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Recommendation System for Videos in Cloud Based on User Behavior

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Abstract: **Online video service is common in Internet services. Users usually waste lot of time to obtain their interested videos in browsing and watching those videos. Therefore, various recommendation systems have been proposed. Most of those proposed systems like content based recommendation system, collaborative filtering recommendation system and context aware recommendation system deploy a large number of context collectors at terminals and access networks. However, the context collecting and exchanging result in heavy network overhead, and the context processing and content matching consumes huge computation. Therefore here we are introducing a recommendation system based on user behavior for videos in cloud, which can reduce network overhead and speed up the recommendation process. The users are recommended with videos based on their behavior information.**

Keywords: **Video service, Recommendation system, User behavior, Tag.**

I. INTRODUCTION

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite(TCP/IP) to link several billion devices worldwide. It is a network of network that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. Also, Internet provides several services in the day to day activities of the technology world. Cloud service is one among such services that plays major role in the networking environment.

A cloud service is any resource that is provided over the Internet. The most common cloud service resources are Software as a Service, Platform as a Service and Infrastructure as a Service. SaaS is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet. PaaS refers to the delivery of operating systems and associated services over the Internet without downloads or installation. IaaS involves outsourcing the equipment used to support operations, including storage, hardware, servers and networking components, all of which are made accessible over a network. SaaS, PaaS and IaaS are sometimes referred to collectively as the SPI model.

Video sharing is common in online services and contents in the Internet are retrieved by many users from the cloud. Facing massive multimedia services and contents in the Internet, users usually waste a lot of time to obtain their interested videos. Therefore, various recommendation systems have been proposed.

Recommender systems have changed the way people find products, information, and even other people. Recommender systems have become extremely common in recent years, and are applied in a variety of applications. The most popular ones are probably movies, music, videos, news, books, research articles, search queries, and products in general. Recommender systems are active information filtering systems that attempts to present to the user with information regarding the items, news or web pages the user is interested in. Information filtering deals with the delivery of information that the user is likely to find interesting or useful. An information filtering system assists users by filtering

the data source and deliver relevant information to the users. When the delivered information comes in the form of suggestions an information filtering system is called a recommender system.

In our project work we have proposed a recommendation system based on user behavior. There are many kinds of user behavior that are considered for recommending videos to users. We are considering four forms of user behavior such as Tag, History, Like and Share. Here the users can play videos, search videos and like videos in video portal. Along with that they can tag and share videos to friends. Hence instead of manually searching the video portal for the interested video user can use the share or tag information to get the video in a less time. By reducing the browsing time of each users network overload can be reduced. And the last one is history, the video portal is implemented in such a way that it collects the history of videos which are previously tagged by user. So the user can directly get the videos which they have tagged previously in this history list.

II. LITERATURE SURVEY

There are several successful video recommendation systems that have been developed and exploited. The most popular ones are mentioned below.

Content-based recommendation system:

In a content-based recommender system, keywords or attributes are used to describe items. A user profile is built with these attributes Items are ranked by how closely they match the user attribute profile, and the best matches are recommended. The systems make recommendation based on the similarities of content titles, tags, or descriptions. Some systems find user-interested items based on user's individual reading history in term of content.

The content-based approach has its roots in the research field of information retrieval which has been studied since the late fifties. In an information retrieval system a user enters a request for information and the system responds by identifying information sources that are relevant to the query. Many techniques that are incorporated in an information retrieval system can also be employed by a content-based filtering system such as the vector space model, latent semantic indexing and relevance feedback. Content-based filtering differs from information retrieval in the manner in which the interests of a user are represented. Instead of using a query an information filtering system tries to model the user's long term interests.

Collaborative filtering recommendation system:

The systems make recommendation based on abundant user transaction histories and content popularity. In the systems, individual user's interests are predicted by a group of similar users. Collaborative filtering (CF) is a technique used by some recommender systems. Collaborative filtering has two senses, a narrow one and a more general one. In general, collaborative filtering is the process of filtering for information or patterns using techniques involving collaboration among multiple agents, viewpoints, data sources, etc. Applications of collaborative filtering typically involve very large data sets.

Collaborative filtering methods have been applied to many different kinds of data including: sensing and monitoring data, such as in mineral exploration, environmental sensing over large areas or multiple sensors; financial data, such as financial service institutions that integrate many financial sources; or in electronic commerce and web applications where the focus is on user data, etc. The remainder of this discussion focuses on collaborative filtering for user data, although some of the methods and approaches may apply to the other major applications as well.

Context-aware recommendation system:

Context-aware recommender systems (CARS) generate more relevant recommendations by adapting them to the specific contextual situation of the user. The majority of the other existing approaches to recommender systems focus on recommending the most relevant items to individual users and do not take into consideration any contextual information, such as time, place and the company of other people (e.g., for watching movies or dining out). In other words, traditionally recommender systems deal with applications having only two types of entities, users and items, and do not put them into a context when providing recommendations. However, in many applications, such as recommending a vacation package, personalized content on a Web site, or a movie, it may not be sufficient to consider only users and

items – it is also important to incorporate the contextual information into the recommendation process in order to recommend items to users in certain circumstances.

For example, using the temporal context, a travel recommender system would provide a vacation recommendation in the winter that can be very different from the one in the summer. Similarly, in the case of personalized content delivery on a Web site, it is important to determine what content needs to be delivered (recommended) to a customer and when. More specifically, on weekdays a user might prefer to read world news when she logs on in the morning and the stock market report in the evening, and on weekends to read movie reviews and do shopping.

Graph-based recommendation system:

Graph is built in the systems to calculate the correlation between recommendation objects. Moreover, recommendation problem turns into a node selection problem on a graph. Incorporating conversion content and contextual information, links on video pages are converted to undirected weighted graph. Furthermore, the graph is partitioned for recommending videos of latent topic or long tail videos. Besides that, users friendships in social network can be described by a graph, and then, random walk with restarts is applied on the social graph to recommend items.

With the huge increase of user numbers, user contexts, user profiles, and video contents, recommendation systems require more and more computation capacity. To resolve the huge computation requirements Recommendation system based on user behavior is proposed.

DRAWBACKS OF EXISTING SYSTEM

- Context processing consumes huge computation.
- Limited content analysis
- No proper recommendation for new user
- Context collecting and exchanging result in heavy network overhead.
- Lack of scalability.

III. PROPOSED SYSTEM

Recommendation System based on user behavior works solely on the behavior made by the user. The user relationships and user profiles are collected from video-sharing websites to generate video recommendation. This involves in reducing the large context and overhead, to provide a better recommendation in less time. This recommendation system recommends videos based on the user behavior information.

Here we have consider 3 roles

- Admin
- Cloud Provider
- User

Admin:

Admin is the one who uploads videos to video portal. Each new video which are uploaded by the admin will be updated in the video list. These videos are provided for all the registered users of the video portal. Apart from this Admin's are provided with the functionality to check the user tags and video status.

Cloud Provider:

Cloud provider is the main responsible person for providing storage space. Cloud provider provides space for Admin to where Admin can upload videos. Along with providing storage space they can check the videos in the video list which are uploaded by the Admin. Cloud Provider can also check the Admin details, User details and Tag list.

User:

All the users who get services from the video portal should be a registered user of that video portal. First the user should register to the video portal by filling the registration from. Then they become the registered user of that portal. From next

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time they can login to the video portal to get their interested videos. All the videos will be provided to them in the video list. They can select and play songs from this list. After this the song can be tagged to other users of the video portal. They can also likes the song that they have played. They can also check tag list i.e. the videos tagged by other user to them and tag history i.e. the videos tagged by them to other users.

Recommendation system

The system recommends the videos based on the user behavior. This system recommends videos to user, which are uploaded by admin to cloud.

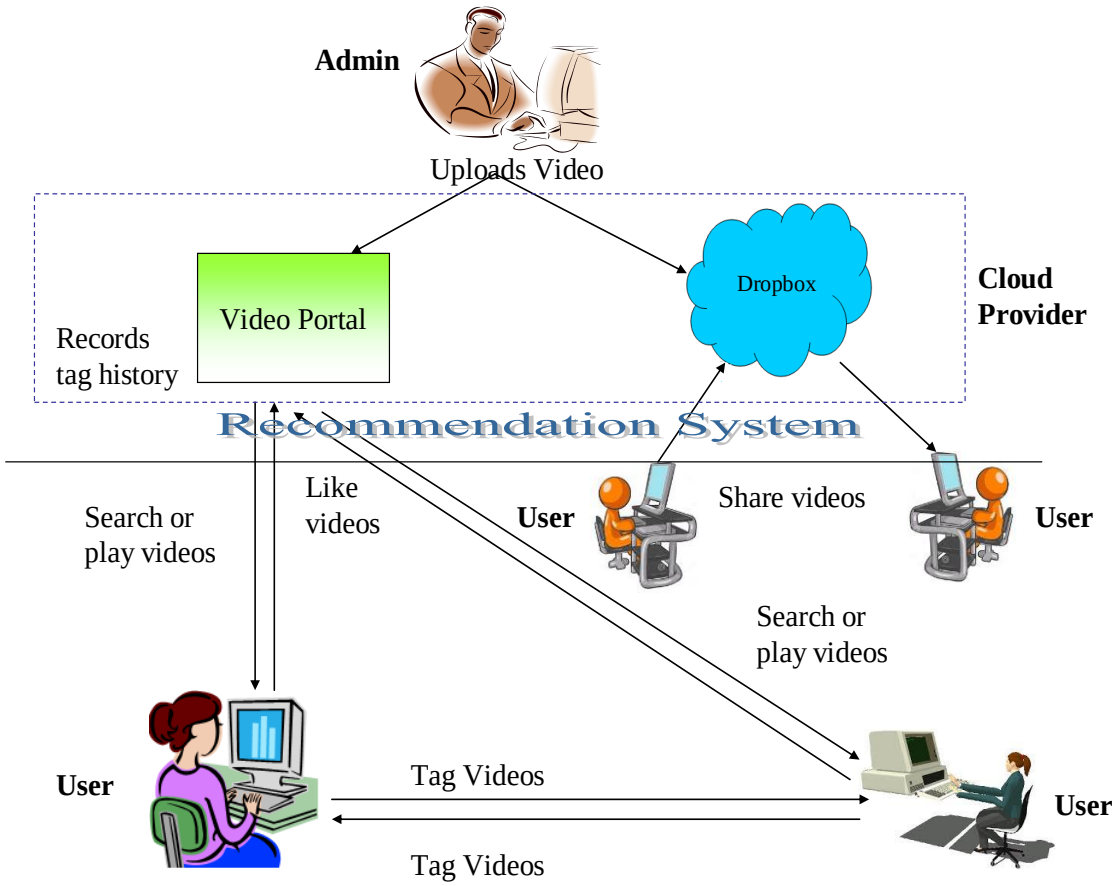

Fig: Architecture of Recommendation System for videos based on User Behavior

Use Behavior Information

Here we have considered 4 types of user behavior. Those are:

- Tag
- History
- Likes
- Share

Tag:

Video tagging is a new thing which we have developed as a part of recommendation process. Here a user A can tag a video to user B in the video portal. For that user A and user B both should be registered users of the same video portal. User A has to login for the video portal after that they should select a video in the video list, this list is same for all the user of the video portal. Then they can select a name of other users i.e. user B in the user list. Now the video song and the name of the user have selected. Next the user A can click on the tag button in order to tag the selected video for the

selected user. This tagging information will be updated in the database for the user B as tag list. And for User A that will be updated as tag history.

When user B logins to video portal, the tag information will be available to them in tag list. In this list they can directly get the name of the video which as tagged to them by other users. Then the user can copy the name of the video from the tag list and paste this in the search field and click on search. Now the video will be recommended for them in the search list. Hence thereby we can reduce the browsing/searching time of the user.

History:

All online websites like Youtube and Google collects user history based on the searching or previously played songs. Here we are collecting history based on the tag information. When a user tags a video to other user then the user who tags a video for that user tag history will be generated and updated in the database.

This information will be displayed to that user as history. So the users can directly get the videos which they have played previously in this list. They can copy the song in this history and can paste this in the search field to get and play the song.

Like:

Like is one of the user behavior we have considered for recommending videos to users. Users can select a video in the video list, play video and can like the video. When users clicks on like button, then the like count of that video will be incremented by 1, and that will be updated in the likes count list.

When a new user logins to the video portal, the videos having more number of likes count will be recommended in the top of the video list.

Share:

Share is the next user behavior we have considered to recommend videos through DropBox. Where, DropBox is a real cloud storage service which holds our data. In DropBox there is a feature called App Console, using this feature we can create a private folder and can name this folder in the DropBox to store our data. From this folder videos can be shared to friends as a part of recommendation.

Hence instead of manually searching the entire video portal for the interested video they can use the tag information to get the video in a less time. By reducing the browsing time of each users network overload can be reduced. And the last one is history, the video portal is implemented in such a way that it collects the history of videos which are previously played by the user. So the users can directly get the videos which they have played previously in this list.

ADVANTAGES OF PROPOSED SYSTEM:

- Provides better recommendation in less time.
- No large context processing and overhead
- Private Storage space for each and every Provider.
- Provide better scalability.

IV. CONCLUSION

Here we have proposed a recommendation system based on user behavior. We have analyzed four kinds of user behavior those are Tagging, History, Likes and Share. Distinguishing with other recommender system we have implemented all the user behavior which was mentioned earlier to form a hybrid recommender system.

Additionally we have stored videos in Dropbox, which is a real cloud storage service. Where, the videos can be shared to friends. Tagging and history helps in getting the interested videos in less time instead of manually searching the video portal. Likes helps in recommending the videos to new user i.e. when a new user login's to the video portal the videos which are having the more number of likes will be recommended in the top of the video list.

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