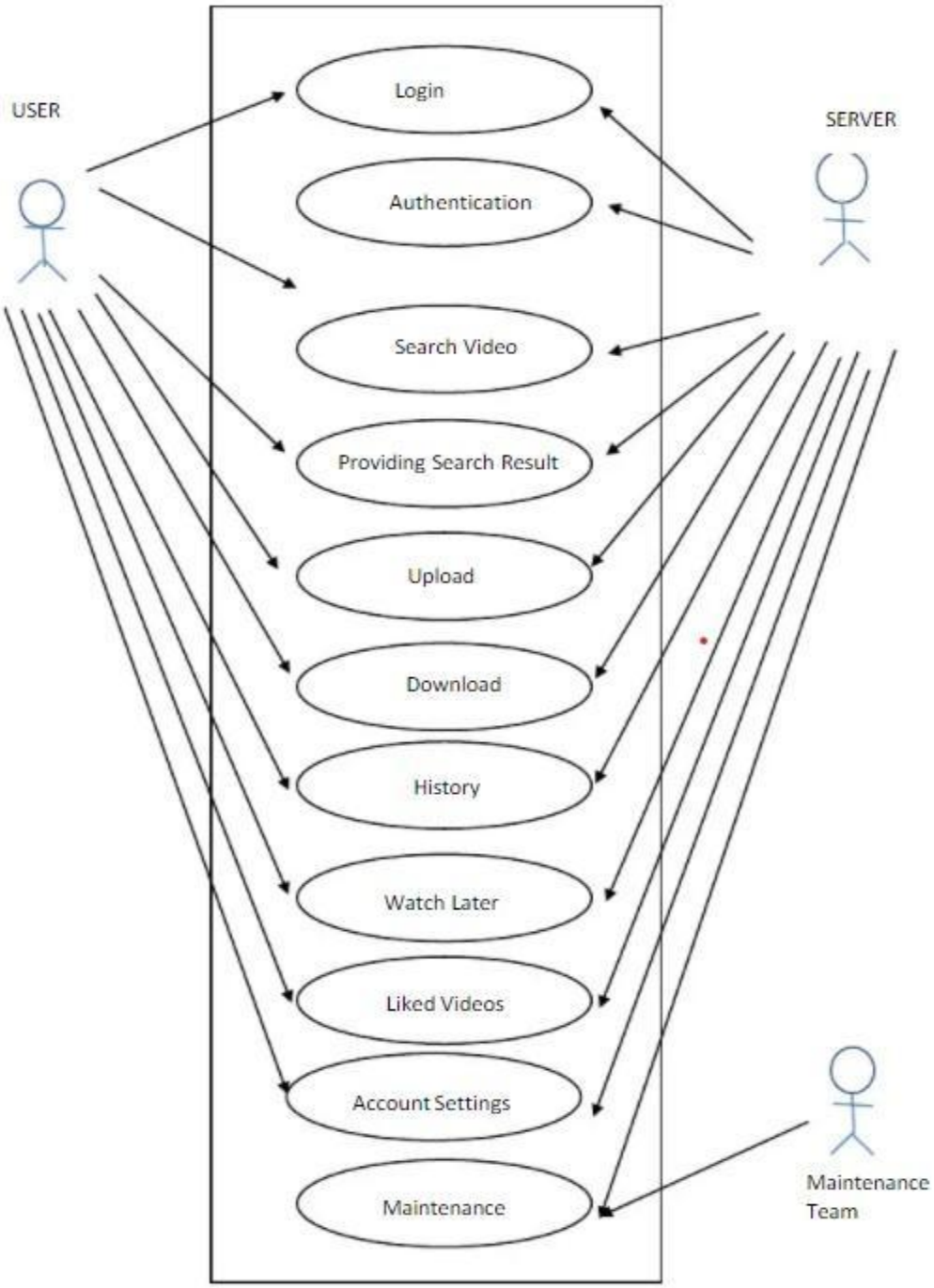
3.3 Communications Interfaces

System lets the user upload and publish video, so the user uploads a video and adds descriptive details which can help viewers to find this video. Before publishing he even adds some other details like title, description and thumbnail, which act as a metadata to find the video. Further behind the curtains, the system creates chunks of this video processos it to get a compatible format, stitches it back and makes it available for all users.
When a user plays a video system will use the technology called adaptive bit-rate HTTP-based streaming for delivering an optimised continuous streaming video that adjusts to your broadband.
As for the communication between the viewer and the publisher, multiple options like likestraeming, comments, community page(to upload stories), short video uploading windows are provided.

4. System Features

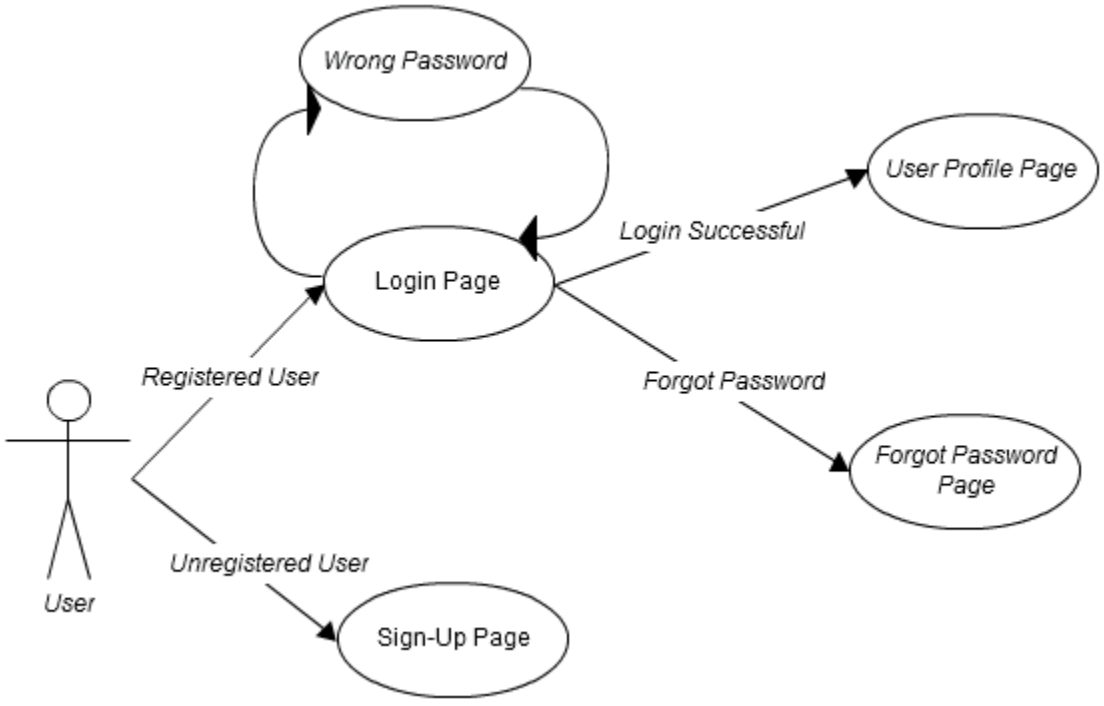
Prevailing features are Login , Search Result, Share Videos, Upload Videos, Streaming, History, Subscription, Notifications, User profile, User Settings, Library, Likes and comments, Home,Trending

Use Case diagram of the platform



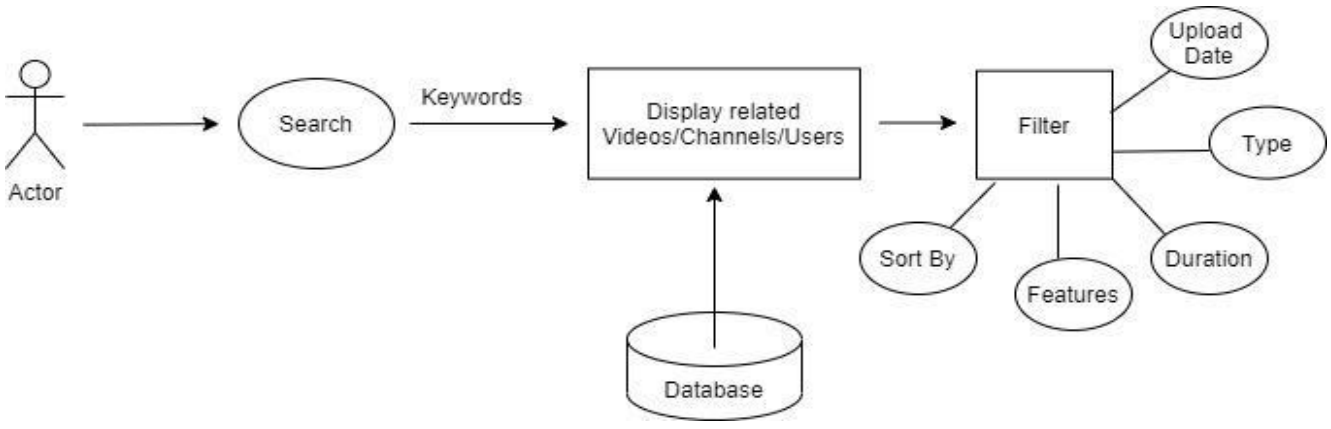
4.1. Login

Use case name	Login
Description	A user login to access all the features of the platform
Actors	Viewers, Publishers
Pre-conditions	System must be connected to the internet , Users should have valid username and password.
Post conditions	After successful login, alert users through a pop up.
Input	Users (viewers and publishers) need to enter username and password
Output	Access to all the features of the platform including user profile.
Basic Flow	Users enter username,password to log in to the platform and get privilege to access all features.



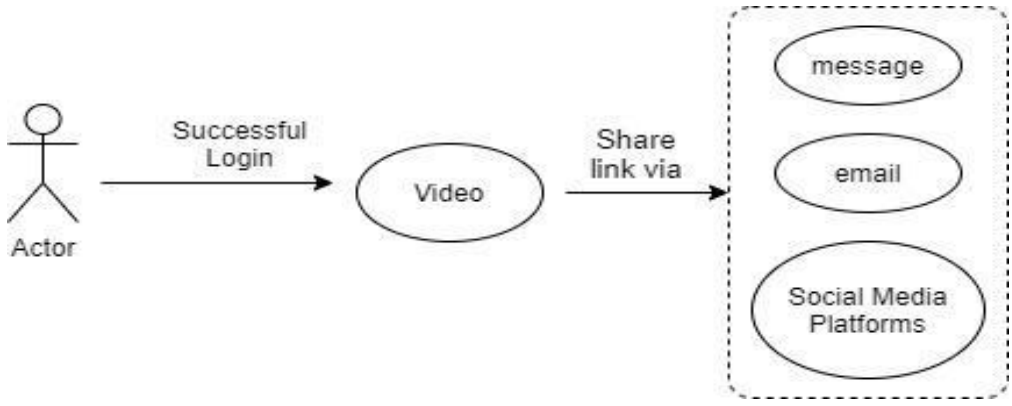
4.2. Search Result

Use case name	Search Result
Description	Allows user to search any video through entering keywords
Actors	Viewers, Publishers
Pre-conditions	System must be connected to internet
Post conditions	Display all the results in a structured manner
Input	Input keyword
Output	Display videos related to the keyword
Basic Flow	Users type in the search section and then the platform displays all the videos related to the keyword. Users ,then choose a video they are looking for.



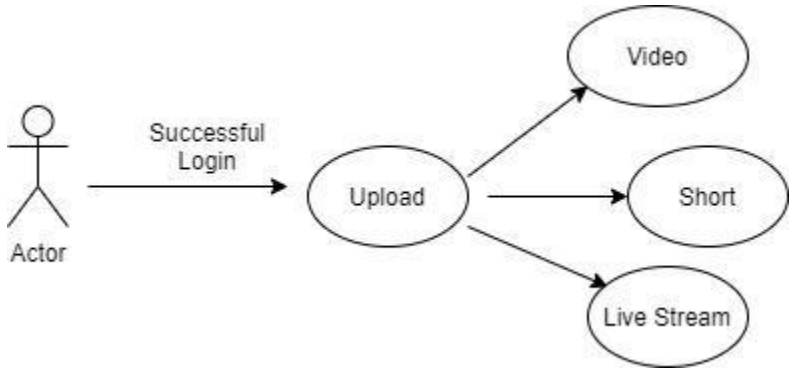
4.3. Share Videos

Use case name	Share Videos
Description	Users can share the video link to anyone
Actors	Viewers, Publishers
Pre-conditions	Internet connectivity, Decide the mode of sharing
Post conditions	Displaying the status of the shared video (successful or unsuccessful)
Input	Click on share icon and choose the way to send the link to the person
Output	Alert user with a pop up , displaying that the video was shared successfully
Basic Flow	Users share video links by clicking on the share icon present below the video and will be prompted with the status of sharing.



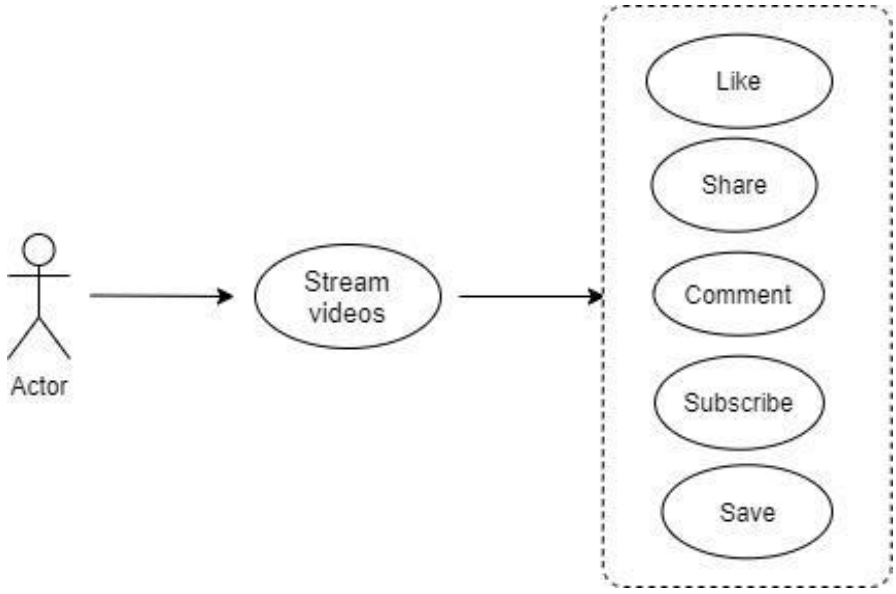
4.4. Upload Videos

Use case name	Upload Videos
Description	Allows users to upload videos
Actors	Publishers
Pre-conditions	Publisher should have logged in, and the video must be ready with all editing and preferred format to upload.
Post conditions	Pop up showing the status of the uploaded video
Input	Click on upload button, upload video, add title,description
Output	Video available in the platform to be accessed via public or private mode
Basic Flow	Publishers upload videos by giving necessary details, the uploaded video then can be accessed in the platform



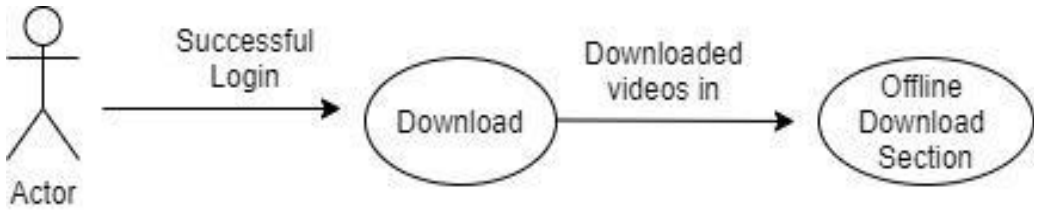
4.5. Streaming

Use case name	Stream videos
Description	Allows the user to view and perform some actions.
Actors	Viewers
Pre-conditions	The viewer should have minimum software requirements specified above and may or may not be logged into the system.
Post conditions	The viewer can stream a video of choice.
Input	Searches for videos of interest or streams from live feed.
Output	Finds the video and views it.
Basic Flow	User searches a video of interest or finds a video from his live feed or from trending or shorts and streams it.



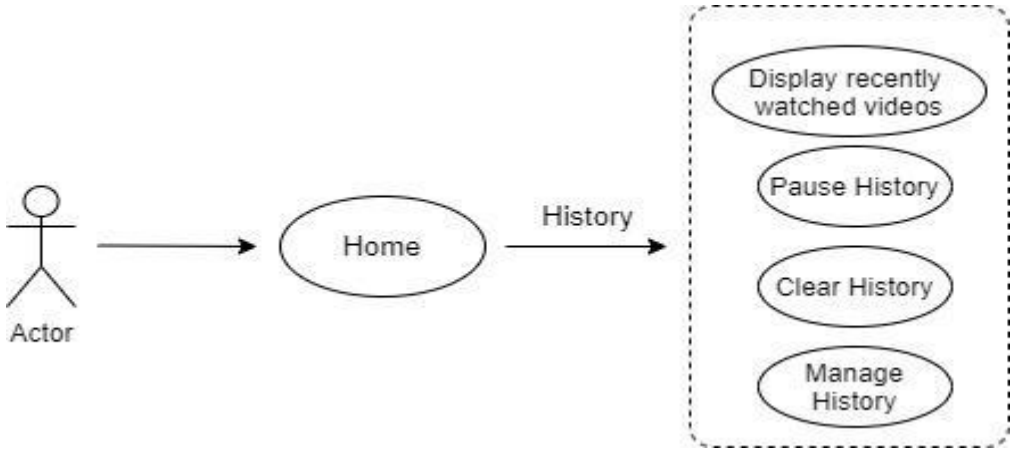
4.6. Download Videos

Use case name	Download Videos
Description	Allows users to download videos
Actors	Viewers, Publishers
Pre-conditions	Users should have logged and must use mobile application
Post conditions	Pop up showing the download status (successful or unsuccessful) Input Click on download icon present below the uploaded video
Input	Click on download icon present below the uploaded video
Output	Video downloaded available in offline section of the platform
Basic Flow	Users who wish to see the videos offline, will click on download icon and get the video available in offline mode



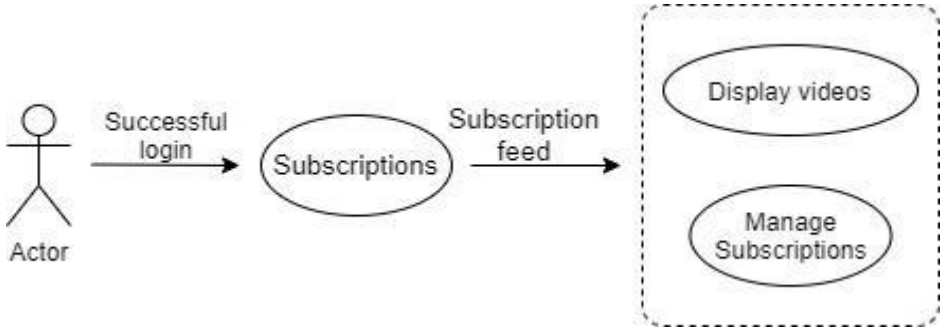
4.7. History

Use case name	History
Description	Shows the users , the list of videos which are viewed before
Actors	Viewers, Publishers
Pre-conditions	Users must be logged in to see the history
Post conditions	Display videos according to last opened
Input	Navigate and click on History button
Output	View history
Basic Flow	Users go to the history section and see the list of videos present in a sequential manner ordered by last opened time.



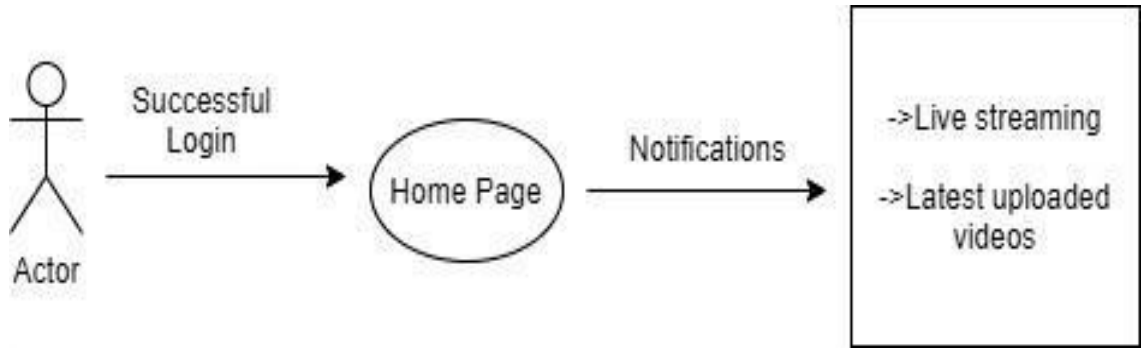
4.8. Subscription

Use case name	Subscription
Description	Viewers can subscribe to channels in order to keep track of the videos posted by the publisher easily
Actors	Viewers
Pre-conditions	User should have signed in before pressing the subscribe button
Post conditions	Notify user about the new subscription through popup
Input	Click on subscribe button present in the interface
Output	Quick access to the videos as viewer has now subscribed to the channel
Basic Flow	Viewers who want to access videos of a particular channel and want to support the publisher will subscribe to that channel.



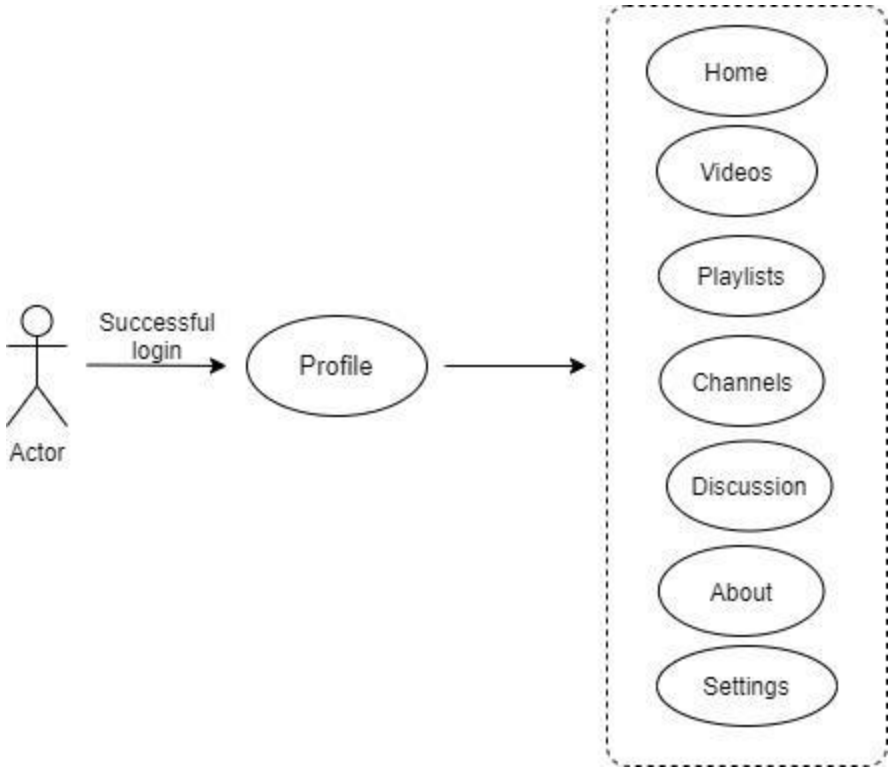
4.9. Notifications

Use case name	Notifications
Description	Users get notified based on subscription, also can get notified by showing recommended videos based on watch history
Actors	Viewers
Pre-conditions	User should have signed in before pressing the subscribe button
Post conditions	Notify user about the new subscription through popup
Input	Click on subscribe button present in the interface
Output	Quick access to the videos as viewer has now subscribed to the channel
Basic Flow	Viewers who want to access videos of a particular channel and want to support the publisher will subscribe to that channel.



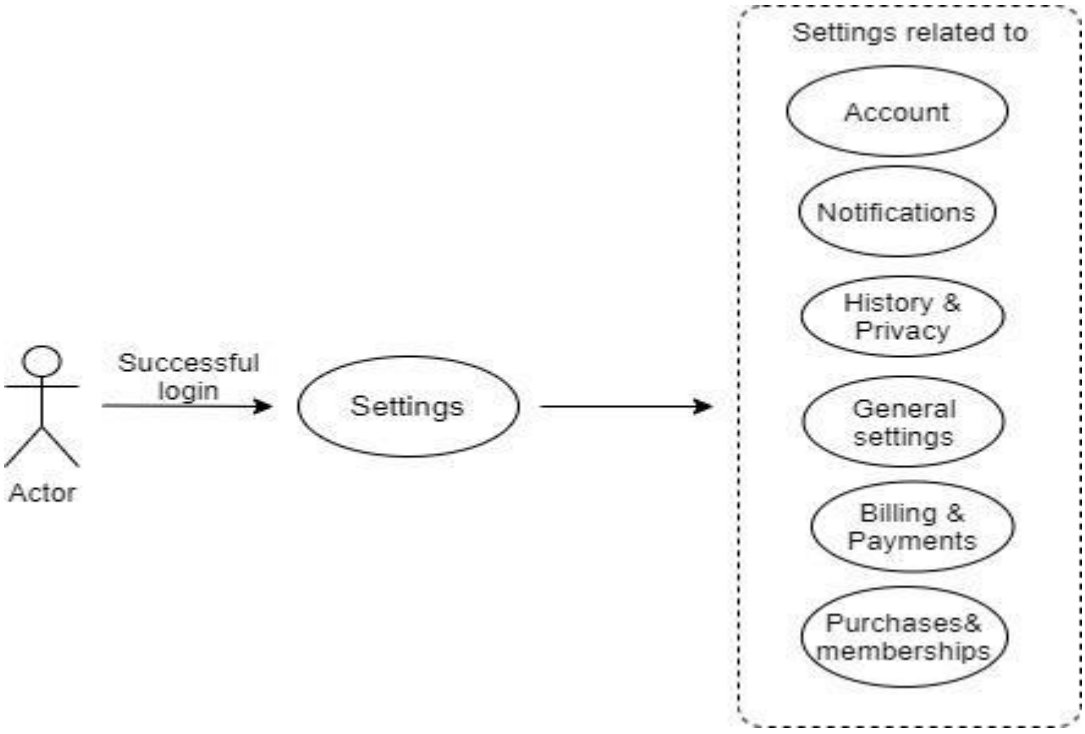
4.10. User Profile

Use case name	User Profile
Description	Display the user activity in the platform
Actors	Viewers, Publishers
Pre-conditions	Users should have logged in to access the features present in the platform
Post conditions	Display various options in a neat manner
Input	Click on profile section
Output	Access to various options regarding video analytics, channel videos,saved or created playlists ,subscriptions details, etc
Basic Flow	Users who want to know about details such as video analytics, list of saved or uploaded videos, list of subscriptions, etc will click on profile section and access the same.



4.11. User Settings

Use case name	User Settings
Description	Helps to access and modify privacy , payments , notifications,general settings , etc
Actors	Viewers, Publishers
Pre-conditions	Users should have logged
Post conditions	Display options
Input	Click on settings under profile section
Output	Access to the various settings available such as history and privacy, billing and payments, notifications, general settings and so on.
Basic Flow	Users once logged in can see or modify the settings available in the platform as per their desired requirement.



5. Other Nonfunctional Requirements

5.1. Performance Requirements

There are various requirements when we consider the performance of the video or the website.Some of these important important metrics for better performances are as follows

Play Length of Video
The total amount of data consumed by the user, which includes every second, minute and hour of the video streaming. This parameter is equally important in understanding and planning out the infrastructure and capacity intake for streaming. With play length, you can make a rough estimate of the overall demand for the streamed data. These data volumes become quite useful to understand if the quality of content needs work.

Buffer
The time the user spends buffering when a video begins is really important. This helps you understand the duration of time a user has to wait before a certain video actually starts to play. Drawback can be if a user waits for a moment longer than usual, they will abandon watching the video before it even starts.

Lag Length
Once there is no buffer, the video will automatically begin to play. At this stage if the streaming is smooth, which also takes into account the right balance between download rate and bit rate, the viewer can watch the video. However, this might not always be the case. Sometimes the buffering may be extended and the playback will eventually stop. The time spent while the video buffers until it begins to play is together known as lag length. This metric helps you understand the users experience when they begin watching a video. The lag length should not be much longer than the buffer fill time, but if it does happen, that means the video streaming quality is extremely bad and needs a performance check.

Play Rate
With bit rate, we can understand the quality of the video a user is experiencing. It’s one of the most important metrics to measure the performance of video streaming. If a video has more bit rate than average, it typically means a higher resolution (quality) image. This means bit rate helps identify the number of bits of a video that can be transmitted over a certain period of time. An HDTV typically transmits between a bit rate of 8–15 Mbps, while for many video streaming apps it is 6-8 Mbps.This also has a direct impact on the play rate of a particular video that helps further estimate the percentage of visitors who clicked on a particular video and began playing it. The combination of both the bit rate and play rate helps you understand how well a particular type of content is doing in a particular location, and what could be the success rate in the future. All videos do not have equal play rate.

5.2. Safety Requirements

Keeping in mind the extensive damage to a wide portion of the database due to catastrophic failure, such as a server crash, the cover method restores a past copy of the database that was backed up to archival storage (typically tape) and reconstructs a more current state by reapplying or redoing the operations of committed transactions from the backed-up log, up to the time of failure. And in the meanwhile, the server switches to the backup servers to keep the site working.

5.3. Security Requirements

Video streaming has been increasing and is in demand in the current world.But along with its wide usage the threats are also increasing leading to various security issues,hacking,piracy,etc.Security systems need database storage just like many other applications. However, the special requirements of the security market mean that owners must choose their database partner carefully. All the Private data uploaded by the user is absolutely confidential to the other users. Users can also report if they find any suspicious activity on the website, so the security department can take care of that.

HTTPS protects the users from so-called “man-in-the-middle” attacks. These attacks are relatively common with video streaming, especially when people use open networks at schools, malls,hotels and libraries.
Hackers can use vulnerabilities in these public networks to steal data as it’s being transmitted to the viewer. Through the use of digital certificates and encryption keys, HTTPS delivery encrypts a users connection with the website and prevents this sort of attack.
HTTPS wraps all communication between the server sending your videos and the viewer in a layer of secure encryption. This provides additional protection to your content.

Encrypted paywall
Whenever customers enter payment details into the website, you need to ensure their data security. The best way to do this is via SSL/TLS. In fact, this is the same type of encryption that banks use to protect your financial data.A secure paywall ensures that you are protecting your customers’ data at all times. Therefore, it’s essential to use a secure paywall protected by SSL/TLS whenever we are trying to make transactions for account.

5.4. Software Quality Attributes

AVAILABILITY: The site is available for the users 24x7 across the world.

MAINTAINABILITY: The developers and a team of software engineers work on the maintenance and the updates of the site.

USABILITY: The site can be used anywhere if the connectivity to the internet and a device.

When you broadcast streaming video, you need sufficient internet speed to sustain the streaming. For live video, your upload bandwidth should be at least twice your broadcast bit rate.

Although they are related to encoder settings, resolution and video aspect ratios are very important.Choosing the perfect resolution requires a bit of a trade-off. Naturally,to use the best video resolution possible so that viewers have a crystal clear view of your video. However, the highest resolution does not equal the “best resolution” when it comes to video streaming.You want a resolution that provides a clear image without being too big to transmit without lagging. Professional broadcasters typically opt for 1280 x 720 pixels (720p) or 1920 x 1080 pixels (1080p).

5.5. Business Rules

Webinars:
Live video streams not only diversify business presentations. They reduce the distance between the seller and buyer. That's especially valuable for businesses that do not engage with the public directly. Most B2B companies need a platform to provide online consultations or Q&A, share materials, and get an immediate response from the customers.

Logistics:
Companies can use live video streaming services to control the delivery process. A webcam installed in a truck's luggage space would stream video for the shipping agents, customers, or other stakeholders. Geolocation and IoT integration will add value to such an application.

Healthcare:
Live video streaming technology can facilitate patient support, education and training of interns, conferences with colleagues, interviews, presentations, etc.

Retail:
Marketing in this industry largely depends on the visual appeal of goods. A demonstration of, say, luxury clothing details in real time can be very alluring. A live-streamed launch of a new product is a great start. Retailers can enhance sales by enabling users to make purchases while watching live video streams.

6. Other Requirements

APPENDIX: A Glossary

1. HTTP: HyperText Transfer Protocol
2. HTTPS: HyperText Transfer Protocol Secure.
3. RAM(Random Access Memory): Computer Memory that can be changed in any order.
4. Mbps: Megabits per second.
5. Cache: is a hardware or software component that stores data so that future requests for that data can be served faster.
6. MPEG: Moving Picture Experts Group.
7. MP4: is a digital multimedia container format most commonly used to store video and audio.
8. AVC: Advanced Video Coding, referred to as H.264
9. Adaptive bit-rate: technique used in streaming multimedia over computer networks.
10. Publisher: user who uploads videos.
11. Viewer: User streaming the videos on the platform.
12. SSL/TLS: Secure Socket Layer/ Transport Layer Security
13. Codec: A codec is either a hardware device or a software-based process that compresses and decompresses large amounts of data used in voice over IP, video conferencing and streaming media.

14. AAC(Advanced Audio Coding): is an audio coding standard for lossy digital audio compression.
15. WMV: is a video format which is compressed with Windows Media compression and contains a video encoded with one of Microsoft's Windows Media Video
16. FLV: file that uses Adobe Flash Player or Adobe Air to transmit video or audio over the internet.

Appendix B: Requirement Traceability Matrix

Sl. No	Requirement ID	Brief Description of Requirement
1	REQ_01	Login: to access all the features of the platform
2	REQ_02	Uploading: Allows users to upload videos
3	REQ_03	Subscription: to keep track of the videos posted by the publisher easily
4	REQ_04	Streaming: for streaming the already present videos in the platform