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Claims

1. A system for object recognition via a computer vision application, the system comprising at least the following components:
 - at least one object (110) to be recognized, the object having object specific reflectance and luminescence spectral patterns,
 - a light source (140) which is configured to illuminate a scene including the at least one object under ambient lighting conditions,
 - a sensor (150) which is configured to measure radiance data of the scene including the at least one object when the scene is illuminated by the light source,
 - a linear polarizer (120) coupled with a quarter waveplate (130), the quarter waveplate (130) being oriented with its fast and slow axes at an angle in the range of 40 to 50 degrees, preferably of 42 to 48 degrees, more preferably of 44 to 46 degrees relative to the linear polarizer (120), the linear polarizer (120) and the quarter waveplate (130) being positioned between the sensor (150) and the at least one object (110), and between the light source (140) and the at least one object (110),
 - a data storage unit which comprises luminescence spectral patterns together with appropriately assigned respective objects,
 - a data processing unit which is configured to detect the object specific luminescence spectral pattern of the at least one object to be recognized out of the measured radiance data of the scene and to match the detected object specific luminescence spectral pattern with the luminescence spectral patterns stored in the data storage unit, and to identify a best matching luminescence spectral pattern and, thus, its assigned object.

2. The system according to claim 1 wherein the linear polarizer and the quarter waveplate are fused together forming one optical component.
3. The system according to claim 2 wherein the linear polarizer and the quarter waveplate are applied directly on top of the at least one object to form a 3-layer construct.
4. A system for object recognition via a computer vision application, the system comprising at least the following components:
 - at least one object (210, 310) to be recognized, the object being at least semi-transparent and having object specific transmission and luminescence spectral patterns,
 - a light source (240, 340) which is configured to illuminate a scene including the at least one object under ambient lighting conditions,
 - two linear polarizers (220, 225, 320, 325) which are aligned at an angle in the range of -5 to 5 degrees, preferably of -3 to 2 degrees, more preferably of -1 to 1 degrees relative to each other or rotated at an angle in the range of 85 to 95 degrees, particularly of 87 to 92 degrees, more preferably of 89 to 91 degrees to each other and which are sandwiching the at least one object between them,
 - a sensor (250, 350) which is configured to measure radiance data of the scene including the at least one object when the scene is illuminated by the light source,
 - a data storage unit which comprises luminescence spectral patterns together with appropriately assigned respective objects,
 - a data processing unit which is configured to detect the object specific luminescence spectral pattern of the at least one object to be recognized out of the measured radiance data of the scene and to match the detected object specific luminescence spectral pattern with the luminescence spectral patterns stored in the data storage unit, and to identify a best matching luminescence spectral pattern and, thus, its assigned object.

5. The system according to claim 4 wherein the linear polarizers are applied directly on either side of the at least one object.
- 5 6. The system according to claim 4 wherein each of the two linear polarizers (320, 325) is coupled with a quarter waveplate (330, 335), wherein the linear polarizers are aligned at an angle in the range of -5 to 5 degrees, preferably of -3 to 2 degrees, more preferably of -1 to 1 degrees relative to each other and each of the quarter waveplate being oriented with its fast and slow axes at an angle in the range of 40 to 50 degrees, preferably of 42 to 48 degrees, more preferably of 44 to 46 degrees relative to the
10 respective linear polarizer and each quarter waveplate being oriented at about 0 degrees relative to the other quarter waveplate.
- 15 7. The system according to claim 6 wherein the two linear polarizers and the respective two quarter waveplates each coupled with one of the two linear polarizers are applied directly on either side of the at least one object, thus forming a 5-layer construct with each layer directly on top of the other.
- 20 8. The system according to any one of the preceding claims, wherein the sensor (150, 250, 350) is a hyperspectral camera or a multispectral camera.
- 25 9. A method for object recognition via a computer vision application, the method comprising at least the following steps:
 - providing at least one object to be recognized, the object having object specific reflectance and luminescence spectral patterns,
 - illuminating a scene including the at least one object under ambient lighting conditions using a light source,
 - 30 - providing a linear polarizer coupled with a quarter waveplate, the quarter waveplate being oriented with its fast and slow axes at an

- angle in the range of 40 to 50 degrees, preferably of 42 to 48 degrees, more preferably of 44 to 46 degrees relative to the linear polarizer, and
- positioning the linear polarizer and the quarter waveplate between a sensor and the at least one object, and between the light source and the at least one object,
 - measuring, using the sensor, radiance data of the scene including the at least one object,
 - providing a data storage unit which comprises luminescence spectral patterns together with appropriately assigned respective objects,
 - detecting the object specific luminescence spectral pattern of the at least one object to be recognized out of the measured radiance data of the scene,
 - matching the detected object specific luminescence spectral pattern with the luminescence spectral patterns stored in the data storage unit, and
 - identifying a best matching luminescence spectral pattern and, thus, its assigned object.
10. The method according to claim 9 wherein the linear polarizer and the quarter waveplate are applied directly on top of the at least one object to form a 3-layer construct.
11. A method for object recognition via a computer vision application, the method comprising at least the following steps:
- providing at least one object to be recognized, the object being at least semi-transparent and having object specific transmission and luminescence spectral patterns,
 - illuminating, using a light source, a scene including the at least one object under ambient lighting conditions,
 - providing two linear polarizers which are aligned at an angle in the range of -5 to 5 degrees, preferably of -3 to 2 degrees, more preferably of -1 to 1 degrees relative to each other or rotated at an angle in the

range of 85 to 95 degrees, particularly of 87 to 92 degrees, more preferably of 89 to 91 degrees to each other and which are sandwiching the at least one object between them,

- 5 - measuring, using a sensor, radiance data of the scene including the at least one object,
- providing a data storage unit which comprises luminescence spectral patterns together with appropriately assigned respective objects,
- providing a data processing unit which is programmed to detect the object specific luminescence spectral pattern of the at least one object
- 10 to be recognized out of the measured radiance data of the scene and to match the detected object specific luminescence spectral pattern with the luminescence spectral patterns stored in the data storage unit, and to identify a best matching luminescence spectral pattern and, thus, its assigned object.

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12. The method according to claim 11 wherein the linear polarizers are applied directly on either side of the at least one object.

13. The method according to claim 11 or 12 wherein each of the two linear
- 20 polarizers is coupled with a quarter waveplate, wherein the linear polarizers are aligned at an angle in the range of -5 to 5 degrees, preferably of -3 to 2 degrees, more preferably of -1 to 1 degrees relative to each other and each of the quarter waveplate being oriented with its fast and slow axes at an angle in the range of 40 to 50 degrees, preferably of
- 25 42 to 48 degrees, more preferably of 44 to 46 degrees relative to the respective linear polarizer and each quarter waveplate being oriented at about 0 degrees relative to the other quarter waveplate.

14. The method according to any one of claims 11 to 13 wherein the two linear
- 30 polarizers and the respective two quarter waveplates each coupled with one of the two linear polarizers are applied directly on either side of the at

least one object, thus forming a 5-layer construct with each layer directly on top of the other.

15. A non-transitory computer-readable medium storing instructions that when
5 executed by one or more processors, cause a machine to:
- provide at least one object to be recognized, the object being at least semi-transparent and having object specific transmission and luminescence spectral patterns,
 - 10 - illuminate, using a light source, a scene including the at least one object under ambient lighting conditions,
 - provide two linear polarizers which are aligned at an angle in the range of -5 to 5 degrees, preferably of -3 to 2 degrees, more preferably of -1 to 1 degrees relative to each other or rotated at an angle in the range
15 of 85 to 95 degrees, particularly of 87 to 92 degrees, more preferably of 89 to 91 degrees to each other, and which are sandwiching the at least one object between them,
 - measure, using a sensor, radiance data of the scene including the at least one object,
 - 20 - provide a data storage unit which comprises luminescence spectral patterns together with appropriately assigned respective objects,
 - detect the object specific luminescence spectral pattern of the at least one object to be recognized out of the measured radiance data of the scene and to match the detected object specific luminescence spectral pattern with the luminescence spectral patterns stored in the data
25 storage unit, and to identify a best matching luminescence spectral pattern and, thus, its assigned object.