Advanced Double Predictor Differential Pulse Code Modulation Image Transmission System

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ABSTRACT

The thesis is focused on the improvement of Double Predictor Differential Pulse Code Modulation algorithm for image data compression to increase the image transmission speed. We adopt the Quadtree segmentation algorithm to divide the real-world images into regions having widely differing perceptual importance. The detail regions of a given image will be segmented into blocks with smaller block size, and the background regions of the image will be assigned larger block size for the blocks. After the pre-processing of Quadtree segmentation, the differential values between the near by pixels of each image block are reduced. Therefore, we can decrease the distribution range of prediction error as well as reduce the bit rate and quantization levels. We also use the double predictor DPCM architecture for the proposed image coding system. The conventional DPCM image coding system can be easily affected by a larger fed-back quanti-zation error while transmitted over an error-free channel. The advantage of double predictor DPCM system is to reduce the affect from the fed-back quantization error and not to increase the system complexity. The system performance results of the proposed variable block-size Double Predictor DPCM image encoder/decoder system are about 5 to 6 dB coding gain in signal to noise ratio（SNR） than the conventional DPCM system.

Keywords : Image Compression ; Quadtree Segmentation ; Variable Block Size ; Differential Pulse Code Modulation ; Double Predictor DPCM

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