CLAIMS

[1] An image decoding device which decodes a predictive-encoded bit stream to acquire a moving image signal, said bit stream being created by dividing each frame of the moving image signal into a plurality of blocks each having a predetermined size and by performing a motion prediction for each of the blocks, said image decoding device comprising:

a decoding unit for decoding said bit stream to acquire information indicating the predetermined size, a motion prediction mode and a motion vector for a motion prediction unit block defined as the block or defined as a block which is obtained by dividing the block hierarchically, the motion prediction mode specifying a motion prediction procedure for the motion prediction unit block; and

a predicting unit

for decoding a first motion prediction mode for a first motion prediction unit block corresponding to the block, and when the first motion prediction mode is a skip mode, determining an estimated vector from surrounding motion vectors, and setting the estimated vector as a motion vector for the first motion prediction unit block to create a prediction image, and

for, when the first motion prediction mode is not a skip mode and the block is divided hierarchically, decoding a second motion prediction mode according to a size of the second motion prediction unit block, for a second motion prediction unit block which is obtained by dividing the block hierarchically, and

for, when the second motion prediction mode is a skip mode, determining an estimated vector from surrounding motion vectors, and setting the estimated vector as a motion vector for the second motion prediction unit block to create a prediction image, and

for, when the second motion prediction mode is not a skip mode, creating a prediction image on a basis of the motion prediction mode and the motion vector which the decoding unit acquires by decoding the bit stream.

[2] An image decoding method which decodes a predictive-encoded bit stream to acquire a moving image signal, said bit stream being created by dividing each frame of the moving image signal into a plurality of blocks each having a predetermined size and by performing a motion prediction for each of the blocks, said image decoding method comprising:

a decoding step of decoding said bit stream to acquire information indicating the predetermined size, a motion prediction mode and a motion vector for a motion prediction unit block defined as the block or defined as a block which is obtained by dividing the block hierarchically, the motion prediction mode specifying a motion prediction procedure for the motion prediction unit block; and

a predicting step of

decoding a first motion prediction mode for a first motion prediction unit block corresponding to the block, and when the first motion prediction mode is a skip mode, determining an estimated vector from surrounding motion vectors, and setting the estimated vector as a motion vector for the first motion prediction unit block to create a prediction image, and

when the first motion prediction mode is not a skip mode and the block is divided hierarchically, decoding a second motion prediction mode according to a size of the second motion prediction unit block, for a second motion prediction unit block which is obtained by dividing the block hierarchically, and

when the second motion prediction mode is a skip mode, determining an estimated vector from surrounding motion

vectors, and setting the estimated vector as a motion vector for the second motion prediction unit block to create a prediction image, and

when the second motion prediction mode is not a skip mode, creating a prediction image on a basis of the motion prediction mode and the motion vector which the decoding step acquires by decoding the bit stream.

Claims

[1] An image encoding device which divides each frame of an moving image signal into blocks each having a predetermined size and performs a motion prediction for each of the blocks to create a predictive-encoded bit stream, said image encoding device comprising:

a predicting unit for adaptively determining a size of a motion prediction unit block in each of said blocks according to a predetermined condition, and for dividing said motion prediction unit block into motion vector allocation regions to search for a motion vector; and

an encoding unit for, when a motion vector is allocated to a whole of said motion prediction unit block, performing encoding in a first skip mode if said motion vector is equal to an estimated vector which is determined from motion vectors in surrounding motion prediction unit blocks and data to be encoded as a motion prediction error signal does not exist, and for, when each of said motion vector allocation regions has a size equal to or larger than a predetermined size and a motion vector is allocated to a whole of each of said motion vector allocation regions, performing encoding in a second skip mode if said motion vector is equal to an estimated vector which is determined from motion vectors in surrounding motion vector allocation regions and data to be encoded as a motion prediction error signal does not exist.

[2] An image decoding device which accepts a predictive-encoded bit stream which is created by dividing each frame of a moving image signal into blocks each having a predetermined size and by performing a motion prediction for

each of the blocks, and which decodes said bit stream to acquire said moving image signal, said image decoding device comprising:

a decoding unit for decoding said bit stream to acquire data showing a size of a motion prediction unit block in each of said blocks, a motion prediction mode for specifying a shape of each of motion vector allocation regions into which said motion prediction unit block is divided, and a motion vector corresponding to said each motion vector allocation region, and for determining whether or not said motion prediction unit block is in a first skip mode and whether or not one of said motion vector allocation regions is in a second skip mode from said motion prediction mode; and

a predicting unit for, when said motion prediction unit block is in the first skip mode or one of said motion vector allocation regions is in the second skip mode, determining an estimated vector from surrounding motion vectors, and setting this estimated vector as a motion vector and also setting all motion prediction error signals to zero to create a prediction image, and for, when the motion prediction unit block is not in the first skip mode and the motion vector allocation regions of said motion prediction unit block are not in the second skip mode, creating a prediction image on a basis of the motion prediction mode and the motion vector which the decoding unit acquires by decoding the bit stream.

[3] An image encoding method of dividing each frame of an moving image signal into blocks each having a predetermined size and performing a motion prediction for each of the blocks to create a predictive-encoded bit stream, said image encoding method comprising:

a predicting step of adaptively determining a size of a motion prediction unit block in each of said blocks according to a predetermined condition, and dividing said motion prediction unit block into motion vector allocation regions to search for a motion vector; and

an encoding step of, when a motion vector is allocated to a whole of said motion prediction unit block, performing encoding in a first skip mode if said motion vector is equal to an estimated vector which is determined from motion vectors in surrounding motion prediction unit blocks and data to be encoded as a motion prediction error signal does not exist, and of, when each of said motion vector allocation regions has a size equal to or larger than a predetermined size and a motion vector is allocated to a whole of each of said motion vector allocation regions, performing encoding in a second skip mode if said motion vector is equal to an estimated vector which is determined from motion vectors in surrounding motion vector allocation regions and data to be encoded as a motion prediction error signal does not exist.

[4] An image decoding method of accepting a predictive-encoded bit stream which is created by dividing each frame of a moving image signal into blocks each having a predetermined size and by performing a motion prediction for each of the blocks, and decoding said bit stream to acquire said moving image signal, said image decoding method comprising:

a decoding step of decoding said bit stream to acquire data showing a size of a motion prediction unit block in each of said blocks, a motion prediction mode for specifying a shape of each of motion vector allocation regions into which said

motion prediction unit block is divided, and a motion vector corresponding to said each motion vector allocation region, to determine whether or not said motion prediction unit block is in a first skip mode and whether or not one of said motion vector allocation regions is in a second skip mode from said motion prediction mode;

a skip mode predicting step of, when said motion prediction unit block is in the first skip mode or one of said motion vector allocation regions is in the second skip mode, determining an estimated vector from surrounding motion vectors, and setting this estimated vector as a motion vector and also setting all motion prediction error signals to zero to create a prediction image; and

a predicting step of, when said motion prediction unit block is not in the first skip mode and the motion vector allocation regions of said motion prediction unit block are not in the second skip mode, decoding the bit stream to acquire data showing the motion vector corresponding to said each motion vector allocation region to create a prediction image on a basis of said motion vector and the motion prediction mode which is acquired by decoding the bit stream in said decoding step.