CLAIMS

1. An image processing method, comprising:

obtaining an image;

obtaining features of at least two parts of a target based on the image;

determining, according to the features of the at least two parts and a first movement constraint condition of a connection portion, movement information of the connection portion, wherein the connection portion connects two of the at least two parts; and

controlling movement of the connection portion in a controlled model according to the movement information of the connection portion.

2. The method according to claim 1, wherein controlling the movement of the connection portion in the controlled model according to the movement information of the connection portion comprises:

determining, according to a type of the connection portion, a control mode of controlling the connection portion; and

controlling the movement of the connection portion in the controlled model according to the control mode and the movement information of the connection portion.

3. The method according to claim 2, wherein determining, according to the type of the connection portion, the control mode of controlling the connection portion comprises:

in response to that the connection portion is a first-type connection portion, the control mode is a first-type control mode, wherein the first-type control mode is used for directly controlling movement of a connection portion in the controlled model

corresponding to the first-type connection portion.

4. The method according to claim 2 or 3, wherein determining, according to the type of the connection portion, the control mode of controlling the connection portion comprises:

in response to that the connection portion is a second-type connection portion, the control mode is a second-type control mode, wherein the second-type control mode is used for indirectly controlling movement of a connection portion in the controlled model corresponding to the second-type connection portion, and the indirect control is achieved by controlling a part in the controlled model corresponding to a part other than the second-type connection portion.

5. The method according to claim 4, wherein controlling the movement of the connection portion in the controlled model according to the control mode and the movement information of the connection portion comprises:

in response to that the control mode is the second-type control mode, obtaining, by decomposing the movement information of the connection portion, first-type rotation information of the connection portion that the connection portion rotates under traction of a traction portion;

adjusting movement information of the traction portion according to the first-type rotation information; and

controlling movement of the traction portion in the controlled model according to the adjusted movement information of the traction portion, to indirectly control the movement of the connection portion.

6. The method according to claim 5, further comprising:

obtaining, by decomposing the movement information of the connection portion,

second-type rotation information of the second-type connection portion rotating with respect to the traction portion; and

controlling, in the controlled model, rotation of the connection portion with respect to the traction portion by using the second-type rotation information.

7. The method according to any one of claims 3 to 6, wherein the second-type connection portion comprises:

a wrist; and

an ankle.

8. The method according to claim 5 or 6, wherein

in response to that the second-type connection portion is a wrist, the traction portion corresponding to the wrist comprises: an upper arm and/or a forearm; and

in response to that the second-type connection portion is an ankle, the traction portion corresponding to the ankle comprises: a thigh and/or a calf.

9. The method according to claim 3, wherein

the first-type connection portion comprises a neck connecting a head and a trunk.

10. The method according to any one of claims 1 to 9, wherein determining, according to the features of the at least two parts and the first movement constraint condition of the connection portion, the movement information of the connection portion comprises:

determining respective orientation information of the two parts according to the features of the two parts connected by the connection portion;

determining candidate orientation information of the connection portion according to the respective orientation information of the two parts; and

determining the movement information of the connection portion according to

the candidate orientation information and the first movement constraint condition.

11. The method according to claim 10, wherein determining the candidate orientation information of the connection portion according to the respective orientation information of the two parts comprises:

determining first candidate orientation information and second candidate orientation information of the connection portion according to the respective orientation information of the two parts.

12. The method according to claim 11, wherein determining the movement information of the connection portion according to the candidate orientation information and the first movement constraint condition comprises:

selecting target orientation information within an orientation change constraint range from the first candidate orientation information and the second candidate orientation information; and

determining the movement information of the connection portion according to the target orientation information.

13. The method according to any one of claims 10 to 12, wherein determining the respective orientation information of the two parts according to the features of the two parts comprises:

obtaining, for each of the two parts, a first key point and a second key point;

obtaining a first reference point for each of the two parts, wherein the first reference point refers to a first predetermined key point in the target;

generating a first vector based on the first key point and the first reference point;

generating a second vector based on the second key point and the first reference point; and

determining the orientation information for each of the two parts based on the first vector and the second vector.

14. The method according to claim 13, wherein determining the orientation information for each of the two parts based on the first vector and the second vector comprises: performing, for each part, cross product on the two vectors of the part to obtain a normal vector of a plane where the part is located; and

taking the normal vector as the orientation information of the part.

15. The method according to any one of claims 1 to 14, further comprising:

determining movement information of the at least two parts based on the features; and

wherein determining, according to the features of the at least two parts and the first movement constraint condition of the connection portion, the movement information of the connection portion comprises:

determining the movement information of the connection portion according to the movement information of the at least two parts.

16. The method according to claim 15, wherein

determining the movement information of the connection portion according to the movement information of the at least two parts comprises:

obtaining a third 3-Dimensional (3D) coordinate of the connection portion with respect to a second reference point, wherein the second reference point refers to a second predetermined key point in the at least two parts; and

obtaining absolute rotation information of the connection portion according to the third 3D coordinate; and

controlling the movement of the connection portion in the controlled model

according to the movement information of the connection portion comprises:

controlling the movement of the connection portion in the controlled model based on the absolute rotation information.

17. The method according to claim 16, wherein

controlling the movement of the connection portion in the controlled model based on the absolute rotation information further comprises:

obtaining, by decomposing the absolute rotation information according to a traction hierarchy relationship among a plurality of connection portions in the target, relative rotation information; and

controlling the movement of the connection portion in the controlled model according to the movement information of the connection portion comprises:

controlling the movement of the connection portion in the controlled model based on the relative rotation information.

18. The method according to claim 17, wherein

controlling the movement of the connection portion in the controlled model based on the absolute rotation information further comprises:

correcting the relative rotation information according to a second constraint condition; and

controlling the movement of the connection portion in the controlled model based on the relative rotation information comprises:

controlling the movement of the connection portion in the controlled model based on the corrected relative rotation information.

19. An image device, comprising:

a memory; and

a processor coupled to the memory and configured to execute computer-executable instructions on the memory, to implement the method provided by any one of claims 1 to 18.

20. A non-volatile computer storage medium storing computer-executable instructions that are executed by a processor to implement a method provided by any one of claims 1 to 18.