Research on New Media Precision Marketing Method Based on Big Data Information Automatic Push

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Abstract: Aiming at the problems of low precision and overload of commodity push system, this paper proposes a precise marketing push model based on user portrait feature information. Based on the analysis results and scoring matrix of users' historical behaviors, the user's interest model is constructed, and it is transformed into the user's label model by using label rules. At the same time, the Thrift framework interface is called according to a variety of mixed rules, and the user's preferred push commodity list is returned, so that an accurate marketing push system with excellent performance and low delay time is realized. The simulation results show that the precision marketing push system in this paper uses NDCG algorithm to optimize the parameters, which has high accuracy and stability.

Keywords: Marketing Push, Intelligent Analysis, System Design, Simulation Experiment.

1 INTRODUCTION

It has become an important research topic in the field of intelligent new media information service that how to discover the information that users are interested in from a large number of new media information resources with complex contents and push it to users in time, so that users can get useful information in line with their interests in time. With the help of increasingly mature cloud computing technology, a smart new media information push system based on cloud platform is constructed, which fully integrates massive information resources, realizes the analysis and mining of massive data, and pushes new media information that meets users' personalized needs by combining their information needs, psychological tendencies and behavior habits [1].

With the rapid development of e-commerce, new network marketing methods have gradually become an important part of e-commerce platform system. In the past 20 years, the number of goods sold by e-commerce companies has been increasing at a high speed every year, which directly leads to the difficulty for users to query the goods they really need. With the large-scale application of mobile Internet technology, this problem has become increasingly prominent. To solve the above problems, the concept of big data with data mining and other technologies as its core has been put forward [2]. However, it is difficult for big data technology to completely solve the above problems at present, that is, the accuracy of data mining technology is low. With the gradual expansion of its application scope, the push systems of many e-commerce

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platforms have the problems of low push accuracy and overload of goods. The root is that the design of data mining algorithm of the system is not reasonable enough, and it is difficult to capture users' complex interests, so it is difficult to push the products that users really need [3].

With the continuous expansion of information system business scale and refined management, the increase of information system load is more and more obvious, and the requirements for the reliability and stability of information system are higher and higher. In order to improve the reliability and stability of the information system, Liu and H established a safe and stable performance analysis system. Therefore, the throughput, response time and other performance indicators of the information system are obtained first. Second, establish a performance baseline between load, response time, and resource consumption [4]. In order to improve the marketing effect of e-commerce products, this paper constructs an e-commerce product marketing model based on machine learning algorithm, Cui, F. In addition, this paper studies the classical reinforcement learning algorithm Q learning, and proposes an improved Q learning algorithm [5].

2 DEMAND ANALYSIS

A large number of technology companies such as Microsoft and Amazon have gradually developed personalized push software based on user portraits and interests. Aiming at the problems of low precision and commodity overload of these softwares, this paper analyzes the functional and non-functional requirements of marketing push system in detail.

2.1 Functional Analysis

From the functional point of view, the traditional marketing push system has two serious problems, namely, poor readability of users' data and frequent loading and unloading of goods. To solve these two problems, the push system based on user portrait features should meet the following two main functional requirements:

(1) Good push content, that is, mining the user's preference information from the user's massive behavior data with the greatest strength and degree, and forming push data in a certain format;

(2) As it is difficult for non-technical personnel to extract information from pure data, the push system should realize the visualization of push data, so as to facilitate the operation of data summary and life cycle query by system maintenance personnel.

2.2 Non-Functional Analysis

With the widespread use of mobile Internet terminals, push systems should meet the following non-functional requirements:

(1) The resources occupied by the recommender system are reduced as much as possible, and the recommender system has to deal with massive behavior data, so the CPU and memory of the system are under tremendous pressure. At this time, how to ensure that the system takes up less resources is an urgent problem to be solved.

(2) The recommended system should have a high throughput rate and reduce the error rate of data mining. Because the recommendation system mainly connects the data end and the calling

end of the system by interface, the system will frequently exchange a large amount of data through interface. At this time, within the carrying capacity, how to realize the operation of the system with low error rate and high data throughput rate is a problem that needs to be considered in the system design.

Based on the above demand analysis, this paper puts forward an accurate marketing push system of goods based on the portrait characteristics of users, which consists of subsystems such as user portrait model and personality push platform [6].

2.3 User Portrait Model

In marketing push system, user portrait is a computing model that depicts the whole situation and realizes labeling. In order to realize the personalized push of goods, this paper designs several modules of the user portrait model, and the specific architecture is shown in Table 1.

TABLE I. USER PORTRAIT MODEL MODULE

User portrait model	
Visualization display	Label display
	Multidimensional data display
	Preference data display
	Market data display
	Life cycle display
Portrait feature description	Build label model
	Constructing interest model
	User data acquisition

As can be seen from Table 1, the user portrait model consists of portrait feature description and visual display. Among them, the former is the core of the portrait model, while the latter is mainly responsible for the display of the model. This paper mainly elaborates the methods of portrait feature description, and the specific contents are as follows:

User data acquisition. In the user portrait model, collecting user data is the most basic and important step in building the model. JavaScript is often used to collect web page data and store it in HDFS file system. The specific architecture is shown in Figure 1.

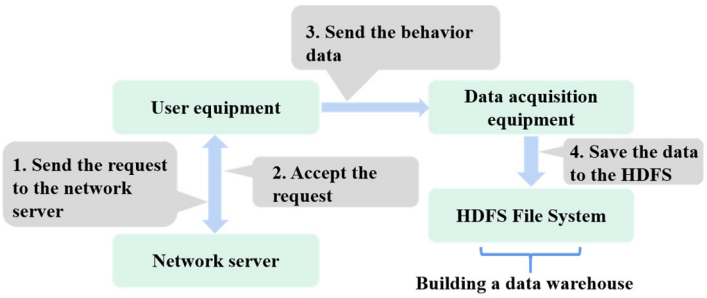

Figure 1. User data acquisition architecture diagram

(2) Build an interest model. Building an interest model is also a key step in building a user portrait model. This step uses the user's basic and behavioral data to guess their personal preferences, and shows the user's interest through the corresponding scoring algorithm.

(3) Build a label model. In the user portrait model, the tag model needs to analyze the necessary user behaviors, preferences and basic attributes according to the user interest model. In these analysis processes, the model needs to analyze a large number of user data indicators [7].

2.4 Personality Push Platform

After the user portrait model is built, the system also needs to implement a push platform with strong personality. In the implementation of this platform, this paper divides it into Task layer and Service layer: Task layer is responsible for extracting user interest model data, and Service layer is responsible for implementing the encapsulated data interface. It is elaborated as follows:

Task layer. In the implementation of Task layer, when the platform obtains the user's interest model, the push platform needs to complete three specific processing operations. ① The push platform removes the expired off-shelf products by calling the interface of the current product; ② The push platform needs to obtain the user's historical push data, so as to filter the pushed products.

Service layer. In the implementation of the Service layer, the push platform needs to provide the corresponding mixed operation rules for the interest model in the form of interface, and its specific operations include: ① The platform needs to set the operation positions of commodities, add the operation positions of other competing products with higher commercial value, and realize the configurability of commodity operation positions; The push platform must be able to tolerate a certain error rate, which is because it is difficult to keep the commodity information in real life in an accurate state; ③ The push platform mainly pushes specific commodity information to users through Thrift interface [8].

3 SIMULATION EXPERIMENT

Based on the above demand analysis, this paper proposes a precision marketing push system for goods based on the user's portrait characteristics, which is composed of user portrait model, personalized push platform and other subsystems. Its application architecture is shown in Figure 2.

It can be seen from Figure 2 that, first of all, in the user portrait model, the system uses a large number of user basic data and behavior data to extract and form the unique tags and attributes of users, so that all user groups can be divided in detail; Secondly, the personalized push platform extracts the tag model in the user profile from Hive warehouse tool, and provides it to the calling device in the form of interface call after filtering.

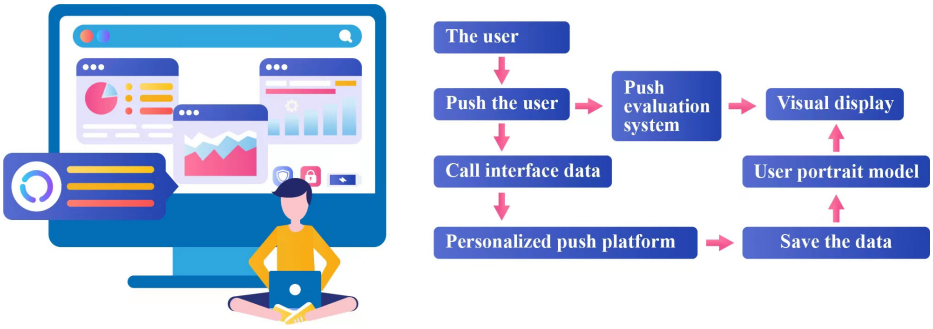

Figure 2. Application architecture of marketing push system

In order to verify the accuracy and stability of marketing push system, this paper uses Web, data collection and Hadoop distributed servers to test the accuracy of commodity push. In the simulation process, the hardware and software environment of the push system are set up. Among them, Huawei cloud server is used in the hardware, and its memory is 8 GB and hard disk is 80 GB.This paper adopts Linux distribution, Redis 2.6 and Hive database, and Hadoop 1.2 distributed server software. In the specific simulation process, this paper randomly selects 10,000 user data from the published real business test data set [9]. Through five consecutive tests and calculation of user satisfaction rate, the traditional push system is simulated and compared with the push system proposed in this paper, and the corresponding simulation results are obtained, as shown in Table 2.

TABLE II. RESULTS OF USER SATISFACTION RATE OF TWO PUSH SYSTEMS

Test times	Traditional system	This paper system
1	0.541	0.978
2	0.348	0.986
3	0.426	0.968
4	0.208	0.976
5	0.436	0.972

As can be seen from Table 2, the user satisfaction rate of the traditional push system is between 0.208 and 0.541 during many tests; The user satisfaction rate of the push system proposed in this paper is between 0.968 and 0.986. It shows that the user satisfaction rate of the proposed marketing push system is significantly better than that of the traditional marketing push system [10-15].

4 CONCLUSIONS

Based on the characteristics of user portraits, this paper proposes a high-precision marketing push system. For a large number of e-commerce platform users, this system can push some kind of commodity information that users really prefer, thus saving advertising costs and enhancing the commercial value of e-commerce platform. However, there are still some

shortcomings in the system proposed in this paper. For example, the push weight calculation of personalized recommendation platform is not accurate enough, which needs further optimization and calibration. This problem will be solved in the follow-up research.

REFERENCES

[1] Zhu, X. L. , Lin, P. , & Liu, Y. . (2021). Research on the method of information system equipment performance analysis based on big data. Journal of Physics: Conference Series, 1883(1), 012163 (6pp).

[2] Fu, Z. , Li, L. , Wang, Y. , Zhao, X. , Sun, M. , & Liu, Y. . (2022). A machine learning method for automated in vivo transparent vessel segmentation and identification based on blood flow characteristics. Microscopy and Microanalysis, 28(3), 801-814.

[3] Lu, S. . (2021). Research on computer programming optimization system based on big data technology. Journal of Physics: Conference Series, 1802(3), 032046 (7pp).

[4] Liu, H. . (2020). Big data precision marketing and consumer behavior analysis based on fuzzy clustering and pca model. Journal of Intelligent and Fuzzy Systems, 40(2), 1-11.

[5] Cui, F. , Hu, H. , & Xie, Y. . (2021). An intelligent optimization method of e-commerce product marketing. Neural Computing and Applications, 33(9), 4097-4110.

[6] Wang, J. , Li, D. , Wang, Z. , & Wan, T. . (2021). Research on enterprise employee information system based on big data analysis. Journal of Physics: Conference Series, 1748(3), 032025 (6pp).

[7] Li, H. , & Kang, H. . (2020). Research on user behavior prediction and profiling method based on trajectory information. Automatic Control and Computer Sciences, 54(5), 456-465.

[8] Miao, Y. . (2019). Research on the vehicle-borne information fusion strategy based on big data analysis. International Journal of Vehicle Information and Communication Systems, 4(2), 187-.

[9] Gong, K. . (2021) . Research and analysis on technical problems of new energy vehicles in china based on big data and artificial intelligence algorithm. Journal of Physics: Conference Series, 2138(1), 012020-.

[10] Zhong, C. R. . (2019). Research on application of precision marketing strategy based on big data mining technology. Electronic Component and Information Technology,3(2),101.

[11] Hu, Y. . (2022). Research on enterprise precision marketing based on data mining technology. Springer, Singapore,52(1),15-19.

[12] Tian, C. . (2019). Research and analysis of automobile precision marketing based on big data: taking the construction of audi car user portrait as an example. Journal of Fujian University of Technology,62(8),45-46.

[13] Zhang, Q. , Qing-Dao-Er-Ji, R. , Li, N. , & Lolli, F. . (2022). Research on animated gifs emotion recognition based on resnet-convgru. Mathematical Problems in Engineering,2(15),78-79.

[14] Cen, H. . (2021). Research on adult public english teaching based on new media information technology with curriculum ideological and political characteristics,6(1),457.

[15] Liu, H. . (2021). Big data precision marketing and consumer behavior analysis based on fuzzy clustering and pca model. Journal of Intelligent & Fuzzy Systems: Applications in Engineering and Technology,2(4), 40.