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Push mechanism and its applications in learning and entertainment

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Abstract. Nowadays, people often use the push mechanism in daily life, especially on websites and the applications such as video applications. People often spend a lot of time using it because of the push mechanism. The appearance of the push mechanism deeply affects people's daily life whether in socializing or entertainment, but most people don't know how the push mechanism works. This paper uses the literature analysis method, case study and review to focus on the development of the push mechanism, principle and its applications. The purpose of this paper is to increase public awareness of the application of the push mechanism and its principle. It can be found that the push mechanism is effective and helpful for all people whether what the identity of the people is.

Keywords: push mechanism, traditional mechanisms, fundamental principles.

1. Introduction

People often use the push mechanism these days. The push mechanism can also be referred to as Netcast, and Webcast which came up by the firm called PointCast Network in 1996 [1]. It is a communication model that relies on the Internet, where the server pushes data to the client without the client initiating a request [2]. The push mechanism is a theory that has emerged from the field of big data and can be regarded as a specific technology application. Its predecessors utilized cookies and recommendation algorithms to establish this theory [3]. Nowadays, this technology is employed by almost everyone in their daily lives. However, most people are unaware of the underlying principles of the push mechanism. Therefore, this thesis aims to provide an explanation of its fundamental principles and everyday usage from a unique perspective. This paper examines the concept and basic rules of the push mechanism, including its traditional mechanisms. Furthermore, it explores the application areas, limitations, and future developments of the push mechanism in the domains of education and entertainment. Throughout the paper, it reviewed a lot of theses which are about push mechanisms. It deeply researched its evolution and its traditional concept. During writing the thesis time, the author adopted the methods of induction and collation to have a particular explanation of push mechanism. This essay aims to popularize the understanding of the principles and nature of push mechanisms among the general public. Additionally, it can contribute to analyzing the evolution of the push mechanism and its algorithms in the future.

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2. Basic principle of push mechanism

2.1. Evolution of the push mechanism

In the traditional client and server system, the transformation of data depends on pull model which means the client will send the request to the server [1]. The server should send the data to the client by confirming its requirement. For example, if a person uses the phone to search online and the server gave him a message. During the technological process, the client is the applicant. The client pulls the data out from the server. The limitation and the disadvantages of this model are both apparent. The limitation is that the amount of transportation of data is low [1]. The advantage is the light network load. However, this model is no longer as useful as it used to be with the development of technology because of the big data age coming. The amount of data is increasing resulting in people cannot find suitable data as soon as possible.

The push communication model is from early natural human communication such as the smoke signaling or pigeon posts before the Christ era can also be counted in [2]. Push communication is not a new form of communication. The push mechanism doesn't depend on that people send clearly messages [2]. Times fly to the present, the push communication was applied to be used as a new mechanism in Big Data.

In 1999, the first company used this technology to provide personalized content, depending on clients' choices. In 2001, the push mechanism can depend on special things to provide client data and provide predicted data depending on behaviors. In 2004, the push mechanism can push to users in a specific area. In 2008, push mechanism can match push based on users and ads. In 2008, it can push based on social network relationships. In 2012, it can predictably push based on activities' time [4].

2.2. The analysis of push mechanism

First, the push mechanism can depend on the cookie. The cookie is the way that web servers use to collect clients' information. Cookies can be used to make clients and the server connected. If there is no cookie, the server cannot access users' accessing history [5]. The cookie is a basic and neutral technology worldwide. The server sometimes uses other same types of technology such as Web Beacon, and ET Tag [3].

Second, user profiling. This concept was come up by Alan Cooper who was the father of interaction design. He defined user profiling as a virtual representation based on real user data [6]. It means that the process of collecting, aggregating, and analyzing personal information to analyze or predict specific individual characteristics of a natural person, such as occupation, economy, health, education, personal preferences, credit, behavior, etc., and form their personal profile model." Among them, the direct use of personal information of a specific natural person to form their profile model is called direct user profiling; the use of personal information from sources other than the specific natural person, such as data from their social group, to form their profile model is called indirect user profiling [3].

Third, the recommended algorithm. It includes a lot of kinds. In the passage, it just refers to the collaborative filtering recommendation and the content–based recommendation. The collaborative filtering recommendation calculates the similarity between different users using techniques such as user profiling. The system then utilizes the opinions and evaluations of 'neighbors' who are highly similar to the target user in order to predict the target user's preference for specific products. Based on this preference, the system provides recommendations to the target user [7]. The collaborative filtering recommendation is not limited by the form of information representation. It can make client know their potential hobbies so that it is extensive use. The content-based recommendation recommends the client through product profiling and so on to calculate the similarity between the different products to recommend high similarity according to the chosen product information [3].

The document's author applies the principal form is in the following, based on information push technology [8]:

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Notification. The notification is the simplest pushing form such as the e-mail. A client can read the push information at any time or anywhere. Thus, the notification doesn't need to have strong interactivity or be mandatory. Meanwhile, it doesn't require a lot of resources or the broadband

Abstract. The abstract can facilitate accessing the full text or other related resources, but it needs people to provide the keyword, data and other query conditions to the server to solve.

Automatically pulled out. "Automatic retrieval" provides a set of pages for users to view, which can be saved for later access, making it convenient for users to review. Automatic retrieval can also obtain a lot of information and deliver it to users in the form of emails and other methods.

Automatic push. Automatic push allows users to define the refresh time and update information automatically. Users need to install special client software on their devices and customize the push information service for regular updates. This push service is highly interactive, allowing users to choose which information to browse, select information to send to other users, or send trial messages of interest.

Channel-based push. Channel-based push is a widely used model that treats web pages as channels for the browser. Users can choose to receive information of interest through these channels.

Web page-style push. Web page-style push delivers all information from a specific web page to the user.

Dedicated push. Dedicated push is similar to confidential point-to-point message delivery, using specialized software for sending and receiving information to specific users. Information push technology based on intelligent database system [9]:

User-initiated push: When a user makes changes to data and stores the updated data in the database, the information push service is triggered to deliver the updated information.

Server-initiated push: In server-initiated push, triggers are used in the server to activate the information push service. This typically occurs when there are changes in the database, and the triggers initiate the information push.

Offline information push: Offline information push refers to the delivery of information even when the user is offline or not connected to the network.

3. The application of push mechanism

3.1. Learning

Learning is a long process. It needs a long period of time to accumulate the knowledge. The development of the Internet can bring a huge influence, especially in this big data time. There are a vast number of free resources for studying on most of the websites such as YouTube or Bilibili. The push mechanism can help students to have better use of these resources. For example, if there is a program that aims to improve students' grades and study efficiency. This program uses push technology and can push students to the courses or the learning data about what students like or are interested to do.

Client Jerry is a high school student. The program needs Jerry to enter his grades, hobbies, goals and his studying scheme. The program can push him through these things:

Remind him the time to learn. The program can combine the studying goals and his goals. It can remind his courses when the impend courses are coming. Meanwhile, it can remind his assignments' performance. Telling him to work hard to avoid he cannot finish the homework when the deadline is coming.

Recommend some courses or events that Jerry may interested in. This situation combined with his learning scheme, hobbies and grades. It can recommend things accurately and avoid the courses that are too difficult for Jerry to learn.

Here the essay will briefly introduce the principle of the program and how it can do it [10]. This reference introduces the approach to use the neural network and the push mechanism to recommend students good courses. Figure 1 is a push model diagram that is used to filter the courses that students didn't study before.

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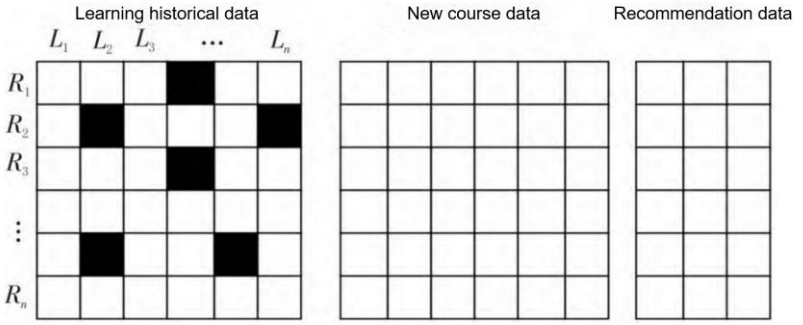

Figure 1. Push model diagram [10].

From Figure 2, it can be observed that the content-based collaborative recommendation model recommends courses based on student's individual characteristics and resource features.

The program can support students about the individual recommendation by the push technology. Let students have a better ability to control time and get more useful resources. In conclusion, the push mechanism in learning can help students to improve their study efficiency and academic performance.

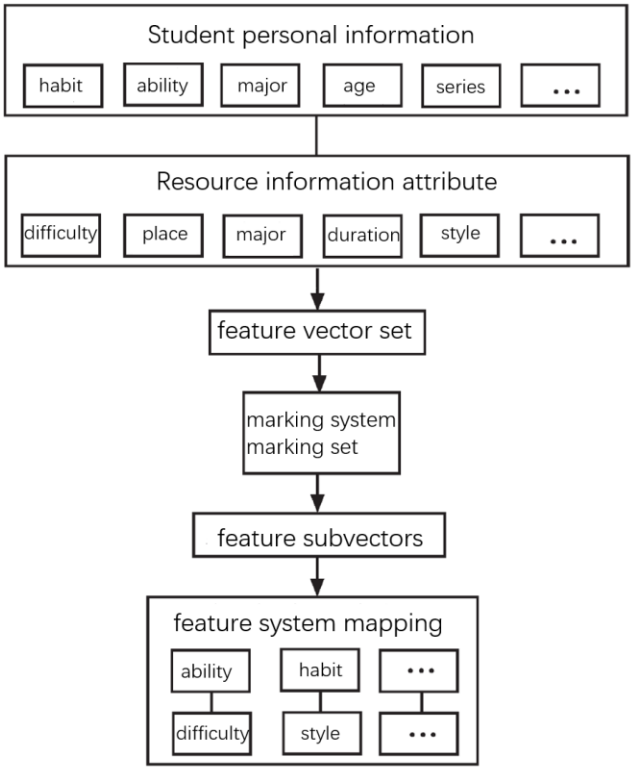

Figure 2. Content-based collaborative recommendation model [10].

3.2. Entertainment

Entertainment includes a vast number of aspects such as news, shopping, or applications like games or socializing. The key to providing a personalized experience is personalized push：

The application of news. Information explosion is an inherent characteristic of big data. However, the abundance of information not only brings convenience to users but also presents them with the dilemma of choice. To improve the situation, pushing precise news information can be delivered by

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gathering clients' consumption behaviors, browsing behaviors， transshipment behavior and comment behavior [11].

The application of shopping. Most clients find that the application of shopping will recommend the product data about the present necessary or recent shopping plans. It is not a coincidence, the applications' algorithm read the clients' present shopping behaviors or places to filter the suitable goods [11].

The application of socializing. These days, some people find that the ability of WeChat which is "people that you might know" can help them to find friends, classmates or neighborhoods who lose communication [11].

Through information push technology, in different application scenarios in the entertainment field, personalized content push can be provided to enhance user experience and meet user interests and needs.

4. Conclusion

This paper focuses on the development history, principle analysis, and applications of the push mechanism in the fields of entertainment and learning. This paper draws a conclusion that the push mechanism can make people live better because it can save people's time. This article primarily explores the application of the push mechanism in the domains of entertainment and learning through literature analysis, case studies, and the examination of its underlying principles. However, it does not extensively cover its application in the business domain or incorporate extensive data analysis. Future research can delve deeper into the push mechanism by focusing on data analysis and algorithmic analysis. This would enable a more comprehensive understanding of the underlying principles and facilitate the exploration of advanced techniques for enhancing the effectiveness and personalization of information push. Additionally, examining the integration of emerging technologies such as artificial intelligence and machine learning in the push mechanism would offer promising avenues for further research.

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