



A Case Study of Key frame Extraction Techniques

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ABSTRACT: This paper is a case study of different keyframe extraction techniques where different algorithm and method are used we studied and analysis each paper with their method and process of an algorithm and find advantages, disadvantages and application in the area of key extraction. This paper helps to improve the chosen the best method for key extraction. key extraction is also a part of video summarization techniques.

KEYWORDS: Video, Video Sequence, Group of Picture(GOP), Frame, Histogram, wavelet statistics, Scene/Shot Boundary Detection(SCD), Video Retrieval, video indexing, browsing and retrieval. False Detection, Detection Rate, SCD, Recall & Precision, PSNR, Macroblocks.

I.INTRODUCTION

The video is most important multimedia. It is a combination of frames that is called GOP(groups of pictures). The GOP is sequential arrangement of frames or pictures. Video summarization is a process in which the key frames are arrange to show the complete video. The key frame extraction is important technique for video summarization. there are different techniques for extraction algorithms such as scene detection, shot detection, edge detection, Histogram detection. When a video scenes are changed this changing frame of scene are extracted by algorithms and process as showing key frame of video for complete summarization of video. Reviews of different literatures are as following method of temporal summarization of digital video[20].Multimedia data gets larger day by day with the extensive usage of digital technology that becomes inexpensive and popular. [18]

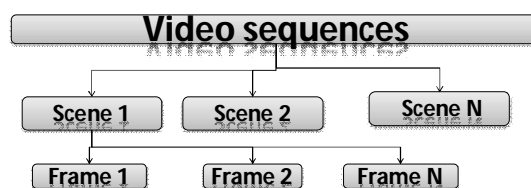


figure1: video sequence[19]

- A. **Scene** :-A scene is a logical grouping of shots into a semantic unit[18].
- B. **Shot** :-A shot is a sequence of frames captured by a single camera in a single continuous action. A shot boundary is the transition between two shots[18].
- C. **Frame**:- A digital video consists of frames that are a single frame consists of pixel[18].
- D. **Precision and Recall** :-"**Precision**" defines how reliable the detected by the algorithm is while "**Recall**" defines the overall performance of the algorithm [18].



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- E. **PSNR** :Peak signal-to-noise ratio is the important parameter of scene change detection algorithm, efficient SCD algorithm having the value of PSNR greater than 35. [18]
- F. **Video Detection process**
 - a) **Color Histograms.** frame-to-frame similarities based on colors which appeared within them and positions of those colors in the frame. After computing the inter-frame similarities, a threshold can be used to indicate shot boundaries.
 - b) **Edge Detection:** Edge Detection is based on detecting edges in two neighboring images and comparing these images .
 - c) **Macroblocks:** Besides, they investigated the shot boundary detection using macroblocks. Depending on the types of the macroblock the MPEG pictures have different attributes corresponding to the macroblock. Macroblock types can be divided into forward prediction, backward prediction or no prediction at all. The classification of different blocks happens while encoding the video file based on the motion estimation and efficiency of the encoding. If a frame contains backward predicted blocks and suddenly does not have any, it could mean that the following frame has changed drastically which would point to a cut. This approach, however, becomes difficult to implement when there is a shot change, and the frame in the next shot contains similar blocks as the frame before[19]..

II. SURVEY FROM DIFFERENT RESEARCH

Xinding Sun et al. proposed a new method of temporal summarization of digital video. First, we address the problem of extracting a fixed number of representative frames to summarize a given digital video. To solve it, we have devised an algorithm called content-based adaptive clustering (CBAC). In our algorithm, shot boundary detection is not needed. Video frames are treated as points in the multi-dimensional feature space corresponding to a low-level feature such as color, motion, shape and texture. The changes of their distances are compared globally for extraction of representative frames. Second, we address how to use the representative frames to comprise representative sequences (R-Sequence) which can be used for temporal summarization of video. A video player based on our devised algorithm is developed which has functions of content-based browsing and content-based video summary. Experiments are also shown in the paper[1].

Tianming Liu et al. presented that The key frame is a simple yet effective form of summarizing a long video sequence. The number of key frames used to abstract a shot should be compliant to visual content complexity within the shot and the placement of key frames should represent most salient visual content. Motion is the more salient feature in presenting actions or events in video and, thus, should be the feature to determine key frames. In this paper, we propose a triangle model of perceived motion energy (PME) to model motion patterns in video and a scheme to extract key frames based on this model. The frames at the turning point of the motion acceleration and motion deceleration are selected as key frames. The key-frame selection process is threshold free and fast and the extracted key frames are representative .In this paper, they have presented a novel key-frame-extraction approach that combines motion-based temporal segmentation and color-based shot detection. The turning point of motion acceleration and deceleration of each motion pattern is selected as a key frame. If a shot is static, the first frame of the video shot is selected as a key frame. With this approach, both the number of key frames and the location of the key frames in a given video are determined automatically by the perceived motion patterns of the video. The proposed approach is threshold free and also fast since motion information in MPEG video can be directly utilized in the motion analysis. Our future work to improve the proposed algorithm includes the integration of color-change analysis and audio cues[2].

Guozhu Liu et al. proposed a method that in order to extract valid information from video, process video data efficiently, and reduce the transfer stress of network, more and more attention is being paid to the video processing technology. The amount of data in video processing is significantly reduced by using video segmentation and keyframe extraction. So, these two technologies have gradually become the focus of research. With the features of MPEG compressed video stream, a new method is presented for extracting key frames. Firstly, an improved histogram matching method is used for video segmentation. Secondly, the key frames are extracted utilizing the features of I-frame, P-frame and B-frame for each sub-lens. Fidelity and compression ratio are used to measure the validity of the method. Experimental results show that the extracted key frames can summarize the salient content of the video and the method is of good feasibility, high efficiency, and high robustness. they have proposed a new algorithm for key frame



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extraction. It compensates for the shortcomings of other algorithm and improves the techniques of key frame extraction based on MPEG video stream. The experimental results show that good fidelity and compression ratio can be achieved. It is not only of good feasibility, high efficiency, but also with low error and high robustness[5].

dolley shukla et& al. presented a paper that number of automated scene change detection methods for indexing a video sequence to facilitate browsing and retrieval have been proposed in recent years. Scene change detection plays an important role in a number of video applications, including video indexing, semantic features extraction, multimedia information systems, Video on demand (VOD), digital TV, online processing(networking) neural network mobile applications services and technologies, cryptography, and in watermarking. for copy protection watermarking is an important technique. Recent advances in technology have made tremendous amount of multimedia content available. The amount of video is increasing, due to which the systems that improve the access to the video is needed. A current research topic on video includes video abstraction or summarization, video classification, video annotation and content based video retrieval. In all these applications one needs to identify shot and key frames in video which will correctly and briefly indicates the contents of video.[18].

dolley shukla et& al. presented a paper that A various number of Scene Change Detection (SCD) methods are proposed in recent years. Today's research topic on video is video summarization or abstraction, video classification, video annotation and content based video retrieval. Applications of scene change detection are video indexing, semantic features extraction, multimedia information systems, Video on demand (VOD), digital TV, online processing (networking) neural network mobile application services and technologies, cryptography, and in watermarking. Therefore, in this paper we provide block processing scene change detection techniques & algorithms[19].

dolley shukla et& al. presented a paper that Video is play an important role in social networking site such as Facebook, Whatsaap as well as its play a greater role in marketing world for advertisement of the product and promotion of the films. Discovering the features of the Video, it has huge amount of information that's way processing time of the video is large and maximize the cost of computation. Minimizing the processing time and cost one of the way is video summarization. The useless information of the video is reduced by using key frame extraction method. key frames are represent as whole video called as video summarization. Today's research topic on video includes video abstraction or summarization, video classification, content based video retrieval and video annotation. this paper carries out video summarization using key frame extraction Techniques along with advantages, disadvantages and applications[20].

Chandra Shekhar Mithlesh et & al. presented this paper said that The video is electronic Media for broadcasting, watching, recording, advertising, sharing and displaying visible effect. A key component of the video is Image; the standard term for the image is the frame. A powerful application of video is indexing, summarization, browsing, online video database analysis these all need for converting the video into a number of the frame. This paper has given a technique for the video to frame extraction with the help of MATLAB platform. This project help today's demand like social media (WhatsApp and facebook), video lecture distribution, and surveillance systemAll experiment of different video and same video sequence with different file format analyze that Size of the video sequence depend on the number of the frame in the video. More size more number of the frame be calculated so that execution time be slower and take some time to display a result of frame extraction. Commonly use the video sequence height to width ratio is 720x 1280. Same video sequence but different file format (MP3, AVI, 3GP, MKV) have different video size (Kb). 3GP format is taken less execution time because of frame rate, a number of frame and height to width ratio is less compared to another file format. this paper helpful in Key frame extraction, and the key to key frame extraction. Video frame extraction is helped in the surveillance system security system, change detection system, video summarization, indexing, online video processing etc[21].



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III.CLASSIFICTION, ADVANTAGES AND DISADVANTAGES OF TECHNIQUES

TABLE I. TABULAR FORM OF DIFFERENT VIDEO SUMMARIZATION ALGORITHMS

S.N	TITLE	AUTHOR, PUBLICATION, PAGES, VOLUME NO, ISSUE NO YEAR	AREA/ APPLICATION	METHODOLOGY USED	DESCRIPTION	
					ADVANTAGES	LIMITATION
1	Video Summarization Using R-Sequences	Xinding Sun and Mohan S.Kankanhalli, Real-Time Imaging, 6, 449-459, 2000	Summarization Of Digital Video	Content-Based Adaptive Clustering (CBAC)	<ul style="list-style-type: none"> Maintain a good segmentation result In this algorithm, shot boundary detection is not needed 	<ul style="list-style-type: none"> Not suitable for content-based browsing
2	A Novel Video Key-Frame-Extraction Algorithm Based On Perceived Motion Energy Model	Tianming Liu, Hong-Jiang Zhang, And Feihu Qi, Ieee,Transactions On Circuits And Systems For Video Technology, Vol. 13, No. 10, October 2003	Summarizing A Long Video Sequence	A Triangle Model Of Perceived Motion Energy (PME) To Model Motion Patterns In Video	<ul style="list-style-type: none"> Proposed approach is threshold free Fast since motion information in mpeg video can be directly utilized in the motion analysis. 	-----
3	A Novel Approach Towards Key frame Selection for Video Summarization	Chitra A. Dhawale and Sanjeev Jain, Asian Journal of Information Technology 7 (4): 133-137, 2008 Medwell Journals, 2008	The method has been tested on various video sequences like news programs, sports, academic etc.	the improved algorithm for Histogram Based approach	<ul style="list-style-type: none"> This method gives better result in much less time and memory 	- -----
4	An Algorithm For Shot Boundary Detection And Key Frame Extraction Using Histogram Difference	Ganesh. I. Rathod And ,Dipali. A. Nikam, International Journal Of Emerging Technology And Advanced Engineering 2008, Volume 3, Issue 8, August 2013	Video Indexing, Browsing, And Retrieval.	Square Histogram Based Model	<ul style="list-style-type: none"> An efficiency of almost 95% to 98% 	<ul style="list-style-type: none"> The limitation of the present work is on tool used, as it has certain constraint related to memory
5	Key Frame Extraction From MPEG Video Stream	Guozhu Liu, And Junming Zhao, Proceedings Of The Second Symposium International Computer Science And Computational Technology (ISC SCT '09) Huangshan, P. R. China, 26-28,Dec. 2009, PP. 007-011	Video Processing Technology	TWO Steps In This Algorithm firstly, Improved Histogram Matching Method Is Used For Video Segmentation Secondly, The Key Frames Are Extracted Utilizing The Features Of I-Frame, P-Frame And B-Frame For Each Sub-Lens.	<ul style="list-style-type: none"> Good Feasibility, High Efficiency, Low Error High Robustness 	- -----



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6	Dominant Audio Energy Based Key Frame Extraction For Sports Video Summarization	Sudhir S. Kanade And Pradeep M. Patil, International Conference On Advancements In Electronics And Power Engineering (ICAEPE'2011) Bangkok Dec., 2011 PP 75-77	Sports Video Summarization	Dominant Audio Energy Based Key Frame Extraction	<ul style="list-style-type: none"> Proved To Be A Practicable For Video Summarization 	<ul style="list-style-type: none"> Application Range Of This Method Is Narrow
7	Weighting Low Level Frame Difference Features For Key	Naveed Ejaz And Sung Wook Baik,	Video Summarization	The Frame Difference Between Consecutive	<ul style="list-style-type: none"> A simple and effective 	<ul style="list-style-type: none"> In future adding more visual
	Frame Extraction Using Fuzzy Comprehensive Evaluation And Indirect Feedback Relevance Mechanism	International Journal Of The Physical Sciences Vol. 6(14), Pp. 3377-3388, 18 July, 2011		Frames.	<ul style="list-style-type: none"> Better Results as compared to some of the other techniques 	features apart form used
8	Dynamic Threshold in Clip Analysis and Retrieval	Satishkumar L Varma and Sanjay N Talbar, International Journal of Image Processing (IJIP), Volume (5) : Issue (4) : 2011	Clip Analysis	Statistics Of Comparison Between The Successive Frames	<ul style="list-style-type: none"> Entropy features are better than the color features results. 	-----
9	Dominant Color Based Extraction Of Key Frames For Sports Video Summarization	Sudhir S. Kanade And P. M. Patil , International Journal Of Advances In Engineering & Technology, Vol. 6, Issue 1, Pp. 504-512 Mar. 2013	Sports Video Summarization	Dominant Color Based Extraction Of Key Frames For Sports Video Summarization	<ul style="list-style-type: none"> Robust and effective Fast browsing, retrieving and video summarization 	<ul style="list-style-type: none"> Same framework is applied for other sports video shots, need to do adjustments in the parameter values such as thresholding of hue values
10	Key Frame Extraction for Video Summarization Using DWT Wavelet Statistics	Khin Thandar Tint, Dr. Kyi Soe, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, No 5, pp 1829-1833, May 2013	video summarization, feature extraction	key frames extraction using wavelet statistics	<ul style="list-style-type: none"> processing speed of the system was relatively fast 	<ul style="list-style-type: none"> future works will needed feature extraction and pattern recognitions from a video
11	Analysis And Verification Of Video Summarization Using Shot Boundary Detection	Sowmya R , Dr.Rajashree Shettar, American International Journal Of Research In Science, Technology, Engineering & Mathematics, 3(1), June-August, 2013, Pp. 82-86	Video Retrieval	Shot Boundary Detection Algorithms	<ul style="list-style-type: none"> In Histogram Based Method Of SBD, The Performance Increases With Respect To The Increase In The Block Size. 	<ul style="list-style-type: none"> In Case Of Euclidean Distance Based, The Performance Remains The Same Irrespective Of Block Size.
12	Key frame extraction using color histogram method.	Miss.A.V.Kumthekar, Prof.Mrs.J.K.Patil ,International Journal of Scientific Research Engineering & Technology (IJSRET) Volume 2 Issue 4 pp 207-214 July 2013	video summarization for video indexing, browsing and retrieval.	key frame extraction based on color histogram and edge detection	<ul style="list-style-type: none"> computationally simple and dynamically satisfactorily represent the content of video efficiency The compression ratio is 98%. 	-----



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13	Visual Attention Based Extraction Of Semantic Keyframes	Irfan Mehmood, Muhammad Sajjad, Sung Wook Baik, Advances In Information Science And Applications, Vol No 1, Pp181-186, 2014	Video Indexing, Browsing And Retrieval	Visual Saliency Model	<ul style="list-style-type: none"> • Low-level features and high-level information • The proposed technique successfully extracts 	<ul style="list-style-type: none"> • More work is required for audio features to create video skimming to provide more attractive
14	Video Key Frame Extraction for Recognising Hand Drawn Human Face	T. Judes Divya and A. Rama, Middle-East Journal of Scientific Research 20 (4): 537-541, 2014	Face Recognition	Principle Component Analysis (PCA) algorithm	the forensic department and criminal investigations. facial authentication criminal investigations, human visual perception and face biometrics	
15	Video Summarization Using Higher Order Color Moments	Mrs.Poonam S. Jadhav, Prof. Dipti S. Jadhva, International Conference On Advanced Computing Technologies And Applications (ICACTA-2015) Published By Elsevier B.V, Procedia Computer Science 45 (2015) 275 – 281	Video Summarization	Image - Block Based Technique	<ul style="list-style-type: none"> • Successfully detects the shot boundary • key frames Best captures the shot boundary detection give best results on high quality videos having less wipes effects 	<ul style="list-style-type: none"> • Not tested on different genres of videos (cartoons, sports, Tv-shows, talk-show) • Enhanced is required for video skimming
16	Design Of A Video Summarization Scheme In The Wavelet Domain Using Statistical Feature Extraction	J. Kavitha, Dr. P. Arockia Jansi Rani, I.J. Image, Graphics And Signal Processing MECS Vol No 4, Pp 60-67, Year 2015	Marine Research	Wavelet Domain Using Statistical Feature Extraction	<ul style="list-style-type: none"> • Effectively detects even the movement Detect even fast moving animals efficiently 	<ul style="list-style-type: none"> • Not specific events detection method • Video processing time larger then decimation techniques

IV.CONCLUSION

The above survey of various researchers of different algorithms of Video summarization Techniques shows that Image - **Block Based** Technique Successfully detects the shot boundary key frames Best captures the shot boundary detection give best results on high quality videos having less wipes effects but Not tested on different genres of videos (cartoons, sports, TV-shows, talk-show)Enhanced is required for video skimming.

Dominant Audio **Energy Based** Key Frame Extraction-Proved To Be A Practicable For Video Summarization but Application Range Of This Method Is Narrow. Square **Histogram Based Model** - An efficiency of almost 95% to 98% but The limitation of the present work is on tool used, as it has certain constraint related to memory. Content-Based Adaptive **Clustering** (CBAC)- Maintain a good segmentation result In this algorithm, shot boundary detection is not needed but Not suitable for content-based browsing.

The **Wavelet Domain** Using Statistical-Feature Extraction technique Effectively detects even the movement Detect even fast moving animals efficiently but Video processing time larger then decimation techniques. Key frames extraction using wavelet statistics- processing speed of the system was relatively fast but future works will needed feature extraction and pattern recognitions from a video.



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For a considerably good quality of video summarization algorithm are threshold free, application range is wide, low error, high robustness, good feasibility, less wipe effect, efficiency > 98%. and compression ratio >98%.

REFERENCES

- [1] Xinding Sun and Mohan S.Kankanhalli, "Video Summarization Using R-Sequences" Real-Time Imaging vol.,6, pp. 449-459, 2000.
- [2] Tianming Liu, Hong-Jiang Zhang, And Feihu Qi, "A Novel Video Key-Frame-Extraction Algorithm Based On Perceived Motion Energy Model" IEEE ,Transactions On Circuits And Systems For Video Technology, Vol. 13, No. 10, October 2003.
- [3] Chitra A. Dhawale and Sanjeev Jain, "A Novel Approach Towards Key frame Selection for Video Summarization" Asian Journal of Information Technology, Medwell Journals, Vol. 7, Issue 4, PP. 133-137, 2008 .
- [4] Ganesh. I. Rathod And ,Dipali. A. Nikam, "An Algorithm For Shot Boundary Detection And Key Frame Extraction Using Histogram Difference" International, Journal Of Emerging Technology And Advanced Engineering, Vol. 3, Issue 8, August 2013.
- [5] Guozhu Liu, And Junming Zhao," Key Frame Extraction From MPEG Video Stream" Proceedings Of The Second Symposium International Computer Science And Computational Technology (ISCCT '09) Huangshan, P. R. Chin , PP. 007-011, 26-28,Dec. 2009.
- [6] Sudhir S. Kanade And Pradeep M. Patil, "Dominant Audio Energy Based Key Frame Extraction For Sports Video Summarization" International Conference On Advancements In Electronics And Power Engineering (ICAPEP'2011) Bangkok PP. 75-77, Dec., 2011.
- [7] Naveed Ejaz And Sung Wook Baik, "Weighting Low Level Frame Difference Features For Key Frame Extraction Using Fuzzy Comprehensive Evaluation And Indirect Feedback Relevance Mechanism" International Journal Of The Physical Sciences Vol. 6, issue 14, PP. 3377–3388, 18 July, 2011.
- [8] Satishkumar L Varma and Sanjay N Talbar, "Dynamic Threshold in Clip Analysis and Retrieval" International Journal of Image Processing (IJIP),Vol.5,Issue4,2011.
- [9] Sudhir S. Kanade And P. M. Patil , " Dominant Color Based Extraction Of Key Frames For Sports Video Summarization" International Journal Of Advances In Engineering & Technology, Vol. 6, Issue 1, Pp. 504-512 Mar. 2013.
- [10] Khin Thandar Tint, and Dr. Kyi Soe, " Key Frame Extraction for Video Summarization Using DWT Wavelet Statistics" International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, No 5, pp 1829 -1833, May 2013.
- [11] Sowmya R , Dr.Rajashree Shettar, "Analysis And Verification Of Video Summarization Using Shot Boundary Detection" American International Journal Of Research In Science, Technology, Engineering & Mathematics, vol. 3, issue 1, Pp. 82-86, June-August, 2013.
- [12] Miss.A.V.Kumthekar, Prof.Mrs.J.K.Patil, "Key frame extraction using color histogram method " International Journal of Scientific Research Engineering & Technology (IJSRET), Volume 2 Issue 4 pp 207-214 July 2013.
- [13] Irfan Mehmood, Muhammad Sajjad, Sung Wook Baik,, "Visual Attention Based Extraction Of Semantic Keyframes" Advances In Information Science And Applications, Vol No 1, Pp181-186, 2014.
- [14] T. Judes Divya and A. Rama, "Video Key Frame Extraction for Recognising Hand Drawn Human Face" Middle-East Journal of Scientific Research vol. 20, issue 4, pp 537-541, 2014.
- [15] Mrs.Poonam S. Jadhav, Prof. Dipti S. Jadhva, "Video Summarization Using Higher Order Color Moments "International Conference On Advanced Computing Technologies And Applications (ICACTA-2015) Published By Elsevier B.V, Procedia Computer Science , vol. 45, pp. 275 – 281, 2015.
- [16] J. Kavitha, Dr. P. Arockia Jansi Rani, "Design Of A Video Summarization Scheme In The Wavelet Domain Using Statistical Feature Extraction", I.J. Image, Graphics And Signal Processing, MECS, Vol. 4, pp. 60-67, Year 2015.
- [17] Azra Nasreenand Dr.shobha G "Key Frame Extraction from Videos - A Survey" , International Journal of Computer Science & Communication Networks, Vol 3, issue 3, pp 194-198.
- [18] Dolley Shukla, Chandra Shekhar Mithlesh, and ,Manisha Sharma, "A Survey On Different Video Scene Change Detection Techniques" International Journal of Science and Research (IJSR) vol. 4, issue 3, 2015, PP.214-219.
- [19] Dolly Shukla, Chandra Shekhar Mithlesh and Manisha Sharma " Design, Implementation & Analysis of Scene Change Detector using Block Processing Method "The Journal of Applied Sciences Research(TJASR), Volume- 2, No 2, 2015, pp103-110.
- [20] Dolley Shukla, Chandra shekhar Mithlesh and Manisha Sharma "Classification for video summarization Techniques," IEEE Sponsored International Conference Shaastrath 2015.
- [20] Chandra shekhar Mithlesh, Dolley Shukla and Manisha Sharma "Video to Image Conversation Techniques-Key Frame Extraction," International Journal of Emerging Science and Engineering, Volume-4, Issue-3, March 25, 2016, pp.30-34.

BIOGRAPHY



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