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Research on the application of personalized recommendation

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Abstract. With the development of the Internet, people have more opportunities to be exposed to personalized recommendations, and the heat of related topics has increased. The purpose of this paper is to summarize the application principle and use of personalized recommendations by analyzing the relevant data, so that people can have a better understanding of personalized recommendations and make preparations for future related research. This paper first introduces the general development context of the personalized recommendation system and its uniqueness. The analysis finds that personalized recommendations can provide users with the most relevant and valuable information, goods, or services according to their interests, preferences, and behaviors. Secondly, this paper explores the application scenarios of personalized recommendation systems in different fields, including but not limited to video content, e-commerce, and online learning. In addition, this paper also lists the application of YouTube and Netflix in video content recommendation, as well as personalized recommendation services in e-commerce and online learning platforms. In particular, the rise of intelligent adaptive online learning systems and their adaptability in the field of education and training are analyzed in detail. Through this research, it can be found that a personalized recommendation system is very beneficial to people's production and life, but at present, personalized recommendation is still in the development stage, and there are many problems to be solved.

Keywords: Personalized Recommendation, Short Video, E-commerce, Online Learning Platform.

1. Introduction

In the information age, the popularization of the Internet and the rapid development of digital technology make users constantly receive a large amount of information and content in their daily lives. As a result, information overload has become a common problem. On the one hand, users feel confused and tired, and on the other hand, they are often at a loss when faced with choices. There are many contradictions between users' individual needs and network information overload. In this case, the role of a personalized recommendation system becomes particularly important. By analyzing users' historical data and behaviors, these systems can provide users with personalized information, goods, and service suggestions to meet their diversified needs and improve user satisfaction. Carnegie, March 1995. Robert Armstrong et al., Mellon University, presented Web Watcher, a personalized navigation system, at the American Association for Artificial Intelligence. In 2000, D B Kurt et al of NEC Research Institute added a personalized recommendation function to a search engine [1]. In 2003, Google pioneered the monetization model of serving relevant ads based on the keywords that users searched for.

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AdWords has a high click-through rate and is the main source of Google's advertising revenue; In 2011, Zayan Network Technology Co., Ltd. added users' social information and users' invisible feedback information on the basis of traditional collaborative filtering recommendation engine, including webpage stay time, product page browsing times, mouse swipes, link clicks and other behaviors, auxiliary recommendation, and put forward the most accurate recommendation method based on social networks so far. This paper aims to understand the relevant information on the development of personalized recommendation systems, for several popular main application scenarios, and analyze its application principle and influence, so as to facilitate people to better understand personalized recommendations. Understanding personalized recommendation systems for People's Daily lives, work, and studies opens the door at the same time, it is necessary to reflect on its potential problems and prepare for promoting the future related research.

2. The development status of personal recommendation

The personalized recommendation system is the product of the development of the Internet and e-commerce. As an advanced business intelligence platform based on massive data mining, it provides personalized information service and decision support to customers. From March 1995 to Carnegie. From Web Watcher, a personalized navigation system proposed by Robert Armstrong of Mellon University and others at the American Association for Artificial Intelligence, to 2009, the famous retailer Overstock began to use the personalized banner AD program produced by the company to place products on some high-traffic websites. Resulting in "double the click-through rate of the ads and an accompanying increase in sales of 20% to 30%". To date, North America has been one of the biggest growth regions in the market, while Asia Pacific has been one of the fastest growing. Personalized recommendation technology has experienced rapid development in nearly 30 years, and has been widely applied to all walks of life in social service. The characteristics of a personalized recommendation system are clear, it can provide users with the most relevant and valuable information, goods, or services according to their interests, preferences, and behaviors. It mainly collects and analyzes users' historical data, such as browsing history, search keywords, purchase behavior, etc., to build user profiles and predict their preferences [2].

Personalized recommendation systems can use a variety of algorithms, such as collaborative filtering, content filtering, deep learning, etc., to extract patterns from massive data and achieve accurate matching of users' interests. YouTube and Netflix, as two typical cases, highlight the importance of personalized recommendations in the field of video content. Take YouTube as an example, as the world's largest video-sharing platform, it relies on deep learning technology to analyze massive amounts of video content and tailor recommendations to users based on their viewing history and interactive behavior. This not only improves users' viewing experience, but also increases the activity of the platform. Similarly, Netflix recommends movies and episodes that meet users' interests through deep labeling and user behavior analysis, and even adjusts the cover content according to users' preferences, so that users can better find their favorite content, so as to obtain the attraction of content, satisfaction of users and loyalty to Netflix.

To sum up, the personalized recommendation system provides users with personalized content recommendations through big data analysis and intelligent algorithms, which solves the problem of information overload and improves user experience.

3. Personalized recommendation application scenarios

With the continuous advancement of information technology and data mining technology, personalized recommendation has been widely used in different fields. The following will discuss the application scenarios of personalized recommendation in the field of music and e-commerce, as well as its impact on user experience and industrial development.

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3.1. Personalized music recommendations

In the past, due to limited music information, people's music choices were limited, and users often struggled to discover music that suited their tastes. With the rise of digital technology and the Internet, access to music has become extremely easy. Platforms such as music streaming platforms, online music stores, and social media have greatly enriched users' access to music [3]. However, the problem of information overload also comes to face, making it difficult for users to accurately retrieve the music that meets their needs from the huge music library. As a result, personalized music recommendation comes into being. Through data analysis and machine learning technology, personalized music recommendation analyzes data such as user behavior, preferences, and consumption records to gain an in-depth understanding of users' music preferences and habits. Different from traditional leaderboard recommendations, personalized recommendation pays more attention to the individual needs of users, thus providing more accurate and intelligent music recommendations. The system will analyze a user's playback history, download record, search behavior, etc., build a user profile, and then predict the types of music a user may be interested in. Such personalized recommendations not only provide users with a better music experience but also help the development of the music industry. Personalized recommendation technology in the music field has played an important role in solving the difficult problem of music selection, improving user experience, and promoting the development of the music industry.

3.2. Personalized recommendations in e-commerce

In the field of e-commerce, personalized recommendations also play a crucial role. Faced with the huge quantity of goods, users often find it difficult to quickly find the goods that meet their needs, then personalized recommendation services came into being. Personalized recommendation services can accurately provide users with product recommendations that meet their interests and needs [4]. Accuracy information recommendation, hot information recommendation and interest recommendation are common personalized recommendation methods in e-commerce. These methods utilize big data to analyze users' browsing, purchase records and behavioral preferences, and provide users with personalized product recommendations, thereby improving the purchase rate and user satisfaction [5]. Keep in mind that for successful personalized recommendations, the e-commerce sector also needs to focus on the basics. The security of big data is a key issue, and protecting the privacy and security of user data cannot be ignored. In addition, the accuracy of a sound recommendation system and personalized recommendation is also a key success factor, which needs to be continuously optimized and improved to meet the changing needs of users [6].

3.3. Adaptive online learning

The rise of intelligent adaptive online learning is an important innovation in the field of education and training, and it is also a major innovative measure of personalized recommendation systems. The intelligent adaptive learning system adjusts the learning content, way, and progress according to the learner's personal characteristics, learning behaviors, and needs, so as to achieve a more suitable learning experience for learners. With the help of advanced technology, it provides personalized learning support and resource recommendations for learners to improve the learning effect and user satisfaction. This personalized learning mode breaks through the limitations of traditional education mode and makes learning more targeted and effective [7]. Under the background of the rapid development of information technology, intelligent adaptive learning system has developed rapidly. It uses technologies such as big data analysis, machine learning, and artificial intelligence to extract valuable information from learners' behavioral data and provide support for personalized learning. This technology makes learners no longer limited by fixed teaching materials and learning paths, but according to their interests and ability characteristics, access to their own learning resources, so as to achieve more efficient learning. The characteristic of personalized learning is that according to the differences of learners, the learning experience is tailored to each learner. The characteristics of personalized learning are reflected in several aspects.

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Customized learning plan: An intelligent adaptive learning system can automatically generate a personalized learning plan according to the learning progress, level, and goal of learners, to help learners arrange learning time and content reasonably.

Resource recommendation: According to the interests and needs of learners, the system recommends relevant learning resources, such as articles, videos, exercises, etc., to provide more attractive learning materials.

Progress adjustment: The system can adjust the learning progress in real time according to the learning performance of learners, avoid too easy or too difficult content, and keep the learning moderately challenging.

Adaptation of learning style: According to learners' learning preferences, the system can provide different learning styles, such as text, images, videos, etc., to meet the needs of different types of learners.

At present, adaptive learning systems have been adopted in many fields, and remarkable results have been achieved. In the field of education, many online learning platforms, such as Coursera and edX, have introduced intelligent adaptive learning systems to provide learners with customized learning suggestions and resources based on their learning history and performance. Enterprise training also applies adaptive learning to customize training plans for employees according to their positions, job requirements, and ability levels to improve training effects [8]. The emergence of intelligent adaptive learning systems has also promoted changes in the field of personalized recommendation systems. Take music recommendation as an example. Music streaming platforms such as Spotify use adaptive learning systems to analyze users' music preferences and recommend music that suits their tastes. In addition, the personalized recommendation in the field of e-commerce also benefits from adaptive learning technology, which recommends interested goods to users based on their shopping history and browsing behavior [9]. To sum up, intelligent adaptive online learning, as an important innovation, improves the learning effect and user satisfaction through personalized learning support and resource recommendation. Applications in different fields show that the adaptive learning system has achieved remarkable achievements, providing learners with a more personalized and effective learning experience.

4. The Impact of Personalized Recommendations

Personalized recommendations technology has had a profound impact in multiple fields, bringing positive changes to user experience and industry development. The field of video content is one of the areas where personalized recommendation technology has exerted a great impact. Take YouTube as an example, its recommendation system can accurately recommend videos that suit users' interests by analyzing their viewing history, likes, comments, and other behaviors. This personalized recommendation not only makes it easier for users to find content they are interested in but also increases their stay time and interaction rate on the platform, expanding the influence of the platform. For YouTube, attracting more users and creators is the key to its long-term growth. They have successfully used personalized recommendation technology to provide users with customized video content, and have achieved remarkable success. Of course, a personalized recommendation system still needs to face a series of challenges such as data privacy and algorithm quality, which requires continuous innovation and optimization. Similarly, in the field of education, online learning platforms such as Coursera make full use of personalized recommendation technology to recommend courses that suit learners' learning goals and interests. This kind of customized recommendation not only increases learner engagement but also provides the educational institution with a broader student base, thus promoting the long-term health of the educational institution.

Social media also needs the help of personalized recommendation technology. Sites like Facebook and Instagram use personalized recommendation algorithms to put content that users are interested in at the forefront of their social networks. For example, Facebook's news feed and friend engagement recommendations are personalized algorithms that help users better explore and connect with content within their social circles. This kind of customized content distribution makes users more engaged, while also promoting user growth and stickiness on the social media platform.

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5. Conclusion

This paper discusses the application of personalized recommendation systems in ecommerce, music streaming media, and online learning. The research found that personalized recommendation systems can help consumers quickly find the content they are interested in, save time for searching and filtering, and improve the user experience while also having a positive impact on related industries. A personalized recommendation system can recommend relevant content according to user preferences, help users discover new content and new resources faster and better, and improve the efficiency of content consumption. Based on the data-driven business model, merchants can also better understand user needs through the system, optimize content production and distribution strategies, and achieve more accurate advertising and commercial realization. Moreover, with the continuous progress of AI technology, the algorithm and model of personalized recommendation systems will be continuously optimized and upgraded, and in the foreseeable future, they will be more accurate and intelligent, which can provide users with a better recommendation experience. Along with the development of technology, personalized recommendation systems will face challenges in terms of data privacy and algorithmic fairness. Organizations such as the media need to pay attention to the protection of user privacy and the fairness of algorithms when applying them, and users and relevant departments need to pay timely attention to the ethical and social impact to ensure that the use of personalized recommendation systems does not lead to information filtering bubbles or socially unfriendly behaviors.

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