CLAIMS

[Claim 1]

A detection apparatus comprising:

an object characteristic storage device to store a parameter indicating a characteristic of an abnormal object;

an object detection unit to detect an abnormal object candidate from image information by using the parameter;

an object storage unit to store the abnormal object candidate;

an object display unit to display the abnormal object candidate stored in the object storage unit;

a calibration input unit to receive input of calibration information on the abnormal object candidate, and, on a basis of the calibration information, correct the abnormal object candidate stored in the object storage unit;

an object characteristic calibration unit to calibrate the parameter stored in the object characteristic storage device, on the basis of the calibration information received by the calibration input unit ;and

an inspection result storage unit to store an inspection result of an inspection for the abnormal object other than the image information, wherein

the object detection unit detects the abnormal object candidate from the image information outside an area indicated by the inspection result stored in the inspection result storage unit.

[Claim 2]

A detection apparatus comprising:

an object characteristic storage device to store a parameter indicating a characteristic of an abnormal object;

an object detection unit to detect an abnormal object candidate from image information by using the parameter;

an object storage unit to store the abnormal object candidate;

an object display unit to display the abnormal object candidate stored in the object storage unit;

a calibration input unit to receive input of calibration information on the abnormal object candidate, and, on a basis of the calibration information, correct the abnormal object candidate stored in the object storage unit; and

an object characteristic calibration unit to calibrate the parameter stored in the object characteristic storage device, on the basis of the calibration information received by the calibration input unit; and

an inspection result storage unit to store an inspection result of an inspection for the abnormal object other than the image information, wherein

the object detection unit changes a value of the parameter and detects the abnormal object candidate from the image information within an area indicated by the inspection result stored in the inspection result storage unit.

[Claim 3]

The detection apparatus according to claim 1 or 2, wherein

when a plurality of pieces of calibration information on an identical abnormal object candidate is input to the calibration input unit, the calibration input unit determines calibration information by majority decision.

[Claim 4]

A detection apparatus comprising:

an object characteristic storage device to store a parameter indicating a characteristic of an abnormal object;

an object detection unit to detect an abnormal object candidate from image information by using the parameter;

an object storage unit to store the abnormal object candidate;

an object display unit to display the abnormal object candidate stored in the object storage unit;

a calibration input unit to receive input of calibration information on the abnormal object candidate, and, on a basis of the calibration information, correct the abnormal object candidate stored in the object storage unit; and

an object characteristic calibration unit to calibrate the parameter stored in the object characteristic storage device, on the basis of the calibration information received by the calibration input unit, wherein

when a plurality of pieces of calibration information on an identical abnormal object candidate is input to the calibration input unit, the calibration input unit determines calibration information on the basis of ratios of areas of the abnormal object candidate indicated by the pieces of the calibration information.

[Claim 5]

The detection apparatus according to claim 4, further comprising:

an inspection result storage unit to store an inspection result of an inspection for the abnormal object other than the image information, wherein

the object display unit displays the abnormal object candidate stored in the object storage unit, and the inspection result stored in the inspection result storage unit, with the abnormal object candidate and the inspection result being superposed on each other.

[Claim 6]

The detection apparatus according to any one of claims 1 to 5, further comprising:

a calibration history storage unit to store a calibration history that is a history of calibration based on the calibration information, wherein

the object characteristic calibration unit calibrates the parameter stored in the object characteristic storage device, by using the calibration information received by the calibration input unit, and the calibration history stored in the calibration history storage unit.

[Claim 7]

The detection apparatus according to any one of claims 1 to 6, further comprising:

an image information storage unit to store the image information, wherein

the object display unit displays the abnormal object candidate stored in the object storage unit, and the image information stored in the image information storage unit, with the abnormal object candidate and the image information being superposed on each other.

[Claim 8]

The detection apparatus according to any one of claims 1 to 7, wherein

the object display unit projects and displays the abnormal object candidate stored in the object storage unit or an image in which the abnormal object candidate is superimposed and displayed.

[Claim 9]

The detection apparatus according to any one of claims 1 to 8, wherein

the calibration input unit makes correction to add or delete an abnormal object to or from the abnormal object candidate stored in the object storage unit, on the basis of the calibration information.

[Claim 10]

The detection apparatus according to any one of claims 1 to 9, wherein

the calibration input unit makes correction to combine a plurality of abnormal object candidates stored in the object storage unit into one abnormal object candidate, or dividing one abnormal object candidate into a plurality of abnormal object candidates, on the basis of the calibration information.

[Claim 11]

The detection apparatus according to any one of claims 1 to 10, wherein

the object characteristic storage device includes:

a plurality of object characteristic storage units in which different parameters are stored; and

an object characteristic selection unit to select one object characteristic storage unit from the plurality of object characteristic storage units, and

the object detection unit detects an abnormal object candidate from image information by using a parameter stored in the object characteristic storage unit selected by the object characteristic selection unit, and

the object characteristic calibration unit calibrates the parameter stored in the selected object characteristic storage unit.

[Claim 12]

A detection method for detecting an abnormality by a detection apparatus, the method comprising:

a detection step of detecting, by an object detection unit, an abnormal object candidate from image information, using a parameter indicating a characteristic of an abnormal object;

a storage step of storing, in an object storage unit, the

abnormal object candidate;

a display step of displaying, by an object display unit, the abnormal object candidate;

a calibration input reception step of receiving, by a calibration input unit, input of calibration information on the abnormal object candidate;

a correction step of correcting, by the calibration input unit, the abnormal object candidate stored in the object storage unit, on a basis of the calibration information; and

a calibration step of calibrating, by an object characteristic calibration unit, the parameter on the basis of the calibration information, wherein

in the detection step, the object detection unit detects the abnormal object candidate from the image information outside an area indicated by an inspection result of an inspection for the abnormal object other than the image information.

[Claim 13]

A detection method for detecting an abnormality by a detection apparatus, the method comprising:

a detection step of detecting, by an object detection unit, an abnormal object candidate from image information, using a parameter indicating a characteristic of an abnormal object;

a storage step of storing, in an object storage unit, the abnormal object candidate;

a display step of displaying, by an object display unit, the abnormal object candidate;

a calibration input reception step of receiving, by a calibration input unit, input of calibration information on the abnormal object candidate;

a correction step of correcting, by the calibration input

unit, the abnormal object candidate stored in the object storage storage unit, on a basis of the calibration information; and

a calibration step of calibrating, by an object characteristic calibration unit, the parameter on the basis of the calibration information, wherein

in the detection step, the object detection unit changes a value of the parameter and detects the abnormal object candidate from the image information within an area indicated by an inspection result of an inspection for the abnormal object other than the image information.

[Claim 14]

The detection method according to claim 12 or 13, wherein

in the calibration input reception step, when a plurality of pieces of calibration information on an identical abnormal object candidate is input to the calibration input unit, the calibration input unit determines calibration information by majority decision.

[Claim 15]

A detection method for detecting an abnormality by a detection apparatus, the method comprising:

a detection step of detecting, by an object detection unit, an abnormal object candidate from image information, using a parameter indicating a characteristic of an abnormal object;

a storage step of storing, in an object storage unit, the abnormal object candidate;

a display step of displaying, by an object display unit, the abnormal object candidate;

a calibration input reception step of receiving, by a calibration input unit, input of calibration information on the abnormal object candidate;

a correction step of correcting, by the calibration input

unit, the abnormal object candidate stored in the object storage storage unit, on a basis of the calibration information; and

a calibration step of calibrating, by an object characteristic calibration unit, the parameter on the basis of the calibration information, wherein

in the calibration input reception step, when a plurality of pieces of calibration information on an identical abnormal object candidate is input to the calibration input unit, the calibration input unit determines calibration information on the basis of ratios of areas of the abnormal object candidate indicated by the pieces of the calibration information.

[Claim 16]

The detection method according to claim 15, wherein

in the display step, the object display unit displays the abnormal object candidate and an inspection result of an inspection for the abnormal object other than the image information, with the abnormal object candidate and the inspection result being superposed on each other.

[Claim 17]

The detection method according to any one of claims 12 to 16, wherein

in the calibration step, the object characteristic calibration unit calibrates the parameter by using the calibration information and a calibration history that is a history of calibration based on the calibration information.

[Claim 18]

The detection method according to any one of claims 12 to 17, wherein

in the display step, the object display unit displays the abnormal object candidate and the image information, with the abnormal object candidate and the image information being superposed on each other.

[Claim 19]

The detection method according to any one of claims 12 to 18, wherein

in the display step, the object display unit projects and displays the abnormal object candidate or an image in which the abnormal object candidate is superimposed and displayed.

[Claim 20]

The detection method according to any one of claims 12 to 19, wherein

in the correction step, the calibration input unit makes correction to add or delete an abnormal object to or from the abnormal object candidate stored in the object storage unit on the basis of the calibration information.

[Claim 21]

The detection method according to any one of claims 12 to 19, wherein

in the correction step, the calibration input unit makes correction to combine a plurality of abnormal object candidates stored in the object storage unit into one abnormal object candidate on the basis of the calibration information.

[Claim 22]

The detection method according to any one of claims 12 to 21, further comprising:

a selection step of selecting one object characteristic storage unit from a plurality of object characteristic storage units when different parameters are stored in the plurality of object characteristic storage units in the detection apparatus, wherein

in the detection step, the object detection unit detects an abnormal object candidate from image information by using a parameter stored in the object characteristic storage unit selected in the selection step, and

in the calibration step, the object characteristic calibration unit calibrates the parameter stored in the selected object characteristic storage unit.