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Lossless Image Compression: Adaptive Decomposition and Design

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Abstract: The goal of lossless image compression is to represent an image signal with the smallest possible number of bits without loss of any information, thereby speeding up transmission and minimizing storage requirements. The number of bits representing the signal is typically expressed as an average bit rate the goal of lossy compression is to accomplish the best possible fidelity given an available communication or storage bit rate capacity or to minimize the number of bits representing the image signal subject to some allowable loss of information. In this way, a much greater reduction. Recent years have seen an increased level of research in image Compression. Certain application such as medical imaging, image archiving & remote sensing require or desire lossless compression. As cameras and display systems are going high quality and as the cost of memory are lowered. We may also wish to keep our precious and artistic photos free from compression artifacts. Hence efficient lossless compression will become more & more important.
Keywords – Image Compression, lossless image compression, lossy image compression.

1. INTRODUCTION

In recent years, the development and demand of multimedia product grows increasingly fast, contributing to insufficient bandwidth of network and storage of memory device. Therefore, the theory of information compression becomes more and more substantial for shrinking the information redundancy to save more hardware space and transmission bandwidth. In computer science and manipulation of information theory, data compression or source coding is the procedure of encoding information using fewer bits or other information-accepting units than an unencoded representation. Compression is useful hence it helps reduce the consumption of expensive available resources like hard disk space or transmission bandwidth.

What is the so-known image compression coding? Image compression coding is to store the image into bit-stream as compressed as possible and to display the decoded image in the monitor as exact as possible. Now consider an encoder and a decoder. When the encoder gets the original image file, the image file will be changed into a series of binary data, which is known the bit-stream. The decoder then gets the encoded bit-stream and decodes it to form the decoded image. If the total data amount of the bit-stream is less than the total data amount of the original image, then this is known image compression.Digital images are usually encoded by lossy compression methods due to their large memory or bandwidth requirements. The lossy compression methods accomplish high compression ratio at the cost of image quality degradation. Still, there are many cases where the loss of information or artifacts due to compression needs to be avoided, like medical, prepress, scientific and artistic images. As cameras and display systems are becoming high quality and as the cost of memory is lowered, we may also wish to hold our precious and artistic photos free from compression artifacts. Hence efficient lossless compression will become more and more important, while the lossy compressed images are usually satisfactory in many cases.

2. ADAPTIVE HIERARCHICAL DECOMPOSITION

The chrominance channels C_u and C_v resulting from the RCT usually have different statistics from *Y*, and also different from the original color planes *R, G,* and B. In the chrominance channels, the overall signal variation is suppressed by the color transform, but the variation is still large near the object boundaries. Hence, the prediction errors in a chrominance channel are much reduced in a smooth region, but remain relatively large near the edge or within a texture region. For the efficient lossless compression, it is important to accurately estimate the pdf of prediction error for better context modeling, along with the accurate prediction. For this, we propose a hierarchical decomposition scheme in which shows that pixels in an input image

X is separated into two sub images: an even sub image X_e and an odd sub image X_o. Then, X_e is encoded first and is used to predict the pixels in Xo. In addition, X_e is also used to estimate the statistics of prediction errors of X_o. In actual implementation, X_e is decomposed once more as will be explained later. For the compression of X_o pixels using X_e, directional prediction is employed to avoid large prediction errors near the edges.

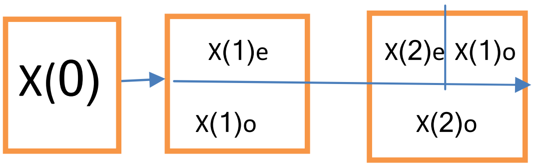

Fig 1. Hierarchical Decomposition

3. DESIGN

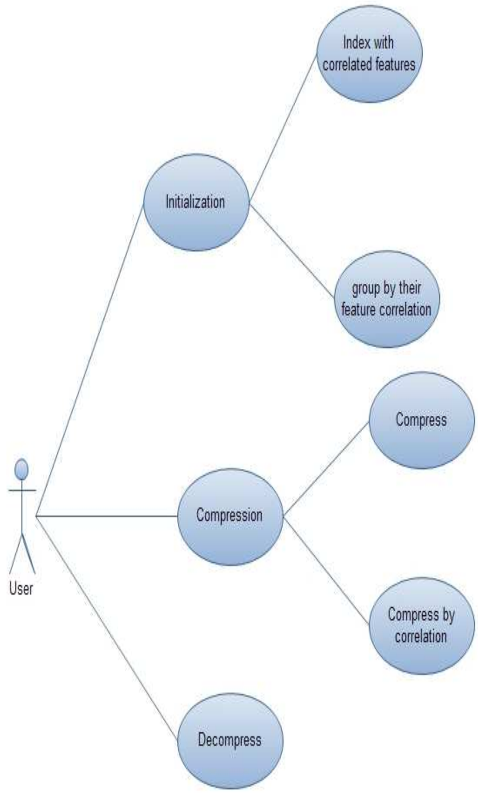

Fig. 2 Use Case Diagram.

Below Use Case Diagram describe about the desing of the proposed method. In which there are two modules one is for the compression using arithmetic coding and another is the decompression based on the feature extraction of that image. In proposed system the feature of the image is extracted with the help of reverse color transform. And image is compress by co-relation.

4. CONCLUSION

In this proposal to develop a hierarchical prediction methods in lossless compression are based on the raster scan prediction which is sometimes inefficient in the high frequency region? In this proposal we design an edge directed predictor and context adaptive model for this hierarchical scheme. For the compression of color images RGB is first transformed to YCuCv by an RCT.

5. REFFERENCE

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