

Practice of User Portrait Big Data Recommendation System Based on Cruise Data

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Abstract. On the basis of the current theoretical research and practical exploration of user portraits, the article starts from smart services, precision services and personalized services, and uses big data technology to build user portraits. Provide cruise users with intelligent services through accurate user portraits, realize intelligent personalized services, and achieve accurate matching between intelligent ocean cruise service resources and users' real needs.

Keywords. User Portrait Recommendation System

1. Introduction

1.1 Application background

In the context of the era with the theme of "wisdom", the research and construction of smart cruise services have become a focus of attention. However, there is no unified definition of the connotation of smart cruise services. Provide users with efficient and accurate services through the perception of intelligent technology. This service is based on the ability of smart cruise services to analyze, judge, think and create. Smart cruise service is based on digitalization, and is a new business form of "people-oriented" online and offline, virtual and online integration. It can be seen from these studies that smart cruise services are intelligent construction and transformation under the empowerment of the Internet of Things, big data, artificial intelligence and other new generation intelligent technologies, reflecting the personalized, accurate and ubiquitous smart services of "people-oriented". At the same time, there are also documents that discuss smart cruise services from the perspective of data mining and service models. In short, both theoretical research and industry practice of smart cruise services are currently in the exploratory stage.

1.2 User portrait

The concept of user portrait was put forward by Alan Cooper et al. User portrait is the labeling of user information. It refers to the collection of multi-dimensional data of electronic product users to depict the user's behavior characteristics, social characteristics, natural characteristics, etc., and then abstract the user's data panorama. The essence of user portrait is the process of studying users, exploring their real needs,

and analyzing users' information. Through analysis, users' characteristics are accurately defined, described, and depicted to provide users with more accurate and personalized services.

1.3 Indicator system and recommended algorithm

The focus of the application of user portrait technology in the recommendation system is to build a reasonable and complete label system, and convert the user portrait information that can be recognized and recognized by humans into a label system that can be recognized and applied by computers with different weights and dimensions. The value range of each label in the system is different according to the actual original data [1]. According to the actual business scenario, the information of each dimension of the user profile can be divided level by level from high to low. Accordingly, multi-level user tags are generated to describe and distinguish user information in a comprehensive and detailed way. At the same time, a label management system needs to be established to be responsible for the storage, use, and regular update and maintenance of the label system. In this recommendation system, enterprises and products are respectively built according to the difference of the recommendation algorithm used, such as

2. Build user profile based on big data

User profile is the basis of personalized recommendation, and personalized recommendation system is the core of recommendation. The recommendation system needs to interact with user profile and service resources at the same time.

To establish an appropriate user profile, you need to filter the appropriate information dimensions for specific business scenarios to describe users [2]. Therefore, to establish a user profile, you need to start from the actual business model and analyze the user's information data according to the actual business processing process. The focus is to filter out several data dimensions that are most relevant to the business as strong relevant data. Analyzing strongly correlated data while ignoring weakly correlated data not only reduces the cost of data analysis and improves the analysis speed, but also helps to reduce the interference of irrelevant information, improve the analysis effect, and enable the established user profile to more accurately describe user information and interest preferences.

The researchers' adoption of user profiling methods mainly depends on the type of user data [3]. The research on user profiling technology at home and abroad is divided into four aspects: first, user behavior profiling based on clustering method. In China, Wu Han used non-commercial data mining tools to analyze online users' shopping preferences, shopping cycles and operating rules; An Lu made a comparative analysis of microblog users' behavior in the context of terrorist events through clustering method. In foreign countries, Godoy D [4] applies clustering method to web page trace data to mine users' browsing preferences; Iglesias J A et al. The second is user social network relationship portrait based on association rules. Jia Zhijuan et al.

2.1 Construction of user index system

In terms of user profile data types, it mainly includes communication service data, financial service data, shopping and transportation product service data; In terms of the tag types of user portraits, they are divided into natural attribute tags, behavioral attribute tags, consumption attribute tags and social relationship tags; In terms of user profile data processing methods, there are mainly data clustering, label classification, association rules and collaborative filtering. Reviewing the existing literature, we can also find that there are significant differences in the integration of user portraits in different fields:

User portrait indicator system					
Label Type	Natural attribute dimension label	User Behavior Dimension Label	User consumption behavior label	User boarding information	User geographic information dimension
User Portrait Label Field Definition	User registration information: <ul style="list-style-type: none">• ID number• full name<ul style="list-style-type: none">• Gender<ul style="list-style-type: none">• Age• nation• Education level<ul style="list-style-type: none">• mailbox• nationality• Native place• occupation• account number	Access behavior <ul style="list-style-type: none">• Browse Store Name• Browse duration<ul style="list-style-type: none">• Views• Browse Practice	Goods and services: <ul style="list-style-type: none">• Consumption amount<ul style="list-style-type: none">• dissipate• Consumption place• Purchase method	Basic registration information: <ul style="list-style-type: none">• shipping space• Boarding date• Length of residence• Number of peers• room number• Room Type	Horizontal distance
	System generated information: <ul style="list-style-type: none">• Account• Registration Practice• UID	Click behavior: <ul style="list-style-type: none">• Search behavior• Sliding screen behavior	Browse trace	Package information: <ul style="list-style-type: none">• Dining type• Travel route	Vertical distance
			Collection		Grid geographic information
			Consumption	Peer information: <ul style="list-style-type: none">• full name<ul style="list-style-type: none">• Age• UID	Dwell time
			evaluate		Path of particle
					Hotspot area

Figure 1. Indicator system

- (1) Tags of natural attribute dimension tags of natural attribute dimension are the most common and basic characteristic indicators of users, including the user's age, gender, occupation, education level, user identity certificate (uid), account registration time, account status, registered residence, active city, etc. use
- (2) User behavior dimension label User behavior refers to the behavior generated when users use enterprise products and receive enterprise services. User behavior dimension label depicts the characteristics of user behavior. Through the data rules reflected by the user's behavior, the police can not only mine the user's individual and group activity preferences, but also find the high frequency time period for suspicious users to surf the Internet. Common behavioral dimension indicators include the types of websites visited by users in recent 30 days, active duration of websites, first and last visit dates, average visit depth, browsing and searching behaviors, etc. The user's behavior data comes from the process of using electronic devices every time. In order to optimize products and services, enterprises will first collect user's behavior information by burying points, and then understand and restore user's activity preferences.
- (3) User consumption dimension label Consumption dimension label refers to the data analysis indicators used by enterprises to accurately grasp users' consumption demand and depict their consumption behavior trajectory and consumption habits. It usually consists of commodity retrieval, browsing traces, collection, evaluation and follow-up, historical purchase records and other information. User consumption data is polymorphic. It distinguishes between groups and individuals, so it can prevent group characteristics from being imposed on individuals and reflect individual user behavior traces
- (4) User social dimension label The label of the social attribute dimension is mainly used to understand the user's family relationship, guest room visitor information, and order information. This information constructs the social network of the target group, and highlights the relationship nodes and ties. "Nodes" represent individuals or organizations (entities) in the social network, and "ties" reflect the relevance and strength of associations (links) between subjects. Through the analysis of users' social networks, they can visualize who they are most close to, which group they are most concerned about, and what relationship they have with others. Therefore, data directly touches the social relationship of users. It extracts intangible elements in our daily life, and then turns them into new ideas for business expansion
- (5) Geographic information dimension label Geographic information dimension label refers to the label that objectively describes the real-time geographic location, active place and parking rule of the target group according to the geo spatial data shared by users.

3. Recommended algorithm construction process

3.1 Recommended system architecture

The recommendation system in this paper improves the traditional user based Collaborative Filtering (UserCF) algorithm and the product based Collaborative

Filtering (ItemCF) algorithm by combining the idea of user portrait, and realizes personalized financial product recommendation for enterprises from the perspective of enterprise user portrait and product user portrait.

3.2 Recommended algorithm practice

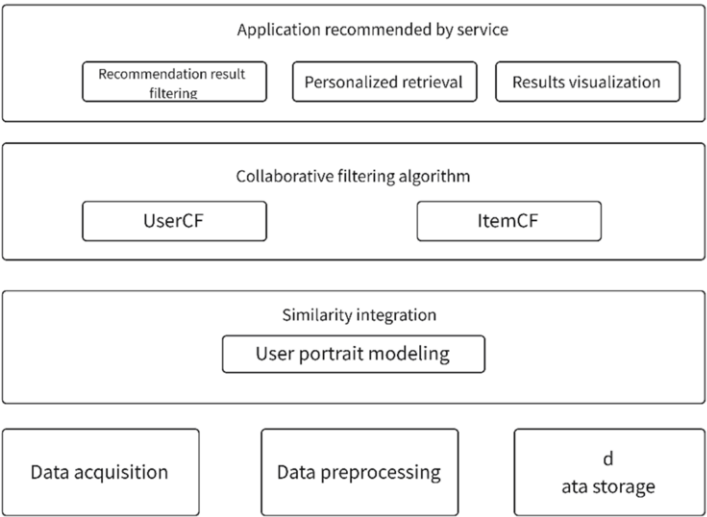


Figure 2. Recommended system architecture

The entire recommendation system is divided into four levels. The bottom layer is the enterprise and product data layer, which is the data support for the successful operation of the entire recommendation system to provide accurate recommendation services [5], mainly including the catering resource library and entertainment resource library. Three initial data source files, which respectively record the basic information of consumer products, are the important basis for subsequent user portrait construction. Split enterprise data and product data into different dimensions. It mainly integrates user based collaborative filtering recommendation algorithm and product based collaborative filtering recommendation algorithm [6]. According to the existing user profile model and product profile model, calculate the similarity, the similarity between products, and the user's interest preferences and consumption trends, respectively, to achieve sexual consumer product recommendation for different users. The top layer is the application interface layer, which is mainly responsible for the specific application of consumer product recommendation system, including recommendation result filtering, personalized retrieval and result visualization functions.

4. Application of smart user portrait

Through accurate user portraits, we can know which type of library users use. As a big data processing method, user portraits need to help professional social work improve service accuracy throughtag development

The purpose of user portrait is to provide intelligent support for personalized recommendation system of smart cruise service, provide personalized resource recommendation for individual users and group users, and achieve accurate mapping between users and resources. Thus, different recommendations are generated for individual users and user groups. Consumer demand recommendation. Through accurate user portraits, we can know which type of consumption demand the user's catering and entertainment is based on. If it is a family consumption demand, it can recommend consumption resources related to personal theme according to the user's age, such as personal amusement park; If it is a honeymoon holiday consumption demand, you can recommend service resources related to honeymoon, such as western dinner.

- (1) Scenario service recommendation. Scene personalized services refer to various services provided by smart cruise lines that meet users' interests and needs, and meet users' needs for real-time scenarios (time, space, consumption scenarios, etc.). The user portrait integrated with the scene tag provides effective support for personalized scene service recommendation of smart cruise. For example, as long as users open the relevant APP, the user portrait model can obtain the user's scene data in real time, so as to recommend the resource list matching the scene.
- (2) Intelligent user tracking. The user life cycle characteristics exist from registration, boarding, travel to final logout and exit. The user's individual portrait can capture the stage of the user's life cycle, use machine learning, data mining and other methods to identify the user's status and category (first class, ordinary class), and make resource recommendation, optimize resource supply and improve service mode based on this information to ensure that high-quality resources are provided for users.
- (3) Smart service evaluation. Users can effectively evaluate the recommendation results, help the recommendation system optimize the recommendation algorithm, generate higher quality and more accurate recommendation results, improve the recommendation quality of the recommendation engine, meet users' potential learning needs, and reflect the "people-oriented" intelligent service.

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