Claims:

1. A method of recognizing a package sorting behavior, comprising:

performing a target detection on an image frame in a target video, so as to acquire at least one human detection box and at least one package detection box;

tracking a motion trajectory of the human detection box and a motion trajectory of the package detection box respectively;

recognizing, in a process of trajectory tracking for a package, a moment at which the package is thrown based on a current motion trajectory tracked for the package; and

acquiring motion information of the package from the moment at which the package is thrown to a current moment, and recognizing a sorting behavior of the package based on the motion information;

wherein the current motion trajectory comprises a human motion trajectory corresponding to the human detection box and a package motion trajectory corresponding to the package detection box, and recognizing, for the package, the moment at which the package is thrown based on the current motion trajectory tracked for the package comprises:

acquiring, from a target package motion trajectory corresponding to the package, first position information of a target package detection box corresponding to the package on each image frame in a reverse chronological order;

acquiring, from the human motion trajectory, second position information of the human detection box on the same image frame;

when there is only one sorter, acquiring a target distance according to the first position information and the second position information of a corresponding moment;

when there are a plurality of sorters, extracting an image region marked by the second position information from an image frame corresponding to the second position information; performing a human key point detection on the image region to acquire human hand position information; and acquiring a distance between the first

position information and the human hand position information, as the target distance; and

determining a moment at which the target distance is less than a distance threshold for a first time, as the moment at which the package is thrown.

2. The method according to claim 1, wherein the determining a moment at which the target distance is less than a distance threshold for a first time, as the moment at which the package is thrown comprises:

determining a moment corresponding to an image frame in which the target distance is less than the distance threshold for the first time, as the moment at which the package is thrown.

3. The method according to claim 1, wherein the recognizing a sorting behavior of the package based on the motion information comprises:

generating a sorting force parameter of the package based on the motion information, and determining a sorting force level of the sorting behavior of the package according to the sorting force parameter.

4. The method according to claim 3, wherein the motion information comprises a distance value, a maximum speed, and an average speed of the package from the moment at which the package is thrown to the current moment, as well as a motion speed and an acceleration of the package at each moment from the moment at which the package is thrown to the current moment.

5. The method according to any one of claims 1 to 4, wherein the tracking a motion trajectory of the human detection box and a motion trajectory of the package detection box respectively comprises:

tracking the human detection box based on first identification information of the human detection box, so as to generate the human motion trajectory corresponding to the human detection box; and

tracking the package detection box based on second identification information of the package detection box, so as to generate the package motion trajectory corresponding to the package detection box.

6. An apparatus of recognizing a package sorting behavior, comprising:

a first acquisition module configured to perform a target detection on an image frame in a target video, so as to acquire at least one human detection box and at least one package detection box;

a trajectory tracking module configured to track a motion trajectory of the human detection box and a motion trajectory of the package detection box respectively;

a second acquisition module configured to recognize, in a process of trajectory tracking for a package, a moment at which the package is thrown based on a current motion trajectory tracked for the package; and

a behavior recognition module configured to acquire motion information of the package from the moment at which the package is thrown to a current moment, and recognize a sorting behavior of the package based on the motion information;

wherein the current motion trajectory comprises a human motion trajectory corresponding to the human detection box and a package motion trajectory corresponding to the package detection box, and the second acquisition module is further configured to:

acquire, from a target package motion trajectory corresponding to the package, first position information of a target package detection box corresponding to the package on each image frame in a reverse chronological order;

acquire, from the human motion trajectory, second position information of the human detection box on the same image frame;

when there is only one sorter, acquire a target distance according to the first position information and the second position information of a corresponding moment;

when there are a plurality of sorters, extract an image region marked by

the second position information from an image frame corresponding to the second position information; perform a human key point detection on the image region to acquire human hand position information; and acquire a distance between the first position information and the human hand position information, as the target distance; and

determine a moment at which the target distance is less than a distance threshold for a first time, as the moment at which the package is thrown.

7. The apparatus according to claim 6, wherein the second acquisition module is further configured to:

determine a moment corresponding to an image frame in which the target distance is less than the distance threshold for the first time, as the moment at which the package is thrown.

8. The apparatus according to claim 6, wherein the behavior recognition module is further configured to:

generate a sorting force parameter of the package based on the motion information, and determine a sorting force level of the sorting behavior of the package according to the sorting force parameter.

9. The apparatus according to claim 8, wherein the motion information comprises a distance value, a maximum speed, and an average speed of the package from the moment at which the package is thrown to the current moment, as well as a motion speed and an acceleration of the package at each moment from the moment at which the package is thrown to the current moment.

10. The apparatus according to any one of claims 6 to 9, wherein the trajectory tracking module is further configured to:

track the human detection box based on first identification information of the human detection box, so as to generate the human motion trajectory

corresponding to the human detection box; and

track the package detection box based on second identification information of the package detection box, so as to generate the package motion trajectory corresponding to the package detection box.

11. An electronic device, comprising:

at least one processor; and

a memory communicatively connected to the at least one processor,

wherein the memory stores instructions executable by the at least one processor, and the instructions, when executed by the at least one processor, cause the at least one processor to implement the method of any one of claims 1 to 5.

12. A non-transitory computer-readable storage medium having a computer instructions stored thereon, wherein the computer instructions are configured to cause a computer to implement the method of any one of claims 1 to 5.

13. A computer program product, comprising a computer program, wherein the computer program, when executed by a processor, implements the method of any one of claims 1 to 5.

14. A computer program, comprising computer program code, wherein the computer program code, when running on a computer, causes the computer to implement the method of any one of claims 1 to 5.