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**Low-complexity Block dividing Coding Method for Image
Compression using Wavelets**

A thesis presented in partial fulfillment of the requirements for
the degree of

Master of Engineering

in

Computer Systems Engineering

at Massey University,

Palmerston North

New Zealand

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2007

Abstract

Image coding plays a key role in multimedia signal processing and communications. JPEG2000 is the latest image coding standard, it uses the EBCOT (Embedded Block Coding with Optimal Truncation) algorithm. The EBCOT exhibits excellent compression performance, but with high complexity. The need to reduce this complexity but maintain similar performance to EBCOT has inspired a significant amount of research activity in the image coding community.

Within the development of image compression techniques based on wavelet transforms, the EZW (Embedded Zerotree Wavelet) and the SPIHT (Set Partitioning in Hierarchical Trees) have played an important role. The EZW algorithm was the first breakthrough in wavelet based image coding. The SPIHT algorithm achieves similar performance to EBCOT, but with fewer features. The other very important algorithm is SBHP (Sub-band Block Hierarchical Partitioning), which attracted significant investigation during the JPEG2000 development process.

In this thesis, the history of the development of wavelet transform is reviewed, and a discussion is presented on the implementation issues for wavelet transforms. The above mentioned four main coding methods for image compression using wavelet transforms are studied in detail. More importantly the factors that affect coding efficiency are identified.

The main contribution of this research is the introduction of a new low-complexity coding algorithm for image compression based on wavelet transforms. The algorithm is based on block dividing coding (BDC) with an optimised packet assembly. Our extensive simulation results show that the proposed algorithm outperforms JPEG2000 in lossless coding, even though it still leaves a narrow gap in lossy coding situations

Acknowledgements

This thesis would not have been written without the help and support that I received. I would like to take this opportunity to express my sincerest thanks to every one who helped me.

I thank my principal supervisor Dr Bing Du and associate supervisor Professor Richard Harris and Dr Xiang Gui for providing the research topic that I felt was both interesting from a research perspective and had the potential to produce marketable results. They have always been patient, knowledgeable, and supportive, which were all invaluable in completing this thesis. I also have enjoyed the fact that they always have confidence in my abilities, and me even when I had difficulties.

I would also like to thank Mr. John Hayward, for his patient proof-reading and grammatical corrections.

Finally, I would like to thank my family for their encouragement and support.

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