determined that the user is eating or drinking unauthorizedly. For example, if the attribute category of the goods is bottled drinking water, and the length of time that the distance between the user and the bottled drinking water is within a distance threshold reaches a preset length, it can be determined that the user drinks the bottled drinking water unauthorizedly.

[077] If the length of time that the distance between the user's mouth and the goods is within a distance threshold reaches a preset length but the attribute category of the goods does not fall in the edible category, it can be determined that the user is not eating or drinking unauthorizedly. For example, when the attribute category of the goods is a household commodity and the length of time that the distance between the user and the household commodity is within a distance threshold reaches a preset length, it can also be determined that the user does not perform an unauthorized eating or drinking behavior.

[078] The attribute category of the goods can be determined before or after step 206 shown in FIG. 2, or may be determined while step 206 is performed, which is not limited by this embodiment.

[079] Optionally, in order to avoid misrecognition and to improve the accuracy in recognizing an unauthorized eating or drinking behavior, external surface image data of the goods may further be obtained as the feature data of the goods. The external surface image data can usually be understood as an external package image of the goods.

[080] Some edible goods in the unmanned supermarket can only be eaten after unpacking; thus, whether the external surface image data of the goods matches a default external surface image may further be determined. Here, the default external surface image can be stored in advance. If the external surface image data of the goods matches the default external surface image, it may indicate that the external package of the goods is not damaged; and if the external surface image data of the goods does not match the default external surface image, it may indicate that the external package of the goods is damaged.

[081] In this example, when the length of time that the distance between the user's mouth and the goods is within a distance threshold reaches a preset length and the external package of the goods is damaged, it can be determined that the user performs an unauthorized behavior.

[082] The external surface image data of the goods can be matched before or after step 206 shown in FIG. 2, or may be matched while step 206 is performed, which is not limited by this embodiment.

[083] In actual application, the above-described various solutions may be combined, or

CLAIMS

1. A method for recognizing an unauthorized eating or drinking behavior, comprising:

obtaining, through machine vision, body movement pattern data of a user;

obtaining mouth position data of the user;

obtaining feature data of an object, the feature data comprising:

position data of the object based on a radio frequency identification tag on the object,

attribute category data of the object, and

external surface image data of the object;

comparing the body movement pattern data with a preset body movement pattern; and

determining that the user's behavior is unauthorized eating or drinking in response to the body movement pattern data matching the preset body movement pattern and that:

a distance between the user's mouth and the object is within a distance threshold over a preset length of time,

the attribute category of the object is an edible category, and

the external surface image data does not match a default external surface image of the object.

2. The method according to claim 1, wherein

the body movement pattern data comprises mouth behavior data of the user; and

the preset body movement pattern comprises a preset mouth movement pattern.

3. The method according to claim 1, wherein the determining that the user's behavior is unauthorized comprises:

when the preset category is an edible category, determining that the user performs the unauthorized behavior.

4. The method according to claim 1, wherein

the body movement pattern data comprises limb behavior data of the user;

the preset body movement pattern comprises a preset limb movement pattern;

the feature data further comprises vibration data of the object, wherein the vibration data is obtained with a sensor on the object; and

the determining that the user's behavior is unauthorized in response to the body movement pattern data matching the preset body movement pattern comprises:

determining a vibration state of the object based on the vibration data; and when the limb behavior data matches the preset limb movement pattern and the object vibrates, determining that the user performs the unauthorized behavior.

5. The method according to claim 1, wherein the obtaining feature data of an object includes obtaining the feature data through machine vision.

6. A method for recognizing an unauthorized eating or drinking behavior, comprising:

obtaining, through machine vision, body data of a user, wherein the body movement pattern data includes mouth position data of the user;

obtaining feature data of an object, wherein the feature data comprises object position data of the object and attribute category data of the object;

comparing the body data with a preset body movement pattern; and

in response to the body data matching the preset body movement pattern and the feature data meeting preset conditions, determining the unauthorized eating or drinking behavior of the user based on the body data and the feature data by:

determining the attribute category of the object is an edible category,

calculating a distance between the user's mouth and the object according to the mouth position data and the object position data, and

determining a length of time that the distance between the mouth and the object is within a distance threshold.

7. The method according to claim 6, wherein

the object position data is obtained with a radio frequency identification tag.

8. The method according to claim 7, wherein the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time, determining that the user performs the unauthorized behavior.

9. The method according to claim 7, wherein

the body data further comprises mouth behavior data of the user;

the preset body movement pattern comprises a preset mouth movement pattern; and

the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time and the mouth behavior data matches the preset mouth movement pattern, determining that the user performs the unauthorized behavior.

10. The method according to claim 7, wherein:

the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time, determining that the user performs the unauthorized behavior.

11. The method according to claim 7, wherein

the feature data further comprises external surface image data of the object;

the preset conditions include the external surface image data does not match a default external surface image; and

the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time, determining that the user performs the unauthorized behavior.

12. The method according to claim 6, wherein

the body data comprises limb behavior data of the user;

the preset body movement pattern comprises a preset limb movement pattern;

the feature data comprises vibration data of the object, wherein the vibration data is obtained with a sensor on the object; and

the preset conditions include that the object vibrates.

13. A method for recognizing an unauthorized behavior, comprising:

obtaining body data of a user, wherein the body data comprises mouth position data of the user;

obtaining feature data of an object, wherein the feature data comprises object position data of the object and attribute category data of the object; and

determining, according to a behavior recognition model trained with results of recognizing unauthorized behaviors, the unauthorized eating or drinking behavior of the user based on the body data, the feature data, and preset body movement patterns, by:

determining the attribute category of the object is an edible category,

calculating a distance between the user’s mouth and the object according to the

mouth position data and the object position data, and

determining a length of time that the distance between the mouth and the object is within a distance threshold.

14. The method according to claim 13, wherein

the object position data is obtained with a radio frequency identification tag.

15. The method according to claim 14, wherein the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time, determining that the user performs the unauthorized behavior.

16. The method according to claim 14, wherein

the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time and the mouth behavior data matches the preset mouth movement pattern, determining that the user performs the unauthorized behavior.

17. The method according to claim 14, wherein

the feature data further comprises external surface image data of the object; and

the determining the unauthorized behavior of the user comprises:

when the length of time reaches a preset length of time and the external surface image data does not match a default external surface image, determining that the user performs the unauthorized behavior.

18. The method according to claim 14, wherein

the determining the unauthorized behavior of the user comprises:

when the length of time reaches a predetermined length of time, determining that the user performs the unauthorized behavior.

19. The method according to claim 14, wherein

the body data comprises limb behavior data of the user;

the preset body movement pattern comprises a preset limb movement pattern;

the feature data comprises vibration data of the object, wherein the vibration data is

obtained with a sensor on the object; and

the determining the unauthorized behavior of the user comprises:

determining a vibration state of the object based on the vibration data; and

when the limb behavior data matches the preset limb movement pattern and the object vibrates, determining that the user performs the unauthorized behavior.