CLAIMS

What is claimed is:

1. A method for performing segmentation on a vehicle damage image, the method comprising:

obtaining a plurality of labeled segmentation samples of vehicle images, wherein a respective labeled segmentation sample includes a boundary box of a target object, a classification of the target object, and an outline of the target object;

obtaining a plurality of labeled target detection samples of vehicle images, wherein a respective labeled target detection sample includes a boundary box of a target object and a classification of the target object; and

training, by a computer, a segmentation model, which comprises:

determining, based on the plurality of labeled segmentation samples, a weight-transfer function indicating a mapping between a target detection parameter for detecting target objects associated with a respective classification and a target segmentation parameter for determining outlines of the target objects of the corresponding classification;

determining a target detection parameter corresponding to each classification; and

obtaining a target segmentation parameter for each classification based on the corresponding target detection parameter and the weight-transfer function, thereby determining the segmentation model for performing segmentation on the vehicle damage image.

2. The method according to claim 1, wherein determining the weight-transfer function further comprises:

obtaining a target detection parameter corresponding to a first classification;

obtaining a corresponding predictive target segmentation parameter based on an initial weight-transfer function and the target detection parameter corresponding to the first classification;

determining, based on the predictive target segmentation parameter, a predicted outline of a target object corresponding to a labeled segmentation sample associated with the first classification; and

adjusting the initial weight-transfer function based at least on the predicted outline and the labeled outline of the target object.

3. The method according to claim 2, wherein the target detection parameter corresponding to the first classification comprises a target classification parameter and a target boundary box parameter, and wherein obtaining a corresponding predictive target segmentation parameter comprises:

obtaining the corresponding predictive target segmentation parameter based on the target classification parameter and/or the target boundary box parameter, and the initial weight-transfer function.

4. The method according to claim 1, wherein determining the weight-transfer function comprises training a convolutional neural network using the plurality of labeled segmentation samples.

5. The method according to claim 1, wherein the plurality of labeled target detection samples comprise a plurality of labeled damage detection samples in which target objects are objects indicating vehicle damage, and wherein the segmentation model is used to perform damage segmentation on the vehicle damage image.

6. The method according to claim 1, wherein the plurality of labeled target detection samples comprise a plurality of labeled component detection samples in which target objects are vehicle components, and wherein the segmentation model is used to perform component segmentation on the vehicle damage image.

7. The method according to claim 1, wherein the plurality of labeled segmentation samples comprise a plurality of labeled damage segmentation samples in which target objects are objects indicating vehicle damage.

8. The method according to claim 7, wherein obtaining the plurality of labeled segmentation samples comprises:

obtaining a predetermined quantity of labeled damage detection samples from a sample library;

extracting, using a salience detection technique, a salient region from a boundary box in each labeled damage detection sample from the predetermined quantity of labeled damage detection samples;

receiving a manual segmentation result for a portion of the predetermined quantity of labeled damage detection samples according to salient regions extracted from the portion of the predetermined quantity of labeled damage detection samples;

including the portion of the predetermined quantity of labeled damage detection samples in the plurality of labeled segmentation samples; and

including rest of the predetermined quantity of labeled damage detection samples in the plurality of labeled damage detection samples.

9. The method according to claim 1, wherein the plurality of labeled segmentation samples comprise a plurality of labeled component segmentation samples in which target objects are vehicle components.

10. An apparatus for performing damage segmentation on a vehicle damage image, the apparatus comprising:

a first sample-acquisition unit configured to acquire a plurality of labeled segmentation samples of vehicle images, wherein a respective labeled segmentation sample includes a boundary box of a target object, a classification of the target object, and an outline of the target object;

a second sample-acquisition unit configured to acquire a plurality of labeled target detection samples of vehicle images, wherein a respective labeled target detection sample includes a boundary box of a target object and a classification of the target object; and

a training unit configured to train a segmentation model, wherein the training unit comprises:

a first determination module configured to determine, based on the plurality of labeled segmentation samples, a weight-transfer function indicating a mapping between a target detection parameter for detecting target objects associated with a respective classification and a

target segmentation parameter for determining outlines of the target objects of the corresponding classification;

a second determination module configured to determine a target detection parameter corresponding to each classification associated with the labeled target detection samples; and

a parameter-obtaining module configured to obtain a target segmentation parameter for each classification associated with the labeled target detection samples based on the corresponding target detection parameter and the weight-transfer function, thereby determining the segmentation model for performing segmentation on the vehicle damage image.

11. The apparatus according to claim 10, wherein, while determining the weight-transfer function, the first determination module is specifically configured to:

obtain a target detection parameter corresponding to a first classification;

obtain a corresponding predictive target segmentation parameter based on an initial weight-transfer function and the target detection parameter corresponding to the first classification;

determine, based on the predictive target segmentation parameter, a predicted outline of a target object corresponding to a labeled segmentation sample associated with the first classification; and

adjust the initial weight-transfer function based at least on the predicted outline and the labeled outline of the target object.

12. The apparatus according to claim 11, wherein the target detection parameter corresponding to the first classification comprises a target classification parameter and a target boundary box parameter, and wherein, while obtaining the corresponding predictive target segmentation parameter, the first determination module is configured to:

obtain the corresponding predictive target segmentation parameter based on the target classification parameter and/or the target boundary box parameter, and the initial weight-transfer function.

13. The apparatus according to claim 10, wherein, while determining the weight-transfer function, the first determination module trains a convolutional neural network using the plurality of labeled segmentation samples.

14. The apparatus according to claim 10, wherein the plurality of labeled target detection samples comprise a plurality of labeled damage detection samples in which target objects are objects indicating vehicle damage, and wherein the segmentation model is used to perform damage segmentation on the vehicle damage image.

15. The apparatus according to claim 10, wherein the plurality of labeled target detection samples comprise a plurality of labeled component detection samples in which target objects are vehicle components, and wherein the segmentation model is used to perform component segmentation on the vehicle damage image.

16. The apparatus according to claim 10, wherein the plurality of labeled segmentation samples comprise a plurality of labeled damage segmentation samples in which target objects are objects indicating vehicle damage.

17. The apparatus according to claim 16, wherein, while acquiring the plurality of labeled segmentation samples, the first sample-acquisition unit is configured to:

acquire a predetermined quantity of labeled damage detection samples from a sample library;

extract, using a salience detection technique, a salient region from a boundary box in each labeled damage detection sample from the predetermined quantity of labeled damage detection samples;

receive a manual segmentation result for a portion of the predetermined quantity of labeled damage detection samples according to salient regions extracted from the portion of the predetermined quantity of labeled damage detection samples;

include the portion of the predetermined quantity of labeled damage detection samples in the plurality of labeled segmentation samples; and

include rest of the predetermined quantity of labeled damage detection samples in the plurality of labeled damage detection samples.

18. The apparatus according to claim 10, wherein the plurality of labeled segmentation samples comprise a plurality of labeled component segmentation samples in which target objects are vehicle components.

19. A non-transitory computer-readable storage medium storing instructions that when executed by a computer cause the computer to perform a method for performing segmentation on a vehicle damage image, the method comprising:

obtaining a plurality of labeled segmentation samples of vehicle images, wherein a respective labeled segmentation sample includes a boundary box of a target object, a classification of the target object, and an outline of the target object;

obtaining a plurality of labeled target detection samples of vehicle images, wherein a respective labeled target detection sample includes a boundary box of a target object and a classification of the target object; and

training a segmentation model, which comprises:

determining, based on the plurality of labeled segmentation samples, a weight-transfer function indicating a mapping between a target detection parameter for detecting target objects associated with a respective classification and a target segmentation parameter for determining outlines of the target objects of the corresponding classification;

determining a target detection parameter corresponding to each classification associated with the labeled target detection samples; and

obtaining a target segmentation parameter for each classification associated with the labeled target detection samples based on the corresponding target detection parameter and the weight-transfer function, thereby determining the segmentation model for performing segmentation on the vehicle damage image.

20. The non-transitory computer-readable storage medium of claim 19, wherein determining the weight-transfer function further comprises:

obtaining a target detection parameter corresponding to a first classification;

obtaining a corresponding predictive target segmentation parameter based on an initial weight-transfer function and the target detection parameter corresponding to the first classification;

determining, based on the predictive target segmentation parameter, a predicted outline of a target object corresponding to a labeled segmentation sample associated with the first classification; and

adjusting the initial weight-transfer function based at least on the predicted outline and the labeled outline of the target object.