

ABSTRACT

Still image compression is an important issue in internet, mobile communications, digital library, digital photography, multimedia, teleconferencing applications, etc. It would be obvious that the present and future applications in multimedia, space, medical and other areas would focus on the problem of optimizing storage space, transmission bandwidth and getting quality image when decompression. In many of these applications, big savings in terms of bit rate can be achieved without any loss of information by the use of a suitable new model and coding method.

In proposed Near Lossless Image Compression (NLIC) algorithm, simple arithmetic shift is applied on the gray scale image pixels, then these pixels are arranged sequentially by the selected scan order, and finally the Huffman coding is applied to code the gray scale image. The near lossless can be achieved with competitive performance compared to the existing Arithmetic compression System (ACS) and Set Partitioning in Hierarchical Trees (SPIHT), especially for satellite imaging. Also this algorithm achieves better PSNR Value with good compression rate, compared to the State-of-the-art schemes for the gray scale standard test images.

Lossless image compression has many applications, such as medical imaging, space photograph and film industry. In this thesis, an efficient lossless image compression scheme HALIC for gray and bit plane images are proposed. The lossless scheme first decomposes gray scale images

into a set of refined bit planes, next uses the scan order for sequencing the bits in the bit plane, subsequently combination of Run length and modified Huffman coding algorithm are applied to encode these sequences. Scan order sequencing of bits in the bit plane along with hybrid coding algorithm iteratively finds the optimum result in the sense of minimizing the compression rate. The Simulation result shows that the proposed scheme can achieve competitive lossless compression performance compared to the JPEG-LS and CALIC algorithm for gray and bit plane images by the combination of hybrid coding and Scan order sequencing of bits.

The new lossless image compression algorithm HALIC was also designed for compressing the color images by decomposing of RGB images into 24 bit planes and finally bit planes are compressed using the combination of hybrid coding and Scan order sequencing of bits. These proposed algorithms are simple and achieve good performance, which is very useful in applications such as satellite imaging, medical imaging, and other standard test images.