such as a person or baskets moving in a shop, defining a region of the moving object, and imaging the moving object while keeping tracking movement of the moving object;

a shelf product recognition means for constantly imaging a state of a shelf in the shop, comparing captured images before and after an object is taken out from the shelf, defining a region of a product of a recognition target from the images, and specifying a product from the defined image region; and

a checkout means for checking out the specified product.

[0006A]

In another aspect, there is provided an information processing system used when a person moves and purchases a first object as a product. The information processing system can include:

- a moving object tracking unit for tracking a moving object, using the person as the moving object;
- an object entering/leaving detecting unit for detecting entry/leaving of the first object into/from a predetermined area; and
- an associating unit that associates the moving object with the first object that has been detected to enter and leave.

Effects of the Invention

[0007]

According to the present invention, it is possible to provide an information processing system which is capable of implementing automation of payment for products and reduction of a time taken for paying for products when purchasers purchase products displayed in shops and preventing misbehaviors by shoppers or cash register personnel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

Fig. 1 is a diagram illustrating a list of main points of first to fourth embodiments of an information processing system according to the present invention.

Fig. 2 is a diagram illustrating a layout example of a convenience store employing a product recognition system in a first embodiment.

Fig. 3 is a schematic perspective view illustrating a

CLAIMS

1. An information processing system used when a person moves and purchases a first object as a product, the information processing system comprising:

a moving object tracking unit for tracking a moving object, using the person as the moving object;

an object entering/leaving detecting unit for detecting entry/leaving of the first object into/from a predetermined area; and

an associating unit that associates the moving object with the first object that has been detected to enter and leave.

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

each of the one or more first objects is arranged in a predetermined place including shelves as a product for sale in a shop, the predetermined area is an area indicating the place.

3. The information processing system according to claim 1 or 2, further comprising

a product specifying unit that attempts to specify the first object as a product by one or more predetermined methods.

4. The information processing system according to any one of claims 1 to 3, further comprising

a display unit that presents a checkout amount determined from the information of the product specified.

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

a checkout unit that performs a checkout process for the product associated with the moving object as a payment for the person.

6. The information processing system according to any one of claims 1 to 5, wherein

the moving object tracking unit assigns an identifier to each of the one or more moving objects, and groups the one or more moving objects using the identifier.

7. The information processing system according to any one of claims 1 to 6, further comprising

an acquisition unit that acquires information about the moving object.

8. The information processing system according to any one of claims 1 to 7, wherein

when the first object associated with the moving object to be tracked is transferred to a person different from the moving object, the moving object tracking unit recognizes its mode, the person different from the moving object is specified as a new moving object, and the new moving object is set as a tracking target; and

the associating unit associates the transferred first object with the new moving object.

9. The information processing system according to any one of claims 3 to 8, further comprising

a first error display unit configured to present that there is a predetermined error condition, if the first object is a selling-restricted product and the person has a possibility of subject to selling restriction.

10. The information processing system according to claim 3, wherein

the associating unit associates the first object that fails in attempts to specify the product by the product specifying unit with the moving object; and

the associating unit further comprises a second error display unit configured to present a predetermined error condition if attempts to specify the product by the product specifying unit fails.

11. The information processing system according to any one of claims 1 to 10, wherein

the moving object tracking unit further includes a clerk identifying means, tracks the moving object with the person moving in the shop where clerk exists as the moving object, and identifies between the clerk and the moving object.

12. The information processing system according to any one of claims 1 to 11, further comprising

an inventory information update means, wherein

each of the one or more first objects is arranged in a predetermined place including shelves as a product for sale in a shop, the predetermined area is an area indicating the place,

the inventory information update means manages the inventory of the product in each of the place and the entire shop, and when the specified product is purchased, the inventory of each of the place and the entire shop where a predetermined product exists is updated; and

when the inventory quantity of the place or the entire shop satisfies a predetermined requirement, execution of at least one of notification to a remote control unit and automatic ordering is controlled.

13. The information processing system according to any one of claims 1 to 12, further includes

an attribute estimation function that estimates the attribute of the person.

14. The information processing system according to any one of claims 1 to 13, wherein

the moving object tracking unit registers history information indicating a movement path of the moving object during tracking.

15. The information processing system according to claim 3, wherein

the product specifying unit includes

a first specifying means that obtains a result of an attempt to specify the first object as the product using a first method of the predetermined methods, the first method is a method in which a person who visually inspect visually confirms an image containing the first object as a subject; and

a second specifying means that attempts to specify the first object as the product using a second method other than the first method among the predetermined methods, and wherein

the product specifying unit specifies the product based on the result of at least one of the first specifying means and the second specifying means.

16. The information processing system according to any one of claims 1 to 15, wherein

the moving object tracking unit tracks, as the moving object, a second object that moves with the person instead of the person.