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Loseless CFA Image Compression for Wireless Capsule Endoscopy

Nijandan[1], R.Murali[2], G.Vignesh[3]

Assistant Professor, Department of ECE., GRT Institute of Engineering and Technology, Tiruttani, India[1]

UG Student, Department of ECE., GRT Institute of Engineering and Technology, Tiruttani, India[23]

ABSTRACT: Recently, wireless capsule endoscopy provides an innovative methodology to diagnose diseases of digestive systems through a comfortable and efficient manner of examination. Since the capsule endoscopy is swallowed into the human body, the size and frequency of wireless signal transmission is strictly limited. Moreover, since the capsule endoscopy records the status of the digestive system through continues image capture, it consumes a lot of energy to transmit the captured images through wireless transmission. Given the limitations in terms size and energy in wireless transmission, there is a need to develop a low complexity, low memory requirement and low power consumption technique for wireless capsule endoscopy. Given this, a lossless image compression technique is useful in reducing the power and storage space used in wireless capsule endoscopy. Recently, most of CCD and CMOS image sensors captured photos using color-filter-array (CFA) formats, in which each pixel includes only one color each for Red (R), Green (G) or Blue (B) color. It is more efficient to compress images in CFA format rather than in RGB format since the amount of data in images in CFA format is only one third compared to RGB format. There are many different structures of CFA, such as Bayer CFA, Lukac and Plataniotis CFA, Yamanaka CFA, diagonal stripe CFA, vertical stripe CFA, modified Baer CFA and HVS-based CFA. Since the Bayer CFA is the most popular and widely used in CMOS image sensors, the Bayer CFA format will be used to develop the proposed lossless CFA image compression algorithm.

KEYWORDS: Matlab, Xilinx, Modelsim, Image processing.

I. INTRODUCTION

In this project we use the digital image processing in proposed work the taken for the image compression is more by using the vlsi chip we decrease the time of compression and the quality does not change. The binary input is given to the matlab and the output of matlab is given to the vlsi chip and the image is compressed

II. RELATED WORK

The components used in this project is only the laptop.The image is converted into binary and then given to the matlab.Thematlab is automatically link to modelsim.From the modelsim the image is given as the input the output is shown as graph in modelsim.The quality of the image is not change the size of the image is compressed within a few minute.

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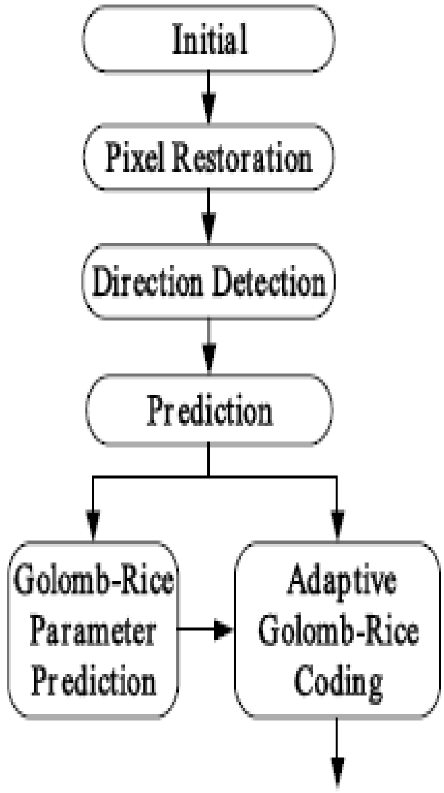
III. PROPOSED SYSTEM



Data compression is known for reducing storage and communication costs. It involves transforming data of a given format, called source message, to data of a smaller sized format, called code word. On Compressed Bit streams, more configuration information can be stored using the same memory. The access delay is also reduced, because less bits need to be transferred through the memory interface. To measure the efficiency of bit stream, is meant by Compression Ratio (CR). It is defined as the ratio between the CompLossless image compression algorithms are used for images that are documents, when lossy compression is not accepted by users, or when we have no knowledge whether lossy compression is allowed or not. Lossless algorithms are especially important for s ystems transmitting and archiving medical data, because on the one hand lossy compression of medical images used for diagnostic purposes is forbidden by law, on the other hand the number and sizes of medical images stored or transmitted grows rapidly. The research trends that are available in the area of image compression for various imaging applications are not adequate for some of the applications. These applications require good visual quality in processing.

In general the tradeoff between compression efficiency and picture quality is the most important parameter to validate the work. The existing algorithms for still image compression were developed by considering the compression efficiency parameter by giving least importance to the visual quality in processing. Hence, we proposed a novel lossless image compression algorithm based on Golomb-Rice coding which was efficiently suited for various types of digital images. Thus, in this work, we specifically address the following problem that is to maintain the compression ratio for better visual quality in the reconstruction and considerable gain in the values of peak signal-to-noise ratios (PSNR). We considered medical images , natural images for the inspection and proposed a novel technique to increase the visual quality of the reconstructed image.

In the paper we analyze the Golomb-Rice (GR) family of codes, infinite family of prefix codes optimal for encoding symbols of exponential probability distribution. The GR family is used in predictive lossless image compression algorithms since the probability distribution of symbols encoded by those algorithms for typical images is close to exponential. The modified GR family of limited code word length is used in the JPEG-LS algorithm recently

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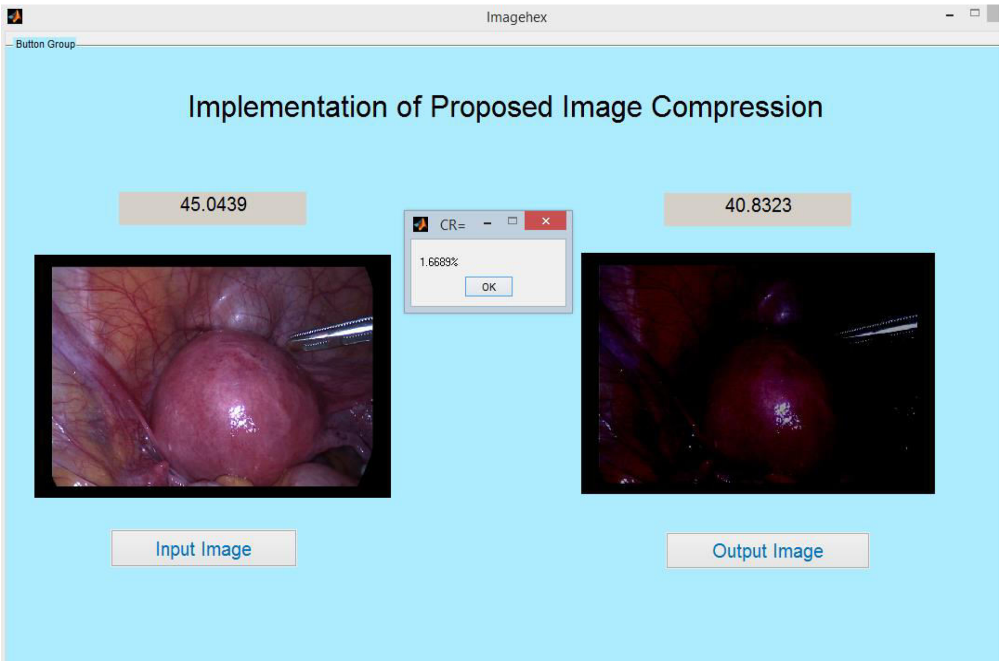
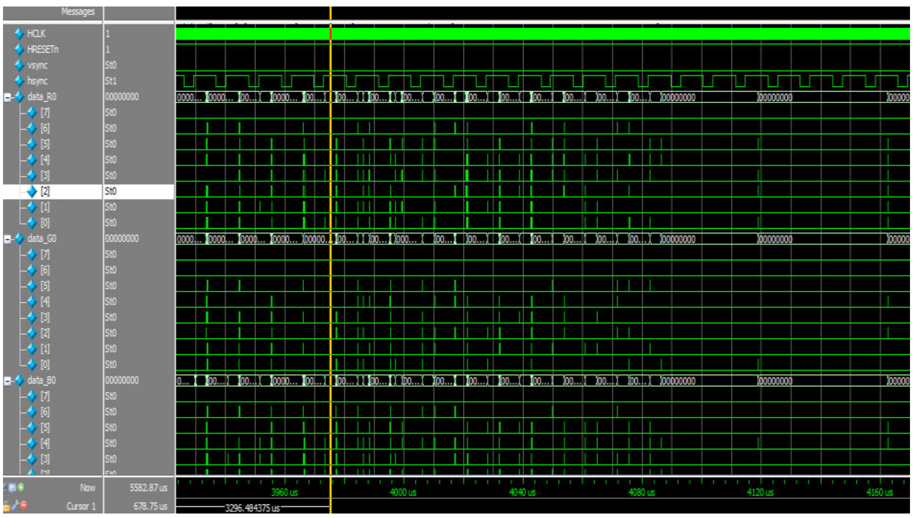
included in the DICOM standard. In the paper we analyze effects of using both the GR and the limited codeword length GR codes for encoding actual images, where the set of encoded symbols is finite and the probability distribution is not exactly exponential.

Advantages:

- Less compression complexity
- Less Area and delay
- Less Power consumptions
- Complexity reduced Arithmetic processing

IV. OUTPUT





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V. CONCLUSION AND FUTURE WORK

The image compressed by the vlsi chip is lesser in size compare to previous compression but the quality is not degraded and in the future the images captured by laproscopy or endoscopy images are compressed in a less time and the quality is not degraded.

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