VIDEO COMPRESSION USING LBMC ALGORITHM

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ABSTRACT

The compression techniques for the images as well as the videos, increasing gradually in the past decade. Video compression techniques such as DCT coding, Quantization, Entropy coding, Motion estimation are widely used. The focus of this paper is to analyze video compression techniques required for video processing especially to discover how much amount of data to compressed, which techniques is faster and visual quality better and so on. We evaluate the video compression techniques for finding compression ratio. Handling video over the internet becomes very complex in the digital world. To reduce the complexity we need a strong algorithm to compress the video to reduce the size and do not affect visual quality. In this paper, we proposed Lattice Based Motion Compensation (LBMC)algorithm is used to compress the video. Lattice Based Motion Compensation (LBMC)algorithm is very efficient to optimize the data, generating a minimum redundancy codes and provide the best compression compared with other methods

Keyword : - *DCT coding, Quantization, Entropy coding, Motion estimation, Lattice Based Motion Compensation(LBMC).*

1. Introduction

The development, of digital video technology has made it possible to use digital video compression for a variety of telecommunication applications: teleconferencing, digital broadcast codec and video telephony. Cameras are nowadays being provided with more and more megapixels to improve the quality of captured images. With improvement in image quality, size of the image file also increases. Due to speed limitation of the Internet, it takes more time to upload good-quality images that are of bigger sizes. A user needs to compress the image without degrading its quality. Mobile manufacturers need algorithms in their cameras that enable storing the images in reduced sizes without degrading their quality. Basic techniques of video compression algorithms are efficient to reduce the redundancy of the video data. And producing a reconstructed video from the original video with the introduction of error that is insignificant to the intended applications. A digital video sequence can be represented as a series of JPEG pictures. The advantages are the same as with a single still JPEG pictures – flexibility both in terms of quality and compression ratio. There are two types of video Compression Algorithms: Lossless Compression Algorithms and Lossy compression algorithms. Lossless Compression, compresses the data with less amount of affect visual quality. Lossy compression compresses the data with more amount of affect visual quality. Here we propose a lossless compression technique like Lattice Based Motion Compensation Algorithm. The main objective of this paper is to compress videos by reducing the number of bits per pixel required to represent the videos using LBMC Algorithm. We are implementing video compression in LBMC because various authors suggest the implementation complexity of LBMC algorithm less than with other algorithms.

2. RELATED WORK

Yih-Chuan Lin and Shen-Chuan Tai et al have proposed a technique "Fast Full-Search Block-Matching Algorithm for Motion-Compensated Video Compression" in 1997. The proposed technique has been built upon fast block-

matching algorithms that use three fast matching error measures, besides the conventional mean-absolute error (MAE) or mean-square error (MSE). An incoming reference block in the current frame is compared to candidate blocks within the search window using multiple matching criteria [18].

Eugeniy Belyaev et al. Propose a new spatial scalable and low complexity video compression algorithm based on multiplication free three dimensional discrete pseudo cosine transform. This paper/papered show an efficient result compared with H.264/SVC as well as it can be used for robust video transmission of wireless channels. [12].

Zhengxin Hou, Baochen Jiang, Yupeng Cao, Aiping Yang and Chengyou Wang et al. Proposed I frame encoding adopts wavelet transform and set partitioning in hierarchical trees (SPIHT) algorithm; of P frames, each frame sets the reconstructed frame of its previous frame as a reference frame, and then P frames proceed to code with ME and MC [14].

Lai-Man Po and Wing-Chung Ma et al.[17] have proposed "A Novel Four-Step Search Algorithm for Fast Block Motion Estimation" in 1995. The proposed algorithm has given based on the center-biased global minimum motion vector distribution characteristic of real world image sequences, a new Four-Step Search algorithm for fast block-based motion estimations.
Cong Dao Han et al. implemented a novel search algorithm which utilizes an adaptive hexagon and small diamond search to enhance search speed. Simulation results shown that the proposed approach can speed up the search process with little effect on distortion performance compared with other adaptive approaches [13].
F. Mueller et al. Proposed the work of introducing the generalized Gaussian distribution to model the DCT-coefficients more accurate than with Laplace distributions [16].
R. Reininger, J. Gibson et al. The distribution of DCT-coefficients in the field of image compression is examined and an approximation of the AC-coefficients with Laplace distributions is proposed [15].

3. PROPOSED MEHOD

3.1 Benefits of Compression

- Storage Space compressing data files allows one to store more files in the storage space that is available
- Bandwidth and Transfer Speed Compressed files contain fewer "bits" of data than uncompressed files, and, as a consequence, use less bandwidth when we download them.
- Cost of storing the data are reduced by compressing the files for storage because more files can be stored in available storage space when they are compressed.
- Accuracy also reduces the chance of transmission errors since fewer bits are transferred.
- Security also provides a level of security against illegitimate monitoring.
- Allow real –time transfer at a given data rate.
- Reduce file size and save disk space.

3.2 LBMC Algorithm:

Our work follows the below given algorithm, which successfully segments the video and compresses it without any quality loss.

- Break video into layers;
- Compute B frames;
- Estimate motion;
- if(motion=0) duplicate frame;
- else subtract the predicted frame from previous frame;
- end if; obtain motion vectors;
- end;

4. EXPERIMENTAL RESULTS:

The proposed compression mechanism is implemented with MATLAB using windows 8- 64 bit operating system with core i5 processor and 4 GB RAM. The experiments are carried out on some standard videos. The performance evaluation factors compression values are obtained from different video is summarized in Table 1.

Video Name	Original Size(kb)	Compressed Size(kb)
Barcodes	9891.84	887
Vipbarcode	59801.6	7064.5

Table -1 Compression Result for different Videos

Original and compressed of the two output results on barcodes and vipbarcode are shown in Figure 1 and 2 respectively.

Fig 1: Original video

Fig 2: Compressed video

5. CONCLUSIONS

Our Proposed method works very efficiently and compresses the video without loss of data using LBMC technique. Compare to other compression technology LBMC is more efficient and also it uses minimum resource to compress the video at low cost. In coding experiments, this LBMC algorithms produce better compression (with comparable quality) compared to the standard motion estimation algorithm, which does not require as much computation. Based on insights gained from the LBMC algorithms, we propose a new technique for motion estimation that minimizes a quickly computed heuristic function of rate and distortion. The new technique gives compression efficiency comparable to the LBMC algorithms while running almost as fast as the standard algorithm.

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