Creating Consumer Portraits through Web-Based Visualization Techniques

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ABSTRACT

This paper mainly describes the significance of constructing consumer portraits in enterprise activities, and briefly discuses how to use existing technical means to analyze the data generated by consumers when browsing and purchasing products, so as to dig out the valuable information, and finally use web-based visualization technology to display the process.

Keywords: Consumer Portrait; Web-Based Visualization; Data Analysis

1. Consumer portrait in the context of big data

1.1 Consumer portrait

Consumer portrait represents a virtual real consumer. Through analysis of the mining of the generated data, the consumer behavior can be scientifically summarized and thus form a consumer portraits, which includes typical consumption characteristics of the consumers, the product demand, purchase demand, brand preference, media habits, consumption ability, and so on. Portraits consumers mentioned in this paper include two aspects. One is generalized on consumer portrait of the individual, and the other is its extended meaning which refers to the analysis of consumers with a particular group of common characteristics, which can achieve precision marketing, and product can be optimized.

1.2 Creating consumer portraits with big data

There is always a trail after one did something. The behavior of each of us on the Internet is recorded in various forms. A consumer also leaves a lot of data, such as the type of purchased goods, the number of purchases, the date of purchase, the amount of each purchase, etc.

These data can be used to analyze consumers' consumption capacities and preferences, and then to build a clear portrait of consumers combined with these basic information, and thus to create consumer portraits using big data.

1.3 The meaning of creating consumer portrait using big data

As mentioned above, a consumer's consumption capacity and preference can be analyzed through one's consumption records. This kind of information is an intangible wealth for enterprises. Enterprises can conduct precision marketing according to the characteristics of a consumer, reduce the marketing cost and improve the marketing rate of return. At the same time, enterprises can also analyze their consumption trend according to the big data of consumption records, so as to make a timely response to the imminent loss of customers, maintain a stable customer relationship, and improve customer loyalty.

Meanwhile, for those goods that were produced in the same production line, enterprises can obtain, consumer's different data after purchase, information such as the buyers' age, gender, characteristics of the goods they buy, purchase frequency, the highest

consumption amount, the cumulative amount and so on. With the analysis of consumption records of goods produced in the same production line, enterprises can learn the characteristics of buyers, and this production line can be optimized to improve products, and further the products competitiveness, which can also reduces the production cost in certain situations. In terms of customer relationship management, enterprises can seek for new users with the similar characteristics by combining with current consumer characteristics.

2. Web-based visualization in the context of big data

2.1 Achieving advantages of web-based data visualization

Web-based data visualization is to represent data graphically in the visual form, rather than in the form of a lengthy obscure text. Science suggests that visual information processing capacity is much higher than written information processing ability of human brain. Enterprises can improve the efficiency when they use this method reasonably. The most important thing is to learn concealed information through analyzing data, further quickly find new opportunities, and timely response to the challenge to offer evidence to support decision making to avoid the passive situation.

Nowadays, there are various ways of data visualization. In the era of data explosion, the visualization tools in the traditional stand-alone mode are more difficult to use for data analysis and visualization, because they cannot open files beyond 1 GB in memory, which cannot meet the needs of enterprises and researchers. The traditional tools also have problems with poor interactivity. Most importantly, under the single mode, data visualization result sharing is not convenient, and the share of real-time performance is poor. This case is easy to form the information isolated island, which is obviously not conducive to the development of the enterprise. A web-based visualization tool is fit to solve the above problem: the web running in the cloud; users only need to browser; shared timeliness is guaranteed. The interactivity of the web is good and the page shows the flow. At the same time, users can have a proprietary virtual cluster to ensure the security of data.

2.2 Process of creating consumer portraits through web-based visualization

If hoping to realize consumer portrait build visual result through the web, one need to do in the following four aspects: data acquisition, data cleaning, data analysis, picture presents, which is also the general steps for visualization after the big data analysis. The following section is a specific introduction to the creation of consumer portraits combined with the research direction of this paper and data analysis of consumer behavior.

The first step is data acquisition. Data generates in consumer buying behavior, according to the different sources, mainly divided into two categories, the first is through the online questionnaire, field market survey methods such as access to collect first-hand information, in addition to the traditional way to collect first-hand information that mentioned above., Currently, the first-hand sources comes from consumer's consumption data and browsing behavior data in online platforms provided by the enterprises, which, can be directly obtained through event tracking and some other methods. The second category is to collect statistics provided by major publications, newspapers and magazines, and related industries (such as Alipay). What is worth mentioning in terms of data acquisition is the popular python crawler technology. Third-party data base Requests are the best tool for python to crawl web pages. Acquisition of such data is referred to as second hand data. In general, the acquisition of second hand information is more conducive for enterprises to understand the macro information of the market through the analysis of consumer behavior and make strategic adjustment based on evidence.

The second step is data cleaning. As many data scientists say, the data acquisition and cleaning account for 80% of the data analysis work. Therefore, it can be seen that the acquired consumer data is important for the construction of consumer portrait. In addition to crawling data, python is a mainstream tool for cleaning and analyzing data, often using its Pandas and Numpy packages for data cleaning. In access to information, not all field types are needed. For example, on the analysis of the consumer spending power, basic data like consumer's weight and height can eliminate. So, the data cleaning must first delete unnecessary columns. Pandas

provides a very convenient way that is a function of drop() to remove the redundancy or independence in data. What's more, when deleting data contains empty value and duplicate records, one can use "isnull", "duplicated" to judge, Put more null value in front. There will be no value analysis if there is too much null value,, and delete the duplicate records data. The simple data cleaning process mentioned abovet, cleaning process, in the practical problems need to combined with the analysis of the background of the problem, sometimes also need to see a circumstance to delete data correlation on the high side.

The third step is data analysis. Preparation of data collection and data cleaning in the early stage, data analysis is the core step of constructing consumer portrait through consumer data. The prerequisite for data analysis is to know what the purpose of the survey is. There are two main directions of thinking.

First, to construct a collective portrait of consumers of a particular commodity, and it is necessary to make statistics on whether the consumption frequency of men and women is different. Whether there is any difference in the consumption amount of users of different age groups, and the number of users who place orders in different months or the buyback rate and repurchase rate of users in March can be counted to find the common characteristics among the purchasers of a certain product. The second is to construct an individual consumer portrait, which can be used to understand the consumer's consumption trend through the total amount of monthly consumption, the amount of products purchased each month, and the number of consumption times each month. It is found that the consumer buys more in the early stage and the trend of steady decline in the later stage according to the consumption data, Then the reason can be analyzed according to the changing situation, which is the result of product optimization, or the result of promotion. And then the appropriate way can be taken to retain customers after finding out the reason. Data analysis tools, commonly used tools are python, SqlServer, spass and so on.

The fourth step is to present the consumer portrait through Web-based visualization tools. There are three main modules: the front-end chart display module, the back-end request processing module, and the back-end parallel computing module. The front-end chart display use chart library of Javascrip called ECharts, which is characterized by intuitive, vivid, interactive, and customized highly personalized data visualization chart. Innovative features, such as drag and drop recalculation, data view, range roaming, and so on, has greatly enhanced user's experience Bind the open link of the form file to the URL and send it to the SERVER side via a POST request. When the back-end has finished processing, the table data is sent back to the front end, and the request is processed by a RequestHandle, the front end sends the corresponding request to the back end through AJAX, and waits asynchronously for the return value of the back end.

3. Conclusion

In the era of big data, the use of big data to analyze consumer behavior, the construction of consumer portrait and the web visualization technology can greatly increase the benefits of enterprises, and thus take initiative in market competition.

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