Still Image Compression using Embedded Zerotree Wavelet Encoding

Abstract

This paper proposes a Embedded Zerotree Wavelet Encoding (EZW) for image compression. Shapiro’s Embedded Zerotree Wavelet encoder or EZW encoder for short [Sha93]. An EZW encoder is an encoder specially designed to use with wavelet transforms, which explains why it has the word wavelet in its name. The EZW encoder was originally designed to operate on images (2D-signals) but it can also be used on other dimensional signals. The EZW encoder is based on progressive encoding to compress an image into a bit stream with increasing accuracy. This means that when more bits are added to the stream, the decoded image will contain more detail, a property similar to JPEG encoded images. It is also similar to the representation of a number like ?. Every digit we add increases the accuracy of the number, but we can stop at any accuracy we like. Progressive encoding is also known as embedded encoding. Coding an image using the EZW scheme, together with some optimizations results in a remarkably effective image compressor with the property that the compressed data stream can have any bit rate desired. Any bit rate is only possible if there is information loss somewhere so that the compressor is lossy. However, lossless compression is also possible with an EZW encoder, but of course with less spectacular results.

Reference

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[4] Vijay S. Shingate received the bachelor’s degree in 1987 and master’s Degree in 1994 in electronics engineering and is registered for Ph.D. in Electronics from S.R.T.M. University, Nanded. Currently working on image Compression and presently as senior Lecturer in Electronics Dept, K.B.P. College of Engineering, Satara. E-Mail : vshingate@yahoo.co.in


[6] Dr.S.N.Talbar received Ph.D. degree from S.R.T.M. University,Nanded and Currently working as Head of Electronics Dept, Babasaheb Ambedkar Technical University, Lonere.

Index Terms

Computer Science  Image Processing

Key words

Entropy coding  wavelet based image

compression  embedded image coding

zero trees