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Teaching Resources-based Multimedia Database and Its Application

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Abstract

This articles tries to explain the fact that how multimedia database deal with various multimedia information in modern times. By analyzing the functional mechanisms and researching its structure, and following two examples, we know that the teaching resources-based multimedia database has made great progress from the conventional method. And what is more, the retrieval system is also taken into consideration, which includes mainly three pathways.

Keywords: *multimedia database, object-oriented, teaching resources, SQL Server, MBase*

1. Introduction

Currently, civilization, economy and politics are closely interacted and they are viewed as the most important three aspects of "soft power", a concept developed by Joseph Nye of Harvard University to describe the ability to attract and co-opt rather than coerce, use force or give money as a means of persuasion [1]. Furthermore, the civilization of a nation or cultural root, which is the core part of aforementioned "soft power", is becoming more and more prominent in the field of constructions of economy and politics. And therefore, almost every country has put the improvement of cultural competitive power on the first place in the agenda.

Distant education resources have integrated the lectures, courseware, and their production principles of experts, scholars, eminent instructors as a whole, and these resources can be directly delivered to every available teacher and student, enhancing the using efficiency of them. Teachers can benefit from this by observing, discussing, communicating, recording, dispersing and producing, and then they will convert these abstract content into objective teaching assisted pathways. Thus, this will help both teachers and students to break the chains of traditional teaching-learning mode. Recently, huge success has been obtained in the research of both theoretical and technological sides of multimedia database system [2]. Multimedia database technology has been extensively employed in various fields, including military application, medical case information management system, astronautics measure and control, trademark management, geographical information system, digital library, CSCW (computer supported cooperative work) system, periodical publishing system, etc[3].

1.1. Current Condition of Multimedia Teaching Resources out of China

Among all the multimedia resources online application, most sites of multimedia resources in Europe and America, such as the educational resource established by American Adobe Company, do not support online downloading. Furthermore, they would introduce these resources to the clients through the style of catalogs, and

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providing some relevant depiction of their attributes, i.e. authors, themes, branch of science and key words, etc. After they get what they want, fill necessary forms, and make their personal information clear, and they will be able to use these resources with charge [4, 5].

Teaching resources may be composed by various professional resources, including aerospace industry and historical culture, and so on. These abstract resources are presented mostly in the form of literatures, but there are as well considerable curriculums and plans. Videos and audios are comparatively rare. Most centers of these resources are closely linked with library, providing massive references, and thus they are called digital library. They have specific service objects, and only these objects can access these resources. Let us take the library of Boston College for example. It offers professional service with its resources to Lynch School of Education, which includes a lot of basic teaching resources.

1.2. Current Condition of Multimedia Teaching Resources in China

In China, we have viewed the great progress of multimedia databases, especially the TimeFound Educational Resources Management system which is established by Tsinghua Tongfang Cisco Company. It is characterized with rich resources and available management function, and in addition, it stresses the power of resources management and availability of resources [6].

Besides that, there are several distant education websites in China, including Chinese Education Net and Chinese Education Online. To add to this positive situation, many colleges and universities begin to set up websites for online education as well, such as Pecking University, Tsinghua University, and Dongbei University of Finance and Economics, and so on. What is more, Based on the aforementioned analysis of the multimedia databases, we can readily come to the conclusion that even though there is a huge difference between the advanced technology in these databases and Chinese present situation, the domestic elites are striving to make their products state-of-the-art in the world. In this passage, we are tentatively trying to reveal the essence and nature of the multimedia databases, especially its correlation with teaching resources, since mountainous paperwork is to be dealt with rapidly and efficiently. Specifically, in this article, the object-oriented technology is applied in the multimedia database, and then furthered into teaching resources attempt. There are some commercial websites too related to this field.

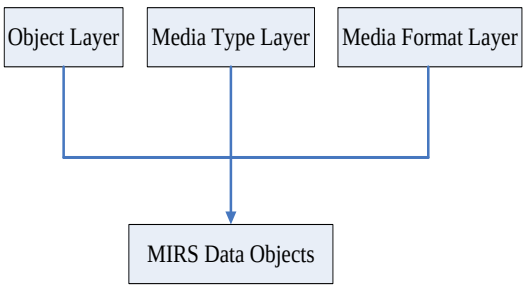

Figure 1. A Universal Multimedia Data Model

2. Multimediabase

Multimedia database is a collection of several multimedia objects, which are assembled according to certain principles, in order that they can be shared with other users. To make it more clear, a data model is proposed as shown in Figure 1.

The data model is always composed by three parts, data structure, data manipulation, and integrity constrains [7].

I, Object Layer (OL) refer to the multimedia projects in the specific space and time. It usually is related to merely one core theme. For example, multimedia is always presented in the form of massive images and videos/audios.

II, Media Type Layer (MTL) is generally used to describe the types of media, say text, graphs, pictures, videos, and audios, and so on. They are accepted to be triggered from some ordinary and abstract media sorts.

III, Media Format Layer (MFL) mainly means the format of data storage, which may be in multiple formats. For example, the figures may be in their original format or some others. Also, there exist many data compression technique and standards, which enable that hidden information, could also be normally decoded, analyzed and presented.

2.1. The Mechanism of Object-Orientation

The technology of multimedia has been forwarded by many scholars by far, and the conceptual temporal model is especially fast expanding. And, Zhou[9] researched the conceptual temporal model, which has been described below in Table 1. Correspondingly, the reverse n elements of temporal constrains has also been defined and listed in Table 2.

Due to the complexity of multimedia data, multimedia databases commonly use the mechanism of object-orientated technique, which means to encapsulate the multimedia data, display properties, methods of operation together in order to reduce the complexity of the multimedia data. In multimedia applications, a variety of data structures and operating requirements are presented, and also some requirements of different data types are proposed, among which there are complex semantic links and they constitute a whole. Object-oriented database systems is a combination of database technique and object-oriented technology, which own the advantages of both object-oriented programming techniques and traditional data model [8]. In detail, the mechanism is literally presented in the following aspects.

2.1.1. The Organization of Multimedia Data by Type

In an object-oriented database, the objects with the same static structure, dynamic behavior and constraints are divided into one class, and each class is with the corresponding attributes, methods and constraints. One media in the multimedia is a media category, and it includes the data structure of the media and appropriate action. Each class completes one media data storage and operation management.

2.1.2. The Internal Structure of Multimedia

Different multimedia has different data structures and different operations, and they are matched to each other and then package together, to form a complete class. The data structure of the media types: one is physical data and logical data are formatted, which can be generally represented in the object-oriented property; another is a physical data are non-formatted but logical data are formatted. The latter data structure is usually restored and appended with other properties, in order to store non-formatted data. In many media, they can be operated multiply, like rotated, amplified, deflated, revised, and edited.

2.1.3. The Links between Media

Since every medium represents one media data and operation, some semantic links may happen in between them.

2.1.4. Information

Media can be updated with the news outside, and also the outside world may communicate with the individualistic medium via this news, in order that the information multimedia receives is latest.

2.2. Realization of Object-Orientation in the Multimedia Database

Briefly, there are mainly four ways to realize the object-orientation in the multimedia database, which is listed below.

(1) Expanded relational database (RDB).

RDB is a formatted database, which cannot satisfy the requirement of management in storage of multimedia. In order that it is able to store and manage multimedia data, the most common pathway is to expand this data model with the function of object-orientation. For example, they can be performed in the following three forms. Firstly, a special multimedia property is needed, through which non-formatted data can be integrated into the formatted database. Secondly, this special multimedia property should accommodate lots of data. Thirdly, a numeric string in binary system should be added, which can be used in multimedia property operation.

(2) Completely object-oriented database.

In this base, the concept of object-orientation is taken, and each entity is considered into this model. It describes the objects, methods, properties, information, and object types of multimedia database models purely with the methods of object-orientation.

(3) Persistence of programming language.

The main difference between the data of database and the data used in ordinary programming designing language is the persistence of data. It means that the data in the database can be re-used in the auxiliary storage, while the data used by ordinary programming designing language are tentatively stored and cannot be re-used. Therefore, by increasing the persistence of the latter data, the operation functions of databases could be enhanced.

(4) Toolbox of database.

It is better to have only one type of database management system to meet with various needs from multiple fields. Hence, a lot of scholars propose to develop such a kind of database. This expandable database management may be made up of core systems plus several developing tools.

2.3. The Storage Structure of Object-Orientated Multimedia Database

The storage and management of multimedia database should follow these three special requirements as described. Firstly, it should be able to store and manage both formatted and non-formatted data. Secondly, it must be enough to hold lots of non-formatted data. Thirdly, it is supposed to have many multimedia data. Generally, there are mainly two kinds of solutions to tackle with above issues.

(1) They can be solved based on RDB.

This method is put into practice by putting an object of each class in a relation, and object-oriented database system will automatically assign it a unique system identifier when any object enters the system. Furthermore, the life cycle of the identifier of the system cannot be changed. Contact between objects is stored in the newly added object tuple, and it is represented by another identifier.

(2) Some insights could be also obtained through the storage of object-oriented database.

Object storage is an object-based approach, and it combines each object in the disk. Each complex object is made up of a collection of objects, and each object corresponds to a record. The first element is defined as the root record, which indicates the public properties of the whole complex object. Complex object storage structure is to store the complex object into two files, one for storage of root record, and all other files are in another separate file, to help improve search efficiency. Thus, the storage structure has to support the storage of both individual object given by object symbols and the collection of many objects.

3. Research Based on MS SQL Server and Mbase

As the multimedia technology and its supporting techniques continuously develop, the application of such skills is becoming wider and wider. Therefore, it seems to be pressing to get efficient information processing, in order to deal with modern redundant information. On the other hand, multimedia is more complicated than traditional media, say there many sorts, and therefore traditional base cannot satisfy the needs of managing and processing it. As a result, a brand new method, multimedia base, emerges as required and expected.

3.1. MS SQL Server

Being an excellent server system, the MS SQL (Structured Query Language) Server developed by Microsoft will distribute the parts of the tasks to corresponding functional parts of the server. In using the huge database constructed by MS SQL Server, the data type of storing every field can be character, integer, and floating-point types, etc. These data can be stored and managed with traditional methods, but for data type in binary system like binary, varbinary, text, ntext and image, ordinary ways are inapplicable due to their over length.

As new data types emerge, a special field for multimedia data is needed. It should be able to store huge and non-formatted data, and store, inquire, save and restore like other fields through DBMS. The capacity limit of binary and varbinary data in binary system is 8 KB, however text, ntext and image is 2 G. Therefore, it is very necessary to know how to insert information into these forms. As indicated by Figure 2, the object-oriented model has many advantages, including that it supports ‘aggregation’ and ‘conclusion’ and can avoid redundant optimized searching. Besides that, SQL Server is also a good candidate for multimedia inquiry and data storage as suggested by Zhou [9].

Query language is one of the most characteristic of multimedia database, which can be used to identify whether or not the DBMS is successful. And there are three query methods or retrieval systems for multimedia database that are clarified in the following parts.

3.2. MBase and its Model

MBase is the original model of multimedia database management system developed by the group of Pan [10]. It uses the classical layering abstraction, but has many new problems in each layer. As to these layers, they are described and illustrated as below.

Conceptual layer mainly deals with the multimedia objects and their inter-logical relationships from the overall points. This kind of logical structure can only reflect the composition of real entity of the world and their conceptual relationships, but not enough for the complex interactions between multimedia data. Based on this, the

difference between MBase conceptual model and traditional data processing models is exclusively that the former has to take the original data type in one model into consideration. Nothing is special for MBase besides that.

Physical layer is the abiding sub-group which is essential to support the conceptual data. The multimedia database needs to efficiently process images, passages, audio information and spatial information etc. original information and provides technical support.

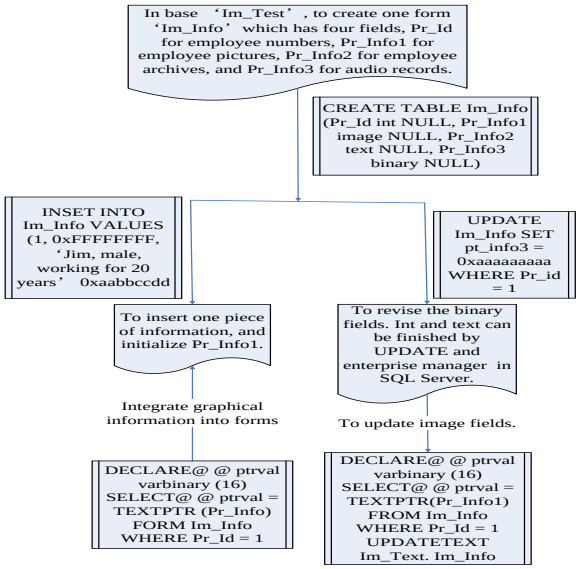

Figure 2. The Grammar of MS SQL Server.

View layer collects many problems in multimedia database. Different from traditional database, this is not the problem of extracting one subaggregate from conceptual database, but a problem of adjusting to the different types of application. Firstly, the view layer of multimedia database needs the series of pretty rich original language. Secondly, it needs the mechanism of relevant management, which can make people naturally and logically operate multimedia data. View layer like this actually plays the role of hypertext abstract machine [11, 12].

Based on the above explanation Figure 3 is chosen. In Figure 3, OM and SM constitute database management information base, which will provide various interface software and make them be the loadable and unloadable parts of MBase. And, these interface software are commonly called clients.

(1) Grammar and model of MBase.

COODL is closely related to MBase, and it provides the space of basic values composed by a series of original types. COODL object is used to describe various entities in the real word. In MBase, these original type may include int, real, bool, char [], and so on. To clarify how COODL works, we can try to obtain a simple database model which can be described by employee, department, project, and working relationship. And the programming is listed below.

type Data = tuple
Day, Month: int [2]; Year: int [4];
end tuple;
type address = tuple
Area: char[10]; Street: char [20]; BuildingNum: int[3];
end tuple;


```
class Employee is
identification
SocNum: int [12];
attributes
Name: char [20] is stored;
Birthday: Date is stored;
Reside: Address is stored;
end class;
class Department is
identification
DeptID: char [4];
attributes
Manager: Employee is stored;
EmpNum: int [4] is
begin
x. EmpNum = Count
select w
while x = w. Dept
for each w from WorksFor;
end EmpNum;
end class;
class Project is
identification
PrjID: char [10]
attributes
Supervisor: Employee is stored;
Starttime, Endtime: Date is stored;
end class;
class WorksFor is
identification
Emp: Employee; Dept: Department;
attributes
Position: char [12] is stored;
end class;
```

The definition of class introduces another class mode and evolutionable epitaxy. The class mode is a domain and the series of function space on it. This domain is the tuple types composed by identifying attributes which are assigned in 'identification', such as the domain of 'WoksFor' is tuple type [Emp: Employee; Dept: Department]. We may tentatively call the domain of class C as its identifying attribute. The epitaxy of the class is the subaggregation of identifying symbol types.

Basically, MBase in COODL model is pretty closely related to the nested model. But to be different, there are two obvious strengthened aspects. Firstly, identification type can be used as the domain of the attribute, so the retrieval of complex objects can be directly expressed as that we do not need external code nor the help of 'object reference'. Secondly, the attributes defined in the functions of abstracted data type can be expressed both in the storage form and calculation process. In any condition, they can be viewed as one definition of equation set of this function.

The standard query language of COODL is designed to be helpful for achieving the connected access of collection-orientation. And a part of the language is a group of algebraic operation which is data-oriented. The elements of this collection will belong to any atomic type, identifier type and any other types which use them as

basic elements. And such language is a perfect subaggregation of the computer language. And one of the SQL grammars supported by the algebraic part is

select f (x1, … , xn)

while p (x1, …, xn)
for each/the x1 from s1, …, xn from sn;

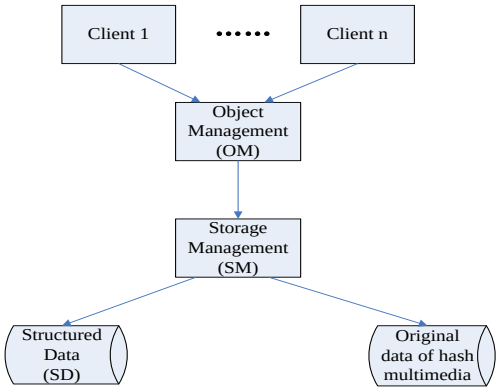

Figure 3. The Structure of MBase System

To take a further step, we want to know more information, such as the one responsible for this project and its endtime.

Select [e. Name, p. Endtime]

While e = p. Supervisor

For each e from Employee, p from Project;

Obviously, the expression above is a bit similar to the logics of relational language. But actually, a much easier expression will be obtained with COODL since it has the ability to inquire function structure of image operation in algebra.

Select [p. Supervisor, Name, p. Endtime]

From each p from Project;

(2) Data types processed by multimedia database.

No matter how complicated are the objects we face in the daily life, or how discrepant are the original and structural concepts, we need to deal with many original data which can not be managed according to the natural logics. And there are principally four original data types in the multimedia databases like MBase - image, text, sound, and spatial information.

These original data will be further attached with more clear labels. It seems that there is no need to distinguish each type of data in every original data, since image is only image. But the problem is efficiency. There are a lot of methods to express images, and we can try to use these different image types to reflect this tiny discrepancy. And, the following is the data type for each original data type in MBase.

Image is mostly used as the basic data type of common abstraction of objects. To take the fitted image type, we initially should separate a group of factors that will affect the properties and the memory capacities of images in the computer.

ColorNum: the number of colors and it is usually in the form of the power of 2.

Mode: the pattern of color, mainly true color and retrieval.

Altitude: the number of pixel is expressed as the number of row and columns. Resolution is merely an outputting index, not the index of itself that impacts the attributes of the image itself. Therefore, it is not usually accepted as the part of graphical data. In MBase, factors of Altitude are taken as value composition, and other factors will be hidden in the next type.

Black & White: only contains two determined colors.

Greyscale: contains as many as 2^8 kinds of determined colors, and they are between the black and white colors.

RGB: it is usually connected to the facility, but always contain 2^{24} sorts of determined colors, which are called as true colors.

Index4, Index8: there are 2^4 and 2^8 sorts of colors respectively. These colors are retrieved from 'palette'. Theoretically, the colors in Black & White and Greyscale also use retrieval, but the true colors retrieved are same. In short, this retrieval is the same as type composition. However, each Index image can use their own 'palette', which means retrieval operation will be considered as value composition. Please note that combination operation such as overlaying cannot be exerted onto Index images with respect to image operation, but they could be used in some other types like RGB.

Text: MBase can distinguish two kinds of texts – general text (GenText) and stylish text (StyText). Usually, GenText will only take the abstract features of field ranking into consideration, but for model of written characters, each group of properties of that model will be connected to each symbol, such as word size, font, and its color. Therefore, MBase should provide operations that could change properties of text, namely StyText, besides the abstract features of GenText.

Sound: the digital sound is widely accepted as an array composed by basic data units, and each basic data unit is called musical note. The musical note is the tiniest processing object in audio information. According to the logical meanings, there are mainly two kinds of audio types – wave type and voice type. Wave type only contains restorable audio information. Under voice condition, the musical note contains several different musical elements. Several musical elements could be attached to visual symbols, dependent on which we can process any sound information just like Text type.

Spatial data: the spatial data in MBase are usually for loading the virtual spatial structural information. Currently there are three spatial types – 2Dcurve, 3Dcurve and Surface. Please note that the problem concerned in spatial data processing is the changing of spatial structure and spatial inter-relationships. Even though operations and tools like drawing may be used in the interactive environment, spatial data processing and drawing are two totally different things, and they are attached with definitely opposite essences.

4. The Retrieval Technique of Multimedia Database Based On Teaching Resources

4.1. Retrieval System Based On Name

The procedure of named based multimedia database retrieval system is in detail listed in Figure 4. It uses traditional fields and database management to manage multimedia database. In fact, it combines files management system, traditional fields and database management, to deal with traditional data with conventional database management, and to deal with unconventional data (like video and graphical data) according to the requirement by corresponding operating system. Actually, it does not put the multimedia data into database, but instead put the file containing the data into the database.

4.2. Retrieval System Based On Text

Due to the fact that early information was only presented in text, the retrieval technique based on text emerged as time required, and it is still the most basic and common multimedia retrieval technique. It initially analyzes the multimedia manually, and abstracts some text information which can reflect its physical properties and content properties. Then, it will classify these text information according to the scientific fields, or extracted the key words to mark. Finally, the retrieval of multimedia will turn into the retrieval of text information.

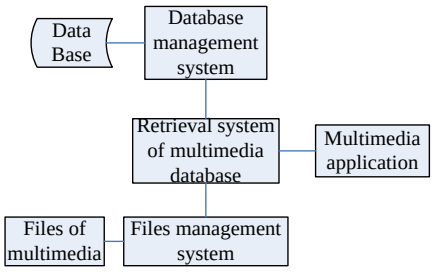

Figure 4. Name Based Multimedia Database Retrieval System

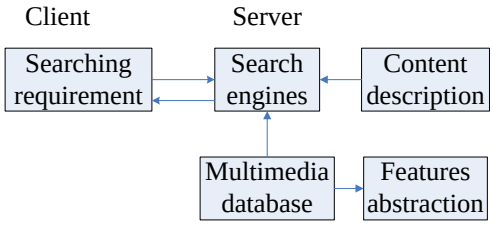

Figure 5. Content Based Retrieval System Structure

In this way, the key words of database are linked with multimedia, and then we can get more multimedia information by retrieval of key words. This retrieval technique can be finished through four ways: a. to use filename extension and hyper text symbol. For example, '.bmp', '.gif', '.avi', '.mov', '.wav', and '.mp3' can be used to track related files. However, this will merely guarantee that final results will contain the files related to such clues, but there will be differences among them. b. to make the filename of multimedia and the information of media in the comment as key words. c. to retrieval information according to the title of the website where multimedia is located or the text around multimedia data. d. to do this from manually selecting or appointing some specific key words of multimedia information.

4.3. Retrieval System Based On Content

This sort of retrieval technique is shown in Figure 5. It greatly is different from traditional methods which rely on key words, since it integrates image understanding and pattern recognition and other techniques. It is characterized with a lot of features which are mainly: a. it directly abstracts clues from media content. b. the retrieval based on content is approximate match, which is different from traditional method. c. it is very convenient to alter the subjects which do not have to satisfy traditional limits. d. feature abstraction and citation establishment can be automatically constructed by computers, thus avoiding the subjectivity and reducing working load.

5. Application in Education

The application of multimedia database in education is accurately a brand new and potential area as well. Dependent on its virtual imitation and vivid depiction, it has increasingly been employed in the class of almost all schools. Hereby, we are going to talk about the main aspects that attract both students and teachers[13], and the opinions of them to this technique.

5.1. Most Used Techniques

(1) Video on demand (VOD).

VOD is the one of the comparatively mature and extensively utilized information service in campus net and Internet. As indicated by Figure 6, a VOD is usually composed by three main parts – server system, network system and client system. Furthermore, the server system is like a general multimedia database management system (MDBMS), including multimedia database storage server, video server, video application service program, video content management program and video data production.

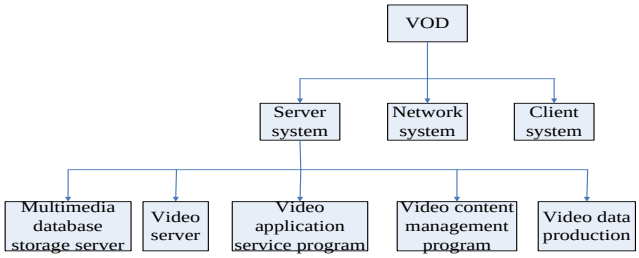

Figure 6. The Structure of VOD

In these five sections, the storage server is mainly responsible for the physical storage of multimedia data; video server is the core part of MDBMS, and it is mainly used to achieve the access, retrieval and management of video data; video application service program is the connector of MDBMS clients, outputting the video data; video content management program will collect and manage some original video data of videos; and video data production is the key procedure in inputting video data.

VOD based on multimedia database has enriched the learning resources of people, and enabled us to enhance the efficiency of learning process based on distant education.

(2) Multimedia teaching resource base

The teaching resources, classified based on the properties of their objects, mainly include media materials, courseware, test questions, case study and distant courses. The objects the teaching/learning resources face are quite complex, leading to different behaviors in choosing these resources. Some teachers are able to develop multimedia, and they can develop the CAI courseware themselves based on obtained materials, and some teachers are not equipped with such ability, and they can just directly retrieve some suitable materials applied into the teaching; for the courses online, the teachers can just use the whole course retrieved from Internet for students. Therefore, media materials, courseware, test questions, case study and distant courses will compensate the disadvantages each other, providing more choices for both teachers and students.

(3) Ditital library

The typical application of multimedia database into education field is digital library. With the informatization of the society, almost all traditional libraries are turned into digitalization. The digitalization of library does not only mean the digitalization of words, but also the digitalization of video tapes and other matters. The management of massive video and audio data has to rely on the technique of multimedia database.

(4) Distant teaching and training

The Internet and distant education are most rapid-expanding areas recently. Almost all online courses depend on the teaching resources production and management system of multimedia database more or less. The advantages of online education are shown through many excellent multimedia educational resources.

(5) Multimedia information system

The multimedia information systems are what collects, produces, disperses and provide professional multimedia information to the whole society. These systems has offered precious educational resources.

5.2. Feed Back From Teachers and Students

Before we try to know how teachers and students react to the multimedia teaching in classes, we should have a knowledge about the mechanism of multimedia helping people to learn. Let us imagine teachers and students sit in one room, and the teacher is using multimedia while the students are focusing on what he is speaking. By stimulation various senses, mainly auditory and visual, the students form impressive memory of knowledge. The whole procedure is elucidated in Figure 7.

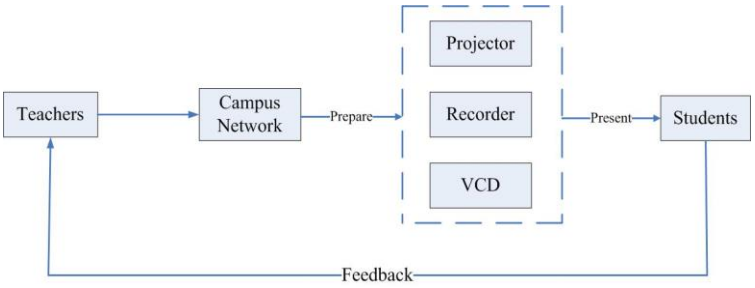

Figure 7. The Education Functional Configuration Based On Multimedia Classroom

5.3. Application of Multimedia Database into English Learning

English learning, the most potential area in Chinese language market, is continously absorbing new techniques and skills. As English learning benefites from these advanced technology, there are some side effects of them. And this also applies to multimedia database. In this article, the results of many investigations conducted in the colleges/universities in China are collected and processed to get further insights[17-23]. Some direct and simple studies have been chosen as the source of data[14,15], and the obtained results are presented in Figure 8. Therefore, we can see that among all the participants most (over 50%) of them hold positive viewpoints towards the integration of multimedia into English teaching and learning.

For students, the vivid images and emulational audio information impress them greatly, and they make the learning process increadibly interesting. Nevertheless, a little proportion of students prefer not to learn English through multimedia methods, probably due to their inconfidence of the teachers' skills in the operation and hardware, over-complicated multimedia constituents, and the undoutable inner need

for more thinking time. Similarly, less than 10% teachers stand against the using of multimedia in the educational process. The reasons accounting for this will be listed in detail in the following paragraphs.

The most important platform the multimedia provides for English teaching is that it enables students and teachers to have more opportunities for communication. Nevertheless, a part of instructors do not interact much with their students in the multimedia classeroom, leading to their discontent and indifference towards the multimedia-assisted courses. A lot of reasons may be responsible for this[16]. The most possible reason may be the problem of time. In the class which will last 45 minutes, the instructor is supposed to get their tasks finished, which are principally limited to the assigned books. As a result, the teachers would like not to spare time on these "extra" issues – for example, how to provoke the interests of the students in the class. Furthermore, some teachers do not seem to realize the significance of interaction between students and teachers. They view the class as a ponderous and solemn place for students to learn knowledge, which is mostly from books instead of combination from realities. With this very view, the instructors try to instill their students in theoretical knowledge as much as possible. However, this is not humanized, because students are pretty concentrated at the beggining and will surely prove to be vigorless and tired in the final thirty minutes. Even though the instructor has said much, the students may perceive and grasp only a little. It is not surprising that many instructors always complain that they use the most advanced facilities, and devote to the cultivation of the students with their heart and soul, but the final result turns out to be totally unexpected.

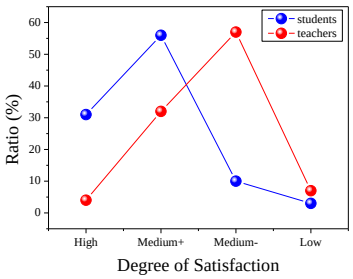

Figure 8. Degree of Satisfaction towards It in English Teaching for both College Students and Teachers

Note: the adopted data are not necessarily accurately the same in every research, and they are employed to reflect the general trend.

6. Conclusion

In this article, the multimedia database is analyzed and especially its subject-orientation is seen in detail. The mechanism, realization pathway, and its structures are gradually presented step by step. As time passed by, many scholars proposed a lot of models to deal with the multimedia information, and in this passage, the typical models of SQL Server and MBase are presented and analyzed. Finally, the retrieval system of teaching resource in three aspects is listed as well. And the retrieval based on name is the most basic and ordinary one, and retrieval based on content is the most convenient one. As a result, modern teachers and students have benefited and enjoyed the triumph of multimedia techniques.

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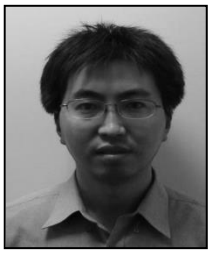

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