Claims

1. A computer implemented method to characterize a skin lesion, the method comprising:

- storing in a memory (201) three different sets of images acquired by an imaging platform (100) which comprises three different optical technologies including a multispectral technology (101), a 3D technology (102) and an optical feedback interferometry, OFI, technology (103);

wherein each set of images being acquired by one of said optical technologies (101, 102, 103), each set of images comprising one or more images of a skin lesion,

wherein the set of images acquired by the multispectral technology (101), termed as first set of images, being acquired by using different illumination spectral bands, each illumination spectral band used providing an image, to detect color and spectral properties of the skin lesion and their spatial distribution,

wherein the set of images acquired by the 3D technology (102), termed as second set of images, being acquired by using stereoscopy and/or fringe projection techniques to detect three-dimensional morphological properties of the skin lesion and their spatial distribution, and

wherein the set of images acquired by the OFI technology (103), termed as third set of images, being acquired to detect blood flow changes of the skin lesion and their spatial distribution;

- analyzing at least two of said first, second or third sets of images and computing a series of indicators and/or parameters for each one of said at least two analyzed sets of images; and

- combining the at least two series of computed indicators and/or parameters to characterize the skin lesion.

2. The method of claim 1, wherein the imaging platform further comprises, depending on a result of said characterization, the use of a reflectance confocal microscopy optical technology, the method further comprising storing a set of images acquired by the reflectance confocal microscopy optical technology to form an image of a region of the skin located beneath the skin lesion.

3. The method of claim 1, wherein the series of indicators and/or parameters for the first set of images being computed by:

- comparing, pixel by pixel, the first set of images of the skin lesion and a reference image computing from the first set of images different radiometric magnitudes, providing a reflectance or absorbance image;

- computing from said reflectance or absorbance image other images whose intensity pixels represent parameters based on color coordinates or color differences of a color representation space or based on other empirically obtained by operating with reflectance/absorbance values of different wavelengths to enhance particular spectral features, and compute from said other

images statistical properties thereof, said statistical properties at least including the computing of a histogram of the intensity of the pixels of said other images; and

- computing different parameters including central moment, energy, entropy and other first or second order statistical descriptors of the computed histogram.

4. The method of claim 1, wherein the series of indicators and/or parameters for the second set of images being computed by:

- combining at least six images of the second set of images of the skin lesion extracting a 3D topography image;

- computing from the extracted 3D topography image statistical properties thereof, said statistical properties at least including the computing of a histogram of a height distribution of the 3D topography image, a histogram of a curvature distribution of the 3D topography image and a histogram of roughness values of the 3D topography image; and

- computing different parameters including central moment, energy, entropy and other first or second order statistical descriptors of the computed histograms.

5. The method of claim 1, wherein the series of indicators and/or parameters for the third set of images being computed by:

- extracting a false color image from the third set of images;

- computing from the false color image statistical properties thereof, said statistical properties at least including the computing of a histogram of the intensity of the pixels of the false color image; and

- computing different parameters including area, shape, central moment, energy, entropy and skewness of the computed histogram.

6. The method of claim 3, wherein the series of indicators and/or parameters computed for the first set of images being further computed by computing average, standard deviation, maximum and minimum values of absorbance, reflectance or color measurements of the skin lesion.

7. The method of claim 4, wherein the series of indicators and/or parameters computed for the second set of images being further computed by computing average, standard deviation, maximum and minimum values related to surface topography of the skin lesion including perimeter, area, shape, height, slope, curvature, roughness and/or volume.

8. The method of claim 5, wherein the series of indicators and/or parameters for the third set of images being further computed by computing average, standard deviation, maximum and minimum values related with the blood flow of the skin lesion.

9. The method of claim 1, wherein said combining comprises comparing the at least two series of computed indicators and/or parameters, providing a combined set of indicators and/or parameters, and further performing a statistical analysis over the combined set of indicators and/or parameters to consider only those indicators and/or parameters of the combined set having a value over a given threshold.

10. The method of claim 1, wherein said different illumination spectral bands comprises at least eight spectral bands, comprised in the visible and/or in the infrared domain.

11. The method of claim 10, comprising obtaining the at least eight multispectral images through an automated and sequential process.

12. A system to characterize a skin lesion, comprising:

- a memory (201) adapted to store at least three different sets of images, said at least three different sets of images being acquired by an imaging platform (100) comprising three different optical technologies including a multispectral technology (101), a 3D technology (102) and an optical feedback interferometry, OFI, technology (103),

wherein each set of images being acquired by one of said optical technologies (101, 102, 103), each set of images comprising one or more images of a skin lesion,

wherein the set of images acquired by the multispectral technology (101), termed as first set of images, being acquired by using different illumination spectral bands, each illumination spectral band used providing an image, to detect color and spectral properties of the skin lesion and their spatial distribution,

wherein the set of images acquired by the 3D technology (102), termed as second set of images, being acquired by using stereoscopy and/or fringe projection techniques to detect three-dimensional morphological properties of the skin lesion and their spatial distribution, and

wherein the set of images acquired by the OFI technology (103), termed as third set of images, being acquired to detect blood flow changes of the skin lesion and their spatial distribution; and

- one or more processors (202) being adapted and configured to execute an algorithm to:

analyze at least two of said first, second or third sets of images computing a series of indicators and/or parameters for each one of said at least two analyzed sets of images; and

combine the at least two series of computed indicators and/or parameters to characterize the skin lesion.

13. The system of claim 12, wherein said memory (201) being further adapted to store a set of images acquired by a reflectance confocal microscopy optical technology to detect a region of the skin located beneath the skin lesion.

14. A computer program product comprising program code instructions that when executed in a computer system implement the method of any of claims 1 to 11.