

to detect one or more objects appearing in the input image, and estimate quantities of one or more spatial features of the detected one or more objects with reference to real space; and a descriptor generator configured to generate one or more spatial descriptors representing the estimated quantities of one or more spatial features, each spatial descriptor having a format to be used as a search target. The image analyzer, when detecting an object disposed in a position with respect to a ground and having a known physical dimension from the input image, detects a plane on which the detected object is disposed, and estimates a quantity of a spatial feature of the detected plane.

[0012]

According to a second aspect of the present invention, there is provided an image processing system which includes: the image processing apparatus; a parameter deriving unit configured to derive a state parameter indicating a quantity of a state feature of an object group, based on the one or more spatial descriptors, the object group being a group of the detected objects; and a state predictor configured to predict, by computation, a future state of the object group based on the derived state parameter.

[0013]

According to a third aspect of the present invention, there is provided an image processing method includes: analyzing an input image thereby to detect one or more objects appearing in the input image; estimating quantities of one or more spatial features of the detected one or more objects with reference to real space; when the detected object is disposed in a position with respect to a ground and has a known physical dimension, detecting a plane on which the detected object is disposed, and estimating a quantity of a spatial feature of the detected plane; and generating one or more spatial descriptors representing the estimated quantities of one or more spatial features, each spatial descriptor having a format to be used as a search target.

ADVANTAGEOUS EFFECTS OF INVENTION

[0014]

According to the present invention, one or more spatial descriptors representing quantities of one or more spatial features of one or more objects appearing in an input image,

CLAIMS

1. An image processing apparatus comprising:

an image analyzer configured to analyze an input image
thereby to detect one or more objects appearing in the input
5 image, and estimate quantities of one or more spatial features
of the detected one or more objects with reference to real space;
and

a descriptor generator configured to generate one or more
spatial descriptors representing the estimated quantities of
10 one or more spatial features, each spatial descriptor having
a format to be used as a search target, wherein,

the image analyzer, when detecting an object disposed in
a position with respect to a ground and having a known physical
dimension from the input image, detects a plane on which the
15 detected object is disposed, and estimates a quantity of a
spatial feature of the detected plane.

2. The image processing apparatus according to claim 1,
wherein the quantities of one or more spatial features are
20 quantities indicating physical dimensions in real space.

3. The image processing apparatus according to claim 1,
further comprising a receiver configured to receive
transmission data including the input image from at least one
25 imaging camera.

4. The image processing apparatus according to claim 1,
further comprising a data-storage controller configured to
store data of the input image in a first data storing unit, and

configured to associate data of the one or more spatial descriptors with the data of the input image and store the data of the one or more spatial descriptors in a second data storing unit.

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5. The image processing apparatus according to claim 4, wherein:

the input image is a moving image; and

10 the data-storage controller associates the data of the one or more spatial descriptors with one or more images displaying the detected one or more objects among a series of images forming the moving image.

6. The image processing apparatus according to claim 1, 15 wherein:

the image analyzer estimates geographic information of the detected one or more objects; and

20 the descriptor generator generates one or more geographic descriptors representing the estimated geographic information.

7. The image processing apparatus according to claim 6, wherein the geographic information is positioning information indicating locations of the detected one or more objects on the 25 Earth.

8. The image processing apparatus according to claim 7, wherein the image analyzer detects a code pattern appearing in the input image and analyzes the detected code pattern to obtain

the positioning information.

9. The image processing apparatus according to claim 6,
further comprising a data-storage controller configured to
5 store data of the input image in a first data storing unit, and
configured to associate data of the one or more spatial
descriptors and data of the one or more geographic descriptors
with the data of the input image, and store the data of the one
or more spatial descriptors and the data of the one or more
10 geographic descriptors in a second data storing unit.

10. The image processing apparatus according to claim 1,
further comprising a data transmitter configured to transmit
the one or more spatial descriptors.

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11. The image processing apparatus according to claim 10,
wherein:

the image analyzer estimates geographic information of
the detected one or more objects;

20 the descriptor generator generates one or more geographic
descriptors representing the estimated geographic
information; and

the data transmitter transmits the one or more geographic
descriptors.

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12. An image processing system comprising:

a receiver configured to receive one or more spatial
descriptors transmitted from an image processing apparatus
according to claim 10;

a parameter deriving unit configured to derive a state parameter indicating a quantity of a state feature of an object group, based on the one or more spatial descriptors, the object group being a group of the detected objects; and

5 a state predictor configured to predict a future state of the object group based on the derived state parameter.

13. An image processing system comprising:

an image processing apparatus according to claim 1;

10 a parameter deriving unit configured to derive a state parameter indicating a quantity of a state feature of an object group, based on the one or more spatial descriptors, the object group being a group of the detected objects; and

a state predictor configured to predict, by computation,
15 a future state of the object group based on the derived state parameter.

14. The image processing system according to claim 13, wherein:

20 an image analyzer estimates geographic information of the detected objects;

a descriptor generator generates one or more geographic descriptors representing the estimated geographic information; and

25 the parameter deriving unit derives the state parameter indicating the quantity of the state feature, based on the one or more spatial descriptors and the one or more geographic descriptors.

15. The image processing system according to claim 12, further comprising a state presentation interface unit configured to transmit data representing the state predicted by the state predictor to an external device.

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16. The image processing system according to claim 13, further comprising a state presentation interface unit configured to transmit data representing the state predicted by the state predictor to an external device.

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17. The image processing system according to claim 15, further comprising:

a security-plan deriving unit configured to derive, by computation, a proposed security plan based on the state
15 predicted by the state predictor; and

a plan presentation interface unit configured to transmit data representing the derived proposed security plan to an external device.

20 18. The image processing system according to claim 16, further comprising:

a security-plan deriving unit configured to derive, by computation, a proposed security plan based on the state predicted by the state predictor; and

25 a plan presentation interface unit configured to transmit data representing the derived proposed security plan to an external device.

19. An image processing method comprising:

analyzing an input image thereby to detect one or more objects appearing in the input image;

estimating quantities of one or more spatial features of the detected one or more objects with reference to real space;

5 when the detected object is disposed in a position with respect to a ground and has a known physical dimension, detecting a plane on which the detected object is disposed, and estimating a quantity of a spatial feature of the detected plane; and

10 generating one or more spatial descriptors representing the estimated quantities of one or more spatial features, each spatial descriptor having a format to be used as a search target.

20. The image processing method according to claim 19,
15 further comprising:

estimating geographic information of the one or more detected objects; and

generating one or more geographic descriptors representing the estimated geographic information.