International Journal on Recent and Innovation Trends in Computing and Communication
Volume: 2 Issue: 8

ISSN: 2321-8169
2088 – 2091

A Review on Design of Low Bit Rate Video Encoding for Image Compression

Sandeep Sherki*, Prof. Nilesh Bodne
Department of Electronics Engg.
RTM Nagpur University, India
sandeep.sherki@gmail.com, nileshbodne@gmail.com

Abstract: In this paper, we propose a new low complexity video compression method based on detecting blocks containing moving edges using only DCT coefficients. The detection, whilst being very efficient, also allows efficient motion estimation by constraining the search process to moving macro-blocks only. It takes advantage of the prior knowledge of the image type to segment the image into different regions, then codes each region with different coding criterion and method according to the different importance. An adaptive region-classified vector quantization strategy is also exploited in this algorithm. Canny method is adopted to detect the edges of the encoded image. These edges are replaced with a pre-designed nine basis nameplates. Then, the Macro edge detection technique is used to reduce the number of these nameplates and keep only the edges that are necessary for visual quality.

Keywords- *Progressive Image Transmission, Edge Detection, Vector Quantization Coding, Low complexity video compression, Moving edge, DCT.*

*****

Introduction

A very low bit rate video coding with main theme focused on an edge detector & vector quantization.

A. Edge Detection:

Edge detection refers to the process of identifying and locating sharp discontinuities in an image. The discontinuities are abrupt changes in pixel intensity which characterize boundaries of objects in a scene. Edge detecting an image reduces the amount of data and filters out useless information.

The Four Steps of Edge Detection

(1) Smoothing: suppress as much noise as possible, without destroying the true edges.

(2) Enhancement: apply a filter to enhance the quality of the edges in the image (sharpening).

(3) Detection: determine which edge pixels should be discarded as noise and which should be retained

(4) Localization: determine the exact location of an edge. Edge thinning and linking are usually required in this step

B. Quantization:

Quantization is used to reduce the total number of bits needed for a compressed image.

- Scalar Quantization: Maps one sample of input signal to one quantized out
- Vector Quantization: Set of input Data to single codeword.

Fig. (a) Reconstructed image with noisy
Fig. (b) Quantization image transmission channel

There are two figures clearly show the amount of energy that is missing when the higher frequency coefficients are deleted. It is also apparent that this energy is concentrated in areas of the image that are associated with edges, or high spatial frequencies. Because of this, it is desired that the total number and the degree of DCT coefficient deletion be controlled on a macro block basis. This control is accomplished with a process called quantization.

 ISSN: 2321-8169
2088 – 2091

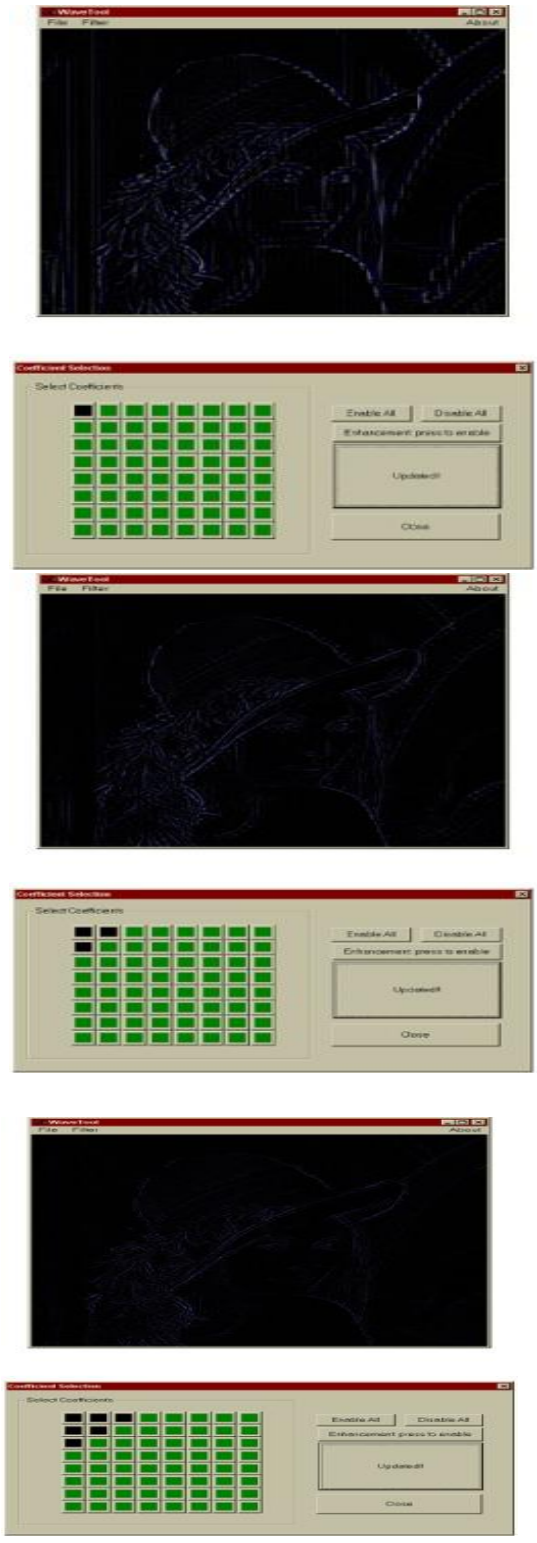


Fig. (c) Edge Detection

II. LITERATURE SURVEY

. In this Paper [1], Work done in the area of edge detection and vector quantization is reviewed In and focus has been made on detecting the edges of the digital images. Edge detection is a problem of fundamental importance in image analysis. In typical images, edges characterize object boundaries and are therefore useful for segmentation and identification of objects in a scene Regarding "The video coding system using adaptive region classified vector quantization", National Taiwan University, by Yee-Wen Chen and Mei-Juan chen**.** only vector quantization strategy is used which uses segmentation based algorithm. Segmentation based algorithm consists of three parts

- Segmentation part
- Codebook generation part
- coding part

Segmentation part:

The segmentation part segments the current frame into different regions, especially the face region from other region. It finds the contours in the reference window which is constructed either by the previous frame or another method for normal or setup period. During set up period since the face region is unknown extra process of highest difference point is executed to find the top of head. The reference window which provides an approximate location of face region is constructed according to this top point.

The binary threshold is computed only during the setup period because of the high correlation between frames. At last, the face region and the further segmentation are obtained by detecting the boundaries of the most suitable contour.

The Limitations are There are more intra blocks in the face region because the eye part and mouth part of the face region correspond to the motion failure part of the image ,and coding criterions for these regions are more complicated in order to keep good subjective view in the face region.

.

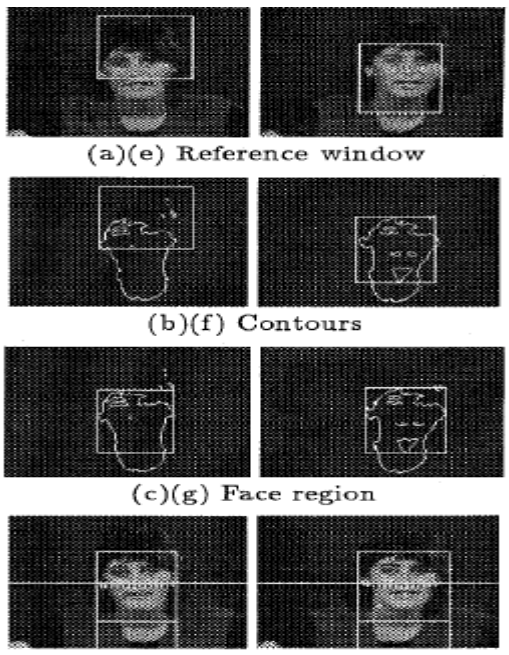
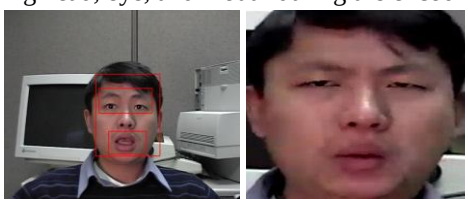


Fig. (d) Segmentation of face

 ISSN: 2321-8169
2088 – 2091

Regarding paper [2], present a system for real-time coding of face video. In this they improve the technique of long term memory prediction by selected into the database only when it is significantly different from those which are already in the database. In this they decomposes a face video into specific layers such as head, eyes, and mouth.

They decompose the face video into multiple layers, where each layer is encoded independently. To code each individual layer of the face video, they use multi-reference frame block based motion compensation prediction. The reference frame database is then searched for the best matching head, eye, and mouth during the encoding process.



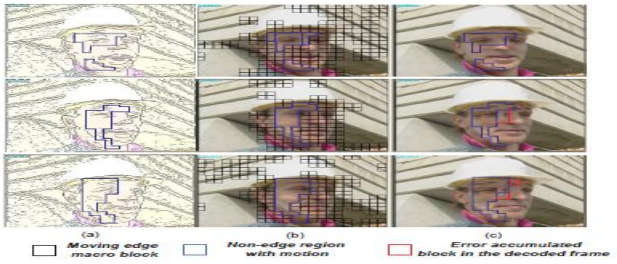
The Limitations are

- The system is work on only face to face video.
- Requires more bandwidth
- Provides blocking artifacts presented in the reconstructed video of the current face.

In this paper [3], gives low complexity video compression method based on detecting blocks containing moving edges using only DCT coefficients. In this They uses the concept of ROI based scheme that detects only moving edges and not complete moving objects. If there are non edge regions with motion inside the object this is not detected by this approach.

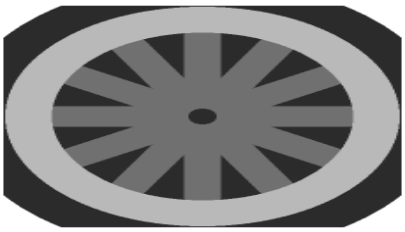
False moving edge removed

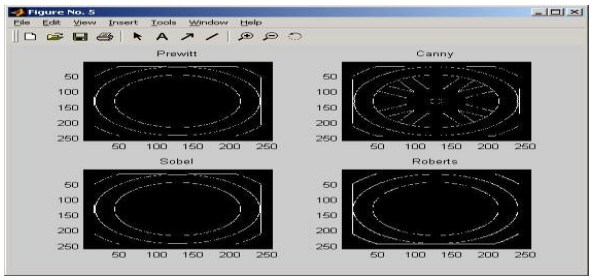
A false moving edge arises from image noise and an incorrect threshold value for deciding moving edges with the SD (standard deviation) of DCT coefficients. The image noise could be eliminated by a pre-processing filter. The reduction block for false moving edge can select real moving edges by defining edge directions and measuring the edge direction difference. The limitations, when the camera is constantly moving; this generates moving edges near the object boundary. If non-edge regions with motion inside the object, this is not detected by our approach. Fig. shows the block artefacts in the decoded frame. Regions classified as non-edges but that have motion are not detected properly as shown by the area within the blue line. This generates block artifacts due to the difference in DC values of the current and reference sub blocks.



In paper [4], gives the study and comparison of various image edge detection techniques such as

- sobel operator , Roberts cross operator, Prewitts operator, Canny edge detection operator





The primary objectives of this study can be summarized as follows:

1. Finding Low bit rate Video Encoding using Vector Quantization and Edge detection
2. The input Retina image data base can be any data base institutional or publically available database attacks.

III. PROPOSED WORK

The proposed work is planned to be carried out in the following manner

- Taking the video as an input
- Covert this video in the form of frames
- Converts the video frames into Low Bit rate encoding with the help of Down sampling
- Apply Vector Quantization for grouping of grey level values
- Lastly taking low bit rate video on canny edge detector to give output edge video

IV. CONCLUSIONS

In this paper, a new algorithm for the very low bit rate video coding system is presented. This algorithm contains segmentation, codebook generation, and coding parts. The segmentation part segments the applications. Current frame to different regions. The codebook generation part generates the region. The coding part performs more detail coding in the more important region according to the region information and region codebooks. The experimental results show that the image quality is acceptable at about the transmission rate of 10k bits per second

In terms of com- putational complexity, it shows almost the same complexity as the DISCOVER codec which is the state of the art in low complexity distributed video coding. However, error accumulation occurs in non edge areas with motion. Clearly, in the future we need to consider not only moving edges but also the entire moving object in order to overcome this drawback. We would also like to investigate our approach into a DVC framework.

ACKNOWLEDGMENT

I would like to thank my guide Prof. Nilesh P. Bodne and Prof. Sachin Jambhulkar for their guidance and support and Department of Electronics Engineering (Comm.), V.I.T. College of Engineering, Nagpur.

REFERENCES

[1] "A very low bit rate video coding system using adaptive region classified vector quantization", National Taiwan University, by Yee-Wen Chen and Mei-Juan chen. **0**-7803-3 192-3196 $5.0001996 IEEE

[2] "Low bit-rate video streaming for face to face teleconference", by Zhen Wen and Tomas Huang.

[3] Chanyul kim and Noel E. O'Connor "Low complexity video compression using moving edge detection based on DCT coefficients".

[4] International Journal of Image Processing by Raman maini and Dr.Himanshu Aggarwal on "Study and coparision of various Image edge detection techniques"

[5] F. Bartolini, V. Cappellini, A. Mecocci, and R. Vagheggi: "A segmentation-based motion compensated scheme for low-bit video coding"

[6] International Journal of Recent trends in engineering, vol, 1, No. 2, May 2009 on "edge detection techniques for image segmentation of soft computing approaches".

[7] University of Strathclyde, U.K., by the GEC Marconi Hirst Research centre by Stathis P. Voukelatos and John J. Soraghan on "very low bit rate color video coding using vector quantization".

[8] Journal of Information Hiding and Multimedia Signal Processing © 2010 ISSN 2073-4212, by Zhe-Ming Ln

[9] Department of Computer engineering, Communication Engineering Mazandara Institute of technology, Iran vol. 2, by Ehsan Nadernejad, Sara Sharifzadeh, Hamid Hassanpour on" Edge detection techniques and evaluations".