Content Based Video Retrieval Using Image Key Frame

Deepika.M[1], Balaji.N[2], Gokul Kumar.M[3]
[1]Assistant Professor Dept of Information Technology
[1]St.Peters Institute of Higher Education and Research
[2, 3]UG Scholar, Jeppiaar SRR Engineering College

Abstract- *Content based video retrieval (CBVR) utilizes the rich and varied video contents for video representation and retrieval. The contents can be broadly divided into static frame level contents, spacio-temporal contents, motion contents and high level semantic contents. The temporal and motion information is utilized for retrieval purposes. The recent trends in CBVR aim for this higher semantic retrieval. The proposed idea is to retrieve the video in short time using Segmentation Key Frames. A user can upload a video on the database, and the proposed system scans the content frame by frame and with the designed protocol generates a hexadecimal code mapping the features of the frame. The code is generated based on spacio temporal algorithm taking into account the vector positions of the objects in the video, the color and texture and also the resolution of the frame. A multidimensional array of the feature codes and stored in a Video Index. These feature codes are integrated with the standard unique code assigned to the video to distinguish it with similar videos. There is an index maintained in the database which maps the multi-dimensional array of feature code to the exact video. During the retrieval time, the user query is scanned and a feature code is generated for the same using the same protocol of generating codes of a frame. This code's least significant data is matched with the least significant data of the codes on the index and the matched ones are filtered. And the matching is done right to left and large filtered in each comparison, finally the frame matching the exact features in the index is used to obtain the entire video using the standard unique code generated for each video. Hence the user is provided with similar results matching the contents. This proposed system would be efficient to save a lot of time and user can retrieve exact video from the database.*

Keywords- CBVR, Feature Extraction, Video Index, Video Retrieval, Segmentation key-frames, spatio-temporal algorithm, Linear Codes.

I. INTRODUCTION

Data retrieval is the challenging task revolving around the digital environment. Data can be retrieved from any database using many forms. They follow certain protocols to retrieve the data from the database. The data is represented in a structured way and there is no ambiguity in data. Data can be retrieved based on the queries provided by the user. The proposed papers related to upload an image to the database by matching the characteristics of the image and retrieve information about the image. Recent proposed system is mapping the coordinates of the uploaded video to the videos in the database to retrieve the video, but it leads more complexity and retrieval rate is higher. Since it needs to match the coordinate positions of the videos in the entire database the access rate is higher. To avoid this complexity, we proposed a new technique of retrieval of videos from the database using Image Key Frames.

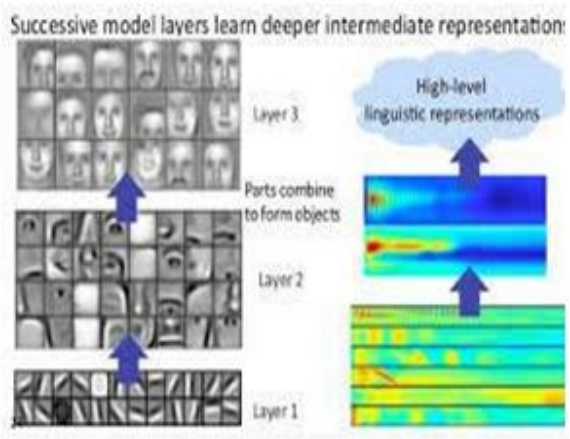
Module-1
Video Upload Strategy:

When the video is uploaded in the database it automatically generates a unique code for the video where the video is stored. The video contains a specific address which is stored in a multi-dimensional array in the database. The generated video code is stored in the form of a tree like structured and the root node contains the code generated for the video. The video contains many frames. For a second the video can run 12 frames at maximum based on the retrieval from the database. The video splits it into Frames stored in it and Code is generated for each frame in a Video clip. The code generated is in the form of Hexadecimal code and the code for each frame is created based on the characteristics such as space, time, color, background and vector positions in the frame. The characteristics differ in each frame based on the coordinate positions. This information is stored in multi-dimensional array for retrieval purposes. Code is consolidated and a new code for the frame is obtained and stored in the database like a child node for the root node. As the root node contains the information about where the video is located in the database.

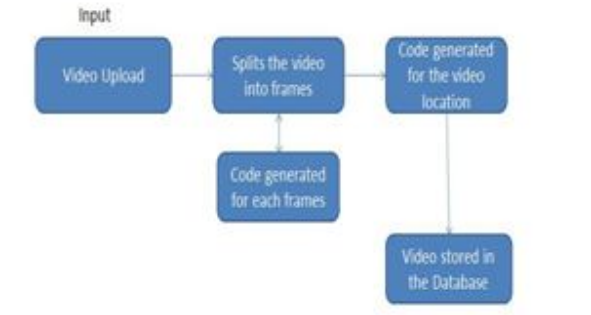
Routine to generate hexcode

1. Get the distinct frames of the video.

2. Figure out the different layers in it.
3. With the sorted out layers, a code is generated which represents the following. Temporal features: Motions, orientation, inter frame relationship. Special features: Color (RGB color model), shape, objects, text, spatial relationships. Each part being of 32 bits, hence we get an overall of 128 bits of code for one layer which corresponds to one row.
4. The next layers are also categorized as shown in the figure and the code for these are also generated according to the prescribed format. Which makes an multidimensional array of codes.
5. Integrate these codes to the standard unique code assigned to each video at the MSB. All frames of one video contain this unique code as common at the MSB for accuracy.

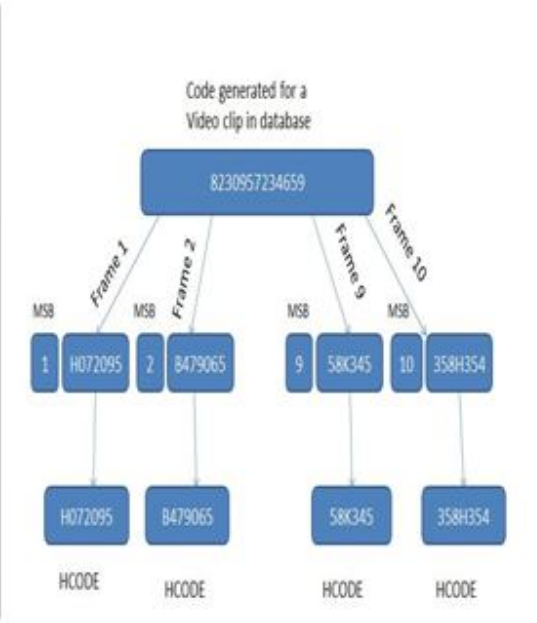


BLOCK DIAGRAM



MODULE-2
Video Indexing:

The data stored in the multi-dimensional array as an index. Indexing contains the information about each frame in a video clip stored in the database. It forms a tree structured data where the root node contains the code generated for the location of the video on the database, the child node contains the Hexadecimal code generated for each frame in a video clip. The code is generated based on color, texture and vector positions. Each frame in the video contains two parts in the child node like an IP address. MSB and HCODE part. The HCODE part contains the hexadecimal code generated based on the characteristics of the frame in a video clip. The MSB part contains the number of the frame in a video clip. In this technique each frame in a video clip is divided into frames. For example, if a video contains 100 frames then the MSB starts from Frame 1 to Frame 100. Then the leaf node in the tree structure contains only the HCODE part and this is the actual hexadecimal code generated for the frame in the video clip in the form of code to Key Frames.



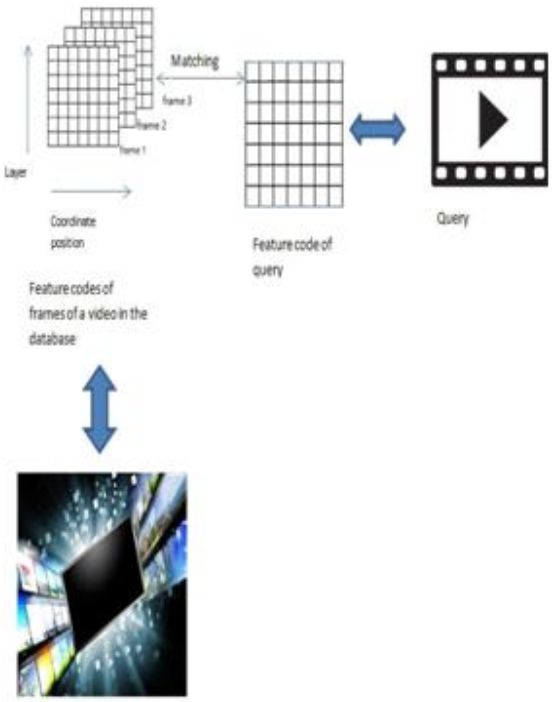
Module 3:
Retrieval strategy:

Once the video is being uploaded to the database with the above proposed technique, it's all about how it is retrieved. The proposal is on how to get a video from the database with an image or a small video clip (sequence of frames) as the query. It is proposed that the algorithm to convert the multimedia data in the form of hexadecimal code is applied on the query too. On giving a query in the form a multimedia content, the 'hexcode' algorithm is introduced to convert the same into a multidimensional hexadecimal code. This generated code is then compared with the codes in the index of videos present in the database. The comparison is done from right to left such that first the least significant bit of the code is only compared, which filters out many of the frames in the index. And the comparison progresses in the same way

towards the most significant bit, each time the number of comparisons being reduced. Once all the bits are compared, the matched frames of the videos are identified and the whole video is retrieved by mapping onto the corresponding video.

II. CONCLUSION

The retrieval of multimedia content using multimedia data as query requires a lot of systematic approach. Features were represented as vectors and they were extracted and matched through Fuzzy Logics and lot of other formulas being proposed.



Still there lacks an efficient search process which reduces the mining time. The proposed system solves the problem though, it is way too complex. Future works needs to simplify the process of content based video retrieval and also efficiently.

REFERENCES

[1] Mohd. Aasif Ansari and Dr. Hemlata Vasishtha,“Enhanced Video Retrieval and Classification of VideoDatabase Using Multiple Frames Based on Texture Information”

[2] Weiming Hu, Nianhua Xie, Li Li, Xianglin Zeng, Maybank S., "A Survey on Visual Content-Based Video Indexing and Retrieval",IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews), 41-6,797-819, 11/2011

[3] Liang-Hua Chen, Kuo-Hao Chin, Hong-YuanLiao, "An integrated approach to video retrieval", Proceedings of the nineteenth conference on Australasian da tabase-Volume 75, 49–55, 2008

[4] B V Patel, B B Meshram, "Content Based Video Retrieval Systems", International Journal of UbiComp, vol 3, No. 2, pg 13-30, 2012

[5] Yining Deng, B.S. Manjunath, "Content-based Search of Video Using Color, Texture, and Motion", IEEE, pg 534-537, 1997

[6] Ja-Hwung Su, Yu-Ting Huang, Hsin-Ho Yeh, Vincent S. Tseng , "Expert Systems with Applications", 37, pg 5068-5085, 2010

[7] Nicu Sebe, Michael S. Lew, Arnold W.M. Smeulders, "Video retrieval and summarization", Computer Vision and Image Understanding, vol. 92, no. 2-3, pg 141-146, 2003

[8] C.V.Jawahar, Balakrishna Chennupati, Balamanohar Paluri, Nataraj Jammalamadaka, "Video Retrieval Based on Textual Queries", Proceedings of the Thirteenth InternationalConference on Advanced Computing and Communications, Coimbatore, Citeseer,