determined as general waste as a whole. Therefore, there is a risk that a certain amount or more of foreign waste material which affects the combustion state or a certain amount or more of waste material which causes troubles of each device are fed into the incinerator.

[0008]

In the waste agitating state detection device and the waste agitating state detection method of JP 2015-124955 A, the degree of tearing of the waste bag is detected on the basis of a brightness value. However, this method can only detect the waste bag. In some cases, in addition to the waste bag, various types of waste material such as pruned branches and futons are fed into the actual waste pit, and thus it is difficult to apply the above method to such an actual waste pit.

[0009]

It is desired to provide an information processing device, an information processing program, and an information processing method capable of identifying the type of waste material in the waste pit.

[0010]

An information processing device according to one aspect of the present disclosure includes

a type identification unit configured to identify a type of waste material accumulated in a waste pit and a type of identification target other than the waste material when new

image data of an inside of the waste pit is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste pit where the waste material is accumulated, wherein the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

[0011]

An information processing program according to one aspect of the present disclosure causes

a computer to function as

a type identification unit configured to identify a type of waste material accumulated in a waste pit and a type of identification target other than the waste material when new image data of an inside of the waste pit is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste pit where the waste material is accumulated, wherein the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

[0012]

An information processing method executed by a computer according to one aspect of the present disclosure includes

identifying a type of waste material accumulated in a waste pit and a type of identification target other than the waste material when new image data of an inside of the waste pit is given as an input by using an identification algorithm

which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste pit where the waste material is accumulated, wherein the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

[0013]

An information processing device according to one aspect of the present disclosure includes

a type identification unit configured to identify a type of waste material accumulated in a waste accumulation place and a type of identification target other than the waste material when new image data of an inside of the waste accumulation place is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste accumulation place where the waste material is accumulated, wherein the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

[0014]

An information processing program according to one aspect of the present disclosure causes

a computer to function as

a type identification unit configured to identify a type of waste material accumulated in a waste accumulation place and a type of identification target other than the waste material when new image data of an inside of the waste accumulation place is given as an input by using an identification algorithm which has been learned with

training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste accumulation place where the waste material is accumulated, wherein the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

[0015]

An information processing method executed by a computer according to one aspect of the present disclosure includes

identifying a type of waste material accumulated in a waste accumulation place and a type of identification target other than the waste material when new image data of an inside of the waste accumulation place is given as an input, by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste accumulation place where the waste material is accumulated, wherein the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

Brief Description of Drawings

[0016]

Fig. 1 is a schematic diagram illustrating a configuration of a waste treatment plant according to an embodiment.

Fig. 2 is a block diagram illustrating a configuration of an information processing device according to the embodiment.

CLAIMS

1. An information processing device comprising:

a type identification unit configured to identify a type of waste material accumulated in a waste pit and a type of identification target other than the waste material when new image data of an inside of the waste pit is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste pit where the waste material is accumulated, wherein

the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

2. The information processing device according to claim 1, wherein

the identification algorithm includes one or more of statistical estimation, reinforcement learning and deep learning using linear regression, Boltzmann machine, neural network, support vector machine, Bayesian network, sparse regression, decision tree or random forest.

3. The information processing device according to claim 1 or 2, wherein

the image data includes one or more of shape/color image data obtained by capturing waste material with an RGB camera, near-infrared image data obtained by capturing the waste material with a near-infrared camera, and three-dimensional image data obtained by capturing the waste material with a 3D camera or an RGB-D camera.

4. The information processing device according to any one of claims 1 to 3, wherein

the type of waste material includes one or more of unbroken waste bags, paper waste, pruned branches, futons, sludge, shredded oversized waste, cardboards, hemp bags, paper bags, and bottom waste.

5. The information processing device according to any one of claims 1 to 4, further comprising:

a plant control unit configured to control a waste treatment plant on a basis of an identification result of the type identification unit.

6. The information processing device according to claim 5, wherein

the plant control unit includes one or both of a

crane control unit configured to transmit the identification result of the type identification unit to a crane control device for controlling a crane which agitates or transports the waste material and a combustion control unit configured to transmit the identification result of the type identification unit to a combustion control device for controlling combustion of the waste material.

7. The information processing device according to any one of claims 1 to 6, wherein

the type of the identification target other than waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, a crane for agitating or transporting the waste material, a wall, a pillar, a floor, a window, a ceiling, a door, a stair, a girder, and a corridor, a dividing wall of the waste pit, a waste feeding hopper, a loading door of the waste treatment plant, a worker, and a carry-in vehicle.

8. The information processing device according to any one of claims 1 to 7, further comprising:

a foreign matter feeding detection unit configured to detect a foreign matter fed into the waste pit on the basis of the identification result of the type identification unit.

9. The information processing device according to claim 8, wherein

the foreign matter feeding detection unit is configured to transmit the identification result of the type identification unit to the foreign matter detection device for detecting the foreign matter fed into the waste pit where the waste material is accumulated.

10. The information processing device according to any one of claims 1 to 9, further comprising:

a fall detection unit configured to detect a fall of a worker or a carry-in vehicle into the waste pit on the basis of the identification result of the type identification unit.

11. The information processing device according to claim 10, wherein

the fall detection unit is configured to transmit the identification result of the type identification unit to a fall detection device for detecting presence of the worker or a carry-in vehicle in the waste pit where the waste material is accumulated.

12. The information processing device according to any one of claims 1 to 11, wherein

the type of the waste material includes one or more of unbroken waste bags, paper waste, pruned branches, futons, sludge, shredded oversized waste, cardboards, hemp bags, paper bags, bottom waste, wood waste, textile waste, clothing waste, plastic waste, animal residue, animal corpse, kitchen waste, vegetation, soil, medical waste, incineration ash, bicycles, chests, beds, shelves, desks, chairs, agricultural vinyl, PET bottles, styrene forms, meat and bone meal, agricultural products, pottery, glass scrap, metal scrap, debris, concrete scrap, tatami mat, bamboo, straw, and activated carbon.

13. An information processing program for causing a computer to function as:

a type identification unit configured to identify a type of waste material accumulated in a waste pit and a type of identification target other than the waste material when new image data of an inside of the waste pit is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste pit where the waste material is accumulated, wherein

the type of the identification target other than the waste material includes one or more of a beam of the waste

treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

14. An information processing method executed by a computer, the method comprising:

identifying a type of waste material accumulated in a waste pit and a type of identification target other than the waste material when new image data of an inside of the waste pit is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste pit where the waste material is accumulated, wherein

the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

15. An information processing device comprising:

a type identification unit configured to identify a

type of waste material accumulated in a waste accumulation place and a type of identification target other than the waste material when new image data of an inside of the waste accumulation place is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste accumulation place where the waste material is accumulated, wherein

the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

16. An information processing program for causing a computer to function as:

a type identification unit configured to identify a type of waste material accumulated in a waste accumulation place and a type of identification target other than the waste material when new image data of an inside of the waste accumulation place is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material

and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste accumulation place where the waste material is accumulated, wherein

the type of the identification target other than the waste material includes one or more of a beam of the waste treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

17. An information processing method executed by a computer, the method comprising:

identifying a type of waste material accumulated in a waste accumulation place and a type of identification target other than the waste material when new image data of an inside of the waste accumulation place is given as an input by using an identification algorithm which has been learned with training data prepared by labeling a type of waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing the inside of the waste accumulation place where the waste material is accumulated, wherein

the type of the identification target other than the waste material includes one or more of a beam of the waste

treatment plant, a side wall of the waste pit, a mountain cliff of the waste material accumulated in the waste pit, and a crane for agitating or transporting the waste material.

18. The information processing device according to claim 1, further comprising:

an identification algorithm generation unit configured to generate the identification algorithm by learning training data prepared by labeling the type of the waste material and by labelling an identification target other than the waste material by type of the target on past image data obtained by capturing an inside of the waste pit where the waste material is accumulated.