Claims

[Claim 1] A method of encoding a video by considering a skip and split order, the method comprising:
splitting a picture into a maximum coding unit including coding units being data units in which the picture is encoded;
for the maximum coding unit, determining coding units having a tree structure including coding units of coded depths and determining encoding modes for the coding units of the coded depths by performing encoding based on coding units according to depths, the coding units according to depths obtained by hierarchically splitting the maximum coding unit as a depth deepens and the depths being proportional to a number of times the maximum coding unit is split; and
outputting information about a maximum coding unit size and, for the maximum coding unit, information indicating an order of split information and skip mode information which is selectively determined for the coding units according to depths, information about the encoding modes for the coding units of the coded depths including the split information and the skip mode information which are arranged according to the order, and encoded video data.

[Claim 2] The method of claim 1, wherein the order of the split information and the skip mode information which is selectively determined for the coding units according to depths is determined by at least one of an image sequence to which the coding units according to depths belong, a slice, a slice type according to a prediction direction, and a quantization parameter of a data unit.

[Claim 3] The method of claim 1, wherein the order of the split information and the skip mode information which is selectively determined for the coding units according to depths is determined by the depths of the coding units in the maximum coding unit.

[Claim 4] The method of claim 3, wherein the order of the split information and the skip mode information of the coding units according to depths is determined in such a manner that:
if a coding unit is the maximum coding unit, the skip mode information precedes the split information, and
if the coding unit is not the maximum coding unit, the split information precedes the skip mode information.

[Claim 5] The method of claim 1, wherein the outputting comprises combining

the split information and the skip mode information of the coding units according to the coded depths and outputting one piece of split and skip information according to the combining.

[Claim 6] The method of claim 5, wherein the outputting further comprises analyzing a frequency of occurrence of a combination of the split information and the skip mode information of the coding units according to depths and determining a number of bits for the one piece of split and skip information for the combination of the split information and the skip mode information according to the analyzed frequency.

[Claim 7] A method of decoding a video by considering a skip and split order, the method comprising:

receiving and parsing a bitstream of encoded video data;

extracting, from the bitstream, information about a maximum size of a coding unit being a data unit in which a picture is decoded, information about an order of split information and skip mode information about coding units according to depths, and, according to the order of the split information and the skip mode information, information about a coded depth and an encoding mode according to a maximum coding unit of the picture; and

based on the information about the maximum size of the coding unit and the information about the coded depth and the encoding mode, decoding the encoded video data of the picture according to coding units having a tree structure including coding units of coded depths, wherein the coding units according to depths are obtained by hierarchically splitting the maximum coding unit as a depth deepens, the depths being proportional to a number of times the maximum coding unit is split.

[Claim 8] The method of claim 7, wherein the order of the split information and the skip mode information is selectively set according to at least one of an image sequence to which a corresponding coding unit, among the coding units according to depths, belongs, a slice, a slice type according to a prediction direction, and a quantization parameter of a data unit.

[Claim 9] The method of claim 7, wherein the order of the split information and the skip mode information is selectively set according to the depths of the coding units in the maximum coding unit.

[Claim 10] The method of claim 9, wherein the extracting comprises:

if a coding unit is the maximum coding unit, according to the order of

the split information and the skip mode information, determining whether the maximum coding unit is predicted in a skip mode according to the skip mode information before determining whether the maximum coding unit is split according to the split information;
if the coding unit is not the maximum coding unit, determining whether the coding unit is split according to the split information before determining whether the coding unit is predicted in a skip mode according to the skip mode information; and
extracting the information about the coded depth and the encoding mode of the coded depth and the encoded video data according to coding units of the coded depth.

[Claim 11] The method of claim 7, wherein the extracting comprises:
if one piece of split and skip information obtained by combining the split information and the skip mode information is extracted for the coding units according to depths, analyzing a combination of the split information and the skip mode information based on a number of bits of the one piece of split and skip information.

[Claim 12] An apparatus for encoding a video by considering a skip and split order, the apparatus comprising:
a maximum coding unit splitter which splits a picture into a maximum coding unit including coding units being data units in which the picture is encoded;
a coding unit and encoding mode determiner which, for the maximum coding unit, determines coding units having a tree structure including coding units of coded depths and determines encoding modes for the coding units of the coded depths by performing encoding based on the coding units according to depths, the coding units according to depths obtained by hierarchically splitting the maximum coding unit as a depth deepens and the depths being proportional to a number of times the maximum coding unit is split; and
an output unit which outputs information about a maximum coding unit size and, for the maximum coding unit, information indicating an order of split information and skip mode information which is selectively determined for the coding units according to depths, information about the encoding modes for the coding units of the coded depths including the split information and the skip mode information which are arranged according to the order, and encoded video data.

[Claim 13] An apparatus for decoding a video by considering a skip and split

order, the apparatus comprising:

a receiver which receives and parses a bitstream of encoded video data;

a data extractor which extracts, from the bitstream, information about a maximum size of a coding unit being a data unit in which a picture is decoded, information about an order of split information and skip mode information of coding units according to depths, and, according to the order of the split information and the skip mode information, information about a coded depth and an encoding mode according to a maximum coding unit of the picture; and

a decoder which, based on the information about the maximum size of the coding unit and the information about the coded depth and the encoding mode, decodes the encoded video data of the picture according to coding units having a tree structure including coding units of coded depths,

wherein the coding units according to depths are obtained by hierarchically splitting the maximum coding unit as a depth deepens, the depths being proportional to a number of times the maximum coding unit is split.

[Claim 14] A computer-readable recording medium having embodied thereon a program for executing the method of claim 1.

[Claim 15] A computer-readable recording medium having embodied thereon a program for executing the method of claim 7.

CLAIMS

1. A video decoding apparatus comprising:

a receiver which receives a bitstream of encoded video;

an extractor which extracts, from the bitstream, split information of a coding unit in a maximum coding unit of a picture; and

a decoder which, when the split information indicates a split for a current depth, splits a coding unit of the current depth, independently from neighboring coding units, into coding units of a lower depth, and

when the split information indicates a non-split for the current depth, determines at least one partition from the coding unit of the current depth and decodes the coding unit of the current depth by performing a prediction based on the at least one partition,

wherein, when skip information for the coding unit of the current depth indicates a skip mode, the coding unit of the current depth is decoded by performing a prediction in the skip mode based on a partition having a size equal to a size of the coding unit of the current depth; and

when the skip information for the coding unit of the current depth does not indicate the skip mode, the coding unit of the current depth is decoded by performing a prediction in a prediction mode indicated by prediction mode information obtained from the bitstream,

wherein the picture is split into a plurality of maximum coding units according to information about the maximum size of the coding unit obtained from the bitstream.

2. The apparatus of claim 1, wherein the split information indicates whether a corresponding coding unit is split into coding units of a lower depth.

3. The apparatus of claim 1, wherein, when the skip information for the coding unit of the current depth does not indicate the skip mode, the coding unit of the current depth is decoded by performing a prediction in a prediction mode indicated by prediction mode information, obtained from the bitstream, based on at least one partition having a size equal to or less than the size of the coding unit of the current depth.

4. The apparatus of claim 3, wherein the at least one partition having a size equal to or less than the size of the coding unit of the current depth is obtained from the coding unit of the current depth based on partition type information obtained from the bitstream.

5. The apparatus of claim 4, wherein the partition type information indicates one of a symmetric partition type and an asymmetric partition type.