International Journal of Innovative
Computing, Information and Control
Volume **7**, Number **6**, June **2011**

 ISSN 1349-4198
pp. 3047–3057

AN ADAPTIVE LINER REGRESSION APPROACH TO STILL IMAGE COMPRESSION

Chin-Chen Chang[1] and Yeu-Pong Lai[2]

[1]Department of Information Engineering and Computer Science
Feng Chia University
Taichung 40724, Taiwan
ccc@cs.ccu.edu.tw

[2]Department of Computer Science and Information Engineering
Chung Cheng Institute of Technology
National Defense University
Tauyuan 33509, Taiwan
yplai@cs.ccu.edu.tw

Received April 2010; revised July 2010

Abstract. *Digital media compression introduces the advantages in storage and transmission. However, the compression procedures also take up computation time. This paper presents an adaptive regression method applied to the standard JPEG compression for archiving higher compression ratios. According to experiments on those popular images, the improvement in compression rate is about 8%, to 18%. Besides, an interesting coding scheme, Golomb-Rice coding, is introduced also for improving the coding and decoding procedures of the JPEG standard. Since the coding scheme is not based on frequency analysis from certain of images to gain a codebook, the decoded images that are encoded with this scheme are assured in average quality. The coding technique can be encoded and decoded in two-directions, since the code-words are symmetric. In other words, the coding techniques have increased encoding and decoding work efficiency two times.*
Keywords: Discrete cosine transform, JPEG, Linear regression, Golomb-Rice coding

1. **Introduction.** In these years, the digital media have become more and more important for people recording their daily lives. These media are presented in images or video. Both are in a larger size, compared with other data files. The raw forms of digital images require a tremendous amount of memory so that the transmission and storage of images are inconvenient. Thus, many researchers have been devoted to the problem of image compression and video compression. In the last two decades, many methods are designed and developed for image compression and video compression [3,4,14,20]. The compressed media files of smaller file sizes accompany those advantages in storage and transmission, although the compression methods introduce overhead. Digital images have become an important source of information in communication systems. Some compression methods are designed for other extra applications, such as data hiding, performed simultaneously [1]. Besides, for art performing applications, some researchers develop the way to image fusion with dynamic range compression [10]. Most of these compression methods are for the higher compression ratio of compressed images and the better image quality of decompressed images. According to the decompressed image quality, these compression methods are classified into two different categories, lossless and lossy [6]. The lossless compression methods are for some special applications, such as these satellite photographs and medical photographs [19]. The image quality of these photographs is very important for these applications in recognizing objects in the images. These lossy compression methods are