A Review On Multimedia Databases

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Abstract: This paper describes effects of Multi-media Database in learning & technology world in broad way and also shows that how positively it enhances the database and technology. Multimedia database is a backbone support and works effectively for large amount of good quality multimedia data. In comparison to traditional database, multimedia database has a strong effect due to its ability of handling various data types at a single platform. This paper describes tremendous innovations, applications and fabulous use of multimedia database e.g. creating virtual museum ,3D MURALE and MPGE 7, Supports English Distance Learning, Smelling Objects, 3D Crime Scene Representation and Analysis, GIS driven Internet Multimedia Databases, Trade mark registration, intelligent agent with MMDB etc.

Index Terms: Database (DB)**,** Database Management System(DBMS), Multimedia Database (MMDB), Computer-aided drafting programs (CAD)**,** Geographical Information Systems: (GIS), Electronic Distance Measurement (EDM), Multimedia indexing framework (MIF), Computer-aided drafting programs(CAD)**,** Audio-Video-Smell-System (AViSS)

1 INTRODUCTION

The organized collection of related data is called database [4]. Database provides the facilities such as data sharing; reduced redundancy and inconsistency, transaction support, integrity, security, balance conflicts and enforced standards [57]. Two main types of database are *centralized* database and *distributed* database. [58] "Database Management System is generally defined as a collection of logically related data and a set of programs to access the data". DBMS provides facilities of defining, creation, maintenance and manipulation of database [1]. Its primary goal is to store and retrieve information of database efficiently. Categorization of Database Management System depends on its types or data structure. In DBMS the control of database development is in the hand of administrator. SQL is the basic language of DBMS [2]. DBMS also provides an appropriate environment for using Multimedia Database as it supports a variety of multimedia data types. The purpose of DBMS in the context of multimedia is integration, diligence, isolation, reliability control, and revival [4]. In the beginning a single medium (uni-medium) was used to present the information in radio, television and newspapers but after the development of computers, data is presented in a totally different and new manner. Almost every computer presents data with text, graphics, animation, acoustic and video etc. Therefore multimedia can be defined as a technique that combines a variety of media items to make the information more attractive and enables it to communicate in variety of ways. [57]. A multimedia Database consists of a variety of multimedia data [3] stuff such as text, images, audios, videos, animations etc. [4].

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Multimedia database contains static, dynamic and dimensional media. It consists of three types of authentication; multimedia database, identification multimedia database and biometrics multimedia database. MMDB has emerged the non- audio-visual digital media that will meet the challenges of storage, retrieval and presentation [5]. A graphical database interface and some prototypes of Multimedia database are discussed in [6]. In this paper different developments of multimedia database [7][20][32][33][40][45][47] [56] [59] are discussed in different fields.

2 DISCUSSIONS ABOUT RESEARCH IN MMDB

This study [7] discusses recent multimedia database applications [8] and some issues in teaching and learning like data availability [9], file format and size [10], data storage and retrieval, search engines and skills of teachers that educators may have into their classrooms during usage of multimedia data. This study also discusses that by using pedagogical concerns [11], data searching [12] and recommendations educators can effectively use multimedia data. Multimedia is a combination of different media and *MMDB* is set of associated MM data. Some multimedia data types are discussed in this study such as text, graphics, images, animation sequences, video, audio, composite multimedia [13]. Two major classes of media type are continuous and discrete [14]. Characteristics of multimedia database such as lack of structure, temporality, massive volume & logistics are also discussed. Traditional DB applications & MMDB applications are different in way of structure and storage, retrieval of multimedia objects [15]. To facilitate classroom teaching teachers apply multimedia data in courses of face to face & distance education. In face to face MM data can promote engagement by its ability to attract student's attention [16], for example Microsoft Word's grammar checker [17]. Sound applications actively engage students in constructing knowledge [18]. In distance education user use browsers, tools of auditory/video, communication & data conferencing via internet [19]. It provides a concise introduction to the effects of multimedia databases in classroom teaching. Effective applications of multimedia databases not only shape teachers' awareness, improving the instructional process and perception but also improve student's practice of English abilities in a realistic learning environment [7]. Another work [20] presents the architecture for the archaeologists for the purpose of construction of effective model of Sagalassos mine site [21], and architecture depends on multimedia database of 3D MURALE. MURALE's goal is to digitally trace, save, reinstate & imagine archaeological objects established at Sagalassos site.

Archaeological [22] excavation means answering questions related to human history by archaeologists. The process is discussed in [20] about virtual recording & modeling procedure which offers an expansion of MURALE. MURALE system stores a lot of MMD types like text, statistics, images, videos & 3Ds. Spatial and temporal dimensions have to be in semantic model. Multimedia data can save in opposition to archaeological objects and query via attribute & query via example are arranged in DB. MPEG-7 is used to describe content of media. Design idea uses accessible technologies. The compulsory standards that are conformed are CIDOC, MPEG-7[23] and VRML [24]. CORBA [25], Unicode [26], XML [27]. PNM are included to uncompressed descriptions & XHTML [28]. The Postgre SQL database is selected because of its advancement and it also supports *open source* object-relational databases [29, 30]. [31] presents layered architecture about 3D MURALE MMDB. Two options are discussed; an off-site DB server and repeat data by on-site DB server. Centralized database architecture is used for capturing and stratigraphic odolite and EMD [54]. Equipment is used for the purpose to generate statues, buildings and pottery *hapeSnatcher tool.* Two wide categories are stratigraphic & Archaeological objects. Temporal queries are used for archaeological objects in DB. Inside the database all records are stored as discrete points. For storing data two concerns are: the data must be scientifically accurate and the data must not be contaminated. The limit for any backup is possibly 24 hours. The conclusion is that new MM types saved in DB have an impact on many aspects. Constrains of the study are to generate solutions extensively suitable for other archaeological sites and to discover probable use of distributed techniques for MURALE DB [20]. The aim of the author [32] is to present English multimedia corpus which includes English distance learning via MMDB & internet techs. Skills about "semantic query" & "link grammar" are for construction of English MM corpus system. He also used it for two functions: first function is querying pattern of English sentence and second function is detection of errors in grammar. Corpus provides better tools on the Internet to student, teacher and researcher. Multimedia corpus not only stores unique data but stores many kinds of MM data as well. It has four main functions: listen, speech, read and write. The structure of system depends on SQL Server 7.0 [55]. This study just talks about essay database. User may carry out the conversation or pronounce the essay many times on Internet and can watch the movies and listen the audio too. It shows that Original Link Grammar cannot parse the sentences but the proposed system parses the sentences, so modified dictionary has made solid progress in the Quality. Idea proposed by this study can be applied on additional languages of world. System gives query patterns of English sentence as well as parse sentence online. System provides interactive relation between teachers & students & combines the humanism education with technology [32]. The research [33] presents view on the ways of integration of olfactory information into multimedia database applications by means of smelling objects. The name of proposed system in this paper is AViSS (*A*udio-*Vi*deo-*S*mell-*S*ystem) in which digital smell is integrated along with audio-visual information. This may well take important advances in fields like education, medicine, military, and entertainment in the near future. In this paper five types of smelling objects are used to store and retrieve olfactory information with audio-visual information in a multimedia database system or from MMDB. Previous works [34-36] have already proposed a theoretical model of a multimedia database. The model is based on three main components: *The Multimedia User Interface* (MUI), *The Processing Unit* (PU) and *The Multimedia Database*. AViSS1 introduced a hierarchy of object classes in implementation phase. Implementation of five new (olfactory) data types in the framework of multimedia database systems makes this work unique. Mono-media objects (such as Text, Image, Audio, Video, Digismell) and composite-media objects (combination of olfactory information with one of the audio-visual data types) are two main categories of objects that are implemented in AViSS. Query specification, query execution, and displaying the results are three main phases in query process of AViSS. The five odor-based object classes in AViSS allow users to create and execute aroma-based queries against the multimedia database. [33] The conclusion of the study is that smelling objects can be stored by means of a multimedia database and retrieved efficiently by their olfactory content. The combination and storing of olfactory information in multimedia applications has raised the impact on user's perception which can lead to a higher achievement of the application objectives. It is considerable to suppose that it is more worthwhile to design and use smelling objects. Some limitations of the study are the presence of olfactory information considerably decreases the performance of the system and high cost and cartridge of output devices does not make it attractive for personal use. So the combination of digital smell and multimedia applications critically depends on the limitations of these output devices also called olfactory displays [37-9]. The purpose of authors [40] is to explain the representation and reasoning of multimedia database for crime scene data. The physical environment of representation makes the crime sight. It also presents method for traditional data & 3D scan. Design of a MMDB to solve problem of representation and difficult datasets related to crime sight analysis are also discussed. User interface interrelates user to DB that provides 3D view of the crime sight. 3D systems like [41] & CBRN [42] are used in this project. This paper describes two functions of database: 1st function is that the data have to be expressed in unchanged condition and 2^{nd} is the key to help investigators by given that data they need in fast & simple way. Objects have a range of representations like standard paper forms. Specific positioned objects are described through multimedia object (video or audio clips). The surfaces and locations of objects are described by textured 3D meshes. For the purpose of data exchange and user interactions Python [43] is used. Hierarchical object relationship and XML are used to return query outcomes. Semiautomatic tool is used for the segmentation of objects; tool used is addition of 2D snapping to 3D [44]. This describes that developed MM merges varied aspects of difficult MMDB with "immersive" illustration flaunt for support of crime sight examination. It gives new technologies like photograph sensible 3d crime sight scans & traditional analytical documentation procedure. This new system promises to improve competence of investigation process. Some problems regarding the study are visualizing dataset in a lot of ways. This creates a lot of problems associated with performance & security of the crime sight [40]. The focus of [45] is to describe the system considering the problems in archaeological data recording and analysis. This paper focuses on a flexible and structured system for recording multiple excavations driven by

GIS (Geographical Information Systems) services, on the bases of flexible multimedia database. The system provides all its services over the internet and it is promoting a generic template supporting data from different excavations. It also focuses on the development of instructional models organizing the existing educational resources of the system. The system architecture applies 3-tier interface: internet layer, open source & proprietary software tools and piece of client-server .The proposed system is flexible with the capability of recording any type of desired data, keeping & enriching and revising the existing data records [45]. It explores that the database consists of the primary entities: archaeologist, construct, deposit, excavation, location, object, phase and section. Data is managed by creating table for each entity that has only the completely necessary fields for the recording of data in the database, including a primary key for each record of the entity. The security issues have been dealt with, by storing user data on the database server. Multimedia data especially digital images are also recorded in the system. Longitude coordinate system is used due to GIS service because of the extensive use of the GPS devices. GIS software is used for the implementation purpose. The digitized spatial data created with ArcMap are presented in the internet through ArcIMS [46]. It provides simple and complex queries for searching the DB and attributes, insert, edit, and delete functions for chronological and spatial analysis. The paper [47] describes retrieval & processing of information in MMDB via Intelligent Multimedia system. Main motto of system is to guarantee that user should not be required to answer many question and will get required information rapidly. System consists of intelligent agents [48] and training strategy for the segmentation of database in to virtual subparts. Intelligent agent frame work [49, 50] is joined with a domain discrimination technique and for proficient querying content. Query & retrieval schemes are also developed [51, 52]. Some modules discussed for the system are: database consisting of more than one predefined images, scheme which decides specific interests of archaeologists, training scheme of system and content based & retrieval schemes that works for competent picture retrieval. Definition of content involves color, color composition, shape, form and texture and texture composition. Profiles are characterized by user's attributes like age, sex and preferences as well as by their line of work and occupation. Face extraction and 3D-modelling techniques [53] can also be integrated in the system. In the present work, intelligent agents and content-based retrieval are the foundations to design multimedia database architecture. Database is divided according to multimedia contents, and algorithm is used for training and using the system to support the searches of images and video sequences. Content based retrieval system is used to retrieve records [47]. The author of [56] aims to enhance the benefits of MPEG-7 multimedia database. The base of system is services of Oracle 10g and Cartridge Technology [5]. Data Cartridge Technology supports new types, methods, functions, user-defined objects and internal objects. Extensible index types are introduced in oracle. The system contains metadata model, XML-based MPEG-7 standard, new indexing & querying system, optimizer & supporting internal & external libraries. The confirmed system is Oracle 10g established by two applications of multimedia audio recognition and image retrieval. In this system these types of languages are used: SQL & Java or C. The system is divided into four parts: core management system, multimedia indexing framework (MIF), internal libraries and application libraries. The usage is of three levels: applied, sophisticated and administrative usage. Some rules for mapping MPEG-7 are also discussed in this paper. Mapping is used for retrieving MM data for both low level features and meaningful content with low-level uniqueness. MIF includes supported query types, GistService and back end of MIF. It presents that system provides the efficiency of processing multimedia data such as insert, query, retrieve familiar approaches like DMBS extenders / CBR systems. Core schema about system is MPEG-7 MM schema. Multimedia querying system is proposed in which by taking help via modular construction user may generate individual statements. The output comes in as MPEG-7. System provides facilities like range-search, Nsearch, NNsearch, multimedia search and filter applications [56]. This work [59] presents a system called STAR (System for Trademark Archival and Registration). This system uses features that depend on image plus text mechanism of trademarks. To overcome the diversity, complexity, difficulties of image archival and search problem of trademarks a structure has been made that contains image, graphics, text, and phonetics. [60-65] describes the current research on image databases. Trademark archival and trademark search are two main functions of the system. Five steps are required for the trademark registration: trademark image input, normalization, segmentation, searching for similar trademarks, verification by trademark officer, registration and insertion of the current trademark. The solution to solve the issues of composite structural representation for trademarks is building this representation structure for each trademark images (through segmentation) and composite search techniques for retrieving similar trademarks. Three sections are described in this paper: scheme of trademark representation and matching, segmentation and feature extraction and searching similar trademarks. These three solutions have sub solutions too. System is tested for a variety of trademark images and the results are promising [59].

3 CONCLUSION

Multimedia Databases are capable of handling vast amount of multimedia items which a common database cannot. MMDB helps in various aspects like creating virtual museum, developing multimedia application, creating excellent teaching packages and in multi user operations too. This review concludes that database has admirable impacts like learning such as in classroom teaching and learning, keeping records of multiple data types, flexible system for Geographical Information Systems, combination and storing of olfactory information, full-fledged images, animations, videos, providing 3Ds, TV newscast & Newspapers, making efficient browsing by the combination of intelligent agents and MMDB and providing a great way for technology to enhance the working of applications in a variety of ways. Multimedia database is a backbone support and work effectively for large amount of good quality multimedia data. Multimedia database is a great and useful invention and facility and it is developing day by day. The day by day developments will prove the broad positive impacts of MMDB.

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