CLAIMS

1. An image decoding method performed by an image decoding apparatus, the image decoding method comprising:

obtaining, from a bitstream, video coding layer (VCL) network abstraction layer (NAL) unit type information of a current picture and first flag information specifying whether a subpicture included in the current picture is treated as one picture;

determining a NAL unit type of each of a plurality of slices included in the current picture, based on the obtained VCL NAL unit type information; and

decoding the plurality of slices based on the determined NAL unit type and the first flag information,

wherein the current picture comprises two or more subpictures based on at least some of the plurality of slices having different NAL unit types,

wherein the first flag information has a predetermined value specifying that each of the two or more subpictures is treated as one picture based on at least some of the plurality of slices having different NAL unit types, and

wherein, based on a first VCL NAL unit of the current picture having one NAL unit type among predetermined NAL unit types and at least some of the plurality of slices having different NAL unit types, a second VCL NAL unit does not have the others NAL unit types among the predetermined NAL unit types.

2. The image decoding method of claim 1, wherein all slices in each subpicture included in the current picture have the same NAL unit type.

3. The image decoding method of claim 1, wherein whether at least some of the plurality of slices have different NAL unit types is determined based on second flag information obtained from a picture parameter set (PPS).

4. The image decoding method of claim 3, wherein the second flag information has a predetermined value specifying that all the plurality of slices have the same NAL unit type, based on a mixed NAL unit type being not applicable to all pictures in an output layer set (OLS).

5. The image decoding method of claim 3, wherein the second flag information has a predetermined value specifying that all the plurality of slices have the same NAL unit type, based on the current picture including only one subpicture.

6. The image decoding method of claim 3, wherein the second flag information has a predetermined value specifying that all the plurality of slices have the same NAL unit type, based on at least one of subpictures included in the current picture being not treated as one picture.

7. The image decoding method of claim 1, wherein a subpicture type of each subpicture included in the current picture is determined based on a NAL unit type of each subpicture.

8. An image encoding method performed by an image encoding apparatus, the image encoding method comprising:

partitioning a current picture into one or more subpictures;

determining a network abstraction layer (NAL) unit type of each of a plurality of slices included in the one or more subpictures; and

encoding the plurality of slices based on the determined NAL unit type,

wherein the current picture is partitioned into two or more subpictures based on at least some of the plurality of slices having different NAL unit types,

wherein each of the two or more subpictures is treated as one picture based on at least some of the plurality of slices having different NAL unit types, and

wherein, based on a first VCL NAL unit of the current picture having one NAL unit type among predetermined NAL unit types and at least some of the plurality of slices having different NAL unit types, a second VCL NAL unit does not have the others NAL unit types among the predetermined NAL unit types.

9. The image encoding method of claim 8, wherein all slices in each subpicture included in the current picture have the same NAL unit type.

10. The image encoding method of claim 8, wherein whether at least some of the plurality of slices have different NAL unit types is encoded based on predetermined flag information included in a picture parameter set (PPS).

11. The image encoding method of claim 10, wherein the flag information has a predetermined value specifying that all the plurality of slices have the same NAL unit type, based on a mixed NAL unit type being not applicable to all pictures in an output layer set (OLS).

12. The image encoding method of claim 10, wherein the flag information has a predetermined value specifying that all the plurality of slices have the same NAL unit type, based on the current picture including only one subpicture.

13. The image encoding method of claim 10, wherein the flag information has a predetermined value specifying that all the plurality of slices have the same NAL unit type, based on at least one of subpictures included in the current picture being not treated as one picture.

14. A non-transitory computer-readable recording medium storing a bitstream generated by an image encoding method, the image encoding method comprising

partitioning a current picture into one or more subpictures;

determining a network abstraction layer (NAL) unit type of each of a plurality of slices included in the one or more subpictures; and

encoding the plurality of slices based on the determined NAL unit type,

wherein the current picture is partitioned into two or more subpictures based on at least some of the plurality of slices having different NAL unit types,

wherein each of the two or more subpictures is treated as one picture based on at least some of the plurality of slices having different NAL unit types, and

wherein, based on a first VCL NAL unit of the current picture having one NAL unit type among predetermined NAL unit types and at least some of the plurality of slices having different NAL unit types, a second VCL NAL unit does not have the others NAL unit types among the predetermined NAL unit types.

15. A method of transmitting a bitstream generated by an image encoding method, the image encoding method comprising:

partitioning a current picture into one or more subpictures;

determining a network abstraction layer (NAL) unit type of each of a plurality of slices included in the one or more subpictures; and

encoding the plurality of slices based on the determined NAL unit type,

wherein the current picture is partitioned into two or more subpictures based on at least some of the plurality of slices having different NAL unit types,

wherein each of the two or more subpictures is treated as one picture based on at least some of the plurality of slices having different NAL unit types, and

wherein, based on a first VCL NAL unit of the current picture having one NAL unit type among predetermined NAL unit types and at least some of the plurality of slices having different NAL unit types, a second VCL NAL unit does not have the others NAL unit types among the predetermined NAL unit types.