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Research Article

Analysis of Food E-commerce Consuming Behavior Based on Web Data Mining Theory

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Abstract: Consumer behavior analysis is an important part of customer relationship management, the traditional analysis is based on the basic theory of economics, no quantitative studies, the results have certain limitations. In the development of the new technology, data mining technology is a powerful data analysis technique and its application in customer relationship management is getting more and more attention. However, from the point of view of the application layer, data mining and customer relationship management have quite one part is in the field of commercial applications, application in non business areas have great development. In this study, the knowledge of related fields are introduced in detail and analyzes the typical application of data mining technology in the application of customer relationship management system. Combined with project management, provides a project implementation process model based on data mining.

Keywords: Customer relationship management, data mining, food e-commerce

INTRODUCTION

Data mining technology is the main tool for customer relationship management. The technology of data mining is from a large amount of data to extract the potential, valuable knowledge, models or rules of the process (Bing, 2006). It combines the database, artificial intelligence, machine learning, theory and technology of Cheung *et al*. (2001) in many fields such as statistics. With the development of the database technology, to accumulate a large amount of data every year and these data are incremental development trend. People have been considering how to not be massive drowning in data, how to find the useful knowledge from the process, improve the utilization of information. Data mining technology is used to solve these problems. Data mining technology can be applied to various fields, such as the insurance industry, telecommunication industry, (Srivastava *et al*., 2000) banking (Aggarwal and Yu, 1999), used for the discovery of customer value analysis, customer loyalty or applied to the management decision to keep (Anu, 2008). In this study, the application of data mining to the analysis of consumer behavior of students or teachers, develop their habit of consumption.

As early as mid nineteenth Century economists began to study consumer behavior. From the perspective of economics of consumption is an important part of social reproduction, in the process of social reproduction, consumption is the end (Monika, 2000; Yang *et al*., 2011). The production is for the purpose of consumption, only expanding the consumption, sustainable growth in order to promote economic (Bing, 2006). So, economics is the earliest of the field of consumer behavior (Srivastava *et al*., 2000). Study on analysis method of static analysis and dynamic analysis, combining qualitative analysis and quantitative analysis are usually used, from different angles and levels of factors affecting consumption (Aggarwal and Yu, 1999). Consumer behavior research is mainly involved in the field of economics and then the theory of sociology to join, is one of the new cross subject (Anu, 2008; Monika, 2000).

In this study, through the research and Analysis on the current data mining, from the engineering point of view, the implementation process of data mining project was determined and the theory of consumer behavior analysis applied to the mining system, according to the actual application and feedback to the theoretical research, perfect theory. Has a certain theoretical and practical value. And to improve the appropriate implementation of the traditional clustering algorithm in the process of mining projects, improve the efficiency of mining.

RELATED METHOD AND THEORY

The three-tier structure B/S mode: B/S mode or called Web mode are referring to the new Web technology-based application system mode of the traditional C/S mode (Dalai *et al*., 2006). The server portion is decomposed into a database server and one or more application servers, thus constituting a client-server system of three-layer structure shown in Fig. 1.

The first layer is the client presentation layer and C/S structure/fat different client, the client tier three-

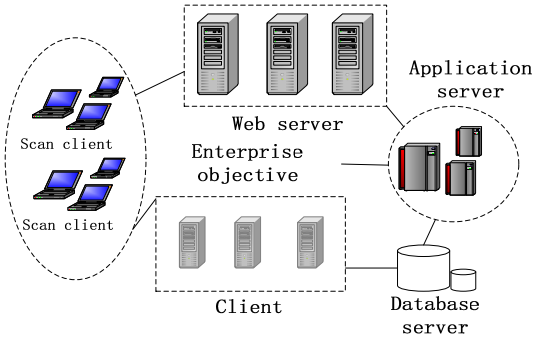

Fig. 1: The client-server system of three-layer structure

tier system to retain only a Web browser and does not store any other application that can run code in Put the second layer tail b downloaded to a local server running in the browser, with almost no management (Chen *et al*., 2010, 2007).

The second layer is the application service layer consists of one or more servers to handle all the business application logic to the database work, the layer has good scalability and can be arbitrarily increased with the application server the number of work focused on the management server, as opposed to C/S, whether it is the complexity of the work or the workload is greatly reduced. The third layer is the data center layer, mainly by the database system.

Knowledge discovery process model: The data processing can be divided into three sub steps: data selection, data preprocessing and data exchange. Determine the discovery task operation object is the main purpose of data selection and the target data is: the extraction of a group of users need data from the original database. And the elimination of noise, derivation of missing data, eliminating duplicate records, data type conversion is the process of data preprocessing. Fayyad knowledge discovery process model was shown in Fig. 2.

If the object is a data warehouse mining, generally speaking, in the generation of the data warehouse has been completed the data pretreatment. Cut data dimension or dimensionality reduction is the main purpose of data transform, data transformation is called from the initial feature to find out the characteristics of the real value of the number of features or variables to be considered in order to reduce the data mining.

Random access technology: They are:

- This is also called the throughput through put S, which is equal to the frame transmission time T0, the average number of frames successfully transmitted. Obviously 1, ≤ S≤, 0 and S = 1 is the limiting case. In the S = 1, the frame sent out one by one, there are no gaps between the frames. However, the S can be closer to 1 to measure the extent of utilization of the channel is sufficient. When the network system reaches a steady state, at time T0, the average number of frames reach the network should be equal to the throughput S:

$$P[t]=\frac{(2G)^k}{k!}e^{-2G}, k=0,1,2... \quad (1)$$

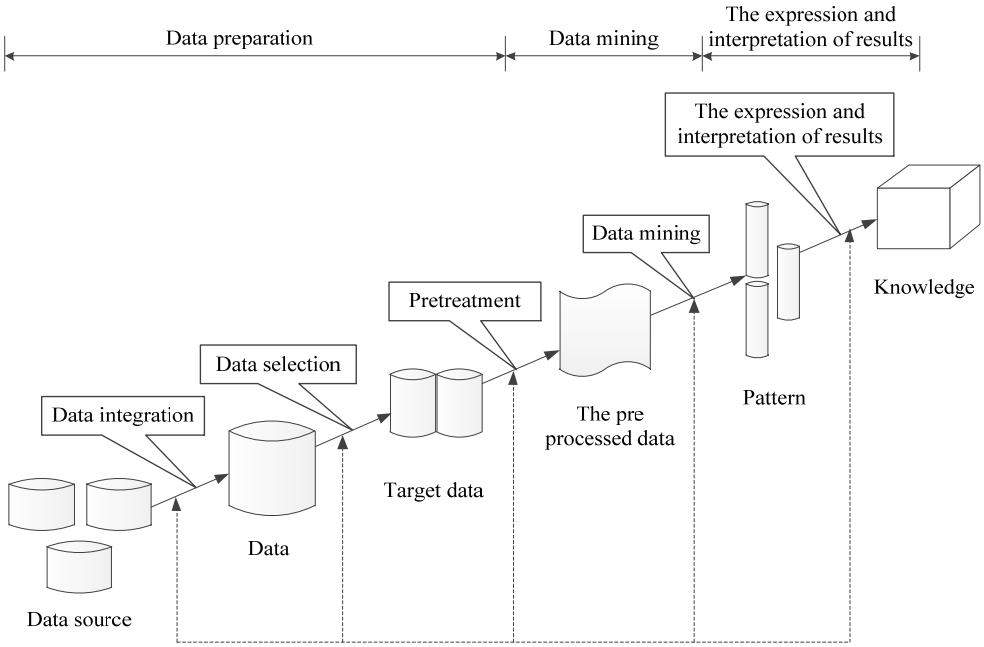

Fig. 2: Fayyad knowledge discovery process model

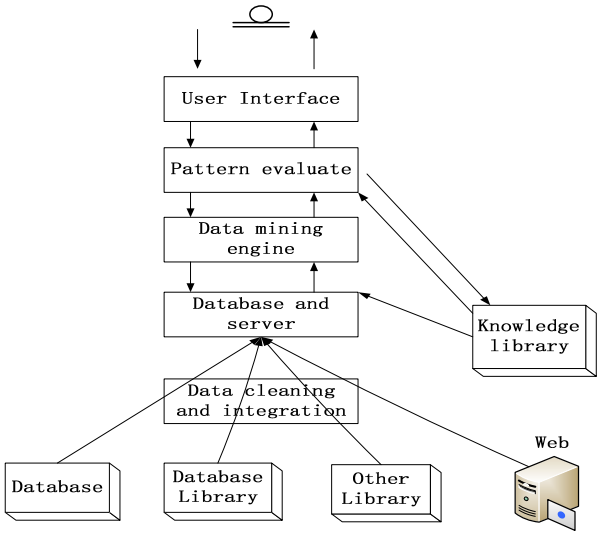

Fig. 3: Data mining and analysis system architecture

In the above formula, 2G in 2T0 mean arrival time frames. Then:

$$S = G \cdot P[t] = G \cdot P[2T0] \quad (2)$$

$$= G\frac{(2G)^0}{0!}e^{-2G} \quad (3)$$

When G = 0.5 when 0.184.≈1−S = 0.5e. It is possible to achieve the maximum throughput of the value of S. A clustered data set for the X, X = {xi, |Xi ∈R, i =1, 2, 3, ..., n}. The clustering center for free and with A cluster categories, said the Euclidean distance between two data objects are as follows:

$$d(x_i, x_j) = \sqrt{(x_i - x_j)^2} \quad (4)$$

Each data object of the arithmetic mean for:

$$z_j = \frac{1}{n}\sum_{x\in\omega_i} x \quad (5)$$

The criterion function can be expressed as:

$$J = \sum_{i=1}^{k}\sum_{j=1}^{n} d(x_j, z_i) \quad (6)$$

Suppose now that for some reason the network load G increases a little. The curve according to Fig. 2 throughput should be decreased. This indicates the number of frames successfully transmitted frames collide reduction increased. This situation causes more retransmissions, thereby further increasing the network load G.

EXPERIMENTAL RESULTS

The design of system process: Data mining technology is based on database technology and developed, so in the field of artificial intelligence, it is often called the knowledge discovery in database. The data mining step includes data preparation, data mining and analysis, system architecture is shown in Fig. 3 the general data mining. Data preparation refers to determine the target data in data mining, to collect relevant data and pre-treating, integration and selection of its formation, behind the data mining engine to identify the data set. Is the use of data mining algorithm of data mining, analysis and mining to get knowledge of the target data set. Analysis refers to one step before the knowledge model assessment, make its become people to identify and direct the use of intelligence or law.

Process of project based on the data mining: The implementation of the whole project is a closed loop of the model, as shown in Fig. 4. In each stage, has its own task. The whole process is a closed process, so once a certain stage, or a step of situation occurs, you can return to the last stage of checking correction. And the whole data mining process is the combination of data mining related technology unique, carried out from the point of view of project development.

Figure 5 shows the analysis of the consumption difference of undergraduates and post graduates pie chart shows the results. Differences in the consumption level of male and female students, mainly taking into account the differences in food consumption and other consumption. From the perspective of food consumption, we divide them into four categories; in other consumer, we will be divided into two groups the

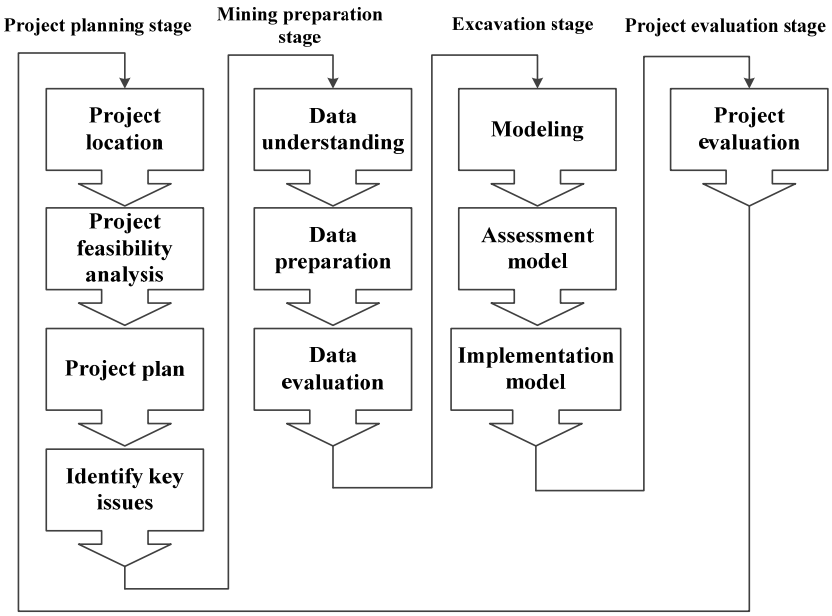

Fig. 4: The implementation of the whole project

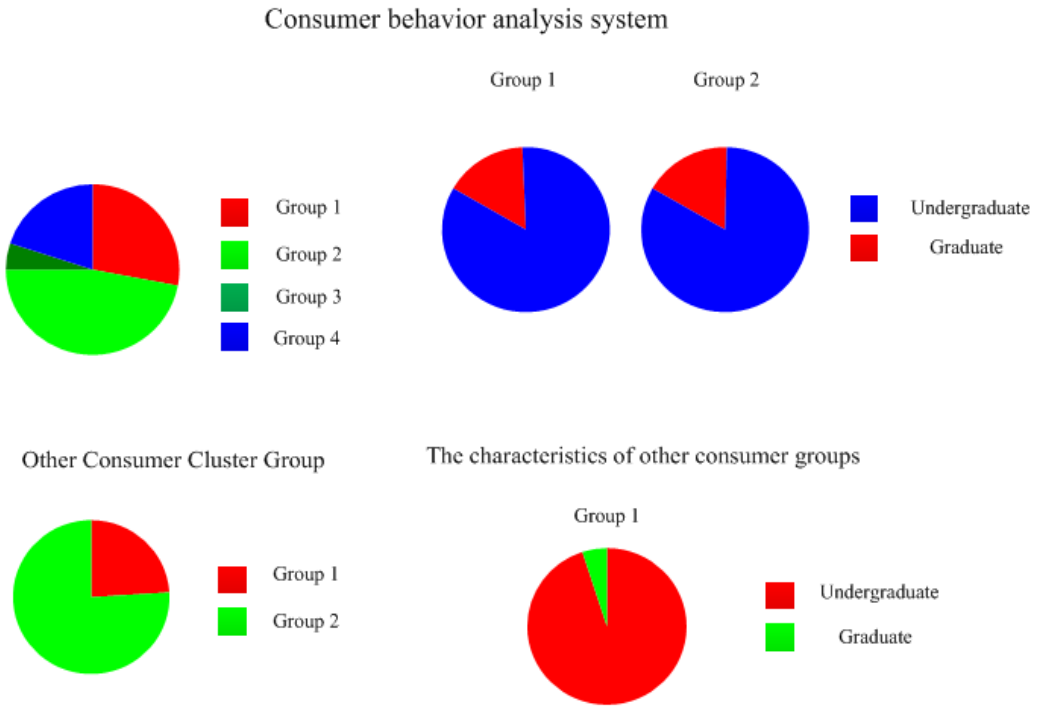

Fig. 5: The analysis of the consumption difference of undergraduates and postgraduates

following to a two-dimensional form of pie chart shows the results of a simple summary, so that readers can better understand the information.

CONCLUSION

Data mining project and other common project development, but the characteristics of their own development or keep; for example: in the aspect of project management, we can not completely in accordance with the general system development management, also can not only carries on the management according to the process of data mining and only the two organic integration, to achieve the effective management of the progress of the project, so it is effectively controlled. Application of data mining

technology in the customer relationship management system has a very broad prospects, it is being more and more attention. System through the use of consumer information online survey and direct use of consumer records, improve the customer database content from different angles, on the basis of the establishment of the data warehouse, data mining. The interface image mining results can be used for the visualization of the show, clear and intuitive display in front of users.

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