CLAIMS

Claim 1.

An image coding device that comprises:

a coding control unit for selecting coding mode for each of coding blocks obtained by hierarchically dividing a coding block having a maximum size which is a processing unit of a coding process;

a prediction image generating unit for performing intra prediction or inter prediction on each of said coding blocks to generate an intra prediction image or an inter prediction image according to said coding mode;

a compressor for carrying out a transformation process and a quantization process by using the quantization parameter on a difference image of a transform block size generated from an original image and the intra prediction image or inter prediction image to obtain a compressed data of the difference image, wherein the transform block size and the quantization parameter are included in a prediction difference coding parameter;

a loop filter for carrying out a process of compensating for an encoding distortion in a decoded image signal which is obtained by adding an intra prediction image or an inter prediction image to a decoded prediction difference signal obtained by performing an inverse transformation process on compressed data of a difference image; and

a variable length coding unit for performing a variable length coding on said coding mode of said coding block, the prediction difference coding parameter, an intra prediction parameter and the compressed data to generate a coded data, said intra prediction parameter being used to perform said intra prediction on a partition of said coding block to generate a prediction image;

said variable length coding unit performing a variable length coding process on an intra merge flag indicating whether or not said intra prediction parameter used for said partition is identical to an intra prediction parameter used for a neighboring partition located above or to the left of said partition,

wherein when there are two or more neighboring partitions located above or to the left of said partition on which said intra prediction is performed, a first partition in a direction away from top left of said partition is selected as each of neighboring partitions located above and to the left of said partition;

wherein when said intra prediction parameter for said partition is identical to said intra prediction parameter used for said neighboring partition located above or to the left of said partition, said variable length coding unit performs a variable length coding process on an intra merge direction specifying one of neighboring partitions located above and to the left of said partition of which intra prediction parameter is identical to said intra prediction parameter, and

when said intra prediction parameter used for said

partition is not identical to said intra prediction parameter used for said neighboring partition located above or to the left of said partition, said variable length coding unit performs a variable length coding process on said intra prediction parameter used for said partition.

Claim 2.

A video decoding device comprising:

a variable length decoding unit for performing a variable length decoding on coded data associated with coding blocks divided up to an upper limit on the number of hierarchical layers to obtain coding mode, prediction difference coding parameter and a compressed data for each of said coding blocks;

a prediction image generating unit for performing intra prediction or inter prediction on each of said coding blocks to generate an intra prediction image or an inter prediction image according to said coding mode; and

an inverse quantization/inverse transformation unit to carry out an inverse quantization process on the compressed data by using the quantization parameter included in the prediction difference coding parameter and an inverse transformation process on the compressed data in units of transform block size included in the prediction difference coding parameter to obtain a prediction difference signal;

a decoded image generator to generate a decoded image by adding the prediction difference signal obtained by decoding the compressed data and the intra prediction image generated by the intra prediction image generating unit or the inter prediction image generated by the inter prediction image generating unit;

a loop filter to carry out a process of compensating for an encoding distortion in the decoded image signal;

said variable length decoding unit decoding an intra merge flag indicating whether or not an intra prediction parameter for a partition of a coding block is identical to an intra prediction parameter for a neighboring partition located above or to the left of said partition,

wherein when there are two or more neighboring partitions located above or to the left of said partition of said coding block on which said intra prediction is performed, a first partition in a direction away from top left of said partition of said coding block is regarded as each of neighboring partitions located above and to the left of said partition;

wherein when said intra prediction parameter for said partition is identical to said intra prediction parameter for said neighboring partition located above or to the left of said partition, said variable length decoding unit decodes an intra merge direction specifying one of neighboring partitions located above and to the left of said partition of which intra prediction parameter is identical to said intra prediction parameter, and

when said intra prediction parameter for said partition is not identical to said intra prediction parameter for said

neighboring partition located above or to the left of said partition, said variable length decoding unit decodes said intra prediction parameter for said partition.

Claim 3.

A moving picture coded data including coded data having a coding mode for each of coding blocks divided up to an upper limit on the number of hierarchical layers;
said coded data comprising:

in the moving picture coded data, coded data of the coding blocks, a maximum size of the coding blocks and the number of hierarchical layers being multiplexed,

the coded data having the coding mode for each of coding blocks and coded data of partitions for each of coding blocks,

the coded mode including division information about the partition belonging to the coding block,

the coded data comprising:

an intra merge flag indicating whether or not an intra prediction parameter for a partition of a coding block is identical to an intra prediction parameter for a neighboring partition located above or to the left of said partition,

an intra merge direction specifying one of neighboring partitions located above and to the left of said partition of which intra prediction parameter is identical to said intra prediction parameter used to perform intra prediction on said partition when the intra merge flag indicates that said intra prediction parameter used to perform intra prediction on said partition is identical to said intra prediction parameter used to perform intra prediction on a neighboring partition located above or to the left of said partition, and

intra prediction parameter for said partition other than said intra prediction parameter on a neighboring partition located above or to the left of said partition when the intra merge flag indicates that said intra prediction parameter used to perform intra prediction on said partition is not identical to said intra prediction parameter used to perform intra prediction on a neighboring partition located above or to the left of said partition, and

compressed data of a difference image between inputted image and prediction image obtained by performing a prediction process according to the coding mode;

prediction difference coding parameters including a quantization parameter for inverse-quantizing the compressed data and a transformation block size;

wherein an image decoding device, which decodes the moving picture data stored in the medium,
for specifying the coded data associated with each of the partitions from the coded data multiplexed into the bitstream by referring to the division information,

inverse-quantizing the compressed data by using the quantization parameter, generating a decoded prediction difference signal by inverse-transforming in units of the transformation block size,

decoding said intra merge flag for a target partition of

said coding block when coding mode of said coding block including the target partition is intra mode,

said image decoding device decodes said intra merge direction when said image decoding device specifies that said intra prediction parameter used to perform intra prediction on a target partition is identical to said intra prediction parameter used to perform intra prediction on a neighboring partition located above or to the left of said partition according to said intra merge flag,

wherein when there are two or more neighboring partition located above or to the left of said target partition, a first partition in a direction away from top left of said partition is regarded as each of neighboring partitions located above and to the left of said partition;

said image decoding device specifies one of neighboring partitions located above and to the left of said partition of which intra prediction parameter is identical to said intra prediction parameter for said target partition according to said intra merge direction, and generates prediction image by performing a prediction process indicated by the coding mode by using the intra prediction parameter specified,

when said image decoding device specifies that said intra prediction parameter for said target partition is not identical to said intra prediction parameter for said neighboring partition located above or to the left of said partition according to said intra merge direction,
said image decoding device decodes said intra prediction parameter for said partition and generates an intra prediction image by performing a prediction process indicated by the coding mode by using the intra prediction parameter decoded, and said image decoding device generates a decoded image by adding the prediction difference signal and the prediction image generated.

Claim 4.

A non-transitory computer-readable medium storing a bitstream including coded data having a coding mode for each of coding blocks divided up to an upper limit on the number of hierarchical layers;
said coded data comprising:

the bit stream stored in the medium into which coded data of the coding blocks, a maximum size of the coding blocks and the number of hierarchical layers are multiplexed,

the coded data having the coding mode for each of coding blocks and coded data of partitions for each of coding blocks,

the coded mode including division information about the partition belonging to the coding block,

the coded data comprising:

an intra merge flag indicating whether or not an intra prediction parameter for a partition of a coding block is identical to an intra prediction parameter for a neighboring partition located above or to the left of said partition,

an intra merge direction specifying one of neighboring partitions located above and to the left of said partition of

which intra prediction parameter is identical to said intra prediction parameter used to perform intra prediction on said partition when the intra merge flag indicates that said intra prediction parameter used to perform intra prediction on said partition is identical to said intra prediction parameter used to perform intra prediction on a neighboring partition located above or to the left of said partition, and

intra prediction parameter for said partition other than said intra prediction parameter on a neighboring partition located above or to the left of said partition when the intra merge flag indicates that said intra prediction parameter used to perform intra prediction on said partition is not identical to said intra prediction parameter used to perform intra prediction on a neighboring partition located above or to the left of said partition, and

compressed data of a difference image between inputted image and prediction image obtained by performing a prediction process according to the coding mode;

prediction difference coding parameters including a quantization parameter for inverse-quantizing the compressed data and a transformation block size;

wherein an image decoding device, which decodes the bitstream stored in the medium,

for specifying the coded data associated with each of the partitions from the coded data multiplexed into the bitstream by referring to the division information,

inverse-quantizing the compressed data by using the quantization parameter, generating a decoded prediction difference signal by inverse-transforming in units of the transformation block size, decoding said intra merge flag for a target partition of said coding block when coding mode of said coding block including the target partition is intra mode,

said image decoding device decodes said intra merge direction when said image decoding device specifies that said intra prediction parameter used to perform intra prediction on a target partition is identical to said intra prediction parameter used to perform intra prediction on a neighboring partition located above or to the left of said partition according to said intra merge flag,

wherein when there are two or more neighboring partition located above or to the left of said target partition, a first partition in a direction away from top left of said partition is regarded as each of neighboring partitions located above and to the left of said partition;

said image decoding device specifies one of neighboring partitions located above and to the left of said partition of which intra prediction parameter is identical to said intra prediction parameter for said target partition according to said intra merge direction, and generates prediction image by performing a prediction process indicated by the coding mode by using the intra prediction parameter specified,

when said image decoding device specifies that said intra prediction parameter for said target partition is not

identical to said intra prediction parameter for said neighboring partition located above or to the left of said partition according to said intra merge direction, said image decoding device decodes said intra prediction parameter for said partition and generates an intra prediction image by performing a prediction process indicated by the coding mode by using the intra prediction parameter decoded, and said image decoding device generates a decoded image by adding the prediction difference signal and the prediction image generated.