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Problems and Optimization Strategies of Intelligent Recommendation System for Short Video Platform

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***Abstract**: After explosive growth, the market pattern of short video platform gradually stabilized, and users have become an important resource for competition among short video platforms. Intelligent recommendation system can analyze user data for short video platform more effectively and enhance the competitiveness of the platform. However, the intelligent recommendation system widely used in the short video platform has the problem of lack of values, the user information exposed to the network is also lack of security, and the tagged matching mode forms a Mobius ring. User anxiety is also magnified in the Information Cocoons. If the short video platform wants to gain user trust and market share, it is necessary to constantly optimize the intelligent recommendation system, enhance the protection of user data information through people intervention in the values of the algorithm, set up a human-computer interaction innovation mechanism that meets the requirements of the development of the platform, and upgrade the recommendation system with multiple indicators.*

***Key words**: Intelligent recommendation; Algorithm; Short video; User data*

Intelligent recommendation system, also known as personalized recommendation system, mainly depends on mining massive data, through machine learning to provide users with personalized information services and decision support.

Short video platform uses intelligent recommendation technology to push short videos with user preferences, which can not only improve the viewing experience of users, but also promote the click rate and conversion rate of short video platform. According to the data of the *2019 China short Video Industry Development trend report* published by *Fastdata* in February 2020, as of December 2019, users had launched an average of 2.61 billion short video APP times a day, an increase of 14.1% over the same period last year. Contrary to the huge entry ratio, the core users of short videos are becoming more and more impatient, with an average of nearly 7 short videos per minute, that means, when intelligent recommendation system classified and focused on users, it is also being screened by users in reverse. In fact, the intelligent recommendation system faces not only the pressure of user choice, but also the challenges of information security and values. The short video platforms have to solve these problems and optimize the intelligent recommendation system.

The Present Situation of the Use of Intelligent Recommendation System

The competition pattern of the short video market has been formed in 2019. The short video platform

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dominated by *Douyin* takes the lead, and fierce competition continues to push the short video platform to open up its own user positions. These platforms have promoted their own intelligent recommendation systems and made full use of the user data for algorithm.

The market pattern of short video platform is gradually stable

After several stages of exploration and growth, the short video industry has entered a mature period, and the market pattern of the short video platforms is gradually stable. On the whole, China's short video industry concentrate on the shape of "triangle", while the concentration degree of user scale is in the shape of "inverted triangle". There are few high-quality platforms in the head, but the user scale accounts for more than half of the total user scale. Among the top 20 short video APP on the market, *Douyin*, *Kuaishou* and *Watermelon* are the top three, with *Douyin* reaching 459.39 million monthly active users in December which is much higher than the total number of long-tailed platform APP at the bottom. The intelligent recommendation system creates favorable conditions for the rapid expansion of the short video platform, especially when a large number of short video platforms pour into the cake to carve up the user dividend, the algorithm distribution of the intelligent recommendation system can accurately locate the users. However, "Lewis turning point" of short video users has appeared, the user value is further enhanced. The short video industry will certainly launch more fierce competition in producing high-quality content supported by intelligent recommendation, stabilizing existing users, expanding potential users and so on.

Competition in the short video market leads to intelligent recommendation

At present, the short video industry has transitioned from the "short video +" mode with short video as the auxiliary expression mode to the "+ short video" mode standard with APP, and striving for user resources has become the core element of the industry competition. According to data from *China Internet Information Center (CNNIC)*, as of June 2019, the number of short video users had reached 648 million, accounting for 75.8% of the total Internet users. These users are not just content consumers, they may also be content producers. The huge user base has led to the emergence of a large amount of short video content on short video platforms, and users' worry is no longer that there is no video to watch, but that there are too many kinds of content. Users may think about "what should I watch" and "what do I want to watch". In order to solve the contradiction between content provision and users' personalized needs, improve user connectivity, and actively introduce intelligent recommendation function, short video platform can meet the changing personalized needs of users. Intelligent recommendation system can help users find the video content they are interested in easily and quickly. When users choose the viewing platform, they will naturally rely on the system push of the platform to enhance user connectivity.

Intelligent recommendation is widely used in short video platforms

In the context of fierce competition in the short video industry, how to attract users, keep them to use platform, and provide users with high-quality personalized content services has become the key to operation. With the increase time using APP, users will have more interaction, while the more abundant data obtained by the intelligent recommendation system, the more accurate the recommendation based on these data. As a result, users cannot leave short video platform. *Douyin* is a very successful representative of the use of intelligent recommendation system. Since its launch in September 2016, with the more mature

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recommendation algorithm of *Jinri Toutiao* platform, *Douyin* has quickly gained a firm foothold in the short video market. *Douyin* has overtaken an established platform *Kuaishou* with daily active users within a year of launch, successfully won the top spot in the short video industry. However, the intelligent recommendation system is not exclusive to *Douyin*, and other short video APP also have this function. With the progress of technology, intelligent recommendation system may no longer be the core competitiveness of short video platform, but will become a basic capability, but what needs to be solved urgently is still the problem of recommendation algorithm. It is to explore and optimize a more competitive intelligent recommendation system.

The content of intelligent recommendation tends to be homogenized

The original intention of intelligent recommendation, which varies from person to person, is to recommend the desired short video content to users in a short time by grabbing and analyzing user data information, but the long-term fixed type recommendation can easily lead to the lack of novelty, surprise and diversity of recommendation results. It is easy to cause homogenization of recommended content. For example, users who watch "cat movies" on *Douyin* contribute their own preference data through likes, retweets, comments, and they will always receive the same or similar content without actively abandoning similar topics. There may even be e-commerce recommendations with such short videos as keywords. The algorithm operation data of the intelligent recommendation system comes from the data generated by the user "in the past", which has always been lagging. Even if the user's preference trend can be determined by calculation, this is only the logic of the machine which cannot fully meet the user`s various tastes. When the user preference changes, but the intelligent recommendation system still recommends homogeneous content based on the user's previous behavior data, it will make the user feel bored and then give up the platform.

The Problems in the Application of Intelligent Recommendation System

The short video platform depends on the recommendation algorithm, and the recommendation algorithm depends on the user data analysis, which can be said to be massive. Every user has a network "digital twin", but these numbers promote the development of the short video platform at the same time. Also imprisoned the users of the short video platform.

Lack of values in intelligent recommendation

Intelligent recommendation seems to point out a "broad road" for users in the "information fog". In fact, the algorithm recommendation focuses on data capture and cannot identify the value orientation of the content. it is possible to distribute content that does not conform to the mainstream value orientation to users. According to the data of the *2019 China short Video Industry Development Trend Report* published by *Fastdata* in February 2020, among the users of the short video platform in the fourth quarter of 2019, the enthusiasm of users with junior middle school education and below is high, but users with high academic qualifications are fleeing quickly. From this phenomenon, it is obviously that young and poorly educated users are unable to correctly judge whether their interest orientation is in line with the mainstream values of the society. This problem is magnified by the algorithm, resulting in intelligent recommendations that lose values. Once there were a large number of "indecent dance" incidents on *Douyin*. In these videos, the girls danced with the

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music in see-through dress , and if girls had fierce movement, you could see that the girl's trousers seemed to disappear. The error of intelligent recommendation technology leads to the unhealthy content provided by the short video platform, which is likely to violate the red line of the law and lead to serious consequences.

User information are insecurity

The algorithm recommendation in the short video platform needs to obtain a large amount of information and data of the user, the more data, the more accurate the user portrait. Users have contributed their own data information consciously or unconsciously when using platform, and the algorithm recommendation has been "following" and "analyzing" the users. The vast amount of personal information is like skin exposed to the sun, with nowhere to hide and enjoy. In 2019, *Jinri Toutiao* received a personal information protection injunction issued by the court on suspicion of infringing users' personal information. Mr. Dou, a *Douyin* user who is one of the people involved, said that he had never used his independent social product Duoshan, but was told by a friend that he had seen a recommendation for his *Wechat* on Duoshan. Before that, Mr. Dou had only used *Wechat* to log in to *Douyin*. On March 12, 2019, the Suiyang District Court in Shangqiu City, Henan Province issued a pre-litigation injunction against *Duoshan*, requiring its operator to stop using Mr. Dou 's profile picture and nickname in *Duoshan* and to recommend Mr. Dou to other users. Coincidentally, before this incident, *Douyin* has been exposed to infringe upon users' personal privacy. The algorithm distribution mechanism of intelligent recommendation system has appeared the guarantee of personal information security and the risk of user privacy leakage, which has become an important factor affecting the development of short video platform, the platform should pay full attention to and take corresponding measures.

Tagging to form a Mobius ring

The German mathematician Mobius once proposed a cyclic and endless structure with no beginning and end, the famous Mobius ring. The intelligent recommendation system constructs a Mobius ring between the "tagging" and the user. On the short video platform, the intelligent recommendation system relies on the user's personal data and the content data of watching the video. The algorithm recommendation will create a portrait by collecting the user's past browsing and recording behavior and the user's basic information to form a user tag. The system will also tag the video according to the video content, and the user tag matches the video tag. In the process of later use, the intelligent recommended Mobius ring was formed. For example, if the user likes, comments and retweets the video about makeup, and plays the video repeatedly, then the algorithm thinks that the user likes the video about makeup very much, and the system will continue to push videos similar with tags. When users watch more and more such videos, they will also form user preference tags with high credibility, and the system once again recommends videos according to the tags, and so on, users may find themselves trapped in the Mobius ring. Although the short video platform can get users in this way in a short period of time, it will definitely leave when users see more novel content on other platforms, and the continuous loss of users is not conducive to the development of the short video platform.

Anxiety of users in Information Cocoons

The recommendation content of the intelligent recommendation system imprison users in the Information Cocoons. Due to the lack of understanding ability and contact opportunities for different things, users will

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have anxiety. Part of the reason for Information Cocoons is that the intelligent recommendation system interprets personal preferences too much. The intelligent recommendation system will recommend to users what they like and want to see according to their personal preferences, which limits the possibility for users to explore other fields to a great extent. Users enjoy the convenience and pleasure of algorithm recommendation when using the short video platform, but when users put down their phones and socialize with the people around them, they will find that the popularity they know is different from that of others. Because conformity psychological users begin to feel anxious because of their "ignorance". When users find that the Information Cocoons built by the short video platform has affected their psychological status, some of them will be separated from the platform, resulting the loss of users.

The Optimization Strategy of Intelligent Recommendation System

Since 2019, the user scale of the short video platform has ushered in a " Lewis turning point ", active users have declined for three months in a row, and core users are becoming more and more impatient. In order to increase the loyalty degree of users and improve the market retention rate, the short video platform should solve the problems affecting its development by optimizing the intelligent recommendation system.

Human intervention in the values of algorithms

With regard to the controversy caused by the recommendation of algorithms, Zhang Yiming, founder of *Jinri Toutiao*, said that he is most taboo about values first-"the technology is neutral and the algorithm has no values." Technology is neutral, but people who use it have value tendencies. When using the intelligent recommendation system, it should also be intervened manually. First of all, manually set up a constantly updated sample library of illegal content. In the final analysis, the algorithm is a machine learning process. In order to improve the recognition ability of the system, a detailed database must be established, which should be constantly updated and expanded according to the network content. Secondly, the verification mechanism should be strictly identified. When the machine identifies the video content, if it is found that there is content marked as a violation in the sample library, such illegal video will not be issued through audit, but the audited content should be entered into another manual sampling system, which is guided by the manual input value to spot check and verify the content approved by the machine, and then put into the platform after it is correct. Through the intervention of the algorithm recommendation in the way of manual input value orientation, it can make up for the disadvantages caused by the lack of values of the algorithm to a certain extent. At present, global machine learning is still in its infancy, and the ideal machine learning may not be completed, but we can make up for the deficiency of machine learning by investing in relevant technical audit mechanisms.

Enhance the protection of data and information

When analyzing the algorithm, intelligent recommendation needs to read a large amount of user data information, which comes from the reading of user information and behavior. However, the limit of reading personal information has not been clearly defined. In order to ensure the security of user information and prevent the disclosure of personal privacy, it is necessary to establish corresponding regulations and mechanisms to actively guide the healthy development of the algorithm. First of all, the relevant regulatory

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departments should improve laws and regulations in a timely manner. The relevant regulatory departments should adjust the algorithm to recommend the punishment and reward mechanism for personal information security according to the specific situation of the development of intelligent recommendation short video platform, and give technology and technology users a clear legal boundary to ensure the bottom line of information security. Secondly, the short video platform must give users the right to choose. Many short video platforms default that users agree to collect their personal information, most users "agree" to release their personal information without knowing it, and some even cannot use the APP if they don't agree. The short video platform must fully respect the user's right to know and protect the user's right to privacy. Before reading and using the user's data, the short video platform should tell the user what information will be obtained and to what extent the information will be obtained, where will it be used and then users can choose whether they are willing to provide this information or not. Through the mandatory means of personal information supervision, we can protect users' right to privacy from the source and ensure the security of users' information.

Setting up an innovative mechanism for human-computer interaction

The algorithm recommends that the "tag" is used to match the user and the video, forming a Mobius ring, which can be cracked through the interaction between the algorithm and the user. The algorithm of intelligent recommendation system for short video platform can establish a good relationship with users and form a human-computer interaction innovation mechanism through data analysis of users. There are a large amount of video content on the short video platform, including user-generated high-quality videos. Intelligent recommendation systems can learn to identify original high-quality content and randomly distribute these original videos outside the tag content to users. It is up to users to judge whether the video is in line with their preferences. When the behavior data actively explored by the user is read, the data is read and analyzed by the system, and combined with the basic traffic and user score, feedback to the user and video producer. After the innovation mechanism of human-computer interaction is formed, the recommendation plan of the algorithm to users will be changed.

Upgrade the multi-indicator recommendation system

At present, the algorithm recommendation mechanism still has a lot of space for improvement in the setting of indicators. There are a large number of user information and video information on the short video platform, which can add more flexible metrics to the existing algorithm index system.

A. Content satisfaction index

Content satisfaction index is the data collection of users' satisfaction with videos. After users watch a certain amount of videos, they can score the satisfaction, score the videos they see, and describe the users' preference curve through the scores. It provides a reference basis for timeliness indicators, and can also judge users' loyalty in advance.

B.The data limitation index

The data timeliness index includes the data timeliness of video content and the data timeliness of user

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preference. Over time, users' preferences may change, and intelligent recommendation systems need to understand these changes by analyzing user usage data. For example, to adjust the timeliness of recommended videos according to the popular direction, just as there are many videos in a dance, you can gradually reduce or increase the amount of push after taking into account the user's preference, so as to ensure that the information is timely and do not make users feel bored at the same time. The intelligent recommendation system should adjust the push proportion of users' favorite videos and other videos according to the results of data analysis, give users access to other high-quality videos, discover their potential preferences, and enrich the video content received by users. users can not only escape the barriers of the Information Cocoons, but also continue to enjoy the satisfaction brought by intelligence.

The development of short video platform can be said to be a victory for netizens, users are very important for short video platform, how to maintain the loyalty degree of users is the core issue. Intelligent recommendation provides reliable technical support for the accurate positioning of users, but users are not simply 0 and 1 in the network world, but have the complexity that machine algorithms cannot learn. Short video platform can use intelligent recommendation to create personalized recommendation service for users and win a strong competitive position for its own platform in the short video industry. However, we should also pay attention to the shackles brought by the algorithm. Only by fully grasping the market ecology, human-computer interaction, and combining high-quality content with algorithm recommendation, can we create a short video soil suitable for innovation and form a virtuous circle of creative space, and also to be able to go for a long time.

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