CLAIMS:

1. A video encoding method for predicting pixel values in a target block under a planar mode, the method comprising computer executable steps executed by a processor of a video encoder to implement:

calculating a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculating a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

averaging the first and second prediction values to derive a respective prediction pixel value in a prediction block.

2. The method according to claim 1, further comprising signaling a residual between the prediction block and the target block.

3. The method according to claim 2, further comprising:

switching from a primary set of transform kernel $H^N(i,j)$ to a secondary set of transform kernel $G^N(i.,j)$; and

transforming the residual, using the secondary set of transform kernel $G^N(i.,j)$.

4. The method according to claim 3, wherein the secondary set of transform kernel $G^N(i.,j)$ is defined by one of the following equations:

(a) $G^N(i,j) = k_t \times \sin(\frac{(2i-1)j\pi}{2N+1})$;

(b) $G^N(i,j) = k_t \times \sin(\frac{(2i-1)(2j-1)\pi}{4N})$; and

(c) $G^N(i,j) = k_t \times \cos(\frac{(i-1)(2j-1)\pi}{2N})$.

5. The method according to claim 3, wherein the secondary set of transform kernel $G^N(i.,j)$ for size $N\times N$ is defined by the primary set of transform kernel $H^M(i.j)$ for size $M\times M$, where $M>N$.

6. The method according to claim 5, wherein the secondary set of transform kernel $G^N(i.,j)$ is defined by

$G^N(i,j) = k_i \times H^{2N}(2i, N+1-j)$, if transform kernels of size $2N\times 2N$ (H^{2N}) are supported, or

$G^N(i,j) = H^N(i,j)$ otherwise.

7. A video decoding method for predicting pixel values in a target block under a planar mode, the method comprising computer executable steps executed by a processor of a video decoder to implement:

calculating a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculating a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

averaging the first and second prediction values to derive a respective prediction pixel value in a prediction block.

8. The method according to claim 7, further comprising:

decoding a residual signaled from an encoder which was generated under the planar mode at an encoder; and

adding the decoded residual to the prediction block to reconstruct image data.

9. A video encoder that predicts pixel values in a target block under a planar mode, comprising a processor of a computer system and a memory that stores programs executable by the processor to:

calculate a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculate a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

average the first and second prediction values to derive a respective prediction pixel value in a prediction block.

10. The video encoder according to claim 9, wherein the processor signals a residual between the prediction block and the target block.

11. The video encoder according to claim 10, wherein the processor:

switch from a primary set of transform kernel $H^N(i.j)$ to a secondary set of transform kernel $G^N(i.,j)$; and

transform the residual, using the secondary set of transform kernel $G^N(i.,j)$.

12. The video encoder according to claim 11, wherein the secondary set of transform kernel $G^N(i.,j)$ is defined by one of the following equations:

(a) $G^N(i,j) = k_i \times \sin(\frac{(2i-1)j\pi}{2N+1})$;

(b) $G^N(i,j) = k_i \times \sin(\frac{(2i-1)(2j-1)\pi}{4N})$; and

(c) $G^N(i,j) = k_i \times \cos(\frac{(i-1)(2j-1)\pi}{2N})$.

13. The video encoder according to claim 11, wherein the secondary set of transform kernel $G^N(i.,j)$ for size $N\times N$ is defined by the primary set of transform kernel $H^M(i.j)$ for size $M\times M$, where $M>N$.

14. The video encoder according to claim 13, wherein the secondary set of transform kernel $G^N(i.,j)$ is defined by

$G^N(i,j) = k_t \times H_F^{2N}(2i, N+1-j)$, if transform kernels of size $2N\times 2N$ (H_F^{2N}) are supported, or

$G^N(i,j) = H_F^N(i,j)$ otherwise.

15. A video decoder that predicts pixel values in a target block under a planar mode, comprising a processor of a computer system and a memory that stores programs executable by the processor to:

calculate a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculate a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

average the first and second prediction values to derive a respective prediction pixel value in a prediction block.

16. The video decoder according to claim 15, wherein the processor further:

decodes a residual signaled from an encoder; and

adds the decoded residual to the prediction block.

CLAIMS:

1. A video encoding method for predicting pixel values in a target block under a planar mode, the method comprising computer executable steps executed by a processor of a video encoder to implement:

calculating a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculating a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

averaging the first and second prediction values to derive a respective prediction pixel value in a prediction block.

2. The method according to claim 1, further comprising signaling a residual between the prediction block and the target block.

3. The method according to claim 2, further comprising:

switching from a primary set of transform kernel $H^N(i, j)$ to a secondary set of transform kernel $G^N(i, j)$; and

transforming the residual, using the secondary set of transform kernel $G^N(i, j)$.

4. The method according to claim 3, wherein the secondary set of transform kernel $G^N(i, j)$ is defined by one of the following equations:

【Equation 1】

(a) $$G^N(i,j) = k_i \times \sin(\frac{(2i-1)j\pi}{2N+1})$$;

【Equation 2】

$$(b) \qquad G^N(i,j) = k_i \times \sin\left(\frac{(2i-1)(2j-1)\pi}{4N}\right)$$

; and

【Equation 3】

$$(c) \qquad G^N(i,j) = k_i \times \cos\left(\frac{(i-1)(2j-1)\pi}{2N}\right)$$

.

5. The method according to claim 3, wherein the secondary set of transform kernel $G^N(i, j)$ for size NxN is defined by the primary set of transform kernel $H^M(i, j)$ for size MxM, where M>N.

6. The method according to claim 5, wherein the secondary set of transform kernel $G^N(i, j)$ is defined by

$G^N(i, j) = k_i \times H^{2N}(2i, N+1-j)$, if transform kernel of size 2Nx2N(H^{2N}) is supported, or

$G^N(i, j) = H^N(i, j)$ if transform kernel of size 2Nx2N(H^{2N}) is not supported.

7. A video decoding method for predicting pixel values in a target block under a planar mode, the method comprising computer executable steps executed by a processor of a video decoder to implement:

calculating a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculating a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

averaging the first and second prediction values to derive a respective

prediction pixel value in a prediction block.

8. The method according to claim 7, further comprising:

decoding a residual signaled from an encoder which was generated under the planar mode at an encoder; and

adding the decoded residual to the prediction block to reconstruct image data.

9. The method according to claims 7 or 8, wherein in the step of calculating the first prediction value, calculating the first prediction value P_P^v (i, j) by

【Equation 4】

$$P_P^v(i,j) = (N-i) \times P_C(0,j) + i \times P_C(N,0)$$

,

in the step of calculating the second prediction value, calculating the second prediction value P_P^h(i, j) by

【Equation 5】

$$P_P^h(i,j) = (N-j) \times P_C(i,0) + j \times P_C(0,N)$$

, and

in the step of deriving a respective prediction pixel value in the prediction block, deriving the respective prediction pixel value P_P(i, j) by

【Equation 6】

$$P_P(i,j) = ((P_P^h(i,j) + P_P^v(i,j)) >> (1 + \log_2 N), \ \forall 1 \le i,j \le N$$

.

10. A video encoder that predicts pixel values in a target block under a planar mode, comprising a processor of a computer system and a memory that stores programs executable by the processor to:

calculate a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary

pixels;

calculate a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

average the first and second prediction values to derive a respective prediction pixel value in a prediction block.

11. The video encoder according to claim 10, wherein the processor signals a residual between the prediction block and the target block.

12. The video encoder according to claim 11, wherein the processor:

switch from a primary set of transform kernel $H^N(i, j)$ to a secondary set of transform kernel $G^N(i, j)$; and

transform the residual, using the secondary set of transform kernel $G^N(i, j)$.

13. The video encoder according to claim 12, wherein the secondary set of transform kernel $G^N(i, j)$ is defined by one of the following equations:

【Equation 7】

$$\text{(a)} \qquad G^N(i,j) = k_i \times \sin\left(\frac{(2i-1)j\pi}{2N+1}\right);$$

【Equation 8】

$$\text{(b)} \qquad G^N(i,j) = k_i \times \sin\left(\frac{(2i-1)(2j-1)\pi}{4N}\right); \text{ and}$$

【Equation 9】

(c) $$G^N(i,j) = k_i \times \cos(\frac{(i-1)(2j-1)\pi}{2N})$$

14. The video encoder according to claim 12, wherein the secondary set of transform kernel $G^N(i, j)$ for size NxN is defined by the primary set of transform kernel $H^M(i, j)$ for size MxM, where M>N.

15. The video encoder according to claim 14, wherein the secondary set of transform kernel $G^N(i, j)$ is defined by

【Equation 11】

$$G^N(i,j) = k_i \times H_F^{2N}(2i, N+1-j)$$

if transform kernel of size 2Nx2N

【Equation 10】

$$(H_F^{2N})$$

is supported, or

【Equation 13】

$$G^N(i,j) = H_F^N(i,j)$$

if transform kernel of size 2Nx2N

【Equation 12】

$$(H_F^{2N})$$

is not supported.

16. A video decoder that predicts pixel values in a target block under a planar mode, comprising a processor of a computer system and a memory that stores

programs executable by the processor to:

calculate a first prediction value using linear interpolation between a value of respective horizontal boundary pixels and a value of one of vertical boundary pixels;

calculate a second prediction value using linear interpolation between a value of respective vertical boundary pixels and a value of one of the horizontal boundary pixels; and

average the first and second prediction values to derive a respective prediction pixel value in a prediction block .

17. The video decoder according to claim 16, wherein the processor further:

decodes a residual signaled from an encoder; and

adds the decoded residual to the prediction block.

18. The video decoder according to claims 16 or 17, wherein the processor

calculates the first prediction value P_P^v (i, j) by

【Equation 14】

$$P_P^v(i,j) = (N-i) \times P_C(0,j) + i \times P_C(N,0)$$

,

calculates the second prediction value P_P^h(i, j) by

【Equation 15】

$$P_P^h(i,j) = (N-j) \times P_C(i,0) + j \times P_C(0,N)$$

, and

derives the respective prediction pixel value P_P(i, j) by

【Equation 16】

$$P_P(i,j) = ((P_P^h(i,j) + P_P^v(i,j)) >> (1+\log_2 N), \ \forall 1 \le i,j \le N$$

.