CLAIMS

1. A model reconstruction method, comprising:

acquiring scanned images of multiple viewing angles corresponding to an object to be reconstructed;

determining first Three-Dimensional (3D) key point information of the object to be reconstructed based on the scanned images of the multiple viewing angles; and

adjusting an initial parametric model based on the first 3D key point information of the object to be reconstructed to obtain a target parametric model characterizing a real posture of the object to be reconstructed,

wherein the scanned image comprises a texture map, and determining the first 3D key point information of the object to be reconstructed based on the scanned images of the multiple viewing angles comprises:

acquiring a camera parameter and the texture map that correspond to each of the multiple viewing angles;

performing Two-Dimensional (2D) key point detection on the texture map of each viewing angle to obtain 2D key point information corresponding to the texture map of each viewing angle; and

determining the first 3D key point information of the object to be reconstructed based on the camera parameter corresponding to each viewing angle and the 2D key point information corresponding to the texture map of each viewing angle,

wherein determining the first 3D key point information of the object to be reconstructed based on the camera parameter corresponding to each viewing angle and the 2D key point information corresponding to the texture map of each viewing angle comprises:

determining position information of each 2D key point in the texture map of each viewing angle based on the 2D key point information corresponding to the

texture map of each viewing angle; and

for each 2D key point, determining position information of a 3D key point corresponding to the 2D key point in a world coordinate system based on the position information of the 2D key point in the texture map of each viewing angle and the camera parameter corresponding to each viewing angle, the first 3D key point information comprising the position information of the 3D key point corresponding to each 2D key point in the world coordinate system.

2. The method of claim 1, wherein the scanned image comprises a depth map, and the method further comprises:

constructing 3D point cloud data of the object to be reconstructed in a world coordinate system based on the scanned images of the multiple viewing angles;

constructing a first mesh model of the object to be reconstructed based on the 3D point cloud data; and

determining a surface texture of the first mesh model of the object to be reconstructed based on the first mesh model and the scanned images of the multiple viewing angles.

3. The method of claim 2, wherein constructing the 3D point cloud data of the object to be reconstructed in the world coordinate system based on the scanned images of the multiple viewing angles comprises:

acquiring a camera parameter corresponding to each of the multiple viewing angles;

for each viewing angle, determining depth information of each of multiple scanned pixels based on the depth map in the scanned image corresponding to the viewing angle, and generating a cloud point set corresponding to the viewing angle based on the camera parameter corresponding to the viewing angle and the depth information of each scanned pixel, the point cloud set comprising position information of each scanned pixel in the world coordinate system; and

constructing the 3D point cloud data of the object to be reconstructed based on the point cloud set corresponding to each viewing angle.

4. The method of claim 2, wherein the scanned image further comprises a texture map, and determining the surface texture of the first mesh model of the object to be reconstructed based on the first mesh model and the scanned images of the multiple viewing angles comprises:

for any model triangular facet in the first mesh model, projecting the model triangular facet into the texture map of at least one viewing angle, determining a projected triangular facet corresponding to the model triangular facet in each texture map and texture information of the projected triangular facet, and determining texture information of the model triangular facet based on the texture information of each projected triangular facet; and

generating the surface texture of the first mesh model based on the texture information of each model triangular facet in the first mesh model.

5. The method of claim 4, wherein projecting the model triangular facet into the texture map of at least one viewing angle and determining the projected triangular facet corresponding to the model triangular facet in each texture map and the texture information of the projected triangular facet comprises:

for each viewing angle, determining, in the world coordinate system, projected vertex coordinates of the projected triangular facet corresponding to model vertex coordinates of the model triangular facet in the viewing angle based on the model vertex coordinates of the model triangular facet and a camera parameter corresponding to the viewing angle; and

determining, in the texture map corresponding to the viewing angle, the projected triangular facet and the texture information of the projected triangular facet based on the projected vertex coordinates of the projected triangular facet in the viewing angle.

6. The method of claim 5, wherein the scanned image further comprises a texture map, and determining, in the texture map corresponding to the viewing angle, the projected triangular facet and the texture information of the projected triangular facet based on the projected vertex coordinates of the projected triangular facet in the viewing angle comprises:

generating reconstructed depth information corresponding to each projected pixel in the projected triangular facet based on the model vertex coordinates of the model triangular facet and the camera parameter corresponding to the viewing angle;

determining original depth information corresponding to each projected pixel in the projected triangular facet based on depth information of each pixel in the depth map;

determining a valid pixel in the projected triangular facet based on the reconstructed depth information and the original depth information corresponding to each projected pixel in the projected triangular facet, a distance between the reconstructed depth information and the original depth information of the valid pixel being less than a preset depth distance threshold; and

determining the texture information of the projected triangular facet based on the texture map and the valid pixel in the projected triangular facet.

7. The method of claim 1, wherein adjusting the initial parametric model based on the first 3D key point information of the object to be reconstructed to obtain the target parametric model characterizing the real posture of the object to be reconstructed comprises:

constructing a target energy function based on the first 3D key point information, the target energy function being configured to determine a difference between the initial parametric model and the real posture of the object to be reconstructed, the target energy function at least comprising a first energy function, and the first energy function being configured to characterize a difference between

second 3D key point information corresponding to the initial parametric model and the first 3D key point information; and

adjusting the initial parametric model by minimizing the target energy function so as to obtain the target parametric model.

8. The method of claim 7, wherein the first energy function is constructed by:

determining a second mesh model corresponding to the initial parametric model based on an initial model parameter of the initial parametric model;

determining the second 3D key point information corresponding to the initial parametric model based on the second mesh model; and

constructing the first energy function based on a 3D key point distance between the first 3D key point information and the second 3D key point information.

9. The method of claim 7 or 8, wherein the target energy function further comprises at least one of a second energy function or a third energy function, the second energy function being configured to characterize a difference between the second mesh model corresponding to the initial parametric model and a third mesh model corresponding to the target object, and the third energy function being configured to constrain a rotation angle of a 3D key point in the initial parameter model.

10. The method of claim 9, wherein the target energy function comprises the second energy function; and the method further comprises: acquiring the third mesh model corresponding to the object to be reconstructed, the third mesh model being configured to characterize a body shape feature of the object to be reconstructed,

wherein the second energy function is constructed by:

acquiring a second model vertex set corresponding to the second mesh model and a third model vertex set corresponding to the third mesh model, the second model vertex set comprising 3D coordinates of each second model vertex in the second mesh model, and the third model vertex set comprising 3D coordinates of each third model

vertex in the third mesh model;

determining a first distance corresponding to each second model vertex in the third model vertex set and a second distance corresponding to each third model vertex in the second model vertex set based on the 3D coordinates of each third model vertex and the 3D coordinates of each second model vertex; and

constructing the second energy function based on the first distance corresponding to each second model vertex and the second distance corresponding to each third model vertex.

11. The method of claim 9, wherein the target energy function comprises the third energy function, and the third energy function is constructed by:

acquiring a rotation threshold of at least one 3D key point, the rotation threshold comprising a rotation range of the 3D key point corresponding to each rotation axis; and

constructing the third energy function based on the rotation threshold of the at least one 3D key point.

12. The method of claim 1, wherein the scanned image further comprises a depth map, and determining the first 3D key point information of the object to be reconstructed based on the camera parameter corresponding to each viewing angle and the 2D key point information corresponding to the texture map of each viewing angle further comprises:

for each viewing angle, determining intermediate 3D key point information of each 2D key point in the viewing angle in a world coordinate system based on the position information of each 2D key point in the texture map of the viewing angle and based on the depth map and the camera parameter that correspond to the viewing angle,

wherein for each 2D key point, the position information of the 3D key point corresponding to the 2D key point in the world coordinate system is determined based

on the intermediate 3D key point information corresponding to the 2D key point at each viewing angle.

13. The method of any one of claims 1-12, further comprising:

acquiring a preset action set, the action set comprising multiple preset actions and second 3D key point information corresponding to each preset action; and

determining a preset action corresponding to target 3D key point information as a real action of the object to be reconstructed, the target 3D key point information matching the first 3D key point information of the object to be reconstructed.

14. A model reconstruction apparatus, comprising:

an acquisition module, configured to acquire scanned images of multiple viewing angles corresponding to an object to be reconstructed;

a determination module, configured to determine first Three-Dimensional (3D) key point information of the object to be reconstructed based on the scanned images of the multiple viewing angles; and

an adjustment module, configured to adjust an initial parametric model based on the first 3D key point information of the object to be reconstructed to obtain a target parametric model characterizing a real posture of the object to be reconstructed,

wherein the determination module is further configured to: acquire a camera parameter and the texture map that correspond to each of the multiple viewing angles; perform Two-Dimensional (2D) key point detection on the texture map of each viewing angle to obtain 2D key point information corresponding to the texture map of each viewing angle; and determine the first 3D key point information of the object to be reconstructed based on the camera parameter corresponding to each viewing angle and the 2D key point information corresponding to the texture map of each viewing angle,

wherein the determination module is further configured to: determine position information of each 2D key point in the texture map of each viewing angle based on

the 2D key point information corresponding to the texture map of each viewing angle; and for each 2D key point, determine position information of a 3D key point corresponding to the 2D key point in a world coordinate system based on the position information of the 2D key point in the texture map of each viewing angle and the camera parameter corresponding to each viewing angle, the first 3D key point information including the position information of the 3D key point corresponding to each 2D key point in the world coordinate system.

15. A model reconstruction device, comprising a memory and a processor, wherein

the memory stores a computer program capable of running in the processor; and

the processor executes the computer program to implement the steps in the method of any one of claims 1-13.

16. A computer storage medium, storing one or more programs capable of being executed by one or more processors to implement the steps in the method of any one of claims 1-13.