【DESCRIPTION】

【Invention Title】

APPARATUS FOR DECODING AN IMAGE

【Technical Field】

The present invention relates to an image processing apparatus and method, and more particularly, to an apparatus for reducing the amount of residual signals of an image and entropy-coding the residual signals.

【Background Art】

To efficiently transmit a moving picture signal at a low data rate while maintaining high image quality, various digital moving picture compression technologies have been proposed. These moving picture compression technologies include H.261, Motion Picture Experts Group (MPEG)-2/H.262, H.263, MPEG-4, Advanced Video Coding (AVC)/H.264, and so on. The compression technologies include a discrete cosine transform (DCT) scheme, a motion compensation (MC) scheme, a quantization scheme, an entropy coding scheme, and so on.

For image coding, each picture is divided into a plurality of slices, and each slice is divided into a plurality of coding blocks of a predetermined size. Since an image of a high-definition (HD) grade or above has many flat areas, an image compression can be improved by encoding the image with coding blocks that are larger than a macroblock (MB).

Therefore, new prediction technique is required and changes in transform coding, entropy coding, intra prediction and inter prediction is required as the size of the coding unit increases to increase image compression ratio without increase of the complexity of image compression.

【Disclosure】

【Technical Problem】

The present invention is directed to an apparatus for encoding a moving picture, and more particularly, to an apparatus for effectively encoding transformed residual signals of a moving picture having a predetermined size or more.

【Technical Solution】

One aspect of the present invention provides an apparatus for decoding an image, the apparatus including: an entropy decoding unit configured to receive intra prediction mode and one-dimensional (1D) quantized transform coefficients from an image encoding device, and restore a quantized block using the 1D quantized transform coefficients; an inverse quantization/transform unit configured to inversely quantize and inversely transform the quantized block to generate a restored residual block; an intra prediction unit configured to generate a prediction block according to the intra prediction mode; and an adding unit configured to add the residual block and the prediction block to generate an original block, wherein, when a size of the quantized block is equal to 8x8, the entropy decoding unit restores a plurality of subsets by applying a scan pattern determined according to the intra prediction mode to the 1D quantized transform coefficients, and restores the quantized block by applying a scan pattern determined according to the intra prediction mode to the plurality of subsets, wherein the scan pattern applied to restore the plurality of subsets from the 1D quantized transform coefficients is the same as the scan pattern

applied to restore the quantized block from the plurality of subsets, and wherein a scan pattern applied to flags is the same as the scan pattern applied to restore the quantized block from the plurality of subsets, wherein each flag indicates whether each coefficient of each subset is o or not.

In an example, an image encoding apparatus may be provided, including: an intra prediction unit configured to determine an intra prediction mode and generate a prediction block; a transform/quantization unit configured to generate and to transform and quantize a residual block of the prediction block to generate a quantized block; and an entropy coder configured to entropy-code quantized coefficients of the quantized block, wherein, when a size of the quantized block is equal to 8x8, the coefficients of the quantized block are divided into a plurality of subsets, and the plurality of subsets are scanned using a scan pattern determined according to the intra prediction mode, wherein a scan pattern for scanning non-zero coefficients of each subset is same with the scan pattern for the main and the plurality of subsets, wherein a scan pattern for scanning flags indicating non-zero coefficients of each subset is same with the scan pattern for scanning non-zero coefficients of each subset, wherein the intra prediction mode is encoded using a upper intra prediction mode and a left intra prediction mode, wherein the upper intra prediction mode or the left intra prediction mode is unavailable, the upper intra prediction mode or the left intra prediction mode is set to a DC mode.

Preferably, the plurality of subsets are scanned in a reverse direction.

CLAIMS

1. An apparatus for decoding an image, the apparatus comprising:

an entropy decoding unit configured to receive intra prediction mode and one-dimensional (1D) quantized transform coefficients from an image encoding device, and restore a quantized block using the 1D quantized transform coefficients;

an inverse quantization/transform unit configured to inversely quantize and inversely transform the quantized block to generate a restored residual block;

an intra prediction unit configured to generate a prediction block according to the intra prediction mode; and

an adding unit configured to add the residual block and the prediction block to generate an original block,

wherein, when a size of the quantized block is equal to 8x8, the entropy decoding unit restores a plurality of subsets by applying a scan pattern determined according to the intra prediction mode to the 1D quantized transform coefficients, and restores the quantized block by applying a scan pattern determined according to the intra prediction mode to the plurality of subsets,

wherein the scan pattern applied to restore the plurality of subsets from the 1D quantized transform coefficients is the same as the scan pattern applied to restore the quantized block from the plurality of subsets, and

wherein a scan pattern applied to flags is the same as the scan pattern applied to restore the quantized block from the plurality of subsets, wherein each flag indicates whether each coefficient of each subset is o or not.

2. The apparatus of claim 1, wherein, the plurality of subsets are scanned in a reverse direction in the image encoding device.

3. The apparatus of claim 1, wherein the intra prediction mode is a vertical mode, the scan pattern is a horizontal scan.