International Journal of Computer Science
ISSN:2348-6600
Oddity...Probe...Reviste...
Published by SK Research Group of Companies(SKRGC)

http://www.ijcsjournal.com Volume 3, Issue 1, No 2, 2015. ISSN: 2348-6600
Reference ID: IJCS-076 PAGE NO: 430-435.

An Efficient Model of Saliency Detection in a Compressed Domain Video Model

Mrs.M.Priya, Research Scholar
Department of Computer Science and Engineering
Alagappa University
Karaikudi, India.
priyacs31@gmail.com

Dr.K.Mahesh, Associate Professor
Department of Computer Science and Engineering
Alagappa University
Karaikudi, India
mahesh.alagappa@gmail.com

Abstract— **Today several problems occur regarding video over internet. The solution of the problem is compression. The need for video compression is very important to minimize the storage space and transmission cost. There are several applications require video compression such as multimedia, internet, remote sensing etc. An Earlier method can be used for detection of visual and motion saliency in a compressed domain of video. However, nearest out of number of target is not considered .To deal with this depth saliency has been proposed for compressed video. Depth in an additional framework to help select the nearest out of a number of moving targets in a various multimedia application. A new fusion method of parameterized normalization, sum and product (PNSP) is designed to combine the results of saliency maps to get the final saliency map for each video frame. The proposed method provides the high compression ratio and high quality of video.The proposed model can predict the salient regions efficiently for video frames.**

***IndexTerms*—video saliency detection, Regions of interest, video frames, video compression.**

I. INTRODUCTION

An image defined in the "real world" is considered to be a function of two real variables, for example, a(x,y) with a as the amplitude (e.g. brightness) of the image at the real coordinate position (x,y).Image processing usually refers to digital image processing, but optical and analog image processing also are possible.Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it.

Video is the technology of electronically capturing, recording, processing, storing, transmitting and reconstructing a sequence of still images representing scenes in motion. Compression basically means reducing image/video data. There are two basic categories of compression. They are losseless and lossy. Video framerate specifies the number of still pictures per unit of time of the video ranges from six or eight frames per second. The size of the video image is measured in pixels for digital video. The common way to reduce the number of bits per pixel in digital video is by chroma sampling. Video quality can be measured with formal metrics like PSNR.

The video parameters are,

• Shot is the most fundamental definition in video making. Shot is a unit for the video recorded on the camcorder. In other words, your video is composed by different shots. Shot has different components and types.

• Video or movie frame is a single picture or still shot, that is shown as part of a larger video or movie. Many single pictures are run in succession to produce what appears to be a seamless piece of film or videotape. Each frame can be selected on its own to print out a single photograph.

• Video can be recorded and transmitted in various physical media which are Magnetic tape (when recorded as PAL or NTSC), Electric signals (video cameras, MPEG-4), Digital media (digital cameras. Quality of video).

International Journal of Computer Science
ISSN:2348-6600
Oddity...Probe...Reviste...
Published by SK Research Group of Companies(SKRGC)
http://www.ijcsjournal.com Volume 3, Issue 1, No 2, 2015. ISSN: 2348-6600
Reference ID: IJCS-076 PAGE NO: 430-435.

• Pair-wise pixel comparison (also called template matching) evaluates the differences in intensity or color values of corresponding pixels in two successive frames. Video compression uses modern coding techniques to reduce redundancy in video data [10].Some video compression schemes typically operates on square-shaped groups of neighboring pixels, often called macroblocks [5]. These pixel groups or blocks of pixels are compared from one frame to the next and the video compression codec sends only the differences within those blocks. Today, nearly all commonly used video compression methods (e.g., those in standards approved by the ITU-T or ISO) apply a discrete cosine transform (DCT) for spatial redundancy reduction. The DCT is widely used in this regard was introduced by N. Ahmed, T. Natarajan and K. R. Rao in 1974.video must be compressed before it is put on the web. "Compressed" just means that the information is packed into a smaller space.

Year	standards	Publisher	Popular Implementations
1984	H.120	ITU-T	Video-CD
1988	H.261	ITU-T	Videoconferencing, Videotelephony
1993	MPEG-1 Part 2	ISO, IEC	DVD Video, Blu-ray, Digital Video Broadcasting, SVCD
1995	H.262/MPEG-2 Part 2	ISO, IEC, ITU-T	Videoconferencing, Videotelephony, Video on Mobile Phones (3GP)
1996	H.263	ITU-T	Video on Interne
1999	MPEG-4 Part 2	ISO, IEC	HD DVD Digital Video Broadcasting, iPod Video, Apple TV
2003	MPEG-4 Part 2	Sony, Panasonic, Samsung, ISO, IEC, ITU-T	Video on Internet
2009	VC-2 (Dirac)	SMPTE	HDTV broadcast, UHDTV
2013	H.265	ISO, IEC, ITU-T	

Fig:1International Video Compression Standards.

There are several standards in MPEG. They are, MPEG 1 video compression is based upon the same technique that is used in JPEG. In addition to that it also includes techniques for efficient coding of a video sequence.

• The MPEG-2 project focused on extending the compression technique of MPEG-1 to cover larger pictures and higher quality at the expense of a higher bandwidth usage.

• MPEG-3 was designed to handle HDTV, however, it was discovered that the MPEG-2 standard could be slightly modified and then achieve the same results as the planned MPEG-3 standard.

• The MPEG-4 standard is a lot wider than the previous standards. It also allows for any frame rate, while MPEG-2 was locked to 25 frames per second

• MPEG-7 is a different kind of standard as it is a multimedia content description standard. MPEG-7 uses XML to store metadata

• MPEG-21 is a standard that defines means of sharing digital rights, permissions, and restrictions for digital content.

Saliency estimation has become a valuable tool in video processing. Saliency is an attempt to determine which regions of an image are the most conspicuous. Saliency detection is considered to be a key attentional mechanism that facilitates learning and survival by enabling organisms to focus their limited perceptual and cognitive resources on the most pertinent subset of the available sensorydata [4]. Saliency typically arises from contrasts between items and their neighborhood. Earlier method can be used in detection of visual and motion saliency. Visual saliency is referred as result of the static object in video frame[3][6]. Motion saliency is considered as result of the moving object in video frame. The videos also include temporal information about the object and camera motion.The following frames may use part of theVideo,

• ***I-frames:*** Intra predicted, self-contained

• ***P-frames:*** Predicted from last I or P reference frame

• ***B-frames:*** Bidirectional; predicted from two references one in the past and one in the future, and thus out of order decoding is needed. An efficient Model of saliency detection depends upon the saliency map. The saliency map is calculated based on the features extracted from DCT [9]. The saliency detection in MPEG-2 has been done by extracting features such as luminance,color,texture and motion features. Currently several papers have studied tried to detect the salient regions in videos. The video detection model in the compressed domain is much desired for various internet based applications. However video over internet is always stored in compressed domain such as MPEG-2, H.264 nad MPEG-4 visual. The proposed method of depth saliency is additional framework to help the nearest out of a number of moving

International Journal of Computer Science
ISSN:2348-6600
Oddity...Probe...Reviste...
Published by SK Research Group of Companies(SKRGC)
http://www.ijcsjournal.com Volume 3, Issue 1, No 2, 2015. ISSN: 2348-6600
Reference ID: IJCS-076 PAGE NO: 430-435.

targets in a various multimedia applications. Three saliency such as visual saliency, motion saliency and depth saliency can be calculated. Finally these saliency results are fused together The visual saliency map of unpredicted frames are computed on the basis of luminance, color and texture features. The motion and depth saliency map of predicted frame is computed by motion and depth feature. A new fusion method of parameterized normalization sum and product(PNSP) is designed to combine the results of the three saliency map for each video frame. An existing saliency detection model can be used in uncompressed domain. It does not provide the better performance. The proposed method of video saliency can also be used in compressed domainand get the high compression ration and high quality. It predicts the salient regions in video frames efficiently. In this paper, the new fusion method can be applied in advanced standards such as MPEG-2, MPEG-4, and H.264. This paper is organized as follows, Section 2 is an overview of the background study and describes in detail.Section 3, gives the evaluation of the proposed work and Section 4 specifies conclusion.

II. BACKGROUND STUDY

A digital video sequence can be represented as a series of JPEG pictures. Another important aspect of MPEG is the bit rate mode that is used. In most MPEG systems, it is possible to select the mode, CBR (Constant Bit Rate) or VBR (Variable Bit Rate), to be used.The goal is to design algorithm for automatic saliency maps, depending on the target quality and data throughput. The video compression algorithms are used to reduce the size of the bits and avoid overhead. An Existing fusion method cannot get good performance. The static and motion saliency maps are considered with the same weighting whatever the differences between these two maps. Already several authors have presented video compression techniques and methods. Many research works carried out in this area. This section presents an existing techniques and algorithms of video compression [1].

A. *Lossless Algorithm*

Lossless compression is a class of algorithms that will allow for the exact original data to be reconstructed from the compressed data. That means that a limited amount of techniques are made available for the data reduction, and the result islimited reduction of data. GIF is an example of lossless images compression, but is because of its limited abilities not relevant in video surveillance. Different encoding and decoding method for lossless which includes run length encoding, transform coding,sub-band coding and vector quantization, Huffman encoding and arithmetic encoding [18].

B. *LossyAlgorithm*

Lossy compression on the contrary means that through the compression data is reduced to an extent where the original information can not be obtained when the video is decompressed. The difference is called the artifacts. In lossy compression most algorithms transform pixels into transform domain using DCT(Discrete cosine Transform), DWT(Discrete wavelet Transform) [8][19].

C. Fractal videocompression

Fractal videocompression is an attractive technique for video coding due to its distinct features and low bit rate video application. Fractal videocompression is based on self similarity concept just as in image compression. This videocompression requires more computational complexity for reducing this computational complexity different techniques has been employed. It uses block matching motion estimation techniques that is a new hybrid technology consist of efficient three step search and cross hexagonal search. Efficient three step search requires lesser search points and getting good result in terms of compression ratio, time complexity than three step search. The new three step search, Diamond and four step search, Cross Hexagonal search requires the lesser search points and obtained the good result than novel and enhanced hexagonal search [11].

D. *MCTF lifting scheme*

The wavelet analysis has shown great success in the analysis of signals such as image processing and video coding. The current progress in 3D spatio-temporal wavelet video coding led to the emergence of a new generation of scalable video schemes. To evaluate the overall system performance, a comparative study was conducted to choose the adequate block-matching algorithm during the temporal filtering steps. Evaluation of the quality of the reconstructed frames based on the compression ratio was done with spatial analysis based on 5/3 and 9/7 wavelet [14].

E. *An Effective scene change detection method*

Video represents a sequence of frames captured from camera. Scene is a series of consecutive frames captured from narrative point of view. In order to fulfill the requirement of limited channel bandwidth and of growing video demand like streaming media delivery on internet, and digital library, videocompression is necessary. In videocompression, temporal redundancy between adjacent frames is removed with block based motion estimation algorithms. The vodeo frames have divided into blocks and applied a canny edge detector in consecutive frames. Count no of pixels (ones) in each block and compare it with consecutive frames. If scene change happens then number of pixels per block will change,

International Journal of Computer Science
ISSN:2348-6600
Oddity...Probe...Reviste...
Published by SK Research Group of Companies(SKRGC)
http://www.ijcsjournal.com Volume 3, Issue 1, No 2, 2015. ISSN: 2348-6600
Reference ID: IJCS-076 PAGE NO: 430-435.

based on that change we can detect scene change in consecutive frame. Here we have presented a hybrid approach, in which we have used scene change detection along with block based motion estimation algorithms (BME) to compress video[12][13].

F. *Weighted Mode Filtering Technique*

An efficient techniques to compress a depth video by taking into account coding artifacts, spatial resolution, and dynamic range of the depth data. Due to abrupt signal changes on object boundaries, a depth video compressed by conventional video coding standards often introduces serious coding artifacts over object boundaries, which severely affect the quality of a synthesized view. The coding artifacts by proposing an efficient post processing method based on a weighted mode filtering and utilizing it as an in-loop filter [16][17].

III. PROPOSED WORK

The proposed method provides the detection of saliency has been done by extracting features such as luminance, color, texture, motion and depth. In addition to existing work, the depth saliency is computed in compressed video. In this paper depth saliency can be calculated which is fundamentally different source of information and the correct exploitation of depth will necessarily change the structure of the saliency computation. Visual salient feature has been extracted by using DCT and motion vectors in video bit stream. Depth features are extracted by estimating the depth channel which informs our saliency computation. Finally the results of three saliencies are fused by using PNSP fusion method. It has the advantage of better performance. The new proposed video saliency detection model depends upon the saliency calculation which is determined by the saliency map for each video frames. The Proposed video saliency detection algorithm consist of following steps,

Step 1: Consider the input video bitstream.

Step 2: Convert the video bitstream into frames (predicted and unpredicted frames).

Step 3: Extract the features luminance, color, texture and depth in unpredicted frames.

Step 4: . Extract the feature of motion from the motion vectors in video bitstream for predicted frames.

Step 5: Obtain the static (visual) saliency map based on the features of luminance, color, and texture for unpredicted frames.

Step 6: Obtain the motion saliency map is calculated on the basis of motion feature for predicted frames.

Step 7: Obtain the depth saliency map based on the feature of depth in video stream of unpredicted frames.

Step 8: Compute depth measurements based on shape information obtained from the depth channel of frames.

Step 9: Combine and fuse these three saliency measurement using parameterized normalization, sum and product (PNSP) fusion method to get the final saliency map.

Step 10:Finally performance is estimated for obtained saliency map.

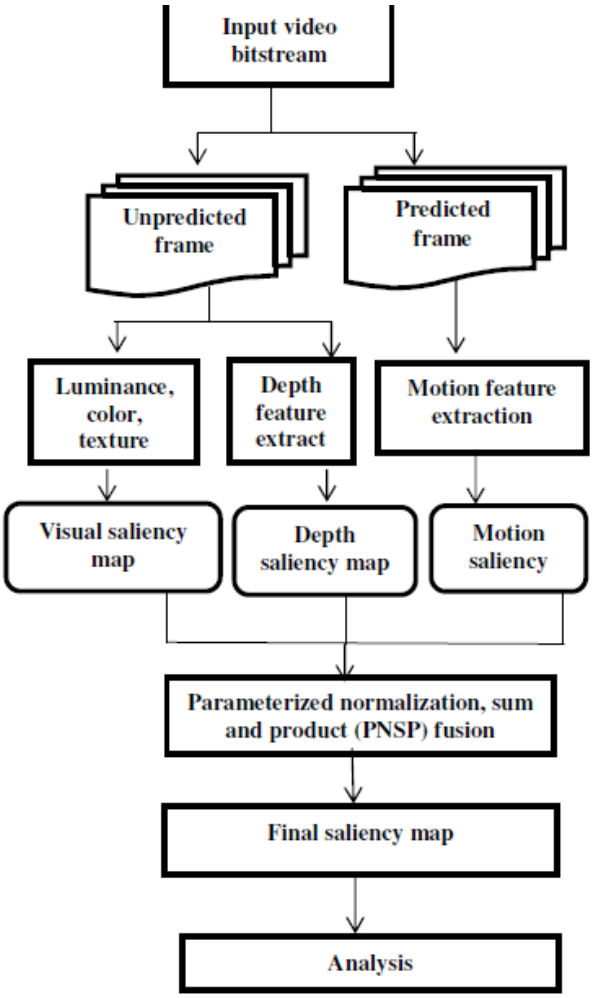

Fig:2 An Overview Of Proposed Model

The proposed method determines the superior performance of the video saliency detection model in compressed domain. The fig:2 shows the performance of the proposed method.

IV. CONCLUSION

The Raw digital video produces enormous file sizes, the video file must be compressed so that it can be stored and

International Journal of Computer Science
ISSN:2348-6600
Oddity...Probe...Reviste...
Published by SK Research Group of Companies(SKRGC)
http://www.ijcsjournal.com Volume 3, Issue 1, No 2, 2015. ISSN: 2348-6600
Reference ID: IJCS-076 PAGE NO: 430-435.

transferred. It achives minimize the storage space and transmission cost. This paper deals with new approach for compress the video efficiently .We presented the proposed method of video saliency detection model can be used in compressed domain. It has been presented the different weights of saliency is considered. An improved saliency detection of video has been achieved in this paper. Thecompression performance has initiated the advanced MPEG-4 and H.264 standards. Compared with the existing method, the proposed method can be used in Internet based multimedia applications and provides high compression ratio and high quality of video.

REFERENCES

[1] A.Kh. Al-Asmari A new video compression algorithm for different video conferencing standards International Journal oNetwork Management, 13 (2003).

[2] ChenleiGuo, Liming Zhang, "A Novel Multiresolution Spatiotemporal Saliency Detection Model and Its Applications in Image and Video Compression," *Image Processing*, 2010, vol. 19, pp. 185–198.

[3]Harel, J., Koch, C., Perona, P.: Graph-based visual saliency. In: Advances in Neural Information Processing Systems, vol. 19, p. 545 (2007) .

[4] Hou, X., Zhang, L.: Saliency detection: A spectral residual approach. In: IEEE Conference on Computer Vision and Pattern Recognition, CVPR 2007, pp. 1–8. IEEE (2007).

[5] Itti, L.: Automatic foveation for video compression using a neurobiological model of visual attention. IEEE Transactions on Image Processing 13(10), 1304–1318 (2004).

[6]Slowe, T.E., Marsic, I.: Saliency-based visual representation for compression. In: Proceedings of International Conference on Image Processing 1997, vol. 2, pp. 554–557. IEEE (1997).

[7] T. Ebrahimi, M. Kunt, Visual data compression for multimedia applications, Proceedings of the IEEE 86 (6) (1998) 1109–1125.

[8]NevrezİmamoĝIu, Weisi Lin,Yuming Fang, "A Saliency Detection Model Using Low-Level Features Based on Wavelet Transform", *IEEE Transactions on Multimedia*, 2013.

[9]Yuming Fang,Weisi Lin, Bu-sung Lee, and Chiew Tong Lau, 'Bottom-up Saliency Detection Model Based on Amplitude Spectrum,' *International Conference on MultiMedia Modeling (MMM)*, 2011.

[10] E. G. Richardson, Iain (2003). *H.264 and MPEG-4 Video Compression: Video Coding for Next-generation Multimedia*. Chichester: John Wiley & Sons Ltd.

[11] M.S. Lazar, L.T. Bruton Fractal coding of digital video June IEEE Transactions on Circuits and Systems for Video Technology, 4 (1994), pp. 297–308.

[12]C.L.Huang, B.Y.Liao, *A Robust Scene-Change DetectionMethod for VideoSegmentation*, IEEE Transactions on Circuits and Systems for Video Technology, vol. 11,no. 12, pp. 1281-1288, Dec. 2001.

[13]H.C.Liu, G.Zick, *Automatic Determination of Scene Changesin MPEG CompressedVideo*, ISCAS, vol. 1, pp. 764-767, 1995.Video Techn.Vol 13 (4): 358-363 (2003).

[14] J.-R. Ohm, "Complexity and delay analysis of MCTF interframe wavelet structures," ISO/IEC JTC1/SC29/WG11,Document M8520, Jul. 2002. [15] V. Bhaskaran, K. Konstantinides, "Image and Video Compression Standards," Kluwer Academic Publishers, 1995.

[16] V.-A Nguyen, D. Min, and M. N. Do, "Efficient Techniquesfor Depth Video Compression Using Weighted Mode Filtering," IEEE Trans. on Circuits and Systems for Video Technology.

[17] D. Min, J. Lu, and M. N. Do, "Depth Video Enhancement Basedon Weighted Mode Filtering," *IEEE Trans. on Image Processing*, 2011.

[18] A. K. Moorthy and A. C. Bovik, "H.264 Visually Lossless Compressibility Index (HVLCI), Software release," http://live.ece.utexas.edu/research/quality/hvlci.zip, 2010.

[19] A.B. Watson, "DCT quantization matrices visually optimized for individual images," in Proceedings of SPIE, 1993, vol. 1913,

International Journal of Computer Science
ISSN:2348-6600
Oddity...Probe...Reviste...
Published by SK Research Group of Companies(SKRGC)
http://www.ijcsjournal.com Volume 3, Issue 1, No 2, 2015. ISSN: 2348-6600
Reference ID: IJCS-076 PAGE NO: 430-435.

pp. 202–216.
[20] Y. Zhu, N. Jacobson, H. Pan, and T. Nguyen. Motion decision based spatiotemporal saliency forvideo sequences. In *Acoustics, Speech and SignalProcessing (ICASSP), 2011 IEEE InternationalConference on*, pages 1333 –1336, may 2011.
[21] D. Zhang, B. Li, J. Xu, and H. Li, "Fast transcoding from H.264 AVCto high efficiency video coding," in *Proc. IEEE Int. Conf. MultimediaExpo (ICME)*, Jul. 2012, pp. 651–656.
[22] I.-H. Shin, Y.-L.Lee, and H. W. Park, "Motion estimation for framerateredution in H.264 transcoding," in *Proc. IEEE Workshop Softw.Technol. Future Embedded Ubiquitous Syst.*, May 2004, pp. 63–67.
[23] ITU-T, "ITU-T Recommendation H.264, Advanced video coding forgeneric audiovisual services," ITU-T, Tech. Rep., May 2003.
[24] A. Vetro, C. Christopoulos, and H. Sun, "Video transcoding architecturesand techniques: An overview," *IEEE Signal Process. Mag.*, vol. 20, no. 2,pp. 18–29, Mar. 2003.