

Claims

What is claimed is:

1. A method for merging a plurality of first digital pictures, each first digital picture comprising a plurality of pixel values, the method comprising:
extracting details from the plurality of first digital pictures;
combining the pixel values of the plurality of first digital pictures to generate a combined digital picture; and
modifying the combined digital picture with the extracted details to generate a merged digital picture.
2. The method according to claim 1, wherein combining the pixel values of the plurality of first digital pictures comprises averaging the pixel values of the plurality of first digital pictures over the first digital pictures to generate an average digital picture.
3. The method according to claim 2, wherein averaging the pixel values of the plurality of first digital pictures over the first digital pictures comprises weighted averaging of the pixel values of the plurality of first digital pictures.
4. The method according to any one of claims 1 to 3, wherein each first digital picture comprises, for each of a plurality of pixels, a pixel value for each of a plurality of colors and wherein combining the pixel values of the plurality of first digital pictures

comprises, for each pixel and each color, combining the pixel values of the plurality of first pictures for the pixel and the color.

5. The method according to claim 4, wherein combining the pixel values of the plurality of first pictures for the pixel and the color comprises averaging the pixel values of the plurality of first pictures for the pixel and the color.

6. The method according to any one of claims 1 to 5, wherein extracting details from the plurality of first digital pictures comprises determining a gradient field for each of the plurality of first digital pictures and averaging the gradient field over the plurality of first digital pictures to generate an averaged gradient field.

7. The method according to claim 6, wherein averaging the gradient field over the plurality of first digital pictures comprises weighted averaging of the gradient field over the plurality of first digital pictures.

8. The method according to claims 6 or 7, wherein extracting details from the plurality of first digital pictures further comprises determining a detail layer based on the averaged gradient field.

9. The method according to claim 8, wherein determining the detail layer based on the averaged gradient field comprises solving a quadratic optimization problem.

10. The method according to any one of claims 8 to 9, wherein each first digital picture comprises a pixel value for each pixel of a plurality of pixels and the detail layer comprises a detail layer pixel value for each pixel of the plurality of pixels.

11. The method according to claim 10, wherein the combined digital picture comprises a combined pixel value for each pixel of the plurality of pixels and wherein modifying the combined digital picture with the extracted details comprises combining, for each pixel, the combined pixel value with the detail layer pixel value.

12. The method according to claim 11, wherein combining the combined pixel value with the detail layer pixel value comprises multiplying the combined pixel value with the detail layer pixel value.

13. The method according to any one of claims 1 to 12, wherein the first pictures are low dynamic range pictures and the merged digital picture is a low dynamic range picture.

14. The method according to any one of claims 1 to 13, wherein the first digital pictures show the same scene at different lighting conditions.

15. The method according to any one of claims 1 to 14, wherein the first digital pictures show the same scene at different exposures.

16. A device for merging a plurality of first digital pictures, each first digital picture comprising a plurality of pixel values, the device comprising:
- an extractor configured to extract details from the plurality of first digital pictures;
 - a combiner configured to combine the pixel values of the plurality of first digital pictures to generate a combined digital picture; and
 - a modifier configured to modify the combined digital picture with the extracted details to generate a merged digital picture.

Claims

We claim:

1. A method for merging a plurality of first digital pictures, each first digital picture comprising a plurality of pixels, each of the plurality of pixels comprising a pixel value for each of a plurality of colors, the method comprising:
 - extracting details from the plurality of first digital pictures;
 - combining the pixel values of the plurality of first digital pictures to generate a combined digital picture, comprising:
 - for each pixel and each color, combining the pixel values of the plurality of first digital pictures for the pixel and the color; and
 - modifying the combined digital picture with the extracted details to generate a merged digital picture.
2. The method according to claim 1, wherein combining the pixel values of the plurality of first digital pictures comprises averaging the pixel values of the plurality of first digital pictures over the first digital pictures to generate an average digital picture.
3. The method according to claim 2, wherein averaging the pixel values of the plurality of first digital pictures over the first digital pictures comprises weighted averaging of the pixel values of the plurality of first digital pictures.
4. The method according to claim 1, wherein combining the pixel values of the plurality of first pictures for the pixel and the color comprises averaging the pixel values of the plurality of first pictures for the pixel and the color.
5. The method according to claim 1, wherein extracting details from the plurality of first digital pictures comprises determining a gradient field for each of the plurality of first digital pictures and averaging the gradient field over the plurality of first digital pictures to generate an averaged gradient field.

6. The method according to claim 5, wherein averaging the gradient field over the plurality of first digital pictures comprises weighted averaging of the gradient field over the plurality of first digital pictures.
7. The method according to claim 5, wherein extracting details from the plurality of first digital pictures further comprises determining a detail layer based on the averaged gradient field.
8. The method according to claim 7, wherein determining the detail layer based on the averaged gradient field comprises solving a quadratic optimization problem.
9. The method according to claim 7, wherein each first digital picture comprises a pixel value for each pixel of a plurality of pixels and the detail layer comprises a detail layer pixel value for each pixel of the plurality of pixels.
10. The method according to claim 9, wherein the combined digital picture comprises a combined pixel value for each pixel of the plurality of pixels and wherein modifying the combined digital picture with the extracted details comprises combining, for each pixel, the combined pixel value with the detail layer pixel value.
11. The method according to claim 10, wherein combining the combined pixel value with the detail layer pixel value comprises multiplying the combined pixel value with the detail layer pixel value.
12. The method according to claim 1, wherein the first pictures are low dynamic range pictures and the merged digital picture is a low dynamic range picture.
13. The method according to claim 1, wherein the first digital pictures show the same scene at different lighting conditions.

14. The method according to claim 1, wherein the first digital pictures show the same scene at different exposures.

15. A device for merging a plurality of first digital pictures, each first digital picture comprising a plurality of pixels, each of the plurality of pixels comprising a pixel value for each of a plurality of colors, the device comprising:

an extractor configured to extract details from the plurality of first digital pictures;

a combiner configured to combine the pixel values of the plurality of first digital pictures to generate a combined digital picture, wherein for each pixel and each color, the pixel values of the plurality of first digital pictures are combined for the pixel and the color; and

a modifier configured to modify the combined digital picture with the extracted details to generate a merged digital picture.