

CLAIMS

What is claimed is:

1. A method for facial skin age estimating, comprising:
 - 5 resizing and aligning a facial image;
 - converting the facial image and a reference image from RGB color space to CIELAB color space;
 - adjusting illumination component and color component of the facial image depending on the reference image;
 - 10 recovering the adjusted facial image from CIELAB color space to RGB color space;
 - analyzing a plurality of evaluation index for assessing skin condition on interest area of the facial image;
 - estimating the skin age of the facial image, according to the evaluation index;
 - wherein the evaluation index comprises melanin concentration, hemoglobin concentration,
 - 15 wrinkles count and sagging seriousness; and
 - wherein analyzing a plurality of evaluation index for assessing skin condition on interest area of the facial image comprises:
 - training a convolutional neural network by a sagging dataset which is comprised a plurality of sagging sample scored by expert;
 - 20 recognizing the score of the sagging seriousness on under eyes, nasolabial fold, mouth corner and jaw lines of the facial image, by the trained convolutional neural network.
2. The method according to claim 1, wherein estimating the skin age of the facial image, according to the evaluation index comprises:
 - 25 generating a benchmark from modeling the relationship between mean value of the evaluation index and an age group;
 - comparing the evaluation index of the facial image with the benchmark;
 - determining the age group corresponding to the image according to the comparison result of the facial image and the benchmark.
 - 30
3. The method according to claim 1, wherein the interest area corresponding to the melanin concentration and the hemoglobin concentration, is the whole facial image excluding mouth area and chin area.

4. The method according to claim 3, wherein analyzing the melanin concentration and the hemoglobin concentration on interest area of the facial image comprises:

taking negative-logarithm on Red component, Green component and Blue component of the facial image, respectively;

5 applying mean filter on Red component, Green component and Blue component of the facial image, respectively;

calculating differences of Red component, Green component and Blue component between the result of negative-logarithm and mean filter, respectively

10 generating the melanin concentration and the hemoglobin concentration, according to the absorption spectra of the melanin and the hemoglobin and the differences of Red component, Green component and Blue component.

5. The method according to claim 1, wherein analyzing a plurality of evaluation index for assessing skin condition on interest area of the facial image comprises:

15 highlighting a subtle curvilinear discontinuity on forehead, glabella lines and under eyes of the facial image by Gabor filter;

localizing a curvilinear shape of wrinkles at the facial image of the subtle curvilinear discontinuities.

20 6. The method according to claim 1, wherein the facial image is taken from portable devices.

7. An electronic device, comprising:

a memory, a communication module and a processor coupled to the memory and the communication module;

25 the memory storing instructions that are executable by the processor, wherein execution of the instructions by the processor causes the processor via the communication module to:

resizing and aligning a facial image;

converting the facial image and a reference image from RGB color space to CIELAB color space;

30 adjusting illumination component and color component of the facial image depending on the reference image;

recovering the adjusted facial image from CIELAB color space to RGB color space;

analyzing a plurality of evaluation index for assessing skin condition on interest area of the facial image;

35 estimating the skin age of the facial image, according to the evaluation index;

wherein the evaluation index comprises melanin concentration, hemoglobin concentration,

wrinkles count and sagging seriousness; and

wherein analyzing a plurality of evaluation index for assessing skin condition on interest area of the facial image comprises:

5 training a convolutional neural network by a sagging dataset which is comprised a plurality of sagging sample scored by expert;

recognizing the score of the sagging seriousness on under eyes, nasolabial fold, mouth corner and jaw lines of the facial image, by the trained convolutional neural network.

10 8. The electronic device according to claim 7, wherein estimating the skin age of the facial image, according to the evaluation index comprises:

generating a benchmark from modeling the relationship between mean value of the evaluation index and a age group;

comparing the evaluation index of the facial image with the benchmark;

15 determining the age group corresponding to the image according to the comparison result of the facial image and the benchmark.

9. The electronic device according to claim 7, wherein the interest area corresponding to the melanin concentration and the hemoglobin concentration, is the whole facial image excluding mouth area and chin area.

20 10. The electronic device according to claim 9, wherein analyzing the melanin concentration and the hemoglobin concentration on interest area of the facial image comprises:

taking negative-logarithm on Red component, Green component and Blue component of the facial image, respectively;

25 applying mean filter on Red component, Green component and Blue component of the facial image, respectively;

calculating differences of Red component, Green component and Blue component between the result of negative-logarithm and mean filter, respectively

30 generating the melanin concentration and the hemoglobin concentration, according to the absorption spectra of the melanin and the hemoglobin and the differences of Red component, Green component and Blue component.

11. The electronic device according to claim 7, wherein analyzing a plurality of evaluation index for assessing skin condition on interest area of the facial image comprises:

35 highlighting a plurality of subtle curvilinear discontinuities on forehead, glabella lines and under eyes of the facial image by Gabor filter;

localizing a plurality of curvilinear shapes of wrinkles at the facial image of the subtle curvilinear discontinuities.

12. The electronic device according to claim 7, wherein the facial image is taken from portable
5 devices.