Application of Computer Technology in Painting Teaching in Colleges and Universities

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Objectives: The attention paid to art teaching is increasing. And according to the education curriculum, the Ministry of Education also formulates the corresponding exercises and the standards of achievement.Methods: Under this condition, the data mining technology was applied to the process of art achievement evaluation. Results:First of all, build the decision tree CI3 algorithm which got the result of the art test, and then sort out the data flow in the algorithm. In addition, contact with the student's own art scores to test the algorithm and implement the data mining analysis to finally find the students. Conclusion: The characteristic information and the algorithm were constructed on behalf of the text have practicability, which had a certain positive effect on art education in colleges and universities.

Keywords:data mining; Art innovation teaching; CI3 algorithm
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The rapid development of computer and network technology has provided a powerful guarantee for the technical construction of informationization in colleges and universities. In the past few years, related universities continued to carry out information construction work and began to construct school office automation and education systems [1]. However, in terms of school teaching, software that can not be operated on, especially in the art teaching of schools, requires a tremendous amount of work to be done by each of the many teachers at the annual art examination. In addition, under the background of increasing attention to students 'comprehensive qualities, how to combine differentiated teaching with students' annual art test scores is a key issue that art education needs to face nowadays. In this paper, the actual situation of art teaching, the application of information technology and data mining technology in art teaching, the purpose is to build a art performance management system based on data mining, to help and promote the art teaching in the school Quality of Art Teaching [2]. In this paper, the decision tree CI3 algorithm is used as the basis to contact the students 'art test scores and carry out data mining analysis to generate the characteristic information of existential values, which brings effective reference to teachers' differentiated teaching and achieves the goal of improving art teaching quality.

Data mining is the implementation of statistical data on the current existence and analysis, to take this algorithm to predict the implementation of this part of the data, with emphasis on generating assumptions, belong to the future of the forecast, there is a previously unknown. Data mining is specifically intended to rely on such methods to the potential of the current data mining useful information, and future data on the laws and trends to be reasonably predicted. Data mining generally covers the following functions [3]. First of all, data mining can automatically analyze existing data, but also can predict its future development trend reasonably. In the past, data analysis must use manual operation to achieve various kinds of analysis work. In contrast, data mining has strong

intelligence. Furthermore, adopting data mining can achieve the correlation analysis between multiple groups of data, which is to analyze the existing relationships among several groups of data, and such functions exist in data mining. Second, by virtue of data mining clustering can be achieved between scattered data. In general, the data stored in the database as a unit, only a single data can not display a specific meaning, if you want to show the overall meaning of a certain part of this data must be clustered, with a variety of methods such as data[4]. In addition to the functions discussed above, data mining also covers concepts such as concept descriptions, deviations, and other related functions.

METHODS

CI3 Decision Tree Algorithm

The decision tree construction algorithm can be realized by training set T, where $T=\{<x,C_j>\}$. $x=(a_1,a_2,\ldots,a_n)$ belongs to a training instance, and there are n attributes, each of which is listed in the attribute table $(A_1,A_2,\ldots,A_n)$, where the value a_i represents A_i . $C_j \in C=\{C_1,C_2,\ldots,C_m\}$ belongs to the classification result of X. The algorithm can be divided into the following steps: Select the attribute A_i as attributes in the attribute table; if the attribute A_i has K_i values, divide T into K_i subsets $T_1,\ldots,T_k$, where $T_{ij}=\{<x,C>|<x,c>\}\in T$ and attribute value of X A is the first K_i value; in the property sheet to delete the attribute A_i; For any $T_{ij}\left(1\le j\le K_1\right)$, so $T=T_{ij}$; If the property list is not empty, return to the first step, otherwise output. Now the relatively perfect decision tree method has CI3, C4.5 and so on.

CI3 Learning Algorithm

Information entropy is called the average amount of information in information theory and belongs to a class of averages chosen to measure the implementation of the information being conveyed. The information transmitted in the source covers a limited number of mutually exclusive and combined complete time, all of which have the corresponding probability of occurrence. To express it in mathematical formula is as follows: a group of events $X_1,\cdots,X_r$, the selected probability $p(X_1),\cdots,p(X_r)$, the average $H(X)$ Belongs to the entropy of information whose value is equal to the mathematical expectation of (self) information amount $I(X)$ of each event, that is:

$$H(X)=-\sum_{r=1}^{r}p(X_i)I(X_i)=-\sum_{r=1}^{r}p(X_i)\log p(X_i) \quad (1)$$

For the traditional CI3 algorithm, the information entropy is taken as the criterion of selecting attributes and the value of information entropy is calculated based on the data calculation. After comparing the entropy of the relevant information, the maximum information entropy is selected and considered as Is the property of the selection criteria. Then the item matching the information entropy is regarded as the root node of the decision tree. Taking this property, we divide the example set (1) 38 into subsets, and the entropy value of the system appears to be the smallest. We expect the non-leaf nodes to enter the average path of the leaf nodes of each descendant is the shortest, and ensure that the generated decision tree has more Small average depth [5]. It can be known that the higher the degree of disorder that the training example set shows when it performs the target classification, the higher the entropy of the training example set. The more clear and orderly the training example set appears in the target classification, the corresponding The lower the entropy, the more the CI3 algorithm belongs to the property according to the information gain, the greater the benefit for the classification of training examples, the larger the criteria, the algorithm selects the attribute table which can best classify the training set attributes [6]. The information gain of an attribute is the system entropy reduction caused by this sample attribute. It is an important step of CI3 algorithm to calculate and compare the information of related attributes.

CI3 algorithm introduced before, the following will focus on the basic strategy of the CI3

algorithm to be discussed, with the analysis of strategies to bring an effective basis for the subsequent data mining. The basic strategy consists of selecting the decision tree for each node representing the training sample to develop, determining whether the sample is in the same class or not, and if it is in the same class, then the matching node will be incorporated into the leaf node, If this sample is not in the same class, take the entropy-based measure called the information gain as the enlightenment information, among which the most suitable one is to reclassify the sample. The test belonging to this node is also a decision attribute. For this new test attribute, a new branch is constructed and delineated according to the new sample. The recursive decision tree of each sample is generated when an attribute is generated in the tree Node, there is no need to contact the descendant properties; the overall recursion process to stop the request is to achieve one of the following conditions, one is that the given node sample is the same category, and the other is there is no other attributes applied in the sample partitioning, in this case can be regarded as the node of the decision tree leaves. Third is the case of a branch does not exist in the sample, in contrast to the training set of classes, is selected as the maximum standard class construct a leaf.

Data Flow Analysis

Data can be generated during operation and processing, and analysis of this part of the data is also data analysis. To analyze this part of the data flow as a whole to carry out the analysis is the data flow analysis. In the process of implementing data flow analysis, we must pay attention to the following aspects: (1) the direction of data flow, in the process of data processing, the need to clarify the flow direction of this part of the data, starting point and end point; (2) In the process of data flow, changes have occurred or not, what changes have to be accurately recorded. Specifically, data flow analysis is intended to rely on this part of the analysis to arrive at some of the problems that arise in the process of data flow, generally including: poor mobility; inadequate correspondence; and inadequate scientific data processing methods [7]. In the actual analysis process must be as much as possible to demonstrate this part of the problem, after knowing the problem need to take targeted measures to deal with.

After analyzing the data flow, the analysis results are recorded, and the data flow diagram is used to record the flow relationship existing between the data. Data flow diagram to allow developers to more clearly understand the status of data flow, in order to facilitate software development. In the process of drawing the data flow graph, it can be divided into three layers generally. With the description of the three-layer flow graph, the flow of the overall information of the algorithm can be very clearly displayed in front of the developer. The three layers are the top, the zero and the first floor. The top mentioned here is based on the overall point of view to describe the flow of data in the algorithm, the flow of information about the boundary of the algorithm is introduced; zero is the breakdown by the top, more detailed, the performance is. When a function module is in operation, the data flow condition is displayed. The layer that belongs to the final function module can not be subdivided, that is to say, it belongs to the smallest unit that can be implemented. Figure 1 is a top-level data flow diagram of the algorithm [8]. With this chart can understand that the data flowing into the target algorithm is the arrow on the left, each for the art test types, art test items, scores and teachers list, etc., this part of the data into the art score management algorithm through the target algorithm can be obtained. Right arrow matches the relevant data and information, and this part of the information feedback to the target user [9].

Figure 1
Top Level Data Flow Chart of Art Performance Management

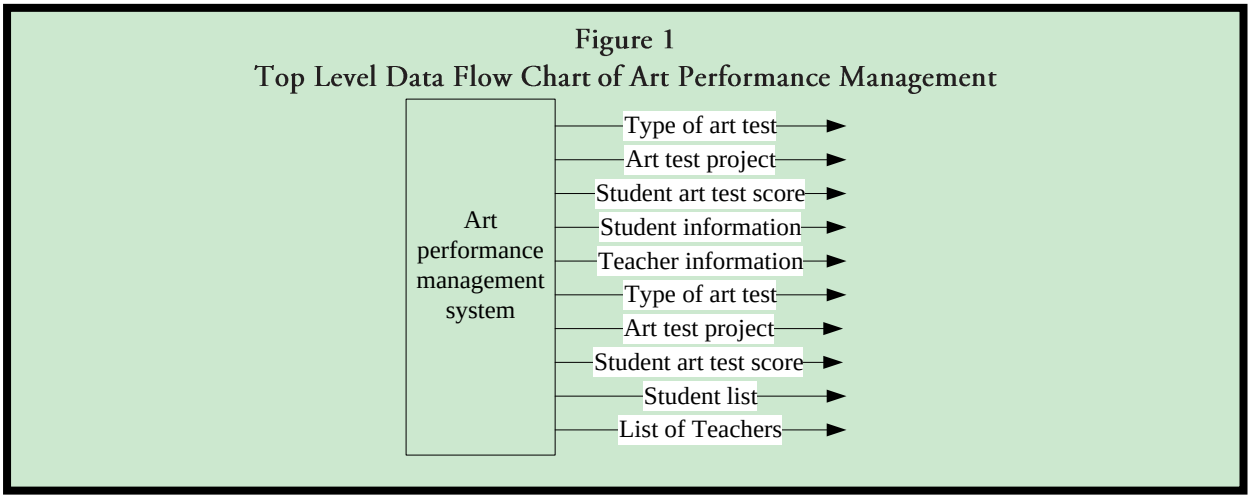
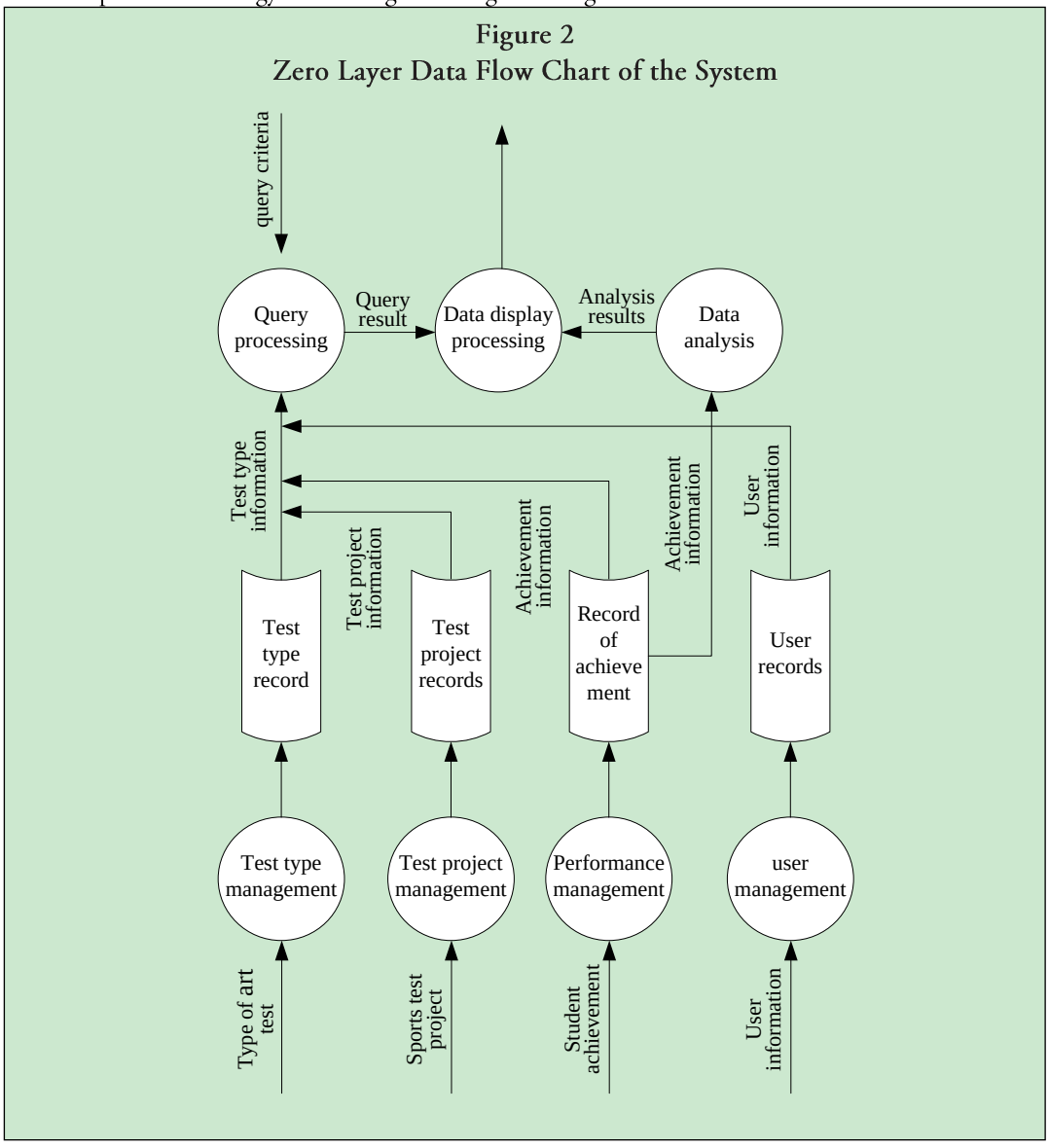


Figure 2 is an algorithm zero-layer data flow diagram, which is specifically for the actual function module implementation of the data flow description, by virtue of its figure can be learned, the user information into the algorithm, through the user management module to process the data, and then stored in the user record table, and this part of the information through the corresponding query and analysis, the final result to the client user feedback [10].

Figure 2
Zero Layer Data Flow Chart of the System

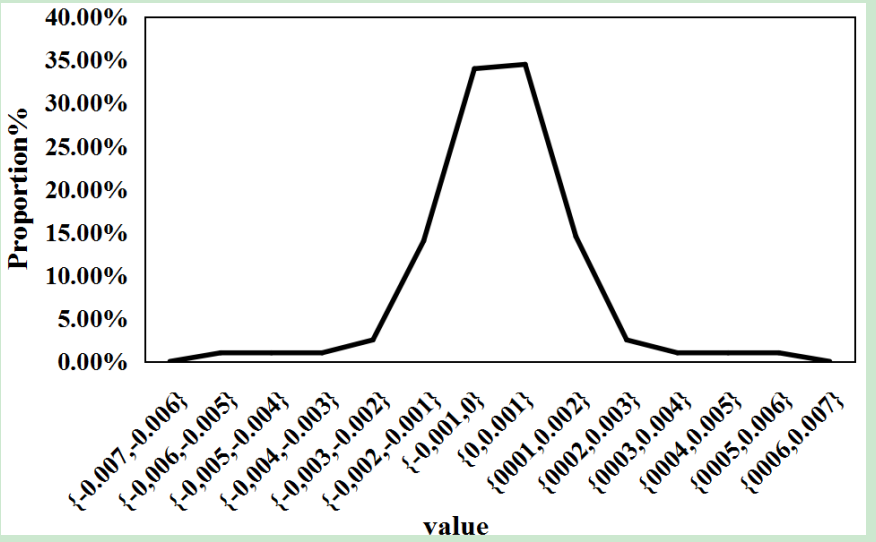


RESULTS

Experiment One

Combined with the student's art test scores, students' achievements are linked to that part of the art project. Table 1 for a class art test scores chart.

Figure 3
Performance Data



At first we started to standardize the database operations. At this stage is to use Excel to create two new worksheets, each for the original worksheet and the original conversion table, the original worksheet storage test scores of all students in the original conversion table, only select 9 test items as attributes,for each student grade, 0 or 1 on behalf of their pass or fail. Therefore, the information stored in the original conversion table exists test items, student information, 0 or 1. After selecting training example set. Combined with the work results obtained in the first stage, the number of passing and failing persons is counted, and the statistical result is regarded as a training set. Statistics as shown in Table 1.

Table 1
Training Set Data

Register number	Graphic Artist Designer	Sketch	Photoshop	Introduction to Art	Art History	Chinese painting overview	Photographic basis	Plane composition
Pass number	81	56	44	41	48	90	48	101
Fail number	78	104	126	128	121	71	121	58

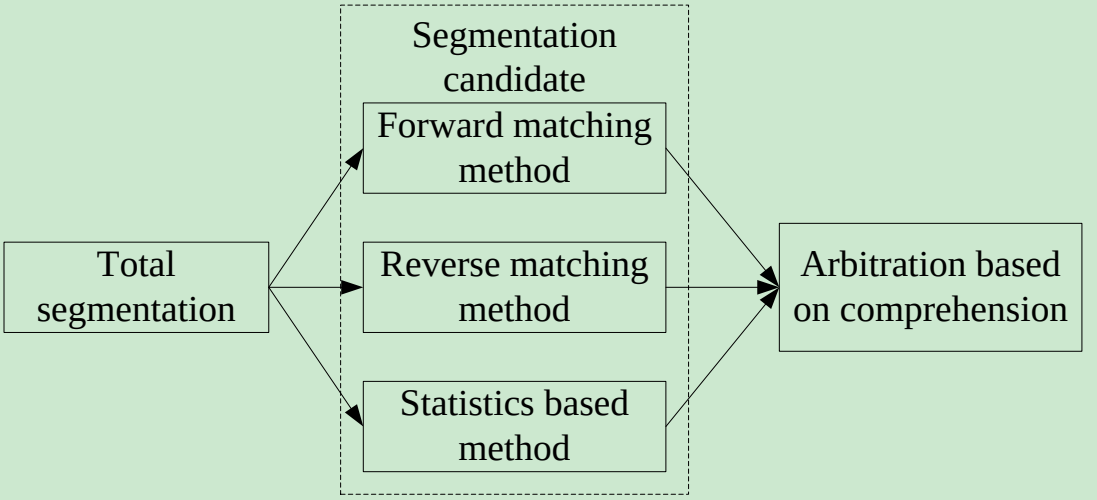
After that, we take the information gain choice to distinguish the best effect from the training set instance. Afterwards, the best attributes that can divide the instances in the training set are given by the degree of information gain. For the construction of decision trees, the smaller the tree, the stronger its predictive ability. Construction of a relatively small decision tree, the key lies in how to select appropriate logical judgments and attributes. The most common way to choose logical judgment and attributes is through information gain. Combined with the information gain, based on given the relevant data, we can calculate the degree of information gain. Afterwards, take the calculation of the information gain of graphic design as an example to discuss the actual process of getting it. The

given data is as follows:

$$I(P,N)-\left[(31/159)^{*}\log 2(29/158)+(130/159)^{*}\log 2(130/158)\right]=0.8021$$

In this case, P and N each represent the number of records for the introduction to fine arts in both cases. Then the value of the image processing can be calculated, that is, E (Graphic Design) = (81/160) * I (31,49) + (81/159) * I (5,81) = 0.7029, (P, N) -E (Graphic Design) = 0.0992, which is obtained by subtracting the value of the image processing from the value of (P, N), to obtain the information gain of the image processing. Combining the above approaches and principles, the information gain of other art test items can be calculated as follows: Gain = 0.2099, Gain = 0.0898. Therefore, in the three art test projects of graphic design, sketching and image processing, sketches have the greatest information gain, that is, sketches in the training set are the key indicators that can best distinguish the achievement of art sketches. Finally, after calculating the information gain of each test item, the node of the tree must be constructed. When building a tree node, you must also create a child node below that node and continue to decompose it. Want to stop this decomposition must meet the requirements of two aspects, one is the data under a node, is called the same category; the second is the application does not have the attributes on the partition.

Figure4
The Basic Thought Diagram of Ccws Word Segmentation



In the previous article, we calculated the information gain of related test items, and the information gain of the inside sketch is the largest, so we can regard the sketch as the root node. There are two types of sketch attribute values, each passing and failing, so you can build two branches in the sketch and the node, the specific structure shown in Figure 4. Compare the related test item data, filter the data whose sketch value is 0, and the number of records with the fine art value 1 is 4. Before the draft on behalf of failed, it will have an impact on the performance of the art of Introduction, the forecast accuracy rate of about 96%. Due to the sketches that failed and the accurate prediction of the art's probability scores, the data that failed the sketches could stop dividing. After that, taking the fine arts probability as the root node, after the implementation of the decomposition, find its forecast data. Finally, combining the above methods and principles, some research conclusions can be obtained, specifically as follows: If the result of the student sketch project is unqualified, the art generalization project also generally fails with the accuracy of (104-4) /104=96.2% ; If the student's passing score is

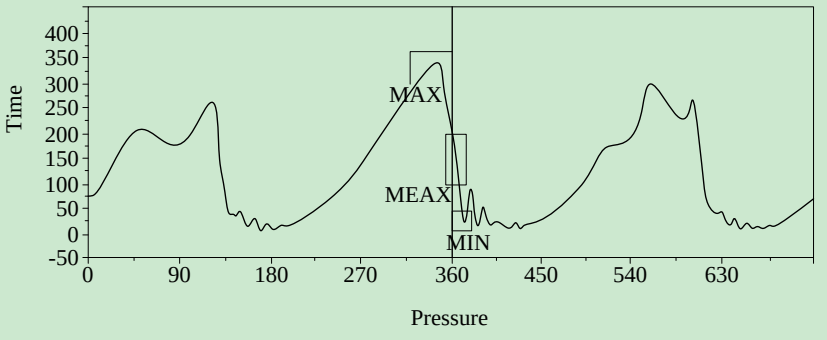
passing, and this student's art history project results are unqualified, so the student's general introduction of art is also a failure, the accuracy is (32-6) /32=81.3%; if the students The passing grade of the drawing is also passed. The art history project also passes the grade. The general introduction to the art is also able to pass the examination with the precision of (25-3) / 25 = 88%.

Here too can be described: student sketch project and the art of the project has a specific relevance, by virtue of the degree of student sketching can outline the learning achievements of this student's art outline. The study of the art history project can also affect the study of the general art of art. Art teachers in the implementation of short-circuit teaching process must attach importance to the student's sketching basis, if some students sketching the foundation better, but the general introduction of art is relatively ordinary, for this part of the students, teachers must pay as much attention as possible to its art history theory to be a reasonable guide.

Experiment Two

In the previous part, we introduced an application of data mining in art management. After that, we discussed another case, selected art test scores of art students as examples, and used data mining to explore the relationship between art achievement and employment status. Algorithm load in the running process is shown in Figure 5.

Figure5
Algorithm Load Condition



After the adoption of CI3 algorithm, the structure of the decision tree, the relationship between subjects and employment status, as in the graphic design project test, the higher the performance on behalf of have better employment status, which represents art students looking for work In the process, the employer pays attention to the student's graphic design test situation, after which the student's sketch achievement is that the two subjects can show the students' painting level.

DISCUSSION

Art education has also become a key component of school teaching, and gradually become the key course in the exam. After entering the era of informationization, the relevant schools have stepped up their efforts in building informatization. Art education is a key part of them. Information construction is also an inevitable trend of development. In this paper, based on the data mining algorithm of art innovation teaching implementation analysis, it began to discuss the CI3 decision tree algorithm and CI3 learning algorithm, and for the implementation of the algorithm in the data stream analysis, and then took the CI3 algorithm to build art teaching evaluation model. In the end, two experiments are used to test the model and algorithm in this paper, analyzed the achievements of the art recorded in the system,

and the data mining technology was adopted to find the suggestion that could promote the development of art teaching in the future. The applicability of the art teaching in colleges and universities can help.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

None declared.

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