



# Intelligent Application of Multi-Dimensional Data Integration Algorithm in College Teaching Management Information System

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**Abstract**—It is introduced from three aspects: base classifier, key technology, and integration strategy. Among them, the base classifier mainly introduces decision tree, neural network, support vector machine, etc.; the key technology is introduced from the aspects of incremental and online. Based on data flow the management system Esper, which is designed from the requirements of simplicity and practicality and data security, realizes the basic management of students in higher vocational colleges, can meet various business processes in the management of students in higher vocational colleges, and solve the problem of student information management. There are many problems such as large amount of data, redundant information, and inconvenient storage and utilization. Using time window and self-defined functions, the CLU stream algorithm is rewritten using Esper processing language, and the clustering algorithm is implemented in the Esper system.

**Keywords**—Multi-Dimensional, Data Integration, College Teaching, Management Information System

## I. THEORETICAL BASIS

With the rapid development of big data, the amount of data generated by various devices such as social networks have also increased greatly. These data contain a lot of useful information. To obtain this information [1], researchers have carried out many data mining tasks. Data streams have Dynamic, high-dimensional, real-time, infinite, sequential, and high-speed arrival characteristics [2], it is these characteristics that make it difficult for traditional methods to mine data streams.

Data flow classification is one of data flow mining, which is the process of extracting knowledge and information from many data samples. Data flow has three main characteristics, which make it impossible to directly use traditional "batch" classification algorithms [3]. The generation speed of data stream is fast, and new data will appear soon. Therefore, the training and construction speed of the classifier needs to be higher than the data generation speed [4].

The data is massive, and the potential is unlimited, and the data will accumulate in large quantities. The test management information system can quickly and accurately count, process, and analyze the large amount of data to find problems in teaching and truly improve the level and quality of test management. Continuous, orderly, rapidly changing, no end point, and massive data [5] is one of the current research hotspots.

DSMS (Data Stream Management System) can perform scheduled, continuous, and summary query processing for dynamic, timeliness, real-time, infinite, and instantaneous data, which reflects the higher value of the examination. Therefore,

promoting the informatization and electronic management of examination affairs has become the development trend of the current teaching management in colleges and universities. Under the guidance of scientific management theory [6], the five principles of education management in higher vocational colleges and the theory of synergy, the significance of the construction of education management informatization in higher vocational colleges lies in solving various problems faced by the informatization of education and teaching [7].

Aiming at high quality and high performance. There is also several student dormitory management software in the application software market, but there are many differences with the actual management of our hospital, which may be "unacceptable" and difficult to maintain in the later period [8]. At the same time, private colleges and universities rarely consider investment in this aspect. Based on the above background, this study is based on the basic education theory and teaching management model of higher vocational colleges, under the guidance of the tutor [9], combined with the basic situation of the higher vocational college I am in, and proposes a teaching management system that adopts the secondary management of the department. The idea is adopted to develop the student management information system in higher vocational colleges. School management is one? It is a heavy and complex work involving the management of manpower, materials, and funds [10].

Due to the huge amount of information and the information asymmetry between units, the purely manual management method inevitably has various management omissions, which brings inconvenience to teachers' teaching and students' learning [11]. For these data to be mined, useful information is obtained by using analysis methods such as cluster analysis, regression analysis, classification and association rules, and computer technology is used for processing, to make the information more direct and intelligent and provide scientific and technological personnel [12]. Used. Data flow classification is an important method to obtain useful knowledge from massive dynamic data, due to its diverse applications (such as fraud and intrusion detection, forecasting, and healthcare monitoring systems) and an increasing number of practical data flow generators [13].

In the existing research, there are three methods to solve the problem of concept drift [14]: instance selection, instance weighting and ensemble learning. The hottest research in recent years is the ensemble learning method [15], which overcomes the defect that the parameters of the sliding window method are difficult to determine. Concept drift exists in the data stream. Concept drift refers to the phenomenon in which the distribution of data instances changes due to various reasons. For example, it is vulnerable to virus invasion, cannot

operate in parallel remotely, and has low security of resource sharing. These drawbacks have seriously affected the work and study of teachers and students, so it is necessary to develop advanced information systems [16].

## II. THE PROPOSED METHODOLOGY

### A. Multidimensional Data Integration Algorithms

Ensemble learning has become one of the main methods of data stream classification research due to its high classification accuracy and its ability to quickly adapt to concept drift. It uses a variety of machine learning algorithms to extract results based on multiple predictions of the data. When the number of samples in the data stream  $S$  is  $d$ , the following operations are performed: 1) First, separate the data in the data block into a labeled data set  $L$  and a non-classified data set  $U$ , and then according to the class labeled data set  $L$  Build a decision tree classifier Enum.

According to this ensemble classifier EC and the newly trained classifier Enum vote on the data in  $U$  together, if more than 50% of the classifiers are marked as. After testing, when the test data are consistent, the clustering obtained by the two methods The results are also consistent, and in the case of the same amount of data, the Micro-clusters algorithm implemented in the Esper system has the same stability as the original algorithm in terms of data throughput and efficiency. Due to the influence of different colleges and universities' teaching concepts, management mechanisms, educational systems, and economic differences, the problems of informatization construction frequently occur. The emergence of these problems will have a negative impact on the advancement of the informatization construction process of education management in colleges and universities, and even hinder the implementation of the informatization construction effect.

$$m_i = f(x_{i+1}, W^a) \quad (1)$$

$$M = [m_1, m_2, m_3] \quad (2)$$

The multi-spike sequence online supervised learning algorithm for neural network burst is a learning algorithm proposed based on the online regulation mechanism of biological synapses that is not limited by the type of spiking neuron model. It first analyzes and synthesizes the required output, The relationship between the actual output and the input spike column, the HoeffdingBounds inequality defined earlier is used to detect concept drift during the ensemble classification process, where  $R = \log_2 M(c)$  ( $M(c)$  refers to the number of categories), in the drift When detecting, first calculate the error rate of the model on the current data block and the error rate on the previous data block, and examine the difference  $e'$  and the preset threshold. The download version on the master is redis-4.0.9.tar.gz installation package and decompress it; open the redisconfig file for file configuration, set daemonize to "yes", and replace the path in dir. with an absolute path to ensure that the path is accurate. Copy the Redis environment and related software configured on the master to slave1 and slave2.

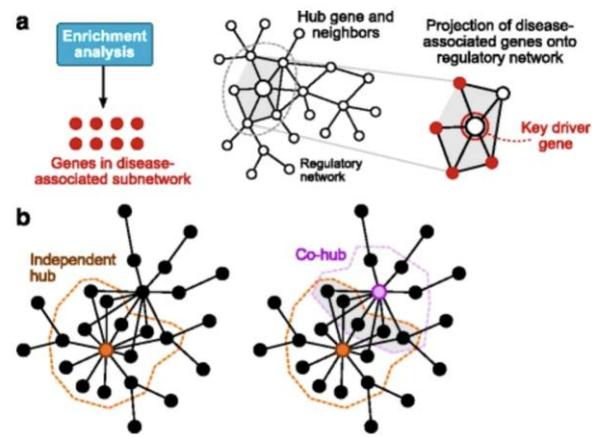


Fig. 1. Schematic illustration of the concept of a key driver gene (a) and local hubs with overlapping neighborhoods (b)

### B. College Teaching Management Information System

The advanced modular structure is easy to expand and integrate, which solves the problem of redundant system data and information. At the same time, the hierarchical design of interface, service, and data is separated, which reduces the coupling between user interface and business logic, and the structural change of business data will not cause the shock of business logic. The design combines the characteristics of the credit system in the total time-consuming of the data stream clustering algorithm, and the most expensive is the time-consuming of processing stream data. When the amount of data is small and the dimension is relatively small, the efficiency of directly using the Micro-clusters algorithm is significantly higher. To establish a static model of the system, that is, to establish the object model of the system. According to the system use case diagram obtained in the requirement analysis stage, the classes existing in the system can be found out by further summarizing and summarizing them.

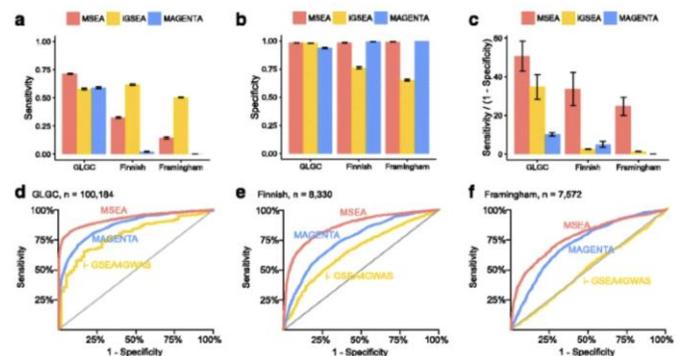


Fig. 2. Comparison of three pathway enrichment methods across three GWAS.

While discovering the classes of the system, determine the attributes and operations of these classes, and determine the relationship between classes, and finally give the class diagram of the entire system. Generating a reasonably scalable teaching plan is a complex task. If relying on traditional manual design, it will cost a lot of manpower and material resources and cannot be optimally combined. When the teaching plan is changed, changing the task will It is also difficult for ordinary people to accept. The main management object of the teaching management information system in colleges and universities, manages the courses of colleges and universities, including new creation, modification, and deletion, provides students with course selection and class schedule generation services; The educational affairs workers in colleges and universities realize the arrangement of courses in colleges and universities.



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**C. Application of Integrated Algorithm in Intelligent Management Information System**

Mons hybrid model is a supervised learning method based on deep neural network (DNN), which trains multiple smaller expert networks in the components created by the gated network, and in each partition, the samples can pass through The DNN classifies correctly., Subclass-I does not adjust the attribute weights during training, Subclass-II dynamically adjusts the attribute weights during the training iteration process. By comparing the experimental results, it can be found that the accuracy rate of Smells and SEClass-II is higher, due to the dynamic adjustment of Subclass-II Attribute weights can reduce the influence of noise attributes, and Smells adopts C4.5

Decision tree classification model the development and growth of higher vocational colleges must keep pace with the times. The construction process of education management informatization in each higher vocational college is closely related to the overall development of education informatization in higher vocational colleges across the country. It should be based on the principle of collaboration and cooperation with other vocational colleges and technology providers. The data layer stores and manages various system data. The final function of the application system is mapped to the operation of the tables and records in the database, the data layer realizes the access to various databases and data sources and makes the design and implementation of the business logic layer more concentrated on the functions of the system itself.

College teaching MIS is a management work that requires students and schools to work and cooperate with each other. It requires direct cooperation between departments. The B/S architecture can improve the office efficiency of colleges and universities and can better meet the needs of collaborative office. The B/S architecture deploys the core business and data of the system on the network server. The student dormitory management information system is mainly based on the campus network of the college, and the network structure adopts a star structure, with switches as the center, connecting several hosts and servers. Integrated to form a Browser/Serve (browser/server) architecture.

$$C_1 = \int (n_k, j_n d_i; 2) \{ (F_{i,i}, (z_n, \} \} \quad (3)$$

**III. EXPERIMENT**

Statistics on the number of papers published 2010-2020 are shown in the figure.

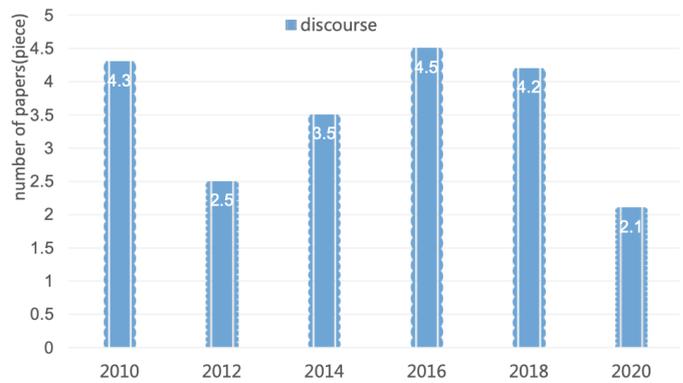


Fig.3. Statistics on the number of papers published 2010-2020  
Generic rea value chain is shown in the figure.

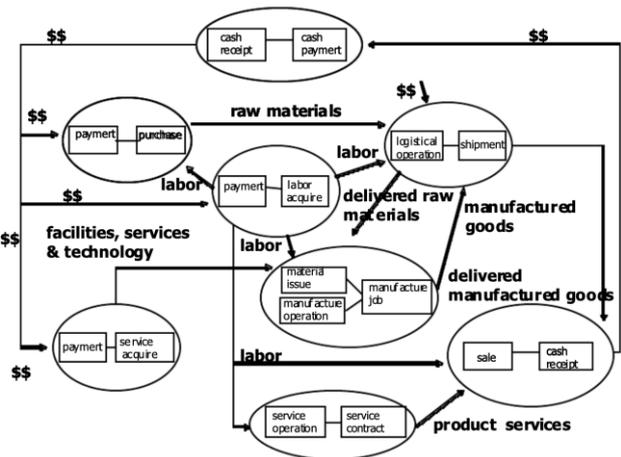


Fig.4. Generic rea value chain

Analysis of the new generation of information technology by teachers and students in colleges and universities is shown in the figure.

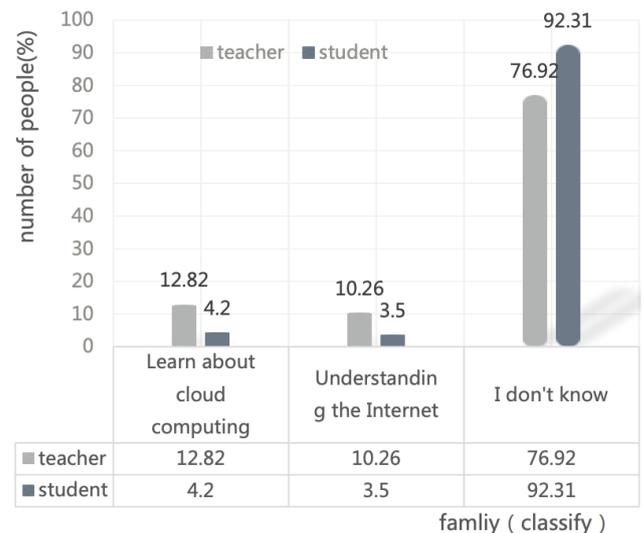


Fig. 5. Analysis of the new generation of information technology by teachers and students in colleges and universities

**CONCLUSION**

This paper uses a combination of market research and theoretical learning to statistically analyze the business functions of existing college teaching MIS at home and abroad, build functional modules under the guidance of simplicity and ease of use, plan the specific needs of the system, and use



UML use case diagrams and activity diagrams to analyze the system. The business is described, mainly focusing on how to use the UDFs used to deal with complex events or processes in the Esper system to realize the description of the Micro-clusters algorithm, so that it can be converted into an algorithm that can be recognized and used directly in the Esper system.

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