Claims

1. An automated method of identifying a structure in a sample, the method comprising:

receiving at least one digital image of a sample wherein at least one localised structural property of the sample is visible in the image based on the colour of received light captured in the at least one digital image, said digital image comprising a plurality of pixels which represent a two dimensional region of the sample;

processing the at least one image, based on the received colour information to selectively identify said structure on the basis of colour differentiation and/or morphology differentiation.

2. The method as claimed in claim 1 wherein processing the at least one image includes providing an output indicating the identification of the structure.

3. The method as claimed in any one of claims 1 or claim 2 which includes filtering the image to selectively process a portion of the image on the basis of colour information contained in the received image.

4. The method as claimed in any one of the preceding claims wherein the at least one image includes a plurality of pixels, and said method includes segmenting the at least one image based on a colour of received light captured in the image.

5. The method as claimed in claim 4 wherein segmenting the at least one image includes one or more of:

identifying one or more subsets of pixels within an image based at least partly on colour;

grouping pixels into features representing a structure on the sample based on correlation between a pixel and at least one neighbouring pixel.

6. The method as claimed in any one of the preceding claims which includes any one or more of: determining a colour distribution of the received image; determining a colour histogram of the received image; performing spectral analysis of at least part of the received digital image.

7. The method as claimed in any one of the preceding claims which includes performing a feature extraction method to identify one or more structures in the image.

8. The method as claimed in any one of the preceding claims wherein the method includes processing the digital image with an image recognition system.

9. The method of claim 8 wherein the image recognition system is artificial neural network.

10. The method as claimed in any one of the preceding claims wherein in the received digital image, the localised structural property of the sample is a localised refractive index.

11. The method of claim 10 wherein a structure in the sample with a given refractive index appears as a corresponding colour or colour range in the image.

12. The method as claimed in any one of the preceding claims wherein the sample is a biological sample.

13. The method as claimed in any one of the preceding claims wherein the method includes identifying a feature based on colour differentiation.

14. The method as claimed in any one of the preceding claims wherein the method includes identifying a feature based on morphology differentiation.

15. The method as claimed in any one of the preceding claims wherein the method includes identifying a feature based on a combination of colour differentiation and morphology differentiation.

16. The method as claimed in any one of the preceding claims wherein receiving at least one digital image of a sample, includes receiving more than one image of the sample captured with any one or more of the following differences:

a different illumination characteristics

different illumination spectrum

different illumination polarisation

different magnification.

17. The method of any one of the preceding claims wherein the structure includes any one or more of a neoplastic cell, cancer cell, healthy cell, cell of a given type, cell state, parasite, group of cells, abnormal cell, infected cell, tissue of a given type.

18. A method of imaging a sample and automatically generating an indication of a presence of at least one structure in the sample, the method includes:

providing a sample holder having a plasmonic layer including a periodic array of sub-micron structures;

placing the sample on the sample holder adjacent the plasmonic layer;

illuminating the sample and sample holder and capturing at least one colour digital image thereof, the illumination stimulating surface plasmon resonance and the sample positioned at least partially within the associated evanescent sensing field;

performing a method of identifying a structure in the sample according to any one of the preceding claims.

19. A computer readable medium storing thereon instructions, which when executed by a data processing system cause the data processing system to perform a method as claimed in any one of claims 1 to 18.

20. A system comprising a data processing system, said data processing system being programmed to perform a method as claimed in any one of claims 1 to 18.

Claims

1. A method of imaging a sample and automatically identifying the presence of a structure in the sample, the method including:

providing a sample holder having a plasmonic layer including a periodic array of sub-micron structures;

placing the sample on the sample holder adjacent the plasmonic layer;

illuminating the sample and sample holder and capturing at least one colour digital image thereof with an optical microscope, the illumination stimulating surface plasmon resonance and the sample positioned at least partially within the associated evanescent sensing field, the at least one digital image comprising a plurality of pixels which represent a two dimensional region of the sample, wherein at least one localised structural property of the sample is visible in the image based on the colour of received light captured in the at least one digital image;

processing the at least one digital image, based on the received colour information to selectively identify said structure on the basis of colour differentiation and/or morphology differentiation.

2. The method of claim, 1 wherein processing the at least one image includes providing an output indicating the identification of the structure.

3. The method of claim 1 or claim 2, including filtering the image to selectively process a portion of the image on the basis of colour information contained in the received image.

4. The method of any one of the preceding claims, wherein the at least one image includes a plurality of pixels, and said method includes segmenting the at least one image based on a colour of received light captured in the image.

5. The method of claim 4, wherein segmenting the at least one image includes one or more of:

identifying one or more subsets of pixels within an image based at least partly on colour;

grouping pixels into features representing a structure on the sample based on correlation between a pixel and at least one neighbouring pixel.

6. The method of any one of the preceding claims, including any one or more of: determining a colour distribution of the received image; determining a colour histogram of the received image; performing spectral analysis of at least part of the received digital image.

7. The method of any one of the preceding claims, including performing a feature extraction method to identify one or more structures in the image.

8. The method of any one of the preceding claims, including processing the digital image with an image recognition system.

9. The method of claim 8, wherein the image recognition system is artificial neural network.

10. The method of any one of the preceding claims, wherein in the received digital image, the localised structural property of the sample is a localised refractive index.

11. The method of claim 10, wherein a structure in the sample with a given refractive index appears as a corresponding colour or colour range in the image.

12. The method of any one of the preceding claims, wherein receiving at least one digital image of a sample, includes receiving more than one image of the sample captured with any one or more of the following differences:

different illumination spectrum;

different illumination polarisation;

different magnification.

13. A computer readable medium storing thereon instructions which, when executed by a system comprising a data processing system cause the system to perform a method as claimed in any one of claims 1 to 12.

14. A system comprising a data processing system, said system being adapted to perform a method as claimed in any one of claims 1 to 12.