Claims

What is claimed is:

1. An image processing device comprising:

an input circuit configured to receive input image data comprising pixels related to varying exposure times, the input image data comprising a plurality of input images;

an interpolation circuit configured to determine an output image based on an interpolation based on the input image data; and

an output circuit configured to output the output image,

wherein the interpolation circuit is configured to perform the interpolation with respect to at least one of the plurality of input images to produce a corresponding upsampled input image, the interpolation comprising a spatial interpolation based on the pixels of said one input image and a temporal interpolation based on the pixels of said one input image and the pixels of at least another one of the plurality of input images.

2. The image processing device of claim 1, further comprising:

a weighting factor determination circuit configured to determine a weighting factor,

wherein the interpolation circuit is further configured to determine the output image further based on the weighting factor.

3. The image processing device of claim 2,

wherein the weighting factor determination circuit is configured to determine the weighting factor based on an intermediate pixel.

4. The image processing device of claim 3,

wherein the intermediate pixel is based on an intensity mapping function.

5. The image processing device of claim 4,

wherein the weighting factor is close to one if the intensity mapping function is reliable.

6. The image processing device of claim 4,

wherein the weighting factor is close to zero if the intensity mapping function is not reliable.

7. The image processing device of claim 1,

wherein each of the plurality of input images comprises rows, wherein the exposure time varies amongst the rows.

8. The image processing device of claim 1,

wherein each of the plurality of input images has an exposure time, wherein the exposure time varies amongst the plurality of input images.

9. The image processing device of claim 1,

wherein the interpolation comprises a cubic interpolation.

10. The image processing device of claim 1,

wherein the interpolation comprises minimizing a cost function.

11. The image processing device of claim 1,

wherein the interpolation comprises an interpolation of an high dynamic range image obtained based on the input image data to restore under-exposed and saturated pixels of the high dynamic range image without discarding any pixels in the high dynamic range image.

12. An image processing method comprising:

receiving input image data comprising pixels related to varying exposure times, the input image data comprising a plurality of input images;

determining an output image based on an interpolation based on the input image data; and

outputting the output image,

wherein the interpolation is performed with respect to at least one of the plurality of input images to produce a corresponding upsampled input image, the interpolation comprising a spatial interpolation based on the pixels of said one

input image and a temporal interpolation based on the pixels of said one input image and the pixels of at least another one of the plurality of input images.

13. The image processing method of claim 12, further comprising:

determining a weighting factor; and

determining the output image further based on the weighting factor.

14. The image processing method of claim 13, further comprising:

determining the weighting factor based on an intermediate pixel.

15. The image processing method of claim 14,

wherein the intermediate pixel is based on an intensity mapping function.

16. The image processing method of claim 15,

wherein the weighting factor is close to one if the intensity mapping function is reliable.

17. The image processing method of claim 15,

wherein the weighting factor is close to zero if the intensity mapping function is not reliable.

18. The image processing method of claim 12,

wherein each of the plurality of input images comprises rows, wherein the exposure time varies amongst the rows.

19. The image processing method of claim 12,

wherein each of the plurality of input images has an exposure time, wherein the exposure time varies amongst the plurality of input images.

20. The image processing method of claim 12,

wherein the interpolation comprises a cubic interpolation without discarding any pixels in an high dynamic range image.

21. The image processing method of claim 12,

wherein the interpolation comprises minimizing a cost function with different constraints to different pixels according to their reliabilities.

22. The image processing method of claim 12,

wherein the interpolation comprises an interpolation of an high dynamic range image obtained based on the input image data to restore under-exposed and saturated pixels of the high dynamic range image.