



Enterprise Information Product Configuration Management System Based on Data Analysis Algorithm

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Abstract. With the popularization of computer in the process of enterprise informatization product configuration management, product information of various types, informatization and strong dynamic has been formed. In order to effectively integrate, organize and manage this information, it is very important to develop product information configuration management technology. In order to solve the shortcomings of enterprise information product configuration management research, on the basis of discussing the functional equations of enterprise product configuration management and data analysis clustering algorithm, this paper aims at the application of enterprise information product configuration management system based on data analysis algorithm. Development tools and runtime environment are briefly introduced. And design and discuss the software materialization results and product project management process of enterprise information product configuration management based on data analysis algorithm. Finally, based on the four algorithms in data analysis algorithm, the calculation time of product classification in enterprise information product configuration management system is carried out. The experimental comparison and analysis, the test results show that the four algorithms in the data analysis algorithm have short calculation time and good stability for the classification of the four information products in the enterprise information product configuration management system. The data analysis algorithm used in this paper The computing time of the clustering algorithm in 2 is shorter, and the computing time of the four product classifications is between 16s-20s, while the computing time of the other three algorithms is stable in the range of 50s-70s. Therefore, the reliability of the enterprise information product configuration management system based on the data analysis algorithm is verified.

Keywords: Data Analysis Algorithm, Clustering Algorithm, Information Product, Configuration Management

1 Introduction

Enterprise information product configuration management is the main way to carry out product serial management, which can improve the accuracy of information product information. Enterprises provide accurate product configuration information for each part of enterprise information products according to the configuration requirements of specific customers and market needs.

Nowadays, more and more scholars pay attention to the research of various technologies and platforms in animation image recognition, and through practical research, they have also achieved certain research results. DT Custódio believes that product management is complex due to the large variety of products, and will cause many contradictions in product configuration. In order to solve the product incompatibility that customers encounter when selecting products, product configuration personnel will take certain measures to form a corresponding product configuration system. Addressing product management complexity and customer selection of products is an issue, primarily by reducing incompatible products. However, this method will lead to the reduction of product types, so DT Custódio proposes a solution to reduce the contradiction of product configuration, and proves the applicability of the proposed method through experiments [1]. The changes of Nie D enterprise information products are handled by the configuration management system, so as to ensure the integrity of the product configuration management system and components in the entire product configuration cycle. In a certain way, it can provide a guarantee for the classification and storage of product configuration management modules and product-related information on the system, and most product configuration management methods support product modularization, taking into account the development and configuration time of high- and low-quality products. It is the primary consideration item of enterprise product configuration management. The corresponding product configuration management support system such as product risk management should support complex configuration management operation and achieve the goal of product configuration management [2]. Rusu M believes that the product configuration system makes the sales and production process of the company's development products more efficient. Different forms of product configuration in the product configuration project have different problems. Therefore, in order to develop an effective product configuration, Rusu M will first study the project using the product configuration method, and then Rusu M will test the development of agile principle product configuration system and the implemented product configuration project. Qualitative research methods are used for multi-product sample information through seminars and direct observation [3]. Although the existing research on enterprise information product configuration management is very rich, the research on the application of enterprise information product configuration management based on data analysis algorithm is still insufficient.

Therefore, in order to solve the problems existing in the existing research on enterprise information product configuration management, this paper firstly introduces the concept of enterprise information product configuration management, the concept of functional equations of data analysis and clustering algorithms, and then discusses the enterprise information based on data analysis algorithm. The development tools and

operating environment for the application of the product configuration management system are designed. Finally, the software materialization results and product project management process framework of enterprise information product configuration management based on data analysis method are designed. The information product configuration management system compares the computing time of the four product categories, and the final experiment shows the use value of the enterprise information product configuration management application based on the data analysis method proposed in this paper.

2 Enterprise Information Product Configuration Management Based on Data Analysis Algorithm

2.1 Configuration Management of Enterprise Information Products

(1) Single product configuration.

Single product configuration is a relatively simple situation in product configuration management. It refers to different versions of parts, structural options, interchangeable parts, and replacement parts involved in non-serialized products, according to the idea of product configuration. Effective management [4].

(2) Serialized product configuration.

It means that after a product is put into the market, it is welcomed by users, and through market analysis, the enterprise responds quickly and makes a variant design on the basis of the original product [5].

(3) Multi-view management of product structure.

Product configuration management uses multi-view management to manage and describe various division methods of a product structure [6]. Each view includes raw materials, semi-finished products, parts, components and their connections, and these components can be associated with multiple views at the same time [7].

2.2 Data Analysis Clustering Algorithm

Clustering trend assessment can determine whether a given information product sample has a meaningful clustered information product structure [8]. The product configuration information can be used to test the randomness of product type variables [9]. For any product configuration information, it can be regarded as a product configuration information sample consisting of a random variable O . In order to determine the degree of dissimilarity between O and a uniformly distributed product type in the product information, it is necessary to first calculate the product configuration process statistics [10]. Follow these steps:

(1) Extract n points k_1, \dots, k_n from the product configuration of R , and ensure that the probability of each point in the product configuration of R being included in the

product type is equal [11]. For each point $k_u (1 \leq u \leq n)$, find k_u , the nearest product type in R , and let f_u be k_u ; and the product key parameters between its nearest neighbor in R , namely:

$$f_u = \min_{t \in R} \{tact(k_u, q)\} \quad (1)$$

(2) Draw n points d_1, \dots, d_n from R uniformly. For each point $d_u (1 \leq u \leq n)$, find d_u , the nearest product type in $R - \{d_u\}$, and let g_u be the product feature set between d_u , and its nearest product type in $R - \{d_u\}$, namely:

$$g_u = \min_{t \in R, t \neq k_u} \{tact(d_u, q)\} \quad (2)$$

(3) Calculate product configuration process statistics W

$$W = \frac{\sum_{u=1}^n g_u}{\sum_{u=1}^n f_u + \sum_{u=1}^n g_u} \quad (3)$$

If R is a uniform distribution of product key parameters, then $\sum_{u=1}^n g_u$ and $\sum_{u=1}^n f_u$

will be close, so W is about 0.5. However, if R is highly skewed, then $\sum_{u=1}^n g_u$ will

be significantly smaller than $\sum_{u=1}^n f_u$, and thus will approach zero.

3 Investigation and Research on Enterprise Information Product Configuration Management System Based on Data Analysis Algorithm

3.1 Development Tool of Enterprise Information Product Configuration System Based on Data Analysis Algorithm

The system development tool adopts IntelliJIDEA17.33, uses Oracle11g database as the background database, and implements it in B/S mode.

- (1) Install Jdk1.8 and development tool IntelliJIDEA17.33 to provide Java8 development environment;
- (2) Install the Docker1.12 version container;
- (3) Install and deploy Tomcat8, Maven3.5
- (4) Install database Oracle11g, MySQL5.7
- (5) Install PL/SQL, Navicat database application tools
- (6) Configure CentOS7.46bitLinux Sevrver

(7) Install Anaconda3.X, PyCharm2.1

3.2 Operating Environment of Enterprise Information Product Configuration System Based on Data Analysis Algorithm

In the process of selecting the operating system, big data components, database, database modeling tools, development tools, etc. for the research and development of company A's information product configuration management system based on data analysis, the specific system research and development operating environment is as follows:

(1) System hardware environment:

1) Server hardware: CPU: at least dual-core; memory: second-generation memory and more than 2G.

2) Client hardware: CPU: at least dual-core, storage space not less than 1G; Display: Display that meets the requirements supported by Windows; Memory: not less than 2G.
5.1.2.

(2) System software environment:

1) Server software: database software no less than 2008; Internet information services; communication protocols supporting database access;

2) Client software: computer system not lower than Windows2003; communication protocol supporting database access; Internet-based construction machinery product information system platform program 4.2.

4 Application Research of Enterprise Information Product Configuration Management System Based on Data Analysis Algorithm

4.1 Software Materialization Results of Enterprise Information Product Configuration System Based on Data Analysis Algorithm

1) The user enters the system login interface, the system verifies according to the account number and password, and then enters the system if the verification is passed.

2) Click on the administrator management to enter the administrator management page, where you can modify and delete the passwords of the configuration personnel of each department. Click the user name to view and edit the configuration personnel information of each department.

3) Click Add Administrator, the pop-up interface can add configuration personnel and select the department to add configuration personnel at the same time.

4) Click the product configuration pop-up interface in the navigation area to display the configuration products that the system can choose to configure.

5) Click the radar device on the product configuration interface in the figure, the system enters the configuration of the radar device, and the product type information interface pops up, providing the option to configure the radar device that can be configured.

6) Take the configuration of airborne radar equipment as an example, click the airborne radar equipment in the product category information interface in the figure to enter the radar equipment configuration condition screening interface.

7) Add filter conditions according to the filter rules provided in the configuration condition filter interface, and then click the submit button to pop up the submit filter success interface.

8) Click the OK button on the successful screening interface, and display the weight value of the system automatically configured for production.

9) Click Upload Product Map in the navigation bar shown on the main interface of the system, and click Upload Image to complete the addition of the product map.

4.2 Design of Enterprise Information Product Project Management Process Based on Data Analysis Algorithm

This paper analyzes the import process of enterprise informatization products used by company A, and designs the project configuration management system process (ie project management process) suitable for predictive enterprise informatization products according to the clustering algorithm in the data analysis algorithm, as shown in Figure 1.

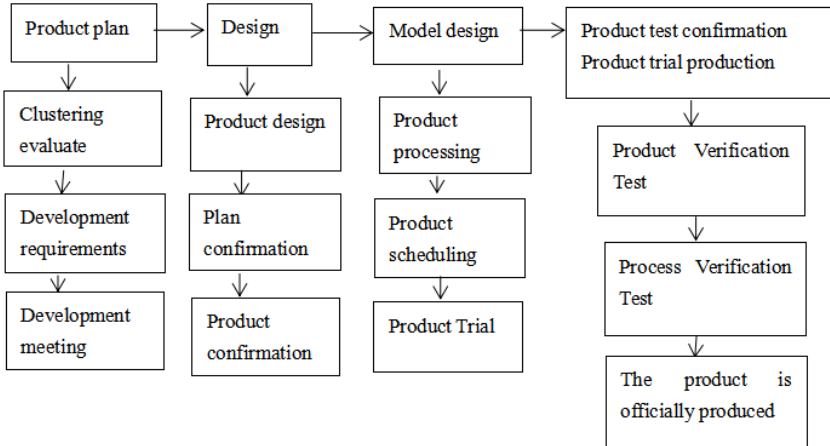


Fig. 1. Product project management process [Owner-draw]

In the above-mentioned enterprise information product project configuration management process, the biggest advantage is that the clustering algorithm in the data analysis algorithm is penetrated to evaluate the product design scheme and carry out calculation analysis for the verification test in the product design stage. It mainly includes the following steps:

(1) Use the crawler program to obtain the initial data, orderly process the out-of-order products, and prepare for the cluster analysis.

(2) Use the relevant cluster analysis to cluster and subdivide the enterprise information products. The product types with similar characteristics are grouped into one

cluster, and the products with relatively different characteristics are grouped into different clusters.

(3) Clustering feature analysis According to the clustering results, the features of the products are analyzed, and the commonality of the products in the same cluster and the different features of the products in different clusters are compared.

(4) Feature rule display Clustering feature analysis should provide a basis for the actual configuration management of enterprise information products.

4.3 Enterprise Information Product Configuration Management System Based on Data Analysis Algorithm

Next, we compare the computing time of the four types of information-based product classifications in the enterprise information-based product configuration management system by comparing the clustering algorithm selected in this paper with the SVN algorithm, the KNN nearest neighbor algorithm, and the AdaBoost adaptive boosting algorithm through experiments. The experimental test, the specific calculation time comparison is shown in Table 1:

Table 1. Algorithm Computation Time [Owner-draw]

Product	Product1	Product2	Product3	Product4
Clustering Algorithm	16.54	18.45	18.39	19.41
SVN	53.21	65.23	53.26	61.24
KNN	52.13	56.23	52.14	65.78
AdaBoost	63.26	52.19	59.71	66.28

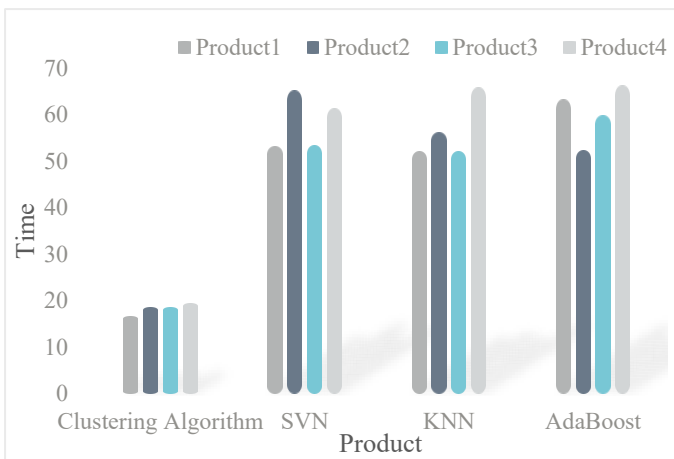


Fig. 2. Comparison of algorithm calculation time [Owner-draw]

It can be seen from Figure 2 that the four algorithms in the data analysis algorithm have relatively short calculation times for the classification of the four information-based products in the enterprise information-based product configuration management system. The clustering algorithm used in this paper is calculated in the product classification. Compared with the other three algorithms, the calculation time is longer, but the calculation time is very stable. In the classification calculation of the four information-based products in the enterprise information-based product configuration management system, the clustering algorithm used in this paper calculates The best effect.

5 Conclusion

This paper specifically introduces the technical basis of the implementation of the enterprise information product configuration management system based on the data analysis method, including the introduction of the enterprise information product configuration management, the function of the data analysis clustering algorithm, and the enterprise information product based on the data analysis algorithm. The specific deployment process of the configuration management system, and the design of the software materialization results and product project management process framework based on the data analysis algorithm system. Through the clustering algorithm, SVN algorithm, KNN nearest neighbor algorithm and AdaBoost self-adaptive boosting algorithm in the data analysis algorithm, the calculation time of the classification of information products is tested experimentally, and the feasibility of the configuration management of enterprise information products based on the data analysis algorithm is verified.

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