A PROGRESSIVE IMAGE TRANSMISSION TECHNIQUE USING HAAR WAVELET TRANSFORMATION

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ABSTRACT. *Progressive image transmission has been widely applied for many applications, such as teleconferencing, remote image database access and so on. In a progressive image transmission system, an image is divided into several parts. In each transmission phase, a sender transmits a part of the image to a receiver. The receiver uses the received parts to reconstruct the original image for quickly seeing the outline of the whole image. This paper proposes a progressive image transmission scheme based on discrete wavelet transformation. In the proposed scheme, a digital image is transformed from spatial domain into frequency domain using Haar wavelet transformation. In other words, the spatial pixels in the image are decomposed into the frequency coefficients. The significant coefficients are transmitted to the receiver for image reconstruction. The scheme also transmits some selected coefficients along with the significant coefficients to the receiver for improving the image quality of the reconstructed image. As the experimental results indicated, the proposed scheme indeed outperforms other schemes in terms of image quality of the reconstructed image in early transmission phases.*
Keyword: Progressive image transmission, Haar, Discrete wavelet transformation

1. **Introduction.** The novel techniques have helped create enormous images. The most convenient way to transmit these images is through Internet. However, a digital image usually requires great bandwidth or storage for transmission. In order to reduce the bandwidth required for transmitting a given image in a given time, image compression techniques are commonly used to encode images. The encoded results, instead of the original images, are transmitted over the Internet. After decoding, we can obtain the decoded images, which are similar to the original ones.

Although image compression provides an efficient and effective method to reduce the amount of data needed to represent an image, it oftentimes requires receivers to wait for the completely encoded results before reconstructing the image. If the decoded image is not the expected one, then receivers must transmit another image again. In order to solve this problem, progressive image transmission (PIT) schemes are proposed to