Data Compression Algorithms for Visual Information

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Abstract. Audio-visual information is one of the richest but also most bandwidth-consuming modes of communication. To meet the requirements of new applications, powerful data compression schemes are needed to reduce the global bit rate drastically. In this paper, we proposed a simple lossless visual image compression scheme that will be used to compress visual images. In this scheme, the two dimensional visual image data is converted to a one dimensional data using our proposed pixel scanning method. The difference between consecutive pixel values in the resulting one dimensional image data is taken and the residues are encoded losslessly using an entropy encoder. The working principles of this our approach is presented together with the image compression algorithm used. We developed a software algorithm and implemented it to compress some standard test images using Huffman style coding techniques in a MATLAB platform.

Keywords: Lossless Image Compression, Huffman coding, Audio-Visual information, Wireless Sensor Network.

1 Introduction

The recent availability of inexpensive hardware such as CMOS cameras and microphones that are able to ubiquitously capture multimedia content from the environment has encouraged the development of Multimedia Wireless Sensor Networks (MWSNs) which are networks of wirelessly interconnected sensor nodes that collect video and audio streams, still images, and scalar sensor data. With increasing technological advancements and miniaturization in hardware, a single sensor node can be equipped with audio and visual information collection modules. MWSNs will not only enhance existing sensor network applications such as tracking, home automation, and environmental monitoring, but they will also enable several new applications such as security and surveillance in which a network of nodes identify and track objects from their visual information. MWSNs will also greatly enhance the application area of environmental monitoring [1].

Generally, a wireless sensor network (WSN) is a network of many autonomous sensor nodes that are deployed inside the phenomenon or very close to it. The sensor nodes which communicate with each other over a wireless channel are deployed to sense or monitor physical or environmental conditions cooperatively. WSN are used in many applications such as habitat monitoring, structural health monitoring,

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