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The Aesthetic Education Function of Digital Information Resources in the Teaching of Ethnic Vocal Music in Colleges and Universities Based on Big Data

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Abstract: As a carrier of culture, folk music is the embodiment of social economy, nature and culture, and reflects the social, historical and aesthetic conditions at that time. This can understand history, aesthetics, values and so on from another perspective. Folk music has a certain role in promoting people's self-cultivation. Ethnic music is the carrier of a country's beliefs and values. Its prosperity promotes national self-confidence and enhances the country's patriotism. However, in the era of big data, due to the proliferation of popular music, people tend to ignore the importance of ethnic music, including some textbooks and courses, and even ignore ethnic music directly. Therefore, this paper mainly studies the aesthetic education function of digital information resources in the teaching of ethnic vocal music in colleges and universities under big data. This paper proposes how to solve this situation, and conducts market research and analysis. The interviews and questionnaires were conducted on all the first-year students of a middle school in Xiamen and the high school music teachers, and the clustering algorithm was used for data analysis, which also made the experimental results more accurate. The test results show that in the case of dissatisfaction with the teaching materials, students believe that the proportion of popular music should be increased, and the proportion of film and television animation music is as high as 99% and 89%. The proportion of choosing to increase Chinese folk music and opera music is pitifully small, only 2% and 1%. This fully shows that the teaching of ethnic music appreciation in colleges and universities has not achieved the desired effect at all, and the inheritance of ethnic music is in a dangerous situation. Therefore, after the research of this experiment, it is also necessary to call on everyone to protect Chinese national vocal music.

1. Introduction

"Inheriting culture and consolidating innovation" has always been an issue that China and the entire society attaches great importance to. In order to improve the overall quality of higher education, cultural inheritance and innovation must be strengthened. Since ancient times, how many excellent music culture has been handed down is unknown. "Teaching" is an important way of cultural inheritance. At the beginning of the founding of the People's Republic of China, some universities in China offered national vocal music courses. It can be seen that the development of national vocal music education is still an urgent problem to be solved.

In the inheritance and innovation of culture, universities must play an important role. But its significance is not limited to this, but: to carry forward the national culture, to promote the development of national music education; to promote the exchange of spirit and culture between different countries. In terms of discipline construction, it is necessary to find suitable methods and methods for the development of national vocal music education. The academic theoretical value is to increase the emphasis on the development of minority vocal music and provide a theoretical basis for the development of ethnic vocal music.

This paper mainly studies the aesthetic education function of digital information resources in the teaching of ethnic vocal music in colleges and universities under big data, proposes how to solve this situation, and calls on everyone to pay attention to this problem. Through making a market research and analysis, and visiting a middle school in Xiamen, a questionnaire survey is conducted on all senior students and high school music teachers, and a clustering algorithm is used for data analysis. The innovation of this article is that the research value of the article is very high, and the experiment is also based on on-site visit investigation, which is very practical.

2. Related Work

We are living in the best of times. At present, the economy is growing steadily, and technology drives the rapid development of all walks of life. Correspondingly, art education has been paid more and more attention by the society, and ethnic vocal music teaching has also been concerned and loved by parents and students. As an important content of quality education, vocal music teaching has a great influence on the effect of ethnic music teaching. The selection of vocal music works has a decisive role in mobilizing students' interest in learning and improving their enthusiasm for learning, and it is helpful to improve the teaching quality and teaching efficiency of vocal music teaching in colleges and universities. Therefore, Kang H discussed the selection method of vocal music works in college vocal music teaching, and on the basis of previous research on vocal music teaching, conducted an in-depth study on the effective teaching methods in college vocal music teaching [1]. With the continuous updating of the development concept of the times, the teaching methods of vocal music are also constantly improving. Fu L put forward the transformation from teacher-centered to student-based. Teaching emphasized the development of students, paid more attention to changes in academic conditions, and paid more attention to the combination of theory and practice [2]. In the article, Rosenzweig S provided a detailed overview of the audio material, transcriptions, and annotations included in the dataset. In addition to its importance for ethnomusicological research, this well-organized and annotated corpus constituted a challenging scene for music information retrieval tasks such as fundamental frequency estimation, onset detection, and score-to-audio alignment [3]. Chinese national opera is a new type of Chinese dramatic art, and it is also the product of the combination of foreign art forms and traditional music. In the inheritance of traditional art, the elements of traditional Chinese drama and opera have laid the foundation for the development of Chinese national opera. In this context, Jinxu H studied and analyzed the development process and characteristics of Western drama, and introduced its

influence on the development of Chinese opera and the development of Chinese opera. By combining the analysis of the characteristics of singing and opera sections and the actual situation of Chinese opera, the integration and application of traditional Chinese opera sections were analyzed [4]. They all well explained the importance of national vocal music and various studies such as comparison with foreign popular music, and achieved good results. However, the current hot research objects are young people who are teaching in colleges and universities, and they have not analyzed the current situation.

With the advancement of technology, the era of big data has come to us unknowingly. The era of big data is a data-oriented era. , In order to reduce the amount of data collected by the Internet of Things, it is necessary to improve the processing speed of big data. In order to reduce the data collected by the Internet of Things, Xue J W proposed a method of compressed sensing sampling. Aiming at the high computational complexity of the compressed sensing algorithm, the multi-objective optimization particle swarm optimization algorithm was used to improve the search term of the gradient projection sparse reconstruction algorithm (GPSR-BB) [5]. Diversity and accuracy are two distinct characteristics of large-scale and heterogeneous data. Efficiently representing and processing big data with a unified scheme has always been a huge challenge. In the article, Kuang L proposed a unified tensor model to represent unstructured, semi-structured and structured data [6]. The Internet of Things (IoT) is a new technology that is developing rapidly in the field of telecommunications, especially in the field of modern wireless telecommunications. The primary goal of interaction and collaboration between things and objects sent over a wireless network is to achieve the goals they set as a composite entity. In addition, based on wireless network technology, mobile cloud computing (MCC) and Internet of Things technologies are developing rapidly. In the article, Stergiou C combines the above two technologies (MCC and IoT) with big data technologies to examine their common characteristics and discover which advantages of MCC and IoT can improve the usage of big data applications [7]. They all introduced that in the information age of the Internet of Things, a large amount of data is constantly pouring in, and the statistics of big data are becoming more and more important. But none of them gave a complete statistic.

3. Clustering Algorithm under Big Data

3.1 The Era of Big Data

With the continuous progress of science and the rapid development of emerging technologies such as cloud computing, the Internet of Things, and social networks, new types of data that are closely related to people are constantly being generated, as shown in Figure 1. At the same time, a large number of popular mobile devices, wireless video frequency devices and wireless sensors are constantly generating new information. Hundreds of millions of netizens around the world are enjoying Internet services and at the same time generating new information data on the Internet, and historical data recording people's work and life information has also exploded. According to incomplete statistics, only in 2009 the data volume reached 0.8ZB, and in the following year, the data volume increased by 50% to 1.2ZB. The growth rate in the next year still be 50%, and the data volume has reached 1.82ZB. This growth rate is accelerating. According to IBM's research, in the entire human civilization process, 90% of the total data has been generated in the past two years. It is also easy to understand that the data of early human civilization was limited by language and written materials, and it was difficult to record the bits and pieces of life. Now, with the carrier of the Internet, data is naturally explosive growth. The data volume will reach nearly 11ZB, and by the end of next year, the data scale will explode to 44 times the current [8-9].

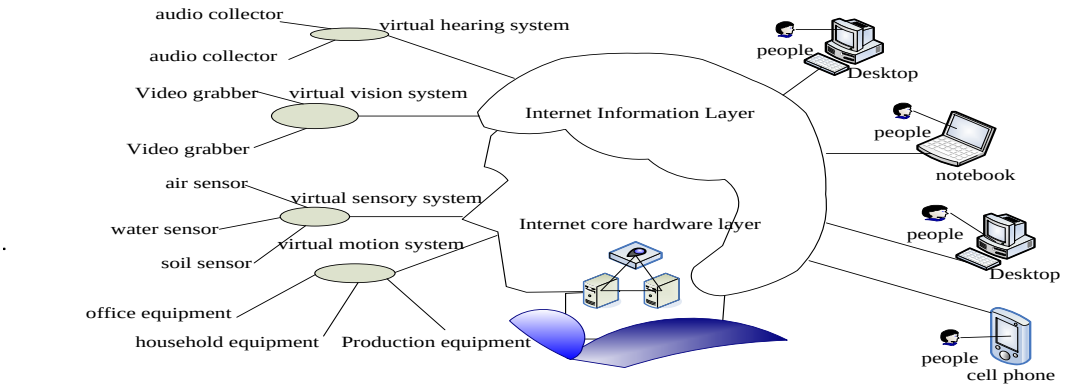

Figure 1. Challenges of Big Data

The era of big data has special significance for enterprises, government agencies, and academic institutions. Much of the previous theoretical research was only at the laboratory stage. Now that the data has come, people are testing those seemingly meaningless hypotheses with real data. The story of beer and diapers is basically familiar to everyone. It is said that a supermarket found through research that when Dad buys diapers, he usually buys some beer to go home. After that, supermarkets linked the diaper counter and the beer counter, which greatly increased the sales of both. This is a typical example of data analysis, and the amount of data generated by people's lives today is increasing. By mining the hidden information in these data volumes, it can provide more in-depth guidance for government decision-making and enterprise product positioning. As shown in Figure 2, this paper finds that in recent years, the scale of global data has grown explosively, and big data will become more and more useful [10].

Figure 2. Scale and Growth of China's Big Data Application Market from 2011 to 2016

Due to the small amount of computation, it cannot be loaded all, so the data set should be sampled rather than the entire set of data. The basic idea of sampling is to first select a representative sample from the population, and the size of these samples is much larger than the total data, so that it can be processed quickly. Then cluster analysis is performed on the samples, and finally it is generalized to the entire data set [11]. As can be seen from Figure 3, the main factors that affect the final clustering result of this method are the selection of sample data and how to generalize the clustering result to the whole world, so these two aspects are the focus of this paper.

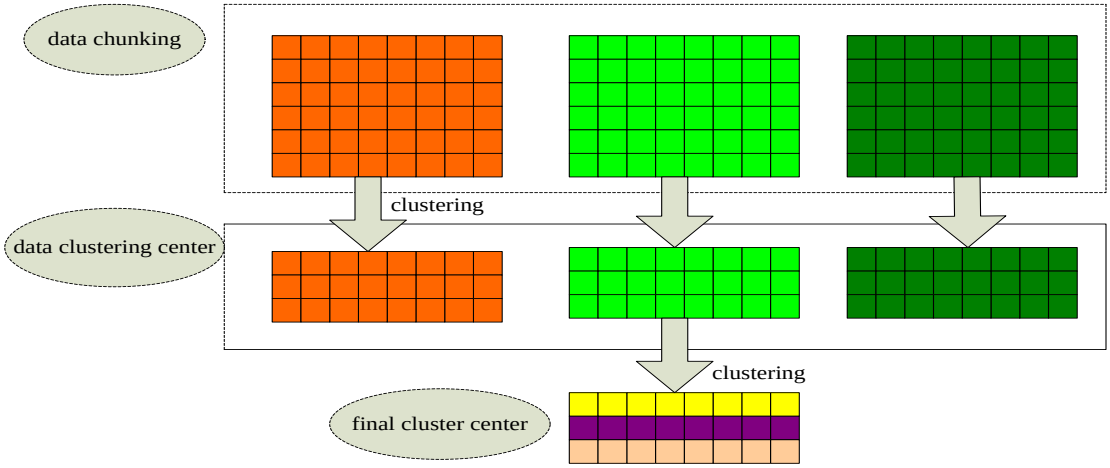

Figure 3. Schematic Diagram of the Online Method

Due to the development of multi-core processors and distributed computing technology, a large number of parallel programs and general parallel architectures emerge as the times require, which greatly improves the current computing power. In the non-interactive computing module, the parallel computing method can be used to improve the computing efficiency, and the data can also be stored in the distributed storage system to speed up the operation of the system. As can be seen from Figure 4, the characteristic of the parallel algorithm is that the clustering work is divided into parallel operations and non-parallel operations, while the non-parallel operations still use serial operations. The parallel computing part can use multiple computing devices to perform computing, thereby improving computing efficiency. However, due to the limitations of the characteristics of some clustering algorithms, they can only be executed continuously, so they cannot be improved by parallel processing.

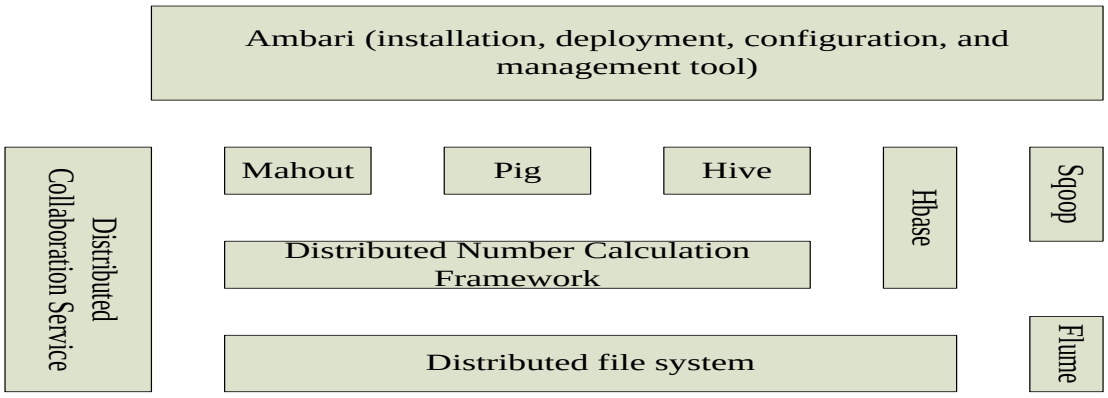

Figure 4. Parallel Programming Protocol and General Parallel Framework Diagram

3.2 Clustering Algorithms

(1) Classical Clustering Algorithm

Clustering algorithms can be roughly divided into partition-based methods, hierarchy-based methods, density-based methods, and spectral graph theory-based methods [12-13].

Classification-based methods are divided into hard partition clustering and soft partition clustering. Its representative algorithms are K-means and fuzzy C-means. For data set $a=\{a_1,a_2,..a_m\}$ and the number of clusters k, the purpose of both algorithms is to find a set of cluster centers $C=\{c_1,c_2,...c_k\}$ to minimize the weighted sum of the distances from each data to the cluster centers, namely:

$$\min_{C}\sum_{j=1}^{m}\sum_{i=1}^{k}\chi_{ji}^{n}\left\|a_j-c_i\right\|^2, q.w., \sum_{i=1}^{k}\chi_{ji}=1 \quad (1)$$

Among them, χ_{ji} is the membership degree of a_j belonging to the corresponding cluster of c_i, and n is the fuzzy coefficient.

According to the hierarchical method, the data is organized into a hierarchical tree structure, and the data can be divided into two types, the dispersion method and the agglomeration method. The algorithm first starts from a group of data clusters, divides a group of clusters into several groups, and then repeats until the termination condition is satisfied. The clustering method is just the opposite. It first treats each data as a cluster, and then merges adjacent clusters layer by layer until the termination condition is reached, or only one cluster containing all the data is left.

Compared with other methods, the biggest advantage of the density-based clustering algorithm is to judge whether the data is a cluster according to the distribution density of the data, rather than directly passing the distance between the data. Compared with the segmentation-based clustering algorithm, the algorithm is more effective only for the classification of hyperspherical clusters, and its biggest advantage is that it can identify clusters of arbitrary shapes and is insensitive to noise. The density-based clustering algorithm is DBSCAN, and its basic principle is: within a given range, if the number of data in adjacent areas exceeds a certain threshold, they will be classified into the same group.

For node sets A, B⊂V, defined as $vol(X)=\sum_{j\in X,i\in V}S_{ji}$, then the standard cut of node sets A and B is defined as:

$$cut(X,Y)=\sum_{j\in X,i\in Y}S_{ji} \quad (2)$$

The normalized partition corresponding to a k partition $\alpha=\{X_1,X_2,...X_k\}$ of graph G is:

$$Ncut(\alpha)=\sum_{X\in\alpha}\frac{cut(X,\overline{X})}{vol(X)} \quad (3)$$

Among them, 1 is the complement of X, which is 2. The purpose of the spectral clustering algorithm is to find k partitions in G so as to minimize normalization in the graph, namely:

$$\min_{\alpha}\sum_{X\in\alpha}\frac{cut(X,\overline{X})}{vol(X)}=\min_{\alpha}Ncut(\alpha) \quad (4)$$

By setting $P\in\{0,1\}^{m\times k}$ as the indicator matrix of the final division result, the Laplacian matrix

$V \in R^{m \times m}$ of the graph G is introduced, namely V=D−W, where $D \in R^{m \times m}$ is the diagonal matrix. Then the objective function of spectral clustering can be rewritten as:

$$\min_{\alpha,P} Tr(P^T VP), s.t., P^T DP = 1 \quad (5)$$

$$P_{ji} = \begin{cases} \frac{1}{\sqrt{vol(X_i)}}, v_j \in X_i \\ 0 \end{cases} \quad (6)$$

If the constraints in the above problem are relaxed to $P \in R^{m \times k}$, that is:

$$\min_{P \in R^{m \times k}} Tr(P^T VP), s.t., P^T DP = 1 \quad (7)$$

Then, by computing the generalized eigenvectors of V and D, the solution to the problem is obtained, namely:

$$Vp = \eta Dp \quad (8)$$

(2) Commonly Used Evaluation Criteria for Clustering Results

For a given dataset $Y = \{y_1, y_2, ...y_m\}$, if $q(x) \in Y = \{y_1, y_2, ...y_k\}$ represents the category of the data y in the clustering result, and $w(x) \in Y = \{y_1^*, y_2^*, ...y_r^*\}$ represents the category of the data y in the given label, then:

$$A = \left| \left\{ (y_j, y_i) \middle| q(y_j) = q(y_i), w(y_j) = w(y_i), j \pi i \right\} \right| \quad (9)$$

$$B = \left| \left\{ (y_j, y_i) \middle| q(y_j) = q(y_i), w(y_j) \neq w(y_i), j \pi i \right\} \right| \quad (10)$$

$$C = \left| \left\{ (y_j, y_i) \middle| q(y_j) \neq q(y_i), w(y_j) = w(y_i), j \pi i \right\} \right| \quad (11)$$

$$D = \left| \left\{ (y_j, y_i) \middle| q(y_j) \neq q(y_i), w(y_j) \neq w(y_i), j \pi i \right\} \right| \quad (12)$$

These respectively represent the number of point pairs that are marked as the same class and belong to the same class in the clustering result, the number of point pairs marked as different classes and the clustering results belong to the same class, the number of point pairs marked as the same class and the clustering results belong to different classes, the number of point pairs marked as different classes and the clustering results belong to different classes [14]. The following indicators can be defined:

Rand index (RI):

$$RI = \frac{A + B}{A + B + C + D} \quad (13)$$

F-measure:

$$F_\varphi = \frac{(\varphi^2 + 1)A}{\varphi^2 (A + C) + (A + B)} \quad (14)$$

Jaccard coefficient (JC):

$$JC = \frac{A}{A+B+C} \quad (15)$$

Purity:

$$purity = \frac{1}{m}\sum_{k}\max_{i}\left|\left\{(y|q(y)=k)\cap\left\{y|w(y)=i\right\}\right\}\right| \quad (16)$$

3.3 Big Data Clustering Methods

(1) Weighted Kernel Fuzzy C-means Algorithm

The classical kernel fuzzy C-means algorithm assumes that the weights of all data in the dataset are the same, while the weighted kernel-fuzzy C-means algorithm assigns different weights to the data in the dataset, and its objective function is:

$$Q_{n,z}(S;R) = \sum_{i=1}^{r}\frac{\sum_{j=1}^{m}\sum_{u=1}^{m}(p_j\phi_{ji}^{n}p_u\phi_{ui}^{n}tR(a_j,a_u))}{2\sum_{m=1}^{m}p\phi_{li}^{n}} \quad (17)$$

Among them, p is the weight vector,

$$\phi_{ji} = \left[\sum_{l=1}^{r}\left(\frac{t_R(a_j,c_i)}{t_R(a_j,c_l)}\right)^{\frac{1}{n-1}}\right]^{-1} \quad (18)$$

$$t_R(a_j,c_i) = \left\|\gamma(a_j)-\gamma(c_i)\right\|^2 \quad (19)$$

$$\gamma(c_i) = \frac{\sum_{l=1}^{m}p_l\phi_{li}^{n}\gamma(a_l)}{\sum_{l=1}^{n}p_l\phi_{li}^{n}} \quad (20)$$

It can be obtained by substituting Formulas:

$$t_R(a_j,c_i) = \frac{1}{\left\|p\circ\phi_i\right\|^2}(p\circ\phi_i)R(p\circ\phi_i) + R_{jj} - \frac{2}{\left\|p\circ\phi_i\right\|}((p\circ\phi_i)^D R)_i \quad (21)$$

Among them, $\circ$ represents the Hadamard product. In the process of the weighted kernel fuzzy C-means algorithm, the data closest to the cluster center is selected as the cluster center and returned [15].

(2) One-pass Kernel Fuzzy C-means Algorithm

It can be known from the above that the space complexity of the kernel fuzzy C-means is $O(m^2)$, where m is the number of data in the dataset. When m is very large, it is easy to cause the program memory overflow and cannot be calculated. Therefore, on the basis of the kernel fuzzy C-means algorithm, someone applied the idea of block to it and proposed a one-pass kernel-fuzzy C-means algorithm. The algorithm initially assigns a weight of 1 to each data, and the weight of each cluster center is the sum of all the data weights of the corresponding cluster of the cluster center [16-17].

(3) Other Algorithms

In addition, many other methods for large-scale data clustering have emerged. Someone proposed the BIRCH algorithm, which first integrates the data into the clustering feature tree and

then divides the data. The nodes of each clustering feature tree represent a cluster in the data, the nodes of the lower layer are obtained by splitting the nodes of the higher layer, and the merging of the clustering feature nodes only requires a small amount of calculation. Therefore, not only the amount of computation is reduced, but also the data information is greatly compressed, thereby reducing the memory requirement. Moreover, the data only needs to be read once to form basic clusters, which reduces the I/O cost. But this method uses the concept of diameter or radius to control the boundaries of clusters. Therefore, non-spherical clusters cannot be well identified, and the order in which data points are read will affect the final clustering effect. Points that belong to the same cluster may be divided into different clusters due to the far different insertion order.

Scientists proposed a strategy to improve the calculation speed of the K-means algorithm, as shown in Figure 5. The algorithm sets three kinds of filters: global filter, group filter and local filter. When it is necessary to calculate the distance from a point to the cluster center, by calculating the distance of each cluster center moving forward and backward, it is judged whether the cluster to which the point belongs has changed, and the unnecessary distance calculation is filtered out by using a filter to save calculation time. This method can only be applied to the K-means algorithm, and when the number of clusters is relatively small, the effect of improving the performance of the algorithm is not obvious.

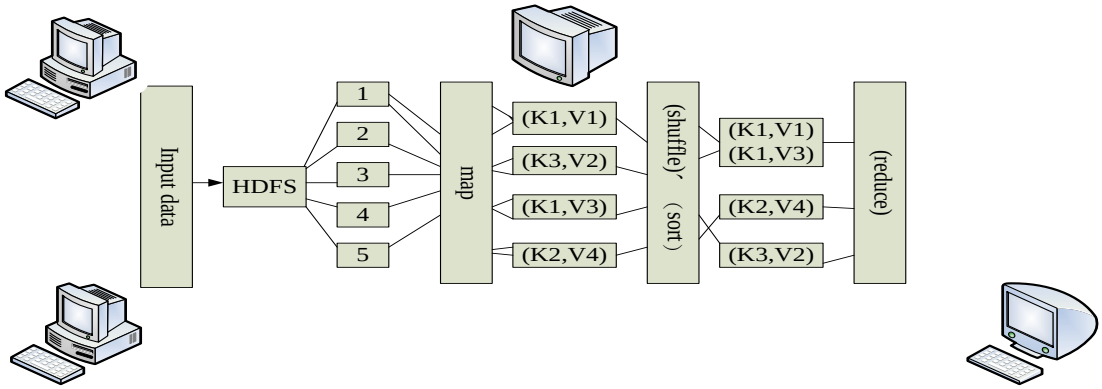

Figure 5. Hadoop Computing Process

Clustering algorithms are not only widely used in practical applications, but also applied to data statistics. The following experiment is based on the data statistics of the clustering algorithm, and does a market research experiment data analysis on the aesthetic education function of digital information resources in the teaching of ethnic vocal music in colleges and universities.

4. Aesthetic Education Function Experiment of Digital Information Resources in College Ethnic Vocal Music Teaching Based on Big Data

4.1 Current Situation of National Vocal Music Teaching

(1) Research Trend of Ethnic Vocal Music Teaching

As a mainstream singing art, national vocal music focuses on the breathing of singing, the use of cavities, the accuracy of articulation, and the emotion of songs. CNKI literature database uses "ethnic vocal music" and "teaching" as the key words. There are more than 1,500 research results on ethnic vocal music from 2006 to 2017, including 265 papers, one of which is a doctoral dissertation. The trend of growth in the number of its studies can be seen in Figure 6. In general, China's research on ethnic vocal music presents a tortuous and upward trend.

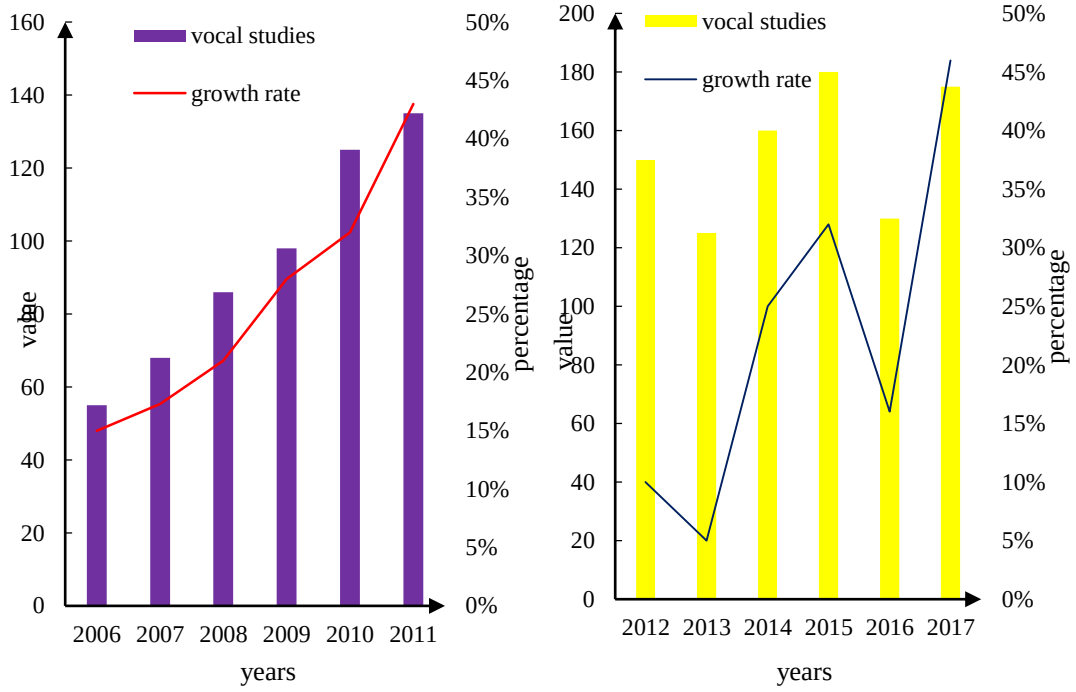

Figure 6. Growth in the Number of Academic Studies on Vocal Music Teaching

(2) The Main Research Direction of Ethnic Vocal Music Teaching

In this paper, more than 1,500 literatures on the teaching of ethnic vocal music are counted in CNKI literature database. The results show that the current domestic national vocal music teaching research mainly includes three aspects: research on teaching concept, case study on case teaching, and research on singing technology research. The discussion of teaching concepts includes the discussion of teaching methods, diversified teaching ideas, nationality and scientific research; the research of singing technology includes singing style, language, articulation, national singing, bel canto and so on.

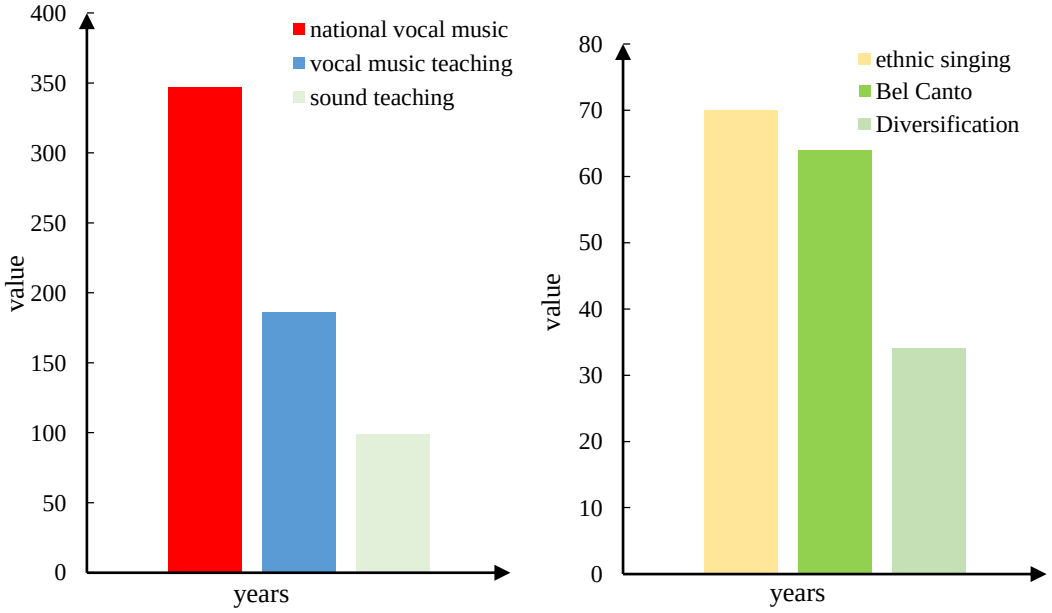

Figure 7. Keyword Distribution Map

4.2 Questionnaire Survey

(1) Purpose of the Investigation

This research is based on a questionnaire survey and interviews conducted by all the first-year students and music teachers of a high school in a middle school in Xiamen on the issues related to the appreciation and teaching of ethnic music in high schools, as well as some experiences of the author during the internship in this middle school. The purpose is to fully and in detail understand the performance of senior first-year students in a middle school in Xiamen in the class of appreciation of ethnic music, and their attitude towards ethnic music. Combined with the understanding of the interviews with teachers, find out the relevant problems that affect the teaching of ethnic music appreciation in the middle school and high school. It is necessary to analyze the cause of the problem from the three aspects of teachers, students and teaching resources, and put forward objective and specific countermeasures and suggestions for the above three levels. It provides a reference for other schools that have similar teaching of ethnic music appreciation in this middle school, and further puts forward arguments and suggestions for inheriting ethnic culture in national music education [18].

(2) Investigation Object

Since this research is a case study, the object of the investigation is very clear, and it only takes all 485 students and music teachers in 9 classes of the first grade of a middle school in Xiamen as the research object.

This middle school belongs to the second-class standard school in Xiamen. Since the enrollment of junior high schools in Xiamen is computer allocation, the source of students in this middle school is no different from that of other schools in Xiamen. The quality of students in high schools is medium in Xiamen, and the grades of students admitted to the middle and high schools are ranked in the middle position in Xiamen. Such students will have favorable objective factors and unfavorable aspects to the classroom effect in the teaching of ethnic music appreciation [19].

Teacher X, the music teacher in our high school, is a very good old teacher. He has good achievements and attainments in music teaching and personal qualifications, and has a considerable degree of scientific research ability. He has published dozens of articles in national and provincial journals. And every year, as the instructor of the normal interns of Xiamen colleges and universities, he helps and guides the normal students of colleges and universities one after another. When listening to Teacher X's music class, both junior high school and high school students left a deep impression. Teacher X's passion and humor in teaching, as well as his prestige among students, have played a good role model.

The research of this paper is a case study based on the questionnaires of its students, interviews with teachers, and the author's practice experience.

(3) Statistics

1) Basic information

The basic information of the respondents in the first part of the questionnaire shows that the students surveyed are all senior first-year students between the ages of 16 and 17; there are 264 boys and 221 girls, with a male-to-female ratio of 6:5. In filling in the hometown, it can be found that 81% of the students' hometown was in Xiamen. 12% of the students are from other areas of Fujian Province, such as Longyan, Putian, Fuzhou and other places. 7% of the students' hometown is outside Fujian Province, such as Chongqing, Xi'an, Sichuan and other places, as shown in Table 1. This shows that most of the students in this middle school belong to Hokkien, and there are also a small number of migrants whose ancestry is from other places.

Table 1. Statistics of the Basic Information of the Respondents

Ratio gender	male	Female	
quantity	264	221	
%	54.4	45.6	
Ratio hometown	Xiamen local	Fujian Province	Provinces
%	81	12	7

2) Knowledge of folk music

The first subtitle of the second part is "Which type of music do you prefer (multiple choices)". And It lists 523 types of music, namely pop music, Western classical music, Chinese folk music, jazz, film and television animation music and others. After the statistics of the questionnaires, as expected, the number of people who like pop music is the largest, reaching a 100% rate, followed by film and television animation music, Western classical music, and jazz music. The percentage of people who like Chinese folk music is the least, only 7%, as shown in Table 2.

Table 2. Statistics of favorite music genres

number of people ratio Music	Pop music	Film and television animation music	western classical music	jazz	Chinese folk music	other
quantity	523	475	455	329	36	10
%	100	91	87	63	7	2

The second subtitle of the second part is "Do you think Chinese folk music or folk music is a bit rustic?". By checking the situation, it was found that 49% chose "not at all earthy"; 25% chose "somewhat earthy"; 20% chose "comparative earth"; 6% chose "very earthy". It can be seen from the data that the number of Chinese folk music as "not earthy" and "rusty" is basically one-to-one, and the option "very earthy" is as high as 6%, which shows that there are great misconceptions about the views of ethnic music among the students.

The third sub-title of the second part is "Do you know or have heard of those folk music? (multiple choice)", and lists 11 more famous folk music works. After checking the statistics, it is found that most of the students have heard of some textbooks, and only a few students have heard of those not on the textbooks, and 2% of the students who choose "do not understand, have not heard". This shows that students do not pay much attention to ethnic music in their daily life, and only passively enjoy a few works during class. And 2% of the students have no impression of the works they have appreciated in class, which is very scary [20], as shown in Table 3.

Table 3. Statistics of the Number of People Who Know Famous Folk Music

Ratio Options	Hundred birds facing the phoenix	Dance of the Golden Snake	rain hits lute	Backgammon	Pinghu Qiuyue
%	42	46	7	15	14
ratio Options	fishing boat singing	Plum Blossom Three Lanes	Ambush	Erquan Yinyue	Have not heard
%	11	96	86	95	2

The fourth sub-title of the second part is "Do you like the folk music of southern Fujian?". 30%

checked "dislike"; 39% checked "somewhat like"; 18% checked "somewhat like"; 6% checked "very much"; and 7% checked "haven't heard of it" , do not understand". It can be seen from the data that due to the location of their hometown, 7% of the people have basically never listened to Hokkien music, so they are not discussed it. However, the remaining 93% of the students have many opportunities to get in touch with Hokkien music, but 30% of them dislike it, which fully shows that the students are not familiar with the music of their hometown and do not like to appreciate it.

The fifth sub-title of the second part is "Which of the following Hokkien folk music do you know?" and lists 7 types of Hokkien music. And it was found that the data for choosing "do not understand all" is basically the same as the data in the above question, which is about 7%, and other students have more or less understanding or heard of different types of southern Fujian folk music. A higher number selected indicates more understanding, 1 means very understanding and 5 means no understanding at all. Its percentage line chart is shown in Figure 8:

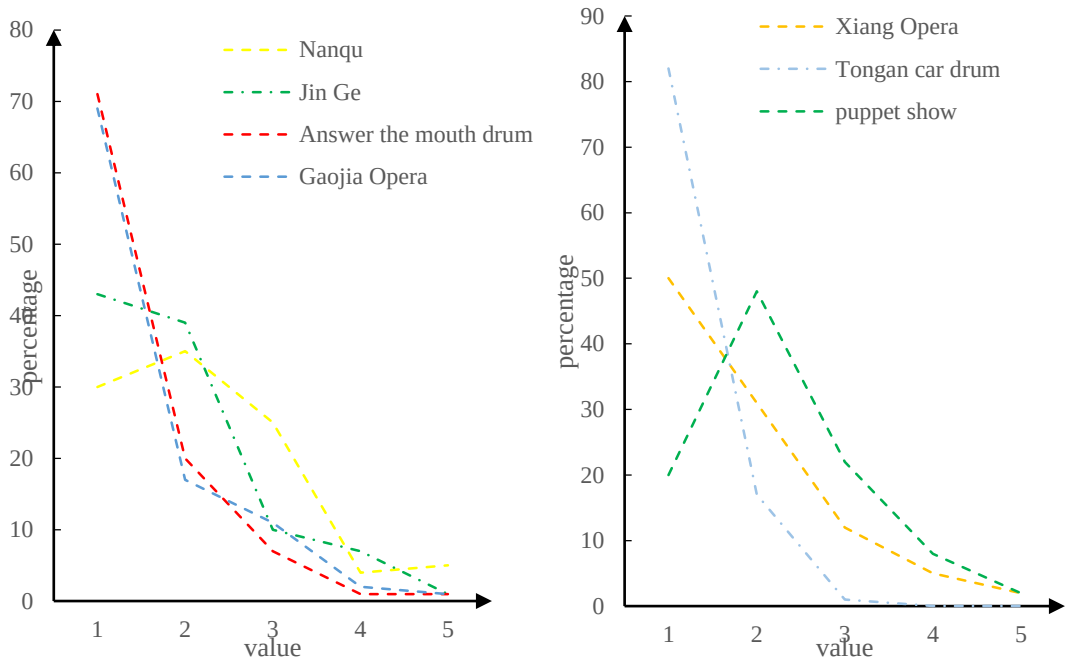

Figure 8. Statistical Chart of the Percentage of Comprehension of 7 Kinds of Southern Fujian Music

The sixth subtitle of the second part is "How many Hokkien songs can you sing?". Since there are more than 90% of the students in the southern Fujian area, they can speak the southern Fujian language, so this question is set. According to the check box, 6% of the students chose "None"; 65% of the students chose "1-2"; 20% of the students chose "3-4"; 9 % of students chose "at least 5 songs". From this point of view, even if the hometown is in Xiamen and the southern Fujian area, the students who can speak the Hokkien language are not very familiar with the songs of southern Fujian. Hokkien is a major language of the Chinese nation, and the number of Hokkien songs is immeasurable. The Hokkien Song Contest is held every year in Xiamen, which shows that Hokkien songs are a very good type of song. However, the situation of the high school students in this school singing is not ideal.

The seventh sub-title of the second part is "Can you play Hokkien music or folk music tunes with an instrument?". According to the students' selection, 98% chose "No", and 2% chose Yes and gave an example. The musical instruments filled in by the 2% middle school students are big and

small. The big ones are guzheng, pipa and piano; the small ones are cucurbit flute and recorder. It can be seen that very few students in this middle school use musical instruments, which to a certain extent reflects the characteristics of students at the basic education stage in China.

According to the statistics of the survey results in the second part, the students in this high school are not optimistic about the national music and the music of their hometown, and their singing performance is not optimistic. That's why it was proposed that every child be able to sing hometown songs. Data is the best proof.

3) Statistical analysis of views on the content of music classes

The first subtitle of the third part is "Which unit in your music textbook do you like the most?". It lists four major units in the "Music Appreciation" textbook of Huacheng Publishing House, and divide the second and third units into two small units. According to the selection situation, it is found that the number of people who are selected in the four units is not large, and the most is "Music and Times" in the third unit. In the "Small Unit" of the second unit, 38% chose "Colorful Chinese Voices", and 62% chose "Beautiful World Music". In the "Small Unit" of the third unit, 59% of the respondents chose "Characteristics of the Western Music Times", and 41 of them chose "Chinese Music in Transition". It can be seen that, no matter which unit they choose, students love world and Western music more than Chinese folk music. This raises the question: Is the content of music textbooks appropriate? Can it arouse the interest of students? It is shown in Table 4.

Table 4. Preference of Unit Sections in Music Textbooks

Ratio Options	The first unit	Second unit	Unit 3	Unit 4
%	21	23	31	25
		colorful sound of China	Characteristics of Western Music Era	
		38	62	
		brilliant music world	The changing Chinese music	
		59	41	

The second sub-title of the third part is "Are you satisfied with the content in the music textbook? If not, what changes do you think should be made? (Multiple choices, please tick)". According to the selection situation, 29% of the students chose "satisfied", and 71% of the students chose "dissatisfied". Of these 71%, further ticks were made on how the content of the music teaching material should be changed. It can be found that, as expected, the students who choose "the proportion of pop music should be increased" and "the proportion of film and television animation music should be increased" are the most, up to 99% and 89%. The proportion of choosing to increase "Chinese folk music" and "opera music" is very small, only 2% and 1%. This fully shows that the teaching of ethnic music appreciation has not achieved the desired effect, and the inheritance of ethnic music is in a dangerous situation, as shown in Figure 9.

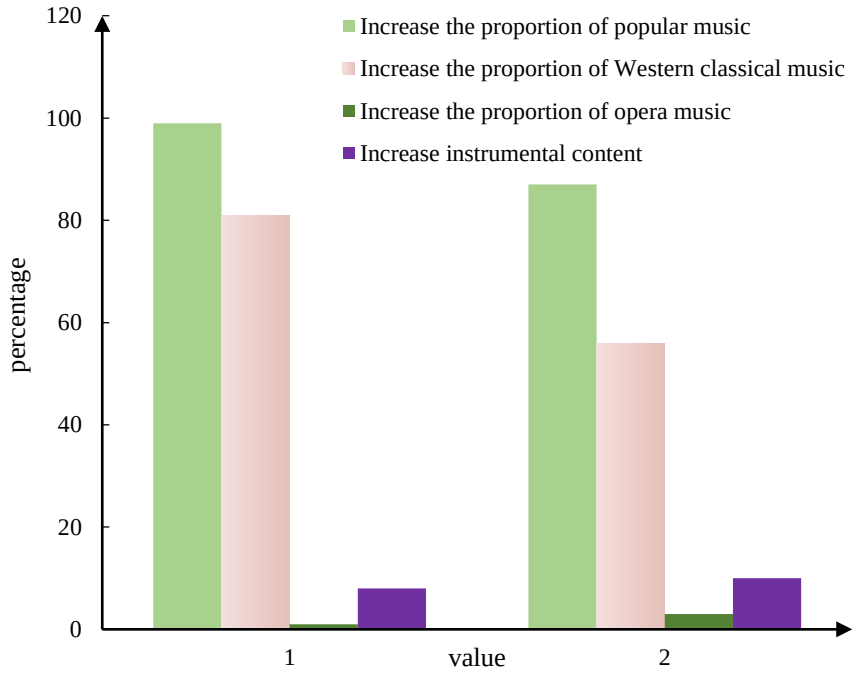

Figure 9. Proportion of Opinions on Improving the Ethnic Music in Textbooks

The third sub-title of the third part is "How do you think the content of Chinese folk music appreciation in music classes should be adjusted in the future?". According to the selection, the number of people who choose "completely cancel" is 0, the number of people who choose "maintain the status quo" is 60%, the number of people who choose "reduction" is 38%, and the number of people who choose "increase" is 2%. This shows that most of the students want to maintain the status quo or reduce the content of ethnic music appreciation in class, and only 2% think that it should be increased. It shows that the students of this school do not put ethnic music in an important position and lack the pride of ethnic music.

The purpose of this part is to understand students' attitudes towards the content of ethnic music appreciation courses and teaching materials. Judging from the statistics of the data, the teaching of ethnic music appreciation is not optimistic, which reflects that in addition to the low pride and self-esteem of the high school students in this school, popular music almost completely occupies the psychology of the students. Attitude is everything. If students do not have the right attitude and the right values, it is really difficult for folk music to be passed down. This is why it is necessary to continuously study the teaching of folk music education in folk music education.

In the last part of the questionnaire, the students' attitude towards ethnic and folk music, their understanding of hometown music, and their suggestions for appreciation and teaching of ethnic music are learned. The most important purpose is to provide a valuable reference for the arguments of this paper. In filling out the situation, it is found that students like folk music are not for no reason, and they do not like it for no reason. Therefore, it is extremely important to grasp and utilize these attitudes and ideas of students to provide reference elements for the teaching of ethnic music appreciation.

5. Conclusions

This paper is an investigation and research on the current hot spot of Chinese national music education—the high school national music teaching in national music education. Through the questionnaire survey of the first-year students of a middle school in Xiamen, and the interview with

the teacher of the appreciation of ethnic music in the high school, it can be known that the current situation of the teaching of ethnic music appreciation in the middle school and the senior middle school. In addition, the author's experience and experience during the internship in the school are analyzed to analyze its influence factors. The countermeasures are studied from the following two aspects.

The first is at the student level. By combining the statistics of the questionnaire and the interviews with teachers, the problems existing in the students of this high school are obtained, which also have both positive and negative sides. Countermeasures and suggestions are put forward for the negative side, that is, to stimulate the teaching reaction force and carry out role-reversal teaching (students become teachers).

The second is at the level of national music resources. Good teaching resources can greatly promote teaching, which can make teaching more effective. Through the investigation, it is found that there are two reasons that affect the teaching of ethnic music appreciation in this high school - teaching materials and musical instruments. The countermeasures and suggestions are put forward for these two points, that is, the development of school-based teaching materials and courses and the enrichment of the campus national cultural atmosphere. With these two points, the resources of ethnic music can be enriched so that it can promote the teaching of ethnic music appreciation. The investigation and research of this paper is aimed at analyzing the current situation of ethnic music appreciation teaching in a middle school in Xiamen and researching on countermeasures, and to a certain extent, it also serves as a reference for other high schools with similar conditions. The purpose is to improve the teaching of ethnic music appreciation as much as possible, so that high school students can have a positive understanding of Chinese ethnic music in the last stage of basic education and only a few class hours. Students can get an aesthetic experience from ethnic music, so that every student can understand the music of their hometown and sing the songs of their hometown.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] Kang H . Analysis on selection of vocal music works and effective teaching methods in vocal music teaching in colleges and universities. Revista de la Facultad de Ingenieria, 2017, 32(15):280-283.

[2] Fu L . Discussion on the Differences between Theory and Practice in Vocal Music Teaching. Region - Educational Research and Reviews, 2021, 3(1):6-9.

[3] Rosenzweig S , Scherbaum F , Shugliashvili D. Erkomaishvili Dataset: A Curated Corpus of Traditional Georgian Vocal Music for Computational Musicology. Transactions of the International Society for Music Information Retrieval, 2020, 3(1):31-41.

[4] Jinxu H . Study on the relationship between Chinese opera and opera music record. Agro Food Industry Hi Tech, 2017, 28(1):858-861.

[5] Xue J W , Xu X K , Zhang F . Big data dynamic compressive sensing system architecture and optimization algorithm for internet of things. Discrete and Continuous Dynamical Systems - Series S, 2017, 8(6):1401-1414.

[6] Kuang L, Hao, Yang L T. A Tensor-Based Approach for Big Data Representation and Dimensionality Reduction. IEEE Transactions on Emerging Topics in Computing, 2017, 2(3):280-291.

[7] Stergiou C , Psannis K E . Recent advances delivered by Mobile Cloud Computing and Internet of Things for Big Data applications: a survey. International Journal of Network Management, 2017, 27(3):1-12.

[8] Savage H D . Reimagining Faur é's Solo Vocal Music: New Editions and Recordings of the Songs and Vocalises. Nineteenth-Century Music Review, 2017, 14(2):1-16.

[9] Yakhno O . Vocal stylistics in rock music: dialectics of general and special. Aspects of Historical Musicology, 2020, 21(21):279-292.

[10]Romania. Critical reception of late 19thcentury Iai-based music. Alexandru Flechtenmacher. Artes. Journal of Musicology, 2018, 18(1):190-206.

[11]Yaoxue, Zhang, Ju. A Survey on Emerging Computing Paradigms for Big Data. Chinese Journal of Electronics, 2017, 26(1):1-12.

[12] Kusiak A . Smart manufacturing must embrace big data. Nature, 2017, 544(7648):23-25.

[13] Xu L , Jiang C , Wang J . Information Security in Big Data: Privacy and Data Mining. IEEE Access, 2017, 2(2):1149-1176.

[14] Zhang Y , Qiu M , Tsai C W. Health-CPS: Healthcare Cyber-Physical System Assisted by Cloud and Big Data. IEEE Systems Journal, 2017, 11(1):88-95.

[15] Rathore M , Paul A , hmad AA. Real-Time Big Data Analytical Architecture for Remote Sensing Application. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2017, 8(10):4610-4621.

[16] Xing H , Qian A , Qiu R C. A Big Data Architecture Design for Smart Grids Based on Random Matrix Theory. IEEE Transactions on Smart Grid, 2017, 8(2):674-686.

[17] Wang Y , Kung L A , Byrd T A . Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. Technological Forecasting & Social Change, 2018, 126(JAN.):3-13.

[18] Calude C S , Longo G . The Deluge of Spurious Correlations in Big Data. Foundations of Science, 2017, 22(3):595-612.

[19] Zhou L , Pan S , Wang J. Machine Learning on Big Data: Opportunities and Challenges. Neurocomputing, 2017, 237(MAY10):350-361.

[20] Cai H , Xu B , Jiang L. IoT-Based Big Data Storage Systems in Cloud Computing: Perspectives and Challenges. IEEE Internet of Things Journal, 2017, 4(1):75-87.