CLAIMS

1. An image predictive encoding device comprising:

region division means adapted to divide an input picture into a plurality of blocks;

predicted signal generation means adapted to determine, from a plurality of prediction modes, an optimum prediction mode with a smallest difference for a pixel signal in a target block, the target block being a processing target from among the plurality of blocks, and the predicted signal generation means adapted to generate a predicted signal in accordance with the determined optimum prediction mode;

residual signal generation means adapted to generate a residual signal representing a difference between the pixel signal of the target block and the predicted signal;

signal encoding means adapted to encode the residual signal to generate a compressed signal;

prediction mode encoding means adapted to encode the optimum prediction mode; and

storage means adapted to restore the compressed signal and store a restored signal as a reproduced pixel signal,

wherein the prediction mode encoding means is adapted to generate a candidate prediction mode list containing elements of optimum prediction modes of a plurality of previously-reproduced blocks neighboring the target block; the prediction mode encoding means adapted to encode a flag to indicate whether the candidate prediction mode list contains an element corresponding to the optimum prediction mode; when the corresponding element is present in the

candidate prediction list, the prediction mode encoding means is further adapted to encode an index to said element present in the candidate prediction mode list; when there is no corresponding element present in the candidate prediction list, the prediction mode encoding means is adapted to encode the optimum prediction mode with a number, after each element in the candidate prediction mode list is removed from the plurality of prediction modes.

2. An image predictive encoding method comprising:

a region division step of dividing an input picture into a plurality of blocks;

a predicted signal generation step of determining, from a plurality of prediction methods, an optimum prediction mode with the smallest difference for a pixel signal in a target block, and generating a predicted signal in accordance with the optimum prediction mode, the target block being a processing target from among the plurality of blocks;

a residual signal generation step of generating a residual signal representative of a difference between the pixel signal of the target block and the predicted signal;

a signal encoding step of encoding the residual signal to generate a compressed signal;

a prediction mode encoding step of encoding the optimum prediction mode; and

a storage step of restoring the compressed signal and storing a restored signal as a reproduced pixel signal,

wherein the prediction mode encoding step comprises: generating a candidate prediction mode list containing elements of optimum prediction modes of a plurality of previously-reproduced blocks neighboring the target block; encoding a flag to indicate whether the candidate prediction mode list contains an element corresponding to the optimum prediction mode; when the corresponding element is present in the candidate prediction list, further encoding an index to said element present in the candidate prediction mode list; when there is no corresponding element present in the candidate prediction list, encoding the optimum prediction mode with a number, after each element in the candidate prediction mode list is removed from the plurality of prediction modes.

3. An image predictive decoding device comprising:

input means adapted to accept input of compressed picture data and encoded information, the compressed picture data containing a residual signal generated by dividing a picture into a plurality of blocks and performing predictive encoding of the block, and the encoded information about a prediction mode indicative of a generation method of a predicted signal of the block;

restoration means adapted to extract the residual signal of the block from the compressed picture data to restore a reproduced residual signal;

prediction mode decoding means adapted to restore the encoded information about the prediction mode to generate an optimum prediction mode;

predicted signal generation means adapted to generate the predicted signal of the block based on the optimum prediction mode;

picture restoration means adapted to add the predicted signal to the reproduced residual signal to restore a pixel signal of the block; and

storage means adapted to store the restored pixel signal as a reproduced pixel signal,

wherein the prediction mode decoding means is adapted to generate a candidate prediction mode list containing elements of optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block; the prediction mode decoding means adapted to decode a flag that indicates whether the candidate prediction mode list contains an element corresponding to the optimum prediction mode; when the flag indicates that the corresponding element is present in the candidate prediction mode list, the prediction mode decoding means further adapted to decode an index indexing the candidate prediction mode list and defining an element indicated by the index, as the optimum prediction mode; when the flag indicates that no corresponding element is present in the candidate prediction mode list, the prediction mode decoding means is adapted to decode information about an REM mode to define, as the optimum prediction mode, a value of the REM mode which is converted based on the candidate prediction mode list.

4. An image predictive decoding method comprising:

an input step of accepting input of compressed picture data containing a residual signal and encoded information, the residual

signal generated by dividing a picture into a plurality of blocks and performing predictive encoding of the block, and the encoded information about a prediction mode indicative of a generation method of a predicted signal of the block;

a restoration step of extracting the residual signal of the block from the compressed picture data to restore a reproduced residual signal;

a prediction mode decoding step of restoring the encoded information about the prediction mode to generate an optimum prediction mode;

a predicted signal generation step of generating the predicted signal of the block based on the optimum prediction mode;

a picture restoration step of adding the predicted signal to the reproduced residual signal to restore a pixel signal of the block; and

a storage step of storing the restored pixel signal as a reproduced pixel signal,

wherein the prediction mode decoding step comprises: generating a candidate prediction mode list containing elements of optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block; decoding a flag that indicates whether the candidate prediction mode list contains an element corresponding to the optimum prediction mode; when the flag indicates that the corresponding element is present in the candidate prediction mode list, further decoding an index indexing the candidate prediction mode list and defining an element indicated by the index as the optimum prediction mode; when the flag indicates that no corresponding element

is present in the candidate prediction mode list further decoding information about an REM mode and defining, as the optimum prediction mode, a value of the REM mode, which is converted based on the candidate prediction mode list.

5. The image predictive decoding device according to claim 3, wherein, when the flag indicates that no corresponding element is present in the candidate prediction mode list after decoding the information about the REM mode,
the prediction mode decoding means is adapted to substitute the decoded value of REM mode into a variable for the intra-frame prediction mode of the target block, and
perform, for every element in the candidate prediction list,
a step of defining, as X, a smallest element among elements on the candidate prediction list which are not yet used in comparison,
a step of comparing the variable with X, and
a step of adding 1 to a value of the variable when the variable is larger than or equal to X to define the value of the variable as the optimum prediction mode.

6. The image predictive decoding method according to claim 4, wherein, when the flag indicates that no corresponding element is present in the candidate prediction list, after decoding the information about the REM mode,
the prediction mode decoding step comprises:
substituting the decoded value of REM mode into a variable for the

intra-frame prediction mode of the target block, and

performing, for every element in the candidate prediction list,

a step of defining as X a smallest element among elements on the candidate prediction list which are not yet used in comparison,

a step of comparing the variable with X, and

a step of adding 1 to a value of the variable when the variable is larger than or equal to X, to define the value of the variable as the optimum prediction mode.

CLAIMS

1. An image predictive encoding device comprising:

region division means for dividing an input picture into a plurality of blocks;

predicted signal generation means for determining, from a plurality of prediction modes, an optimum prediction mode with a smallest difference for a pixel signal in a block, the block being a processing target from among the plurality of blocks, and the predicted signal generation means being for generating a predicted signal in accordance with the determined optimum prediction mode;

residual signal generation means for generating a residual signal representing a difference between the pixel signal of the block and the predicted signal;

signal encoding means for encoding the residual signal to generate a compressed signal;

prediction mode encoding means for encoding the optimum prediction mode; and

storage means for restoring the compressed signal and storing a restored signal as a reproduced pixel signal,

wherein the prediction mode encoding means generates a candidate prediction mode list by adding, as elements, optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block, the candidate prediction mode list containing no duplicate prediction modes as the elements, and

wherein the prediction mode encoding means encodes a flag to indicate whether the candidate prediction mode list contains an element

corresponding to the optimum prediction mode.

2. An image predictive encoding method executed by an image predictive encoding device, the image predictive encoding method comprising:

a region division step of dividing an input picture into a plurality of blocks;

a predicted signal generation step of determining, from a plurality of prediction methods, an optimum prediction mode with the smallest difference for a pixel signal in a block, and generating a predicted signal in accordance with the optimum prediction mode, the block being a processing target from among the plurality of blocks;

a residual signal generation step of generating a residual signal representative of a difference between the pixel signal of the block and the predicted signal;

a signal encoding step of encoding the residual signal to generate a compressed signal;

a prediction mode encoding step of encoding the optimum prediction mode; and

a storage step of restoring the compressed signal and storing a restored signal as a reproduced pixel signal,

wherein the prediction mode encoding step comprises:

generating a candidate prediction mode list by adding, as elements, optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block, the candidate prediction mode list containing no duplicate prediction modes as the

elements, and

encoding a flag to indicate whether the candidate prediction mode list contains an element corresponding to the optimum prediction mode.

3. An image predictive decoding device comprising:

input means for accepting input of compressed picture data containing a residual signal and encoded information about a prediction mode, the residual signal being generated by dividing a picture into a plurality of blocks and performing predictive encoding of a block, and the encoded information about the prediction mode being indicative of a generation method of a predicted signal of the block;

restoration means for extracting the residual signal of the block from the compressed picture data to restore a reproduced residual signal;

prediction mode decoding means for restoring the encoded information about the prediction mode to generate an optimum prediction mode;

predicted signal generation means for generating the predicted signal of the block based on the optimum prediction mode;

picture restoration means for adding the predicted signal to the reproduced residual signal to restore a pixel signal of the block; and

storage means for storing the restored pixel signal as a reproduced pixel signal,

wherein the prediction mode decoding means generates a candidate prediction mode list by adding, as elements, optimum

prediction modes of a plurality of previously-reproduced blocks neighboring the block, the candidate prediction mode list containing no duplicate prediction modes as the elements, and

wherein the prediction mode decoding means decodes a flag that indicates whether or not the candidate prediction mode list contains an element corresponding to the optimum prediction mode.

4. An image predictive decoding method executed by an image predictive decoding device, the image predictive decoding method comprising:

an input step of accepting input of compressed picture data containing a residual signal and encoded information about a prediction mode, the residual signal being generated by dividing a picture into a plurality of blocks and performing predictive encoding of a block, and the encoded information about the prediction mode being indicative of a generation method of a predicted signal of the block;

a restoration step of extracting the residual signal of the block from the compressed picture data to restore a reproduced residual signal;

a prediction mode decoding step of restoring the encoded information about the prediction mode to generate an optimum prediction mode;

a predicted signal generation step of generating the predicted signal of the block based on the optimum prediction mode;

a picture restoration step of adding the predicted signal to the reproduced residual signal to restore a pixel signal of the block; and

a storage step of storing the restored pixel signal as a reproduced pixel signal,

wherein the prediction mode decoding step comprises:

generating a candidate prediction mode list by adding, as elements, optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block, the candidate prediction mode list containing no duplicate prediction modes as the elements; and

decoding a flag that indicates whether or not the candidate prediction mode list contains an element corresponding to the optimum prediction mode.

5. An image predictive encoding program that causes a computer to function as:

region division means for dividing an input picture into a plurality of blocks;

predicted signal generation means for determining, from a plurality of prediction modes, an optimum prediction mode with a smallest difference for a pixel signal in a block, the block being a processing target from among the plurality of blocks, and the predicted signal generation means being for generating a predicted signal in accordance with the determined optimum prediction mode;

residual signal generation means for generating a residual signal representing a difference between the pixel signal of the block and the predicted signal;

signal encoding means for encoding the residual signal to

generate a compressed signal;

prediction mode encoding means for encoding the optimum prediction mode; and

storage means for restoring the compressed signal and storing a restored signal as a reproduced pixel signal,

wherein the prediction mode encoding means generates a candidate prediction mode list by adding, as elements, optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block, the candidate prediction mode list containing no duplicate prediction modes as the elements, and

wherein the prediction mode encoding means encodes a flag to indicate whether the candidate prediction mode list contains an element corresponding to the optimum prediction mode.

6. An image predictive decoding program that causes a computer to function as:

input means for accepting input of compressed picture data containing a residual signal and encoded information about a prediction mode, the residual signal being generated by dividing a picture into a plurality of blocks and performing predictive encoding of a block, and the encoded information about the prediction mode being indicative of a generation method of a predicted signal of the block;

restoration means for extracting the residual signal of the block from the compressed picture data to restore a reproduced residual signal;

prediction mode decoding means for restoring the encoded

information about the prediction mode to generate an optimum prediction mode;

predicted signal generation means for generating the predicted signal of the block based on the optimum prediction mode;

picture restoration means for adding the predicted signal to the reproduced residual signal to restore a pixel signal of the block; and

storage means for storing the restored pixel signal as a reproduced pixel signal,

wherein the prediction mode decoding means generates a candidate prediction mode list by adding, as elements, optimum prediction modes of a plurality of previously-reproduced blocks neighboring the block, the candidate prediction mode list containing no duplicate prediction modes as the elements, and

wherein the prediction mode decoding means decodes a flag that indicates whether or not the candidate prediction mode list contains an element corresponding to the optimum prediction mode.