CLAIMS

1. A video encoding method comprising:

in order to encode a current region of a video, performing transformation on the current region by using transformation units in a variable tree-structure which are determined from among transformation units that are hierarchically split from a base transformation unit with respect to the current region and which are generated based on a maximum split level of a transformation unit, and determining transformation units with respect to the current region from among the transformation units in the variable tree-structure; and

outputting encoded data of the current region which is generated via encoding comprising the transformation based on the determined transformation units, information about an encoding mode determined in the encoding with respect to the current region, and transformation-unit hierarchical-structure information comprising maximum size information and minimum size information of the transformation unit with respect to the video.

2. The video encoding method of claim 1, wherein the transformation-unit hierarchical-structure information further comprises maximum split information indicating the maximum split level of the transformation unit, and

wherein the maximum split level of the transformation unit with respect to the current region is set for each of data groups at a data level from among data levels comprising a picture sequence, a picture, a slice, and a data unit for the encoding of the video, and is equal to or less than a total number of levels from a maximum coding unit to a minimum coding unit that respectively correspond to a maximum size and a minimum size of the transformation units with respect to the video.

3. The video encoding method of claim 1, wherein the maximum split level of the transformation unit with respect to the current region is separately determined in each of prediction modes used while the encoding is performed on the current region.

4. The video encoding method of claim 1, wherein transformation units at lower levels which are obtained by splitting the base transformation unit with respect to

the current region are determined as data units having shapes that are comprised in partitions so as not to span a boundary between the partitions that are data units for prediction encoding with respect to the current region.

5. The video encoding method of claim 1, wherein the base transformation unit with respect to the current region is a maximum and uppermost-level transformation unit that is usable with respect to the current region, and is equal to or less than a maximum size of the transformation unit with respect to the video,

wherein a level of a predetermined transformation unit indicates a total number of splits so as to generate the predetermined transformation unit by stepwise splitting the base transformation unit,

wherein the transformation units in the variable tree-structure that are generated based on the maximum split level of the transformation unit with respect to the current region comprise the base transformation unit and transformation units according to levels that are generated by stepwise splitting the base transformation unit to the maximum split level, and

wherein a minimum size of the transformation units with respect to the current region is determined as a larger one from among a minimum size of the transformation unit with respect to the video and a size of a transformation unit at a lowermost level which is obtained by splitting the base transformation unit to the maximum split level.

6. A video decoding method comprising:

receiving a bitstream comprising data obtained by encoding a video;

parsing the bitstream and extracting, from the bitstream, encoded data of a current region, information about an encoding mode determined in the encoding with respect to the current region, and transformation-unit hierarchical-structure information comprising maximum size information and minimum size information of the transformation unit with respect to the video; and

performing inverse-transformation on the current region by using transformation units in a variable tree-structure which are determined from among transformation units that are hierarchically split from a base transformation unit with respect to the current region and which are generated based on a maximum split level of the transformation

~~unit, decoding the encoded data of the current region, and restoring the video.~~

7. The video decoding method of claim 6, wherein the transformation-unit hierarchical-structure information further comprises maximum split information indicating the maximum split level of the transformation unit, and

wherein the maximum split information of the transformation unit is extracted as a parameter with respect to one data level from among data levels comprising a picture sequence, a picture, a slice, and a data unit for the encoding of the video, and is equal to or less than a total number of levels from a maximum coding unit to a minimum coding unit that respectively correspond to a maximum size and a minimum size of the transformation units with respect to the video.

8. The video decoding method of claim 6, wherein the extracting comprises separately reading the maximum split level of the transformation unit with respect to the current region, in each of prediction modes used while the encoding is performed on the current region.

9. The video decoding method of claim 6, wherein transformation units at lower levels which are obtained by splitting the base transformation unit with respect to the current region are determined as data units having shapes that are comprised in partitions so as not to span a boundary between the partitions that are data units for prediction encoding with respect to the current region.

10. The video decoding method of claim 6, wherein the extracting comprises extracting transformation-unit sub-split information indicating whether each of transformation units is split into a transformation unit at a next lower level, wherein the transformation units are determined from among the transformation units in the variable tree-structure with respect to the current region and exclude a transformation unit having a minimum size of the transformation unit with respect to the current region.

11. The video decoding method of claim 6, wherein the base transformation unit with respect to the current region is a maximum and uppermost-level transformation

unit that is usable with respect to the current region, and is equal to or less than a maximum size of the transformation unit with respect to the video, and a level of a predetermined transformation unit indicates a total number of splits so as to generate the predetermined transformation unit by stepwise splitting the base transformation unit,

wherein the transformation units in the variable tree-structure that are generated based on the maximum split level of the transformation unit with respect to the current region comprise the base transformation unit and transformation units according to levels that are generated by stepwise splitting the base transformation unit to the maximum split level, and

wherein a minimum size of the transformation units with respect to the current region is determined as a larger one from among a minimum size of the transformation unit with respect to the video and a size of a transformation unit at a lowermost level which is obtained by splitting the base transformation unit to the maximum split level.

12. A video encoding apparatus comprising:

a transformation-unit determining unit, in order to encode a current region of the video, performing transformation on the current region by using transformation units in a variable tree-structure which are determined from among transformation units that are hierarchically split from a base transformation unit with respect to the current region and which are generated based on a maximum split level of a transformation unit, and determining transformation units with respect to the current region from among the transformation units in the variable tree-structure; and

an output unit outputting encoded data of the current region which is generated via encoding comprising the transformation based on the determined transformation units, information about an encoding mode determined in the encoding with respect to the current region, and transformation-unit hierarchical-structure information comprising maximum size information and minimum size information of the transformation unit with respect to the video.

13. A video decoding apparatus comprising:

a receiving unit receiving a bitstream comprising data obtained by encoding the video;

an extracting unit parsing the bitstream and extracting, from the bitstream, encoded data of a current region, information about an encoding mode determined in the encoding with respect to the current region, and transformation-unit hierarchical-structure information comprising maximum size information and minimum size information of the transformation unit with respect to the video; and

a decoding unit performing inverse-transformation on the current region by using transformation units in a variable tree-structure which are determined from among transformation units that are hierarchically split from a base transformation unit with respect to the current region and which are generated based on a maximum split level of the transformation unit, decoding the encoded data of the current region, and restoring the video.

14. A computer-readable recording medium having recorded thereon a program for executing the video encoding method of claim 1.

15. A computer-readable recording medium having recorded thereon a program for executing the video decoding method of claim 6.

CLAIMS

1. A video decoding apparatus comprising:

a receiver which receives a bitstream comprising data obtained by encoding the video;

an obtainer which obtaining, from the bitstream, encoded data of a current region, information about an encoding mode determined in the encoding with respect to the current region, and transformation-unit hierarchical-structure information comprising minimum size information of the transformation unit with respect to the video; and

a decoder which performs inverse-transformation on the current region by using transformation units in a variable tree-structure which are determined from among transformation units that are hierarchically split from a base transformation unit with respect to the current region and which are generated based on a maximum split level of the transformation unit, decodes the encoded data of the current region, and reconstructs the video.

2. The video decoding apparatus of claim 1, wherein the transformation-unit hierarchical-structure information further comprises maximum split information indicating a total number of levels from a maximum coding unit to a minimum coding unit that respectively correspond to a maximum size and a minimum size of the transformation units with respect to the video, and

wherein the maximum split information of the transformation unit is extracted as a parameter with respect to one data level from among data levels comprising a picture sequence, a picture, a slice, and a data unit for the encoding of the video.

3. The video decoding apparatus of claim 1, wherein transformation units at lower levels which are obtained by splitting the base transformation unit

with respect to the current region are determined as data units having shapes that are comprised in partitions so as not to span a boundary between the partitions that are data units for prediction encoding with respect to the current region.

4. The video decoding apparatus of claim 1 wherein the obtainer obtains transformation-unit sub-split information indicating whether each of transformation units is split into a transformation unit at a next lower level, wherein the transformation units are determined from among the transformation units in the variable tree-structure with respect to the current region and exclude a transformation unit having a minimum size of the transformation unit with respect to the current region.

5. The video decoding apparatus of claim 1, wherein the base transformation unit with respect to the current region is a maximum and uppermost-level transformation unit that is usable with respect to the current region, and is equal to or less than a maximum size of the transformation unit with respect to the video, and a level of a predetermined transformation unit indicates a total number of splits so as to generate the predetermined transformation unit by stepwise splitting the base transformation unit,

wherein the transformation units in the variable tree-structure that are generated based on the maximum split level of the transformation unit with respect to the current region comprise the base transformation unit and transformation units according to levels that are generated by stepwise splitting the base transformation unit to the maximum split level, and

wherein a minimum size of the transformation units with respect to the current region is determined as a larger one from among a minimum size of the transformation unit with respect to the video and a size of a transformation unit at a lowermost level which is obtained by splitting the base transformation unit to the maximum split level.