Multimedia Mining – An Overview

Greeshma Sunny

Dept of Computer Science

St.Joseph's College

Irinjalakuda

Abstract— **Multimedia data mining refers to the process of extracting data from multimedia data such as audio, video, text, web ,speech, image and a combination of several types of these data sets. These multimedia data can be either semi-structured or unstructured. To extract information from the multimedia database we have to use various multimedia techniques and powerful tools. So there is a high requirement of developing data mining techniques which we can use for the multimedia data base. This paper details the basic concepts regarding the multimedia data mining, it's essential characteristics and the issues involved in the multimedia mining and the solutions to it.**

Keywords — Image Mining, Data Mining, Multimedia Data.

I. INTRODUCTION

Multimedia data mining involves the process of extraction of multimedia data set which can be images, speech, text, audio, video, graphics and the combination of these data sets. All these data sets have to be converted to the digital format from the existing format. The multimedia can be mainly classified in to two different categories. :(i) Static media which can be a text, image or graphics and (ii) dynamic media which can be a audio, speech, animation, music, video. Fig.1 illustrates different aspects of multimedia mining[1].
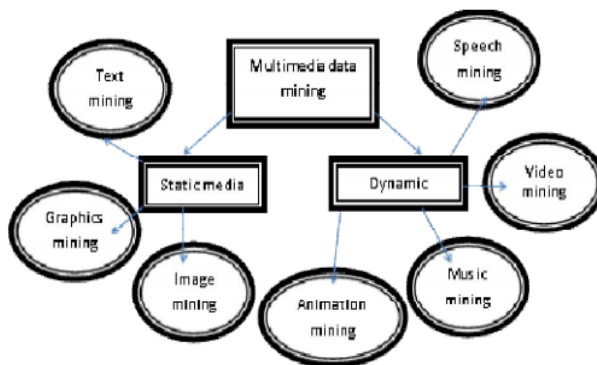

Figure 1.Multimedia Data Mining

The data in multimedia databases can be either semi structured or unstructured. The traditional data mining techniques can be used to handle structured data but for the analysis of the semi structured data we have to employ advanced technologies.

II. STRUCTURED AND UNSTRUCTURED DATA

Data in multimedia databases can be either semi structured or unstructured. Fig 2. Illustrates the architecture to convert unstructured data to structured data for mining. Data is extracted from the unstructured data base and is stored in the structured database. Then the data mining tools are applied on the structured data base[1].
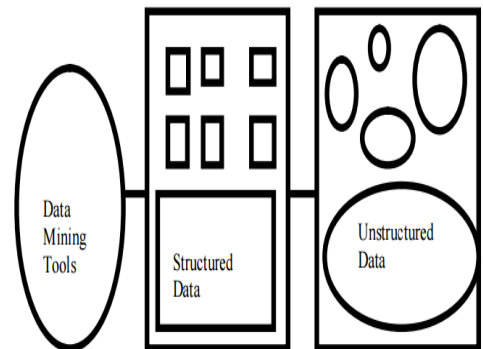

Figure 2. Converting unstructured data to structured data for Mining

III. CATEGORIES OF MULTIMEDIA DATA MINING

The multimedia data mining is classified into two categories[2].

- Static media - Static media contain text and images.
- Dynamic media – Dynamic media contains audio andvideo.

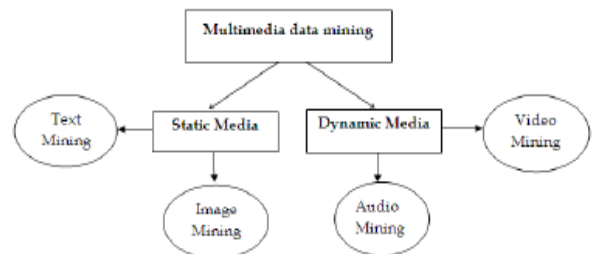 The given figure illustrates the categories of multimedia data mining.

Figure 3. Categories of Data Mining

Special Issue - 2015

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
NSRCL-2015 Conference Proceedings

Static Media may contain[3]:

➢ Text mining

Text mining is the data mining method which is used to extract information from unstructured text. Text is one of the most common medium for exchange of information. In text mining it evaluate large amount of language texts and checks for exact pattern to find out useful information.

➢ Image mining

In image mining system extracts meaningful information from image data.

➢ Video mining

Video has several type of multimedia data such as image, text, audio, visual etc. It is widely used in application such as entertainment, medicine,education, sports etc. Video mining has the objective of describing interesting patterns form large amount of video data and is one of the fields which are to be advance further.

➢ Audio mining

Audio mining is the technique in which audio signals are automatically analyzed and searched. This technique is generally implemented in automatic speech recognition.

IV. APPLICATIONS OF MULTIMEDIA MINING

Some of the applications of multimedia data mining is given below.

➢ Medical Analysis: Multimedia mining finds application in analyzing the medical images. Forexample Automatic localization and detection of vertebrae in 3D CT scans ECG and X-Ray.

➢ Surveillance system: It involves the collecting and analyzing the audio and video about a specific area.It can also use by military,police and security agencies to strengthen security.

➢ Media Making and Broadcasting:Radio and TV companies can make use of the data mining techniques to improve their quality.

➢ Traffic Video Sequences: Authorities can make use of the video mining techniques to improve the traffic situation by vehicle identification,traffic pattern at interceptions etc.

V. MULTIMEDIA DATA MINING PROCESS

The figure below represents the multimedia mining process. Data collection is the first process in which the raw data is available. Preprocessing is done to extract significant features from the raw data and it has data cleaning and feature extraction and the two steps. After preprocessing training set is obtained and is further processed to a multimedia Model.
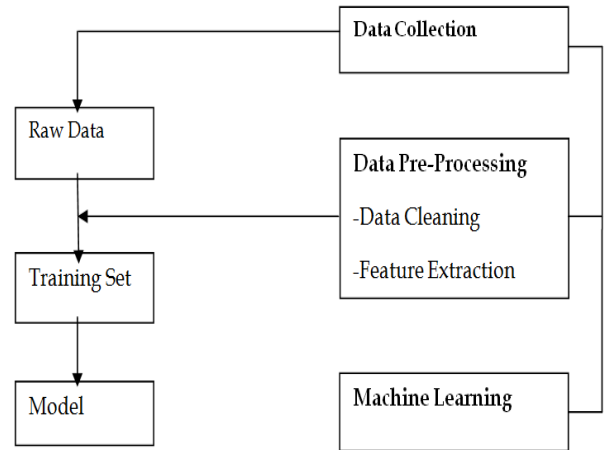

Figure 4.Multimedia Mining Process

VI. ARCHITECTURE FOR MULTIMEDIA DATA MINING

Multimedia mining architecture for data mining is given in Figure 5. The architecture is very simple and has several components[4]. Important components are (1) Input (2) Multimedia Content (3) Spatiotemporal Segmentation (4) Feature Extraction (5) Finding the similar Patterns and (6) Evaluation of Results.
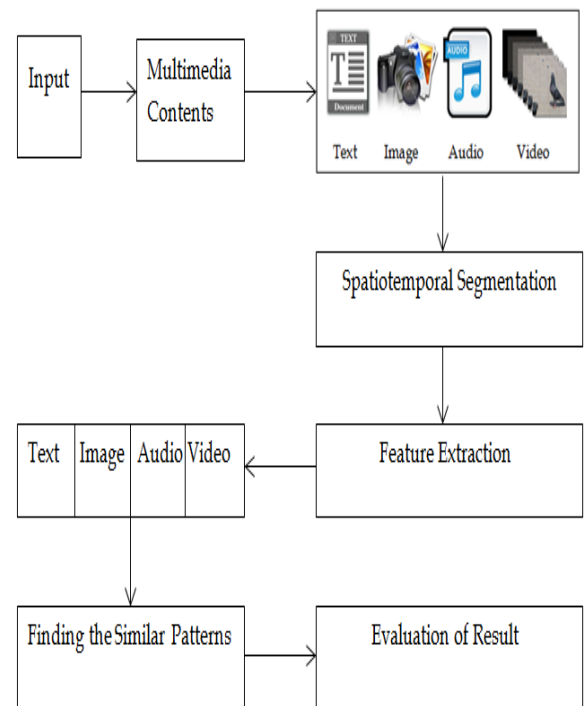

Figure 5. Multimedia Data Mining Architecture

The steps in this architecture are:

1. Input stage determines which database is to be utilized for the data processing
2. Multimedia content is the selection of data. The data to be selected for processing.
3. Spatio-temporal segmentation is the process of moving objects in sequential basis and is useful for segmentation.
4. Feature extraction involves the process of integrating data from various sources.
5. Finding the similar pattern involves the major process of uncovering the hidden data.
6. Evaluation of Results is the stage used to check the result and to check the previous process to be repeated or not.

VII. MODELS FOR MULTIMEDIA MINING

Mainly four types of Models are used for data mining[5]. These are
- Classification
- Association Rule
- Clustering And
- Statistical Modeling.

- Classification: Classification has a function that maps data in to several pre defined classes by inputting a training data set and making model of the class attribute depending on the rest of the attributes.

- Association Rule: Association Rule is one of the most important data mining techniques used to to find relations between data items in huge databases. There are two different types of associations in multimedia mining.

- Clustering: Cluster analysis joins all objects based on their groups. In multimedia mining, clustering technique can be applied to group similar objects, sounds images, videos and texts.

- Statistical Modeling :Statistical mining models can be used to regulate the statistical validity of test parameters.
It requires more research and analysis. Multimedia mining isone of the important and challenging research domains in thefield of computer science. Most of the researchers are interested to do their research in the field of mining.

VIII. CONCLUSION

In this paper the basic concept regarding the data mining is been discussed. It is a field of computer science where it

IX.FUTURE SCOPE

The world is being mechanized and all the offices and institutions are being computerized.One of the future work field is feature extraction. That is, Multimedia features are extracted from media collections or sequences and converting them into symbolic or numerical form. Good features shall be able to capture the perceptual saliency, distinguish content semantics, as well as being and representation economical

X. ACKNOWLEDGEMENT

XI. REFERENCES

[1] Manjunath T.N, Ravindra S Hegadi, Ravikumar GK, "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.
[2] Sarla More, Durgesh Kumar Mishra, "Multimedia Data Mining: A Survey" Pratibha: International Journal of science, spirituality, business and technology (ijssbt), vol. 1, no.1, march 2012 issn (print) 2277—7261.
[3] Manjunath R, S. Balaji, "Review and Analysis of Multimedia Data Mining Tasks and Models"InternationalJournal of Innovative Research in Computer and Communication Engineering Vol.2, Special Issue 2, May 2014.
[4] 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.
[5] Manda Jaya Sindhu, MadhaviLatha, 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