

CLAIMS

1. An image processing method, comprising:
 - obtaining key points of a reference region of an object in an image;
 - determining an orientation of the reference region according to the key points of the reference region; and
 - performing deformation processing on a region to be adjusted of the object based on the orientation of the reference region, wherein the region to be adjusted is the same as or different from the reference region.
2. The method according to claim 1, wherein determining the orientation of the reference region according to the key points of the reference region comprises:
 - obtaining at least three key points in the reference region, wherein the at least three key points are not on a same straight line;
 - determining a target vector based on the at least three key points; and
 - taking a direction of the target vector as the orientation of the reference region.
3. The method according to claim 2, wherein the at least three key points comprise a first key point, a second key point, and a third key point, and the first key point and the third key point are symmetrical about the second key point;
 - determining the target vector based on the at least three key points comprises:
 - constructing a first vector based on the first key point and the second key point;
 - constructing a second vector based on the third key point and the second key point; and
 - determining the target vector based on the first vector and the second vector.
4. The method according to claim 3, wherein determining the target vector based on the first vector and the second vector comprises:
 - obtaining the target vector by performing a cross product on the first vector and the second vector.
5. The method according to any one of claims 1 to 4, wherein performing the deformation processing on the region to be adjusted of the object based on the orientation of the reference region comprises:

determining the orientation of the region to be adjusted based on the orientation of the reference region; and

performing the deformation processing on the region to be adjusted of the object based on the orientation of the region to be adjusted.

6. The method according to claim 5, wherein determining the orientation of the region to be adjusted based on the orientation of the reference region comprises:

if the region to be adjusted is a region of a first type, determining that the orientation of the region to be adjusted is opposite to the orientation of the reference region, wherein the region of the first type comprises: a hip region; and

if the region to be adjusted is a region of a second type, determining that the orientation of the region to be adjusted is the same as the orientation of the reference region, wherein the region of the second type comprises: a face region, a shoulder region, or a crotch region.

7. The method according to any one of claims 2 to 4, wherein performing the deformation processing on the region to be adjusted of the object based on the orientation of the reference region comprises:

performing the deformation processing on the region to be adjusted according to the target vector, a first reference vector, and a second reference vector, wherein a direction of the first reference vector is perpendicular to a photographing direction of the image, and the direction of the first reference vector is opposite to a direction of the second reference vector.

8. The method according to claim 7, wherein the region to be adjusted comprises a first sub-region and a second sub-region, and the first sub-region and the second sub-region are symmetrical about a center line of the region to be adjusted;

performing the deformation processing on the region to be adjusted according to the target vector, the first reference vector, and the second reference vector comprises:

if the direction of the target vector is different from the direction of the first reference vector and the direction of the target vector is different from the direction of the second reference vector, adjusting an area of the first sub-region and an area of the second sub-region according to a first included angle between the target vector and the first reference vector and a second included angle between the target vector and the second reference vector.

9. The method according to claim 8, wherein if the direction of the target vector is different from

the direction of the first reference vector and the direction of the target vector is different from the direction of the second reference vector, adjusting the area of the first sub-region and the area of the second sub-region according to the first included angle between the target vector and the first reference vector and the second included angle between the target vector and the second reference vector comprises:

- determining a first area adjustment amount of the first sub-region and a second area adjustment amount of the second sub-region according to the first included angle and the second included angle; and

- adjusting the area of the first sub-region according to the first area adjustment amount and adjusting the area of the second sub-region according to the second area adjustment amount.

10. The method according to claim 9, wherein determining the first area adjustment amount of the first sub-region and the second area adjustment amount of the second sub-region according to the first included angle and the second included angle comprises:

- if the first included angle is greater than the second included angle and the area of the first sub-region is greater than the area of the second sub-region, taking a ratio of the first area adjustment amount to the second area adjustment amount as a first ratio, and taking a ratio of the first included angle to the second included angle as a second ratio; and

- determining the first area adjustment amount and the second area adjustment amount according to the second ratio so that the first ratio is positively correlated with the second ratio.

11. The method according to claim 10, further comprising:

- if the first included angle is equal to the second included angle, determining that the first area adjustment amount is equal to the second area adjustment amount.

12. An image processing apparatus, comprising:

- an obtaining unit, configured to obtain key points of a reference region of an object in an image;

- a determining unit, configured to determine an orientation of the reference region according to the key points of the reference region; and

- a processing unit, configured to perform deformation processing on a region to be adjusted of the object based on the orientation of the reference region, wherein the region to be adjusted is the same as or different from the reference region.

13. The apparatus according to claim 12, wherein the determining unit is configured to:
- obtain at least three key points in the reference region, wherein the at least three key points are not on a same straight line;
 - determine a target vector based on the at least three key points; and
 - take a direction of the target vector as the orientation of the reference region.
14. The apparatus according to claim 13, wherein the at least three key points comprise a first key point, a second key point, and a third key point, and the first key point and the third key point are symmetrical about the second key point;
- the determining unit is configured to:
 - construct a first vector based on the first key point and the second key point;
 - construct a second vector based on the third key point and the second key point; and
 - determine the target vector based on the first vector and the second vector.
15. The apparatus according to claim 14, wherein the determining unit is configured to:
- obtain the target vector by performing a cross product on the first vector and the second vector.
16. The apparatus according to any one of claims 12 to 15, wherein the processing unit is configured to:
- determine the orientation of the region to be adjusted based on the orientation of the reference region; and
 - perform the deformation processing on the region to be adjusted of the object based on the orientation of the region to be adjusted.
17. The apparatus according to claim 16, wherein the processing unit is configured to:
- if the region to be adjusted is a region of a first type, determine that the orientation of the region to be adjusted is opposite to the orientation of the reference region, wherein the region of the first type comprises: a hip region; and
 - if the region to be adjusted is a region of a second type, determine that the orientation of the region to be adjusted is the same as the orientation of the reference region, wherein the region of the second type comprises: a face region, a shoulder region, or a crotch region.

18. An image processing device, comprising:
- a memory; and
 - a processor, connected to the memory, and configured to execute computer executable instructions stored on the memory to implement the image processing method provided according to any one of claims 1 to 11.
19. A computer storage medium, wherein the computer storage medium stores computer executable instructions, and the computer executable instructions can implement the image processing method provided according to any one of claims 1 to 11.
20. A computer program, which is executed by a processor to implement the image processing method provided according to any one of claims 1 to 11.