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Challenges of Interactive Multimedia Data Mining in Social and Behavioral Studies for latest Computing &Communication of an Ideal Applications

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Abstract: *Now a day's entire world became a single village because due to the technology of computer science it brings whole globe peoples in front of each other on a single place like a village another thing computer is quite different with human being due its dynamic characteristics like speed, versatility, accuracy, storage and due to these super specialty characteristics computer has got variety of applications and challenges and booms of demands in every field of life. And hence the demands and market of Growing and emerging Multimedia computing and communication applications also increased since last few years. So the advancement in computing, carrying towards its modern and smart technology, large amount of (Audio, Video) that is multimedia data is being required and collected in highly research labs for various scientific purposes in various scientific fields, specifically in social and behavioral research studies and so new ideas and knowledge is being collect and extracted from raw multimedia data which poses a computing challenges of data mining techniques can often only search and extract pre-defined patterns or knowledge from complex heterogeneous data. In this paper our approach is to take in cash the human perception power system and the strength of computer algorithms. so this results into turning of the visualized and lead to the next round of visual exploration and analysis. And from the raw data ideology will come out the current status of analysis can be helpful and fruitful in further analysis.*

Keywords: *Multimedia data ; Communication; Database;, Software; Hardware,;Modem; visual data mining,*

I. Introduction

Now a days, multimedia data is universal and is needed in various applications, archival of multimedia data requires extremely large storage. Multimedia data mining is an interdisciplinary research field in which generic data mining theory and techniques are applied to the multimedia data sets so as to facilitate multimedia-specific knowledge discovery tasks. Multimedia is a combination of more than one media such as text, image, video, audio, numeric, sound files, animation, graphical and categorical data [1].The multimedia is classified in to two categories:(i) static media such as text, graphics, and images and (ii) dynamic media such as animation, music, audio, speech, and video [2]. Fig. 1illustrates the various aspects of multimedia data mining. Multimedia data mining refers to the analysis of large amounts of multimedia information in order to find patterns or statistical relationships. Multimedia data becomes complex as the sequence progresses and the concept being mined may change as well [3]. Understanding and representing the changes in the mining process is necessary to mine multimedia data [4]. Data in multimedia databases are semi structured or unstructured [5]. The structured data is handled by traditional data mining techniques while advanced technologies are extended for semi structured heterogeneous data.

Why the Necessity of Multimedia:- SCSI/IDE, Memory storage devices, RAM, ROM, Floppy disks & hard disk, optical storage devices ,DVD, CD ROM players & recorders. Input devices including keyboard, trackballs, mice, touch screens, magnetic card encoders and readers, graphics, tablets, flat bed scanners, OCR devices, infrared remotes, voice recognition systems, digital cameras. The output devices with audio devices such an amplifier, speakers, monitors, video devices, projectors, printers. Modems, ISDN, cable modems [6]. In particular, a large amount of higher solution High-quality multimedia data (video, audio, EEG, and fMRI, etc.) has been collected in research laboratories in various scientific disciplines, especially in social, behavioral and cognitive studies. Multimedia data contains a huge amount of information with various kinds. In video data, each frame may contain several objects and people in a scene [7]. One can extract different properties from each entity (an object or a person) in an image frame, such as the location of the entity, the size of the entity, the speed of the entity, or the color change of the entity. Assume that there are M objects and N people appearing in a video clip, and K properties can be extract from each, we will have (M+N)K temporal continuous variables. With the increase of M, N and K, extracting all the information from a video clip seems not to be efficient and may not be possible. However, data mining algorithms can effectively search and discover only predetermined patterns and those patterns need to be statistically reliable. This limitation significantly constrains what can be achieved using standard data mining algorithms because the exploratory nature of discovering new knowledge requires the ability to detect uncommon (but interesting) patterns The key to solve the above problem is to develop a mechanism that allows data researchers to explore the data and gain some insights on how to analyze it [8]. In light of this, we propose to use visualization techniques that present the data in various informative ways and by doing so make it easier for researchers to employ their own visual perception system to detect new patterns that previously overlooked, to gain new insights, and to generate new hypotheses which will lead to new discoveries. Thus, our solution is to take advantages of both the power of human perception system and the power of computational algorithms. More specifically, researchers can use data mining as a first pass, and then form a closed loop of visual analysis of current results followed by more data mining work inspired by visualization, the results of which can, in turn, be visualized and lead to the next round of visual exploration and analysis. In this way, Figure 1 illustrates multimedia data mining, in particular, various aspects of

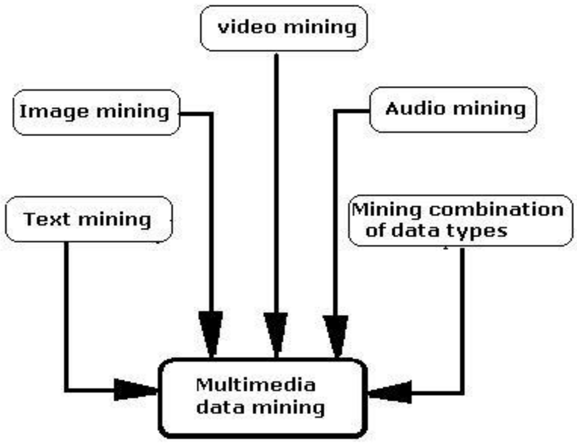

Figure 1. Multimedia data mining [9].

multimedia data mining [10, 11]. Figure 1. Multimedia data mining Motivation for multimedia data mining tremendous benefits of traditional data mining is proven for structured data. Now its time for extending the mining techniques for unstructured, heterogeneous data.

Why mining of multimedia data:- Potential

Applications It is well known that multimedia information is ubiquitous and often required, if not essential in, many applications. Consider the application areas of MDM and related industries who are users of technology. Multimedia Data Mining in Digital Libraries [12] the digital library retrieves collects stores and preserves the digital data. For this purpose, there is a need to convert

different formats of information such as text, images, video, audio, etc. The data mining techniques are popular while conversion of the multimedia files in the libraries. Multimedia data mining for traffic video sequences [13]. Many government banks and etc are using surveillance system to monitor movements of employees, visitors, machines etc. An ultimate objective of such surveillance system is to detect suspicious person based on their movements to maintain security and avoid any casualty. Application in medical analysis Application of Data Mining Techniques for Medical Image Classification Media Production and Broadcasting [14]. Proliferation of radio stations and TV channels makes broadcasting companies to search for more efficient approaches for creating programs and monitoring their content. Multimedia Data Mining On What Kind of Data Multimedia data mining is being put into use and studied for databases, including multimedia databases and unstructured and semi structured repositories such as the World Wide Web. Multimedia Databases Multimedia databases include video, images, and audio and text media.

World Wide connectivity: The multimedia is becoming increasingly available on the World Wide Web which can be viewed as a large, distributed, multimedia database. However the data is unstructured and heterogeneous. Data in the World Wide Web is organized in inter-connected documents. These documents can be text, audio, video, raw data, and even applications [14].

II. Literature Review

There are several visualization approaches for multivariate data over time in the literature (see an overview in [15]). Time Searcher [16] is a time series exploratory and visualization tool that allows users to query time series by use of Time Boxes, which are rectangular query regions drawn directly on a two-dimensional display of temporal data. [17] is used to visualize thematic changes in large document collections. Viz Tree [18] is designed to visually mine and monitor massive time series data. It uses symbols to represent time series data first, and then codes those symbols in a modified suffix tree in which the frequency and other properties of patterns are mapped onto colors and other visual properties. Spiral [19] is mainly used to compare and analyze periodic structures in time series data, where the time axisis represented by a spiral, and data values are characterized by attributes such as color and line thickness. Van Wijketal [20] ,designed a cluster and calendar-based approach for the visualization of calendar-based data. Those methods deal with linear time or highly periodic time, Our approach provides an interactive tool to integrate visualization with the data mining.

Multimedia Database Mangement:

Recently, multimedia has been the major focus for many researchers around the world and many technologies are proposed for representing, storing, indexing, and retrieving multimedia data. Most of the studies done are confined to the data filtering step of the KDD process. In [21], Czyzewski demonstrated how KDD methods can be used to analyze audio data and remove noise from old recordings. as shown in Fig. 2. Multimedia data mining refers to pattern discovery, rule extraction and knowledge acquisition from multimedia database, as discussed in [22].Chienet.al. in [23] use knowledge based AI techniques to assist image processing in a large image database generated from the Galileo mission. A multimedia data mining system prototype, Multi Media Min includes the construction of a multimedia data cube which facilitates multiple dimensional analyses of multimedia data, primarily based on visual content, and the mining of multiple kinds of knowledge, including summarization, comparison, classification, association, and clustering [24].

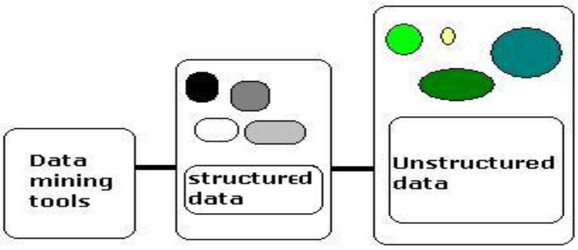

Fig. 2: Conversion of Unstructured data to Structured Data for Mining

A. Text Mining:- Text mining is a burgeoning new field that attempts to glean meaningful information from natural language text. Compared with the kind of data stored in databases, text is unstructured, amorphous, and difficult to deal with algorithmically. Nevertheless, in modern culture, text is the most common vehicle for the formal exchange of information. The field of text mining usually deals with text whose function is the communication of factual information or opinions, and the motivation for trying to extract information from such text automatically is compelling even if success is only partial [25].

B. Image Mining:- Image mining systems that can automatically extract semantically meaningful information (knowledge) from image data are increasingly in demand. The fundamental challenge in image mining is to determine how low level, pixel representation contained in a raw image or image sequence can be processed to identify high-level spatial objects and relationship [26].

C. Video Mining:- Video contains several kinds of multimedia data such as text, image, meta data, visual and audio. It is widely used in many major potential applications like security and surveillance, entertainment, medicine, education programs and sports. The objective of video data mining is to discover and describe interesting patterns from the huge amount of video data as it is one of the core problem areas of the data-mining research community [27].

D. Audio Mining:- Audio mining is a technique by which the content of an audio signal can be automatically analyzed and searched. It is most commonly used in the field of automatic speech recognition, where the analysis tries to identify any speech within the audio [27].

III. Various Issues Involves Multimedia Datamining:

Before multimedia data mining develops into a conventional, mature and trusted discipline, many still-pending issues have to be addressed. These issues pertain to the multimedia data mining approaches applied and their limitations. Major Issues in multimedia data mining include content based retrieval and similarity search, generalization and multidimensional analysis, classification and prediction analysis, and mining associations in multimedia data [28]. Multimedia data mining needs content-based retrieval and similarity search integrated with mining methods. Content based retrieval in multimedia is a challenging problem since multimedia data needs detailed interpretation from pixel values [29].

APPLICATIONS AND PROCESS OF MULTIMEDIA DATA MINING:- The model of applying multimedia mining in different multimedia types is presented in Fig. 4 [30]. Data collection is the starting point of a learning system, as the quality of raw data determines the overall achievable performance. Then, the goal of data pre-processing is to discover important features from raw data. Data pre-processing includes data cleaning, normalization, transformation, feature selection, etc. Learning can be straight-forward, if informative features can be identified at pre-processing stage. Detailed procedure depends highly on the nature of raw data and problem's domain. The product of data preprocessing is the training set. a) the huge volume of data, b) the variability and heterogeneity of the multimedia data (e.g. diversity of sensors, time or conditions of acquisition etc.) and c) the multimedia content's meaning is subjective. Application and system of multimedia data mining based on the process discussed is surveyed in the following sub-section.

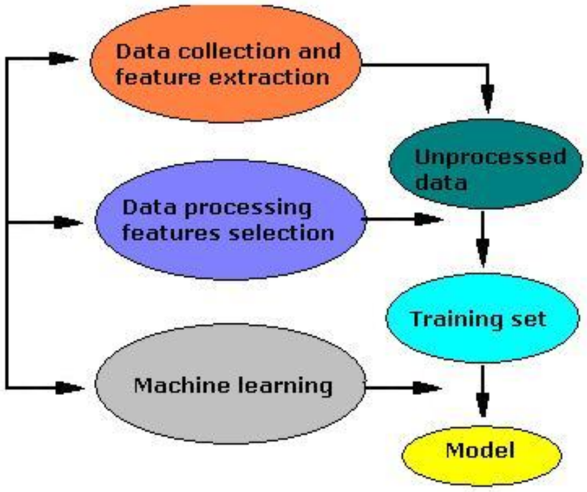

Fig. 3: Multimedia Mining Process

Tasks Of Multimedia Data Mining:-

The main tasks involved in multimedia data mining are [31]:

A. Multimedia Data Cube: Multimedia data cube is an interesting model for multidimensional analysis of multimedia data; we should note that it is difficult to implement a data cube efficiently given the large number of dimensions. This curse of dimensionality is especially serious in the case of multimedia data cubes. We may like to model color, orientation, texture, keywords, and so on. Many of the multiple dimensions in multimedia data cubes are set oriented instead of single, valued. e.g. one image may correspond to a set of keywords. It may contain a set of objects, each associated with a set of colors. If we use each keyword as a dimension or each detailed color as a dimension in the design of the data cube, then we will create huge number of dimensions [31].

B. Feature extraction: Multimedia features are extracted from media sequences or collections converting them into numerical or symbolic form. Good features shall be able to capture the perceptual saliency, distinguish content semantics, as well as being computationally and representation ally economical [31].

C. Data Pre-processing: Integrating data from different sources and making choices about representing or coding certain data fields is the task of this stage. It serves as input to the pattern discovery stage[31].

D. Discovering Patterns: The pattern discovery stage is the heart of the entire data mining process. The hidden patterns and trends in the data are actually uncovered in this stage. Several approaches of pattern discovery stage include association, classification, clustering, regression, time-series analysis and visualization.

E. Interpretations: To evaluate the quality of discovery and its value to determine whether previous stage should be revisited or not this stage of data mining process is used.

F. COLECTED KNOWLEDGE:- knowledge: This final stage is reporting and putting to use the discovered knowledge to generate new actions or products and services or marketing strategies as the case may be[31].

Multimedia Data Visualization:-

As shown Figure 2, there are two major display components in the application: a multimedia playback window and a visualization window. The multimedia playback window is a digital media player that allows users to access video and audio data and play them back in various ways. The visualization window is the main tool that allows users to visually explore the derived data streams and discover new patterns and findings. More importantly, when users visually explore the dataset, these two display windows are coordinated to allow users to switch between synchronized raw data and derived data, which we will discuss more later. We will first introduce the analytical functions in our visualization system. The main window in our visualization tool is designed based on Time Searcher [32]. There are three display areas. After users load a multimedia data set, variables in the data set are displayed in a window in the upper right corner of the application. Each variable is labeled by its name. Users can select which ones they will load into individual display panels.This zoom box allows users to control the level of detail in the main display area wherein users can select and examine multiple variables simultaneously by zooming in the areas of interest defined by the zoom box in the overview panel and comparing multiple data streams side by side. We have developed various functions to visualize derived data streams individually or together to highlight different aspects of multimedia multivariable data.

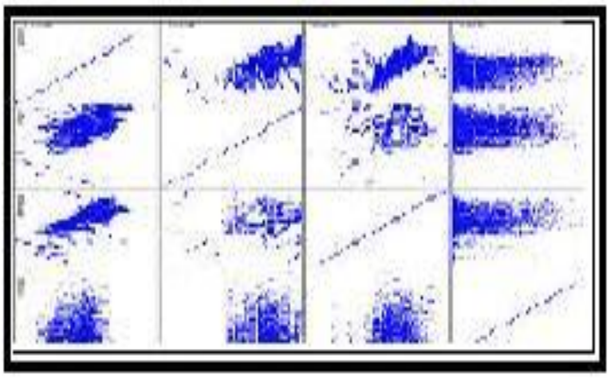

Fig. 4: Multimedia Visualization data (A)

Fig. 4: Multimedia Visualization data (B)

Visualization and Data Representation:-

From a multimedia data processing perspective, we propose that these temporal data can be categorized into two kinds: (33) continuous variables: related to time points (a series of single measurement at particular moments in time) and (34) event variables: related to time intervals (e.g. the onset and offset of an event). For example, the location of an object in a video is a continuous temporal variable that may vary over time. The time intervals when a participant is speaking can be captured as an event variable. In the following sections, we will first present how our visualization tool deals with continuous data and event data, and then we will introduce how we visualize.

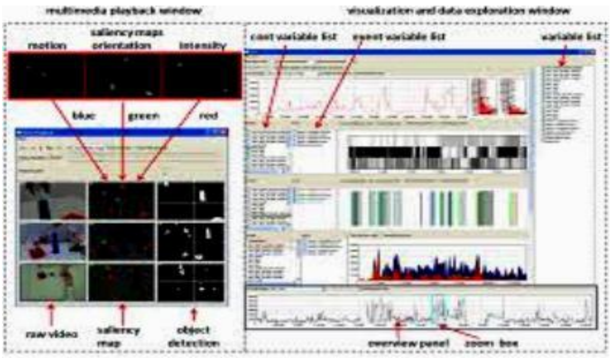

Fig. 5: Representation of data Visualization

Continuous Time Series Data:-After loading the dataset, a list of continuous variables is displayed next to individual display panels, from which users can select one or multiple variables to display. Our visualization tool supports three ways to visually explore continuous time series data: (35) as individual data streams, (36) as a set of multiple data streams, and (37) as an arithmetic combination of multiple data streams. We will present each mode one by one.

Using curves to visualize individual data streams:- The purpose is to allow users to explore individual data streams and examine both the overall statistics of a data stream and the statistics within a local window. As shown Figure 3, users can examine multiple streams at the same time, one for each display panel. Meanwhile, users can move the zoom box in the overview panel to zoom in and take a closer look within certain duration in time. A novel feature we added here is histogram display. Compared with summary statistics and metrics (means and variances, etc.) extracted from the data, a visual plot of histogram reveals more fine-grained features such as whether distributions are uniform, normal, skewed, bimodal, or distorted by outliers, and as well as the range of the time series and the
proportion of each

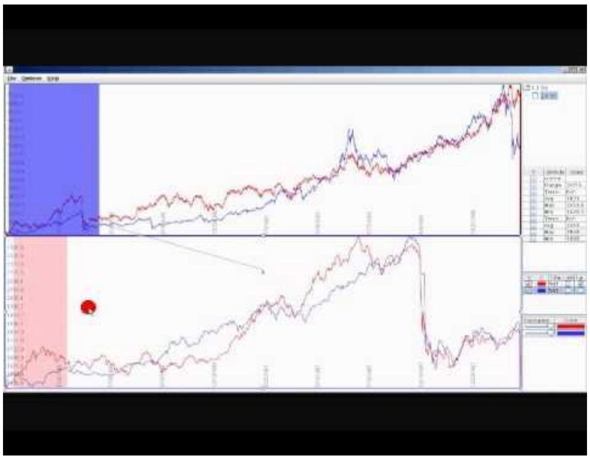

Fig. 6: Curves to visualize individual data streams

Challenging research issues:- Computer programmers write, test, & maintain the detailed instructions called as programs, computers must follow to perform their functions. They also conceive, design & test logical innovations in Programming -advanced computing technologies & sophisticated new languages & programming tools-have redefined the role of programmer & elevated much of programming work done today along with wide range of challenges as follows:

.Technical improvements & changes in multimedia applications improve productivity through better collaboration opportunities, visualisation of different manufacturing process. Protocols & network should support all types of
mediums

.OS must consider virtual memory, shared memory, remote procedure calls, c p u scheduling, disk scheduling

. New applications are to be researched

.The compression and decompression with high
compression ratio & lossless compression with less storage space.

.The query for audio & video entries in database should be content oriented.

.Random access of optical storage devices still takes too long & magnetic storage devices are too expensive for the storage of multimedia data.

.Voice quality is very hard to judge without subjective tests from users opinions [38].Therefore voice processing is again a challenge.

.The database manager is frequently given tasks to
perform such as security, integrity & synchronisation
[39].Providing these require great deal of work in future for large data.

. Techniques like branch & bound, backtracking often make it possible to solve at least some larger instances of difficult combinatorial problems [40]

.Science of hiding messages is called as Stegenography [41], processing it efficiently requires new formulations

.The order of growth of running time of an algorithm gives a simple characterization of algorithms efficiently & also allows for compare relative performances of alternative algorithm [42].

.Image display issues

Stages of multimedia project:-
The following are the stages of a multimedia project involves
(i). Planning & costing (ii). Designing & producing (iii).Testing (iv). Delivering
Two major software selections are to be made are:
i) Ultimate choice of disk OS to support the task & ii) Language to implement the task [43].
The complete structure of multimedia is in fig1

Multimedia skills:- Many of the skills are desirable for multimedia Including, 1)Executive producer 2)Producer /project manager 3) Creative 4) director Art director 5) Interface designer
6)Game designer 7)Subject matter expert
8)Training specialist 9)Script writer 10)Animator
11)Music composer 12)Video producer 13)Multimedia programmer 14) Html coder

Results & Multimedia applications:-
Multimedia finds applications in following areas:
1)Multimedia in schools [44] 2)Multimedia in business [44] 3)Image processing & recognition 4)Film industry 5)Finger print identification
6)Full motion digital video [45] 7)Electronic messaging 8)Document imaging [45].
Computer programmers write, test, & maintain the
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, Science of hiding messages is called as Stegenography [49], processing it efficiently requires new formulations

.The order of growth of running time of an algorithm gives a simple characterization of algorithms efficiently & also allows for compare
relative performances of alternative algorithm [50].

.Revolutionary changes in routers, hubs, gateways, routing algorithms, congestion control algorithms.

Fig. 7: Algorithmic analysis of Data Mining with
Respect to challenging issues

IV. Approach towards Result and Methodology:-

The above visualization is implemented with different colors pattern to assigning different event variables that users select to display and handle more complicated patterns by using more variables and logical operations that may typical to visualized to user just on the base color pattern coding, we are also allowing to users to assign new event of variable to combining existing events with three universal logic operators (&& ,!, !=). Users are allowed to create a new event and assign a meaningful variable name for the new event. After that, the new event variable will be automatically added in the event list to allow users to select and visualize this new variable visualizing either event variables or continuous list of variables. Our approach to visualizing, exploring the combination of these two patterns. Our interest to explore the potential complex patterns hidden in continuous variables.

Conditioned on event variables: – Our approach is to use colors to visualize various events when patterns exist in the continuous variables while certain events happen. Using gray levels to observe continuous values, and overlap these two before to visually spot potential patterns across those data streams. Take a multiple continuous variables displayed in parallel as Meanwhile, users can also select multiple events (with various colors) overlapped on the top of gray-level continuous variables to visually examine the underlying patterns of continuous variables at those moments when a certain event occurs. We allow users to select one or many events and also assign a transparency value for each one to visualize certain events over others. The other aim of re-assigning transparency values is to allow users to trade-off between the visibility of events and the visibility of the underlying continuous data since the overall visualization.

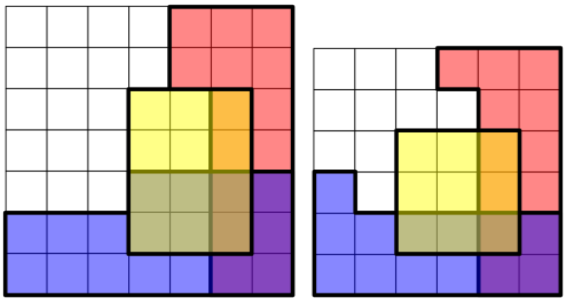

Fig. 8: conditioned on event variables

Event-based Interactive Visual Exploration:- Its being observed that many multimedia data are essentially event driven. observer can magnify and quantify their observations in terms of individual events, such as the event of a person entering a room, the event of a such object appearing in a certain location hence we are giving updated functions to allow observer to observe each events thoroughly. All the instances in this event are listed. After users select both Now users can exploits those events one at a time and the corresponding continuous values are displayed and updated as well. In such a way, users can examine in a fine-grained way the patterns of the underlying continuous variables within a certain event. users also are supposed to change the time axis to zooming out to the examine what happen before and after each instance of the selected event while the display panel is centered on the current instance

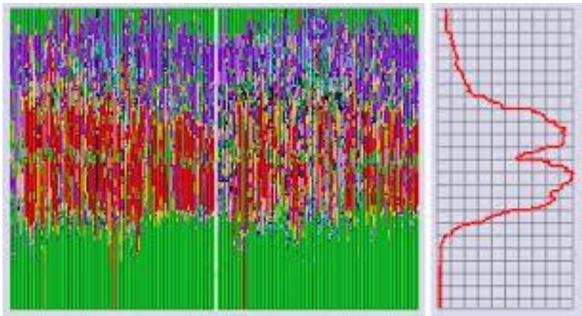

Fig. 9: Event-based Interactive Visual Exploration.

V. Visualization And Data Processing

In our visualization tool in addition to various analytical functions provided to users to effectively examine the data visually, we are also providing smooth and compatible interfaces application between visualization and data mining to allows researchers to smoothly switching between these two. This section introduces two interfaces between:

(1)Unprocessed data and derived data, and

(2) Visualization and data analysis.

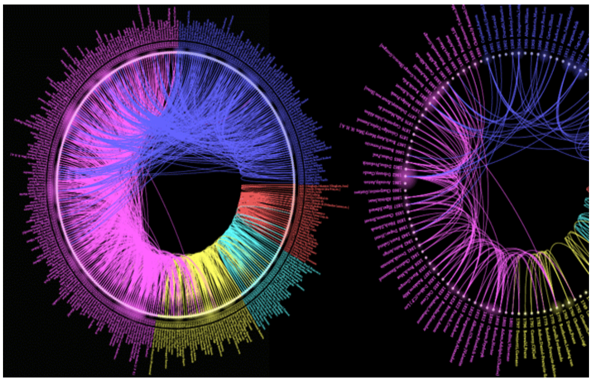

Fig. 10: Visualization and Data processing.

Synchronization of Multimedia Data and Visual data exploration:- We have described various ways for researchers to visually examine, observe and analyze continuous and event variables processed from multimedia data. It is being noticed that derived (processed data) are extracted from (Unprocessed data) raw multimedia data. Therefore, it is important that users can refer to the raw multimedia data while exploring derived data. Our media playback panel allows users to play back video and audio data at various speeds, from fast forward/backward to frame-by-frame playback. Users can also control the onset of the playback and Stop/restart the video at any moment. On the basis of these standard video playback functions, we design and implement one critical component to synchronized multimedia playback with visual data mining. This feature is the ability to control the interval of video that is played back using the visual data mining tools. The main object behind this technical issue in implementing this feature is to synchronize intime video playback with users' ongoing visual exploration. Its is also being observe and brought into our consideration that users can change the current time in visual exploration mechanisms to synchronize multimedia playback with visual exploration

VI. Conclusion:

The application which we proposed for visualization to support and interact with the varieties of procedure which carry to user towards observation for monitoring in conversion unprocessed data to derived data and give the ideology of embedded data in the form of verities of patterns. and all this completion is take place under the human observer's visual system for that to extend these hypothesis researcher and architect need to a develop and use of data mining multimedia algorithms But it is being observed that many developer have many priorities of using programming languages tools and packages or softwares so to increase the compatibilities and smoothness with multimedia data mining's our system allows to programmers to programmed any programming language to obtained fruitful results then developers have devolved new multimedia data mining algorithms using their own way either in Matlab,C,C++,Java,etc and as soon as programmer will write program then results into text files with pre-defined formats (one for continuous variables and one for event variables. Then the upcoming result will be loaded automatically into our visualization program. So in such Way we proposed a loop between visual exploration and multimedia data mining. So As a result our approach is towards our achievement, we have implemented visualization system with three components

1) Interfacing between data mining and visualization.

2) A tool to extract temporal data from unprocessed multimedia data and the temporal data is represents 2 stages continuous and event variables.

3) Interfacing between unprocessed multimedia data and derived data. And visualization tool allows users to compare, and analyze multi-stream derived variables and simultaneously switch to access unprocessed multimedia data.

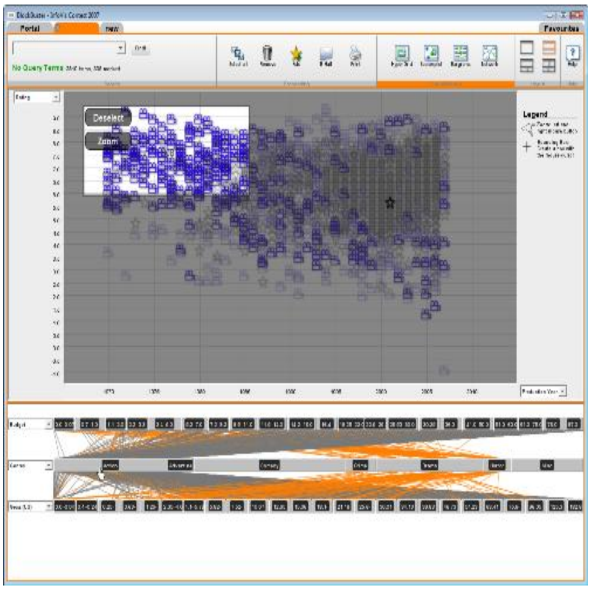

Fig. 11: Synchronization of Multimedia Data and Visual data exploration

References:

[1]. Fabio Faria, Jefersson Dos Santos, Anderson Rocha and Ricardo Da Torres, "A Framework for Selection and Fusion of Pattern Classifiers in Multimedia Recognition", Pattern Recognition Letters, Vol. 20, No. 7, pp. 1-13, 2013.

[2]. Chih-Ming Chen and Hui-Ping Wang, "Using Emotion Recognition Technology to Assess the Effects of Different Multimedia materials on Learning Emotion and Performance", Information Science Research, Vol. 33, No. 44, pp. 244 –255, 2011.

[3]. Sanjeevkumar R. Jadhav, and Praveenkumar Kumbargoudar, "Multimedia Data Mining in Digital Libraries: Standards and Features" in Proc. READIT-2007, p. 54

[4]. Manda Jaya Sindhu, Madhavi Latha, Samson Deva Kumar and Suresh Angadi, "Multimedia Retrieval Using Web Mining", International Journal of Recent Technology and Engineering, Vol. 2, No. 1, pp. 106-108, 2013.

[5]. Farham Mohamed, Nordin Rahman, Yuzarimi Lazim and Saiful Bahri Mohamed, "Managing Multimedia Data: A Temporal-Based Approach", International Journal of Multimedia and Ubiquitous Engineering, Vol. 7, No. 4, pp. 73-86, 2012.

[6]. Willis j Tompkins, "biomedical digital signal processing", PHI.

[7]. E. J. Keogh and M. J. Pazzani. Relevance feedback retrieval of time series data. In Proceedings of the 22nd Annual International ACM SIGIR Conference on Research and Development in Information Retrieval SIGIR '99, pages 183–190,Berkeley CA, August 1999. ACM.

[8]. Ben Shneiderman, Inventing discovery tools: combining information visualization with data mining, Information Visualization, 2002, 1(1), 5-12, ACM Press.

[9]. Manjunath T.N1, Ravindra S Hegadi2, Ravikumar G K3 ,Research Scholar, Bharatiar University, Coimbatore Tamilnadu, INDIA A Survey on Multimedia Data Mining and Its Relevance Today IJCSNS International Journal of Computer Science and Network Security, VOL.10 No.11, November 2010-165Manuscript received November 5, 2010 Manuscript revised November 20, 2010

[10]. Dianhui Wang, Yong-Soo Kim, Seok Cheon Park, Chul Soo Lee and Yoon Kyung Han " Learning Based Neural Similarity Metrics for Multimedia Data Mining ",Soft Computing, Volume 11, Number 4, February 2007 , pp. 335- 340

[11]. Bhavani Thuraisingham, Managing and Mining Multimedia,Databases, Published by CRC Press, 2001

[12]. Sanjeevkumar R. Jadhav, and Praveenkumar Kumbargoudar, "Multimedia Data Mining in Digital Libraries: Standards and Features" in Proc. READIT-2007, p. 54

[13]. Shu-Ching Chen, Mei-Ling Shyu, Chengcui Zhang, and Jeff Strickrott, "Multimedia Data Mining for Traffic Video Sequences," Proceedings of the Second International Workshop on Multimedia data Mining MDM/KDD'2001), in conjunction with the Seventh ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, pp. 78-85, August 26, 2001, San Francisco, CA, USA.

[14]. Valery A. Petrushin and Latifur Khan, "Multimedia Data Mining and Knowledge Discovery", 2007 - London: Springer-Verlag, pp. 3- 17.

[15]. Wolfgang Aigner, Silvia Miksch, Wolfgang Muller, Heidrun Schumann, Christian Tominski Visualizing time-oriented data—A systematic view. Computers & Graphics, Vol. 31, No. 3. (June 2007), pp. 401-409.

[16]. Hochheiser, H., and Shneiderman, B. Interactive Exploration of Time-Series Data. In Proceedings of the 4th International Conference on Discovery Science. Washington D.C., 2001, Nov 25-28. 441-446.

[17]. Susan Harve, Elizabeth Hetzler, Paul Whitney, and Lucy Nowell. ThemeRiver: Visualizing Thematic Changes in Large Document Collections. IEEE Transactions on Visualization and Computer Graphics. 2002, Vol.8, No.1, 9-20.

[18]. Lin, J., Keogh, E., Lonardi, S., Lankford, J. P., and Nystrom, D. M. Visually mining and monitoring massive time series. In Proceedings of the Tenth ACM SIGKDD international Conference on Knowledge Discovery and Data Mining. Seattle, WA, USA, 2004, August 22 - 25. 460-469.

[19]. Weber, M., M. Alexa, and W. Muller. Visualizing Time Series on Spirals. In Proceedings of 2001 IEEE Symposium on Information Visualization. San Diego, CA, 2001, Oct 21-26. 7-14.

[20]. Van Wijk, J.J., and E. Van Selow. Cluster and Calendar based Visualization of Time Series Data. In Proceedings of IEEE Symposium on Information Visualization. San Francisco, CA, 1999, Oct 24-29. 4-9.

[21]. A. Czyzewski, "Mining Knowledge in Noisy Audio Data", in Proc. 2nd Int. Conf. on KDand Data Mining, pages 220-225, 1996.

[22]. Dianhui Wang, Yong-Soo Kim, Seok Cheon Park, Chul Soo Lee and Yoon Kyung Han, "Learning Based Neural Similarity Metrics for Multimedia Data Mining" Soft Computing, Volume 11, Number 4, February 2007, pp. 335- 340

[23]. S. Chien, F. Fisher, H. Mortensen, E. Lo, and R. Greeley, "Using artificial Intelligence Planning to Automate Science Data Analysis for Large Image Databases", In Proc. 3rd Int. Conf. on Knowledge Discovery and Data Mining, pages 147-150, 1997.
[24]. Osmar R. Za _ane Jiawei Han Ze-Nian Li Sonny H. Chee Jenny Y. Chiang, "MultiMediaMiner: A System Prototype for MultiMedia Data Mining," Intelligent Database Systems Research Laboratory and Vision and Media Laboratory report, 2009.
[25]. Ian H. Witten "Text mining", Computer Science, University of Waikato, Hamilton, New Zealand, 2005.
[26]. Ordenoz C,Omiecinski E. Discovering association rules based on image content. In:ADL '99: Proceedings of the the IEEE Forum on Research and Technology Advances in Digital libraries.Washington, DC: IEEE Computer Society; 1999, p.38.
[27]. V. Vijayakumar, R. Nedunchezhian "A study on video data mining", International Journal of Multimedia Information Retrieval, October 2012, Volume 1, Issue 3, pp 153-172, Publisher Springer-Verlag.
[28]. Jiawei Han, Micheline Kamber "Data Mining: Concepts andTechniques" Published by Morgan Kaufmann, 2001.
[29]. Mittal, Ankush An overview of multimedia content-based retrieval strategies, Publication: Informatica, October 1 2006.
[30]. Pravin M. Kamde, Dr. Siddu. P. Algur "A SURVEY ON WEB MULTIMEDIA MINING" The International Journal of Multimedia & Its Applications (IJMA) Vol.3, No.3, August 2011.
[31]. Dianhui Wang, Yong-Soo Kim, Seok Cheon Park, Chul Soo Lee and Yoon Kyung Han, "Learning Based Neural Similarity Metrics for Multimedia Data Mining" Soft Computing, Volume 11, Number 4, February 2007, pp. 335- 340.
[32]. Hochheiser, H., and Shneiderman, B. Interactive Exploration of Time-Series Data. In Proceedings of the 4th International Conference on Discovery Science. Washington D.C., 2001, Nov 25-28. 441-446.
[33]. E. J. Keogh and M. J. Pazzani. Relevance feedback retrieval of time series data. In Proceedings of the 22nd Annual International ACM SIGIR Conference on Research and Development in Information Retrieval SIGIR '99, pages 183–190,Berkeley CA, August 1999. ACM.
[34]. Ben Shneiderman, Inventing discovery tools: combining information visualization with data mining, Information Visualization, 2002, 1(1), 5-12, ACM Press.
[35]. E. J. Keogh and M. J. Pazzani. Relevance feedback retrieval of time series data. In Proceedings of the 22nd Annual International ACM SIGIR Conference on Research and Development in Information Retrieval SIGIR '99, pages 183–190,Berkeley CA, August 1999. ACM.
[36]. Ben Shneiderman, Inventing discovery tools: combining information visualization with data mining, Information Visualization, 2002, 1(1), 5-12, ACM Press.
[37]. Wolfgang Aigner, Silvia Miksch, Wolfgang Muller, Heidrun Schumann, Christian Tominski Visualizing time-oriented data—A systematic view. Computers & Graphics, Vol. 31, No. 3. (June 2007), pp. 401-409.
[38]. William Y. L, "mobile cellular telecommunications & digital systems", second edition, Tata MCG
[39]. Jeffrey D U, "Principles of data base management systems", second edition, Galagotia publications.
[40]. A. Levitin, "Introduction to design & analysis of algorithms", Pearson
[41]. Andrew S Tanenbaum, "Computer networks", fourth edition
[42]. Thomas H. C, Charles, Ronald , Clifford stein," Introduction to algorithms" third edition, PHI
[43]. Willis j Tompkins, "biomedical digital signal processing", PHI
[44]. Tay Vaughan, "multimedia making it work", fifth edition, Tata MCG
[45]. K Prabhat, Andleigh, Kiran, Thakar, "multimedia system design", PHI.
[46]. William Y. L, "mobile cellular telecommunications & digital systems", second edition, Tata MCG
[47]. Jeffrey D U, "Principles of data base management systems", second edition, Galagotia publications.
[48]. A. Levitin, "Introduction to design & analysis of algorithms", Pearson
[49]. Andrew S Tanenbaum, "Computer networks", fourth edition.
[50]. Thomas H. C, Charles, Ronald , Clifford stein," Introduction to algorithms" third edition, PHI.