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Enhancing Video Abstraction Technique using Fuzzy Rule based Classifier

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Abstract: ***Data mining is the process of identifying useful thing from large amount of data. These identified data are useful to business analyst to take a business decision. Video mining is the process of finding interesting data from large amount of video. It is important to categories video based on features such as frame, sound, frame-rate, resolution. In existing technique, only images are extracted from video that provide summary of video. In proposed technique, fuzzy classifier is used to classify all the frames of video and these frames are combined into one or multiple videos. Finally one video or number of small videos provide summary of the whole video.***

Keywords: Data mining, Video mining ,Video Shot ,Video Pattern, Video extraction, Video Association mining.

I. INTRODUCTION

Data mining is the process which is used for extracting the knowledge and detecting the interesting pattern from the large amount sets of data. Multimedia data which contains large amount of data. Video data contains different types of data such as the text, video and audio.

Video is the an example of the multimedia data as it contains different types of data such as audio, image, text, meta-data and it is used mostly in many potential applications like medicine, education, programs, sports, security, and surveillance.

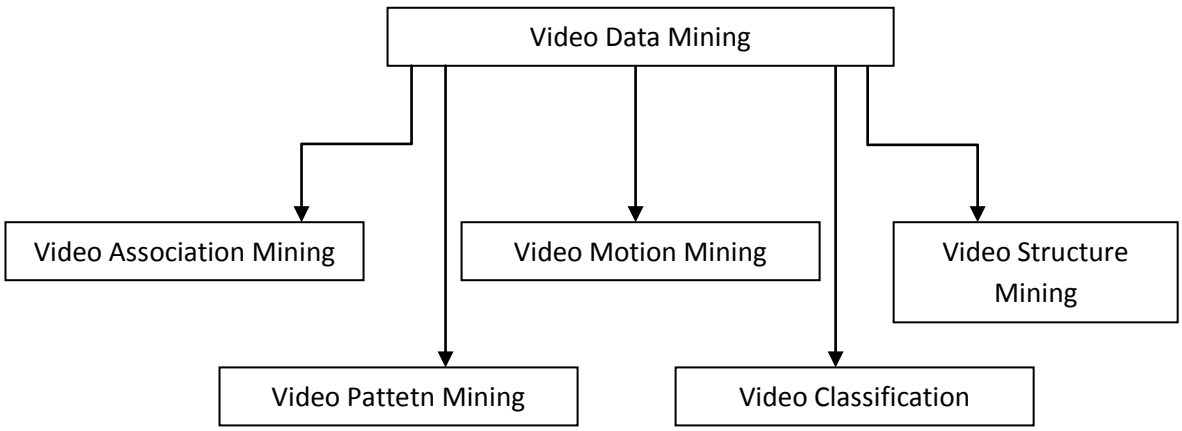

Figure 1 Various approaches for video data mining

A. Video Association Mining

Video association mining is the process which is used to show the association between the videos.

B. Video Motion Mining

Video motion mining is the process which is used for the find the various motions from video and identify useful events.

C. Video Structure Mining

Video structure mining is the process which is used to identify the objects in the video.

D. Video Pattern Mining

Video pattern mining is the process which is used for the finding the pattern form the video and those pattern are useful for finding the same pattern in the other video such as the same event.

E. Video Clustering and Classification

Video clustering and classification is the process which is used for the cluster and classify various types of videos to improve the brows ability of video.

Video is an example of multimedia data as it contains several kinds of data such as text, image, meta-data, visual and audio and it is widely used in many major potential applications like security and surveillance, entertainment, medicine, education programs and sports [3]. With the development of the Digital Video Processing technology, Video Surveillance has been playing an important role for security and management and it is necessary and important to allow the computer to automatically extract the parts of interest from videos [3]. Video abstraction techniques as an important way to organize video datasets into more condensed forms or extract compact semantically meaningful information for video browsing, retrieval, event detection and genre classification have gained lots of attentions [3].

II. Related Work

Multimodal temporal panorama (MTP) approach is used to accurately extracting and reconstructing moving vehicles in real-time using a remote multimodal (audio/video) monitoring system [9] and object is classified in various categories [10]. Object such as person is detected by automatic training image acquisition and effective feature selection [11] and boundary between video is detected by motion activity descriptor [12].

Fuzzy c-mean [13] and genetic algorithm [14] is used to classifying text and image segmentation method. Event in video is detected by knowledge-based video indexing and content management framework for domain specific videos based upon association rule [15]. Soccer Video is mined by decision tree using fuzzy event mining approach [16] and also by using machine learning [17]. Video is summarized by matching low-level user browsing preferences [18]. It is useful for visualizing social data [19] and fraud in data is detected by off-line and semi-online mode [20].

III. Fuzzy Ruled based Classifier and Support Vector Machine (SVM)

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. The main intention of it is to create an efficient method to find multi keyframe from video by using fuzzy classifier. Fuzzy rule based classifier [16] is used to classify all the frame of video into relevant classes. Fuzzy rule based classifier is explained in [16]. From this classifier, it provides a better and faster correlation map of videos. Mainly number of event, precious is important in this method. Support vector machine require a lot of data and use for discontinuous data. Essential keyframe are further generated for abstraction using rough set, and the event-centered correlation maps are presented to serially assemble multi-keyframe along time line, to facilitate easy browsing of video datasets [2].A support vector machine is a technique which is based to machine learning and it is used to classify frames of video but this technique is very slower to classify image. It requires a summary of video into various classes.

IV. IMPLEMENTATION METHODOLOGY

We implement addition of Fuzzy ruled basedC-Classifiers for creating better and faster correlation maps. SVM (Support VectorMachine) Technique is used for Machine Learning, but this technique for classification can be slowerand using Fuzzy CClassifier,a dual layered correlation map can be created, where-in a basic correlation can blaid down by Fuzzy Classifier and then a C-Means Clustering technique can be used for faster and relevant key-frame abstraction.This system is identifying keyframes from video. It takes all frames of video and classify into various number of classes.Classification a technique is a rule based techniques to classify frames.We use a color an entropy parameter to create classes. Final result will generate set of keyframe that provide a summary ofvideo.

Main steps in the proposed algorithm

1. Abstracting random frames from a video.
2. Processing of the frame based upon color histogram, motion detection, and profiling and segmentation methods like motion activity descriptor was applied for different video sequence to detect breaks in videos, and shot boundary detection.
3. Dynamic and essential keyframes sorting.
4. Keyframe importance computation.
5. Creating database for the variations in key-components. For example roads, parks, ocean view etc.
6. Adding Fuzzy C-Classifier Techniques to the keyframes.
7. After classified key frame then combime for the video.
8. For the multiple video combined the generate the final vide which is providing the summary of original video.
9. Result comparison.

V. EXPERIMENTAL RESULTS

Dataset Format

We take a video of any format and generate a database that contains information about video frames. A frame contains information like as frame number, red value, blue value, green value, mean of rgb, entropy, class number and etc. In this technique, I have taken a one rhinos.avi video of 7 second and generate a summary of video in a form of keyframe.

Method Details

Matlab

Matlab is commercial software developed by Math works Inc. It is an interactive software package for scientific and engineering numeric computation [Inc90]. Matlab has several basic routines which do matrix arithmetic, plotting etc.

Need for Matlab

Matlab is already in use in many institutions. It is used in research in academia and industry. Prototype solutions are usually obtained faster in Matlab than solving a, problem from a programming language. Matlab is fast, because the core routines in Matlab are fine tuned for different computer architectures. Following test was made to compare the speed between Matlab and a program written in C. Since the back propagation algorithm involves Matrix manipulations the test chosen was matrix multiply. As the next section shows, Matlab was about 2.5 times faster than a C programming both doing a matrix multiplication. MATLAB is a high-performance language for technical computing. It integrates Computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Typical uses include the following:

• Math and computation

• Algorithm development

• Data acquisition

• Modeling, simulation, and prototyping

• Data analysis, exploration, and visualization

• Scientific and engineering graphics

• Application development, including graphical user interface building

VIDEOREADER() This method read a video data from file and return a object of video

IMWRITE() Write image to graphics file.

medfilt2() It performs median filtering of the matrix in two dimensions..

Entropy() It calculate the intensity of image

Xlswrite() It write a contains to excel file that will become our database.

Results

1. **Abstract all the frames rom video**

Input : One video

Output : All frames of video

Calculate the features of video such as height, video, format, no. of frames, frame's height and width

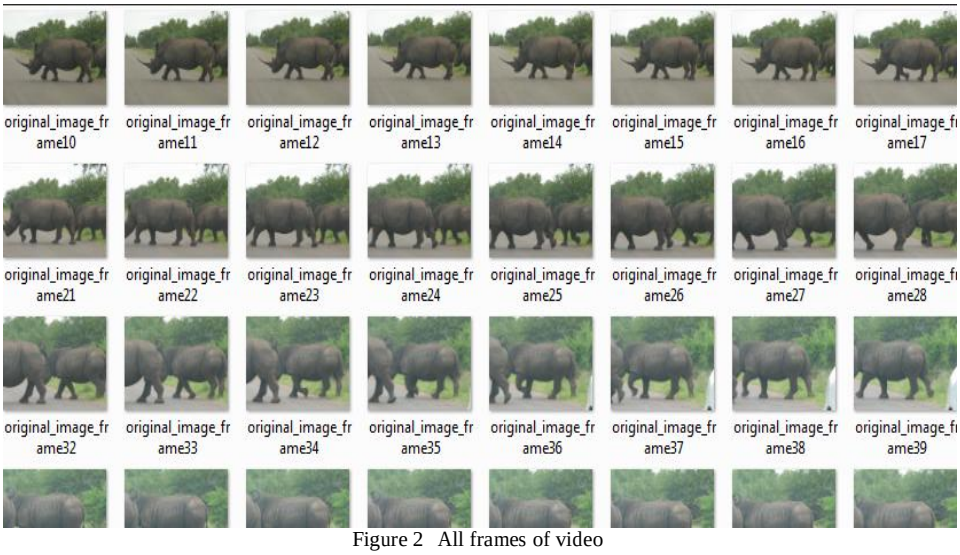

Figure 2 All frames of video

2. **Preprocessing of video**
   - In the first step of data mining, preprocessing is very useful to process our data before implementation.
   - It is very useful to get accurate result and good output.
   - Some video are not corrected and contains error information.
   - Correct video orientation & Filtering of video
   - Take a matrix of images and check orientation by using FLIPUD(Flip up/down) direction
   - Median Filtering for Noise Removal
   - MEDFILT2 (2D) performs median filtering of the matrix using the default 3-by-3 neighborhood for each R,B & G.

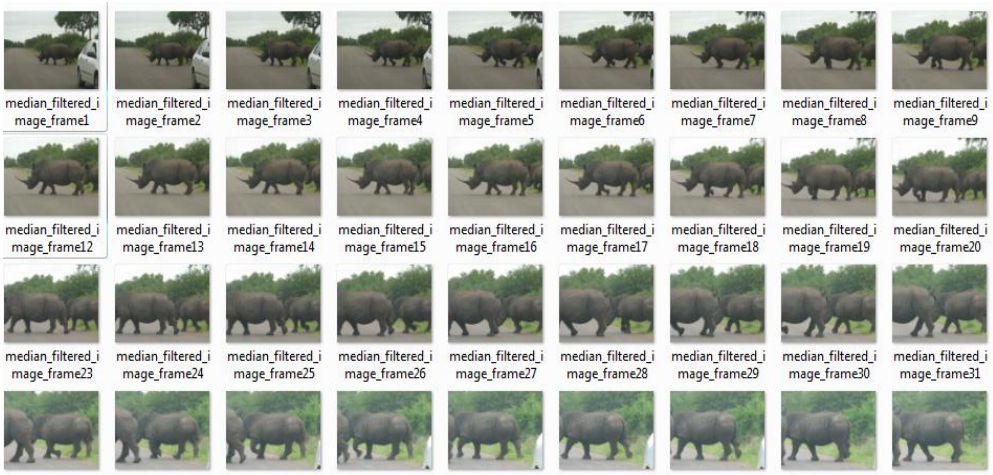

Figure 3 All filtered frames of video

3. Image Color Component Analysis

- Find a mean value of Red
- Find a mean value of Green
- Find a mean value of Blue
- MEAN() is a row vector containing the mean value of each column
- Furthermore mean used for taking mean of row vector equal to one mean of color per image.
- This final mean give a majority of color in a frame
- This procedure is also repeated for red, green and blue color
- Entropy of frame is also calculated

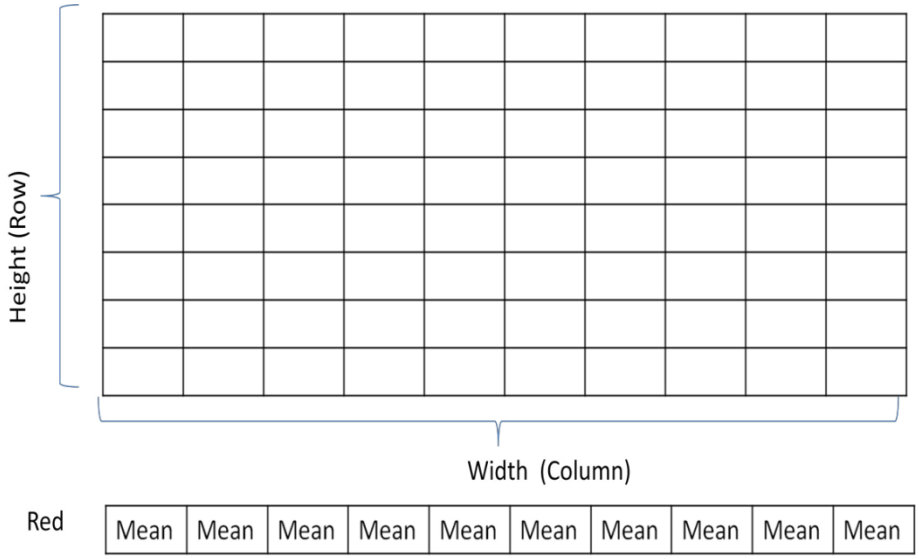

Figure 4 Frame Importance Calculation

4. Fuzzy Rules:-

Image is made by 3 color which are red, green and blue. So We create a 3 type of fuzzy rules that based on color of frames. We also consider of entropy of each frames of video.

Create a fuzzy rule:-

1) If color dominance is Red Then put in fuzzy set ‘R’

2) Else If color dominance is Green Then put in fuzzy set ‘G’

3) Else color dominance is Blue Then put in fuzzy set ‘B’

Based on fuzzy rule, Create a database for R,G,B set and store color dominance for each frame of video. This dominance give a major color of frames in video.

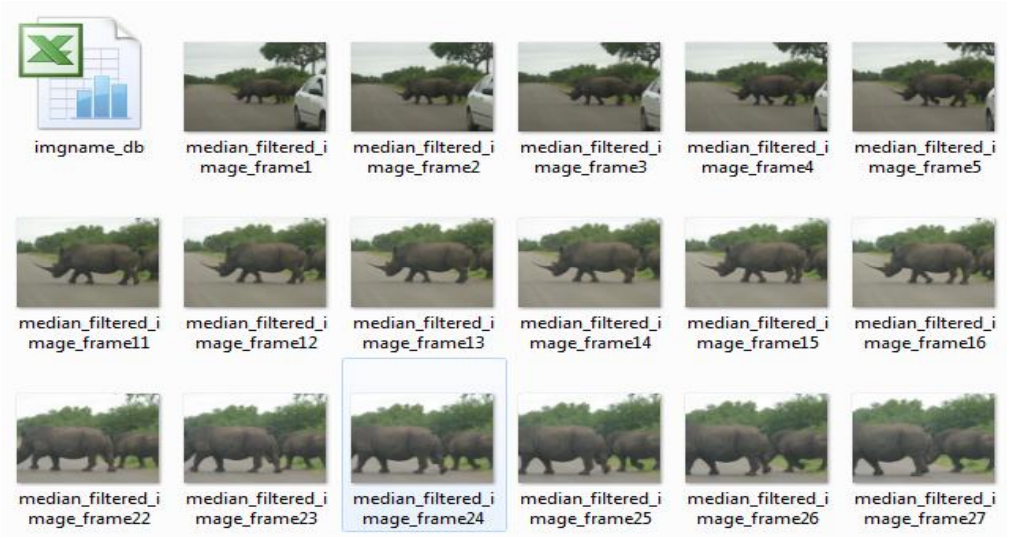

Figure 5 Database for all frames of video

5. Database

E:\123\rhinos_frame1.jpeg	123.5715	126.9142	115.6312	g	122.0389	5
E:\123\rhinos_frame2.jpeg	122.0097	125.2119	113.435	g	120.2189	5
E:\123\rhinos_frame3.jpeg	121.3983	124.3689	111.988	g	119.2517	5
E:\123\rhinos_frame4.jpeg	121.5419	124.1217	111.5545	g	119.0727	5
E:\123\rhinos_frame5.jpeg	121.3556	123.7804	110.9406	g	118.6922	5
E:\123\rhinos_frame6.jpeg	123.368	125.6869	112.5148	g	120.5232	5
E:\123\rhinos_frame7.jpeg	125.4559	127.4307	114.0116	g	122.2994	5
E:\123\rhinos_frame8.jpeg	126.6239	128.4988	114.7576	g	123.2935	5
E:\123\rhinos_frame9.jpeg	125.2995	127.2584	112.8416	g	121.7999	5
E:\123\rhinos_frame10.jpeg	124.2273	125.9636	111.6518	g	120.6142	5
E:\123\rhinos_frame11.jpeg	127.0744	128.8532	114.2673	g	123.3983	5
E:\123\rhinos_frame12.jpeg	129.7681	131.2218	116.4776	g	125.8225	5
E:\123\rhinos_frame13.jpeg	131.495	132.8451	117.8767	g	127.4056	6
E:\123\rhinos_frame14.jpeg	134.6882	135.8542	121.1856	g	130.576	6
E:\123\rhinos_frame15.jpeg	135.8837	137.2438	123.557	g	132.2282	6
E:\123\rhinos_frame16.jpeg	138.779	140.0913	126.4932	g	135.1212	6
E:\123\rhinos_frame17.jpeg	140.1897	141.4553	129.0762	g	136.9071	6
E:\123\rhinos_frame18.jpeg	141.4677	143.0333	130.2824	g	138.2611	7

Figure 6 All fields of database for each frame of video

6. Classification of all the frames

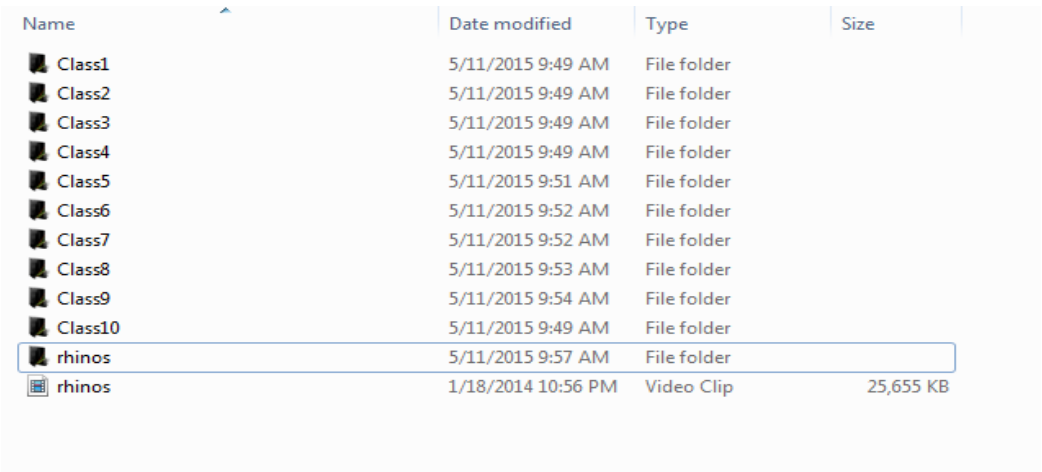

Figure 7 All classes of frame

7. Keyframe directory

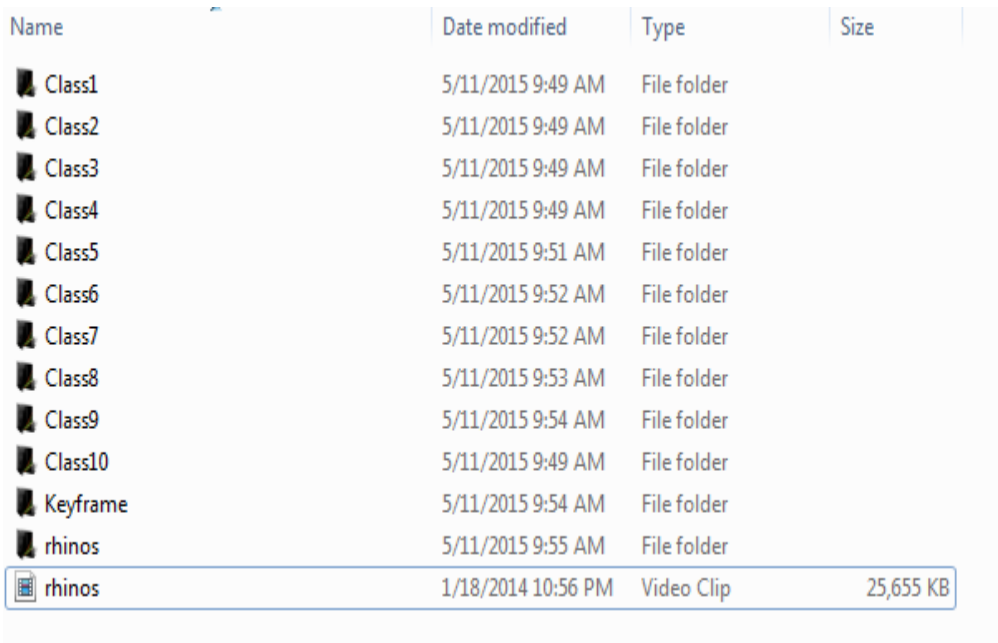

Figure 8 Keyframe directory

8. Keyframes of video

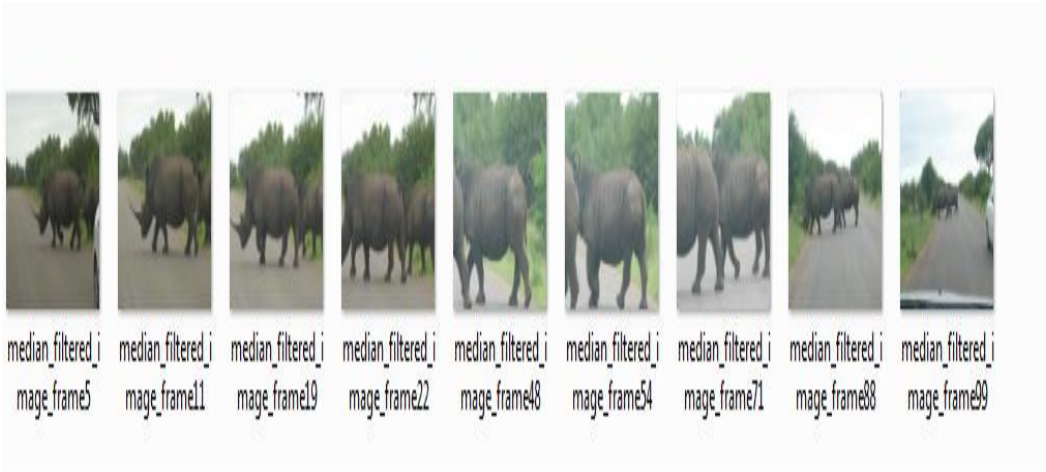

Figure 9 Keyframes of video

9. Final Video

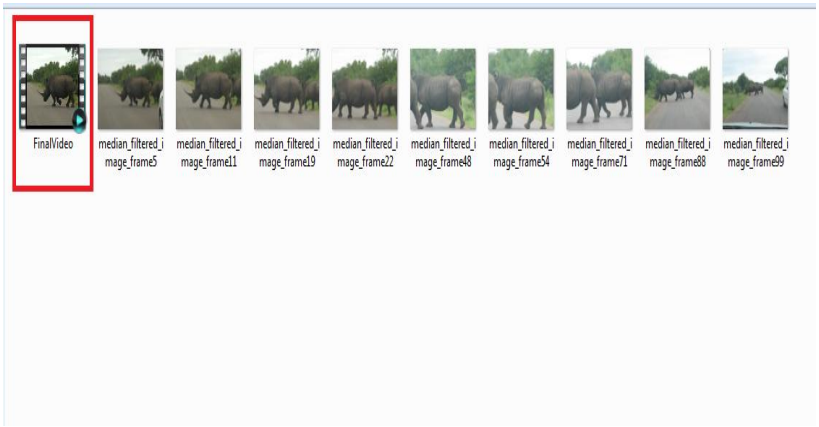

Figure 10 Generation of final video

VI. CONCLUSION

Keyframe abstraction is useful for summarization of video. Fuzzy classifier is very effective technique to classify all the keyframes of video into various classes and it is better than support vector machine to classify keyframes. All classes gives a summary of video in a form of keyframe. These keyframe gives summary of video that require less time and

space.We will generate a short video from each class that are generated from video and compare to support vector machine. We will also get a keyframe from each class of video.and generate the final video from the keyframe.

VII. Future Enhancement

This paper is work for the single video.in future its works for the multiple video.and generate the video. This video gives the summary of the multiple video.other is the gives the summary of the large video.

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