TECHNICAL PROBLEM

[0006] Embodiments of the present invention seek to provide a device, a system, a program, and a method which can estimate composition of waste even if waste materials having different components and similar colors and waste materials having similar components and different colors are mixed in waste.

SOLUTION TO PROBLEM

[0006a] A first aspect of the present invention provides a device comprising an estimation unit which inputs, to a model that is constructed by performing learning using training data associated with a captured image of waste stored in a waste pit, data of a new captured image of waste stored in the waste pit to thereby obtain a value representing composition of the waste corresponding to the new image; wherein the training data is collected from at least one of a value representing a characteristic of waste identified based on operation history of a waste treatment plant, and a label representing result of classification of composition of waste, wherein classification is performed by an operator based on image data of the waste in the waste pit.

[0006b] A second aspect of the present invention provides a waste treatment plant system comprising an estimation unit which inputs, to a model that is constructed by performing learning using training data associated with a captured image of waste stored in a waste pit, data of each of blocks of a captured new image that is obtained by dividing the captured new image of the waste stored in the waste pit into plural blocks, and generates an inference map that associates values representing composition of the waste corresponding to the new image with the respective blocks, and an instruction unit which generates, based on the inference map, at least one of an instruction to a crane control device which controls a crane and an instruction to a combustion control device which controls an incinerator.

[0006c] A third aspect of the present invention provides a method for estimating composition of waste stored in a waste pit of a waste treatment plant comprising a step for inputting, to a model that is constructed by performing learning using training data associated with a captured image of waste stored in a waste pit, data of a new captured image of waste stored in the waste pit, and thereby obtaining a value representing composition of the waste corresponding to the new image; wherein the training data is

collected from at least one of a value representing a characteristic of waste identified based on operation history of a waste treatment plant, and a label representing result of classification of composition of waste, wherein classification is performed by an operator based on image data of the waste in the waste pit.

[0006d] There is also provided a program that makes a processor in the waste treatment plant to perform the method according to the third aspect.

[0007] (Mode 1) According to mode 1, a device is provided, and the device comprises: a training data generation unit which generates training data associated with a captured image of waste stored in a waste pit; a model construction unit which constructs a model by performing learning using the training data; and an estimation unit which inputs, in the model, data of a new captured image of waste stored in a waste pit, and obtains a value representing composition of the waste corresponding to the new image.

[0008] (Mode 2) According to mode 2, the mode comprises the device of mode 1, wherein the estimation unit further divides the captured new image of the waste into plural blocks; regarding each of the blocks, outputs a value representing composition of the waste corresponding to the new image; and generates an inference map which associates outputted values representing composition of the waste with the respective blocks.

[0009] (Mode 3) According to mode 3, the mode comprises the device of mode 2, wherein the device further comprises an instruction unit which generates, based on the inference map, at least one of an instruction to a crane control device which controls a crane and an instruction to a combustion control device which controls an incinerator.

[0010] (Mode 4) According to mode 4, the mode comprises the device of mode 3, wherein the instruction to the crane control device is an instruction to a crane to move waste stored in the waste pit; and the instruction to the combustion control device is an instruction required to incinerate waste thrown into the incinerator.

[0011] (Mode 5) According to mode 5, the mode comprises the device of any one of modes 1 to 4, wherein the training data is collected from at least one of a value representing a

CLAIMS

1. A device comprising:

an estimation unit which inputs, to a model that is constructed by performing learning using training data associated with a captured image of waste stored in a waste pit, data of a new captured image of waste stored in the waste pit to thereby obtain a value representing composition of the waste corresponding to the new image; wherein

the training data is collected from at least one of a value representing a characteristic of waste identified based on operation history of a waste treatment plant, and a label representing result of classification of composition of waste, wherein classification is performed by an operator based on image data of the waste in the waste pit.

2. The device according to Claim 1, wherein the estimation unit further

divides the captured new image of the waste into plural blocks, and, regarding each of the blocks, outputs a value representing composition of the waste corresponding to the new image; and

generates an inference map which associates outputted values representing composition of the waste with the respective blocks.

3. The device according to Claim 2, further comprising

an instruction unit which generates, based on the inference map, at least one of an instruction to a crane control device which controls a crane and an instruction to a combustion control device which controls an incinerator.

4. The device according to Claim 3, wherein the instruction to the crane control device is an instruction to a crane to move waste stored in the waste pit; and the instruction to the combustion control device is an instruction required to incinerate waste thrown into the incinerator.

5. The device according to any one of Claims 1 to 4, wherein the value representing composition of the waste is an index that represents flammability of the waste.

6. The device according to any one of Claims 1 to 5 further comprising:

a training data generation unit which generates the training data associated with a captured image of waste stored in the waste pit.

7. The device according to Claim 6 further comprising:

a model construction unit which constructs the model by performing learning using the training data.

8. A waste treatment plant system comprising:

an estimation unit which inputs, to a model that is constructed by performing learning using training data associated with a captured image of waste stored in a waste pit, data of each of blocks of a captured new image that is obtained by dividing the captured new image of the waste stored in the waste pit into plural blocks, and generates an inference map that associates values representing composition of the waste corresponding to the new image with the respective blocks, and

an instruction unit which generates, based on the inference map, at least one of an instruction to a crane control device which controls a crane and an instruction to a combustion control device which controls an incinerator.

9. A method for estimating composition of waste stored in a waste pit of a waste treatment plant comprising a step for:

inputting, to a model that is constructed by performing learning using training data associated with a captured image of waste stored in a waste pit, data of a new captured image of waste stored in the waste pit, and thereby obtaining a value representing composition of

the waste corresponding to the new image; wherein

the training data is collected from at least one of a value representing a characteristic of waste identified based on operation history of a waste treatment plant, and a label representing result of classification of composition of waste, wherein classification is performed by an operator based on image data of the waste in the waste pit.

10. A program that makes a processor in the waste treatment plant to perform the method according to Claim 9.