

SPECIFICATION

LABELING METHOD AND APPARATUS, ELECTRONIC DEVICE, AND STORAGE MEDIUM

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TECHNICAL FIELD

[0001] The present disclosure relates to the field of computer technology, and particularly, to a labeling method and apparatus, an electronic device, and a storage medium.

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BACKGROUND

[0002] In the field of artificial intelligence, information included in images may be automatically recognized and understood through training a neural network, and in the process of training the neural network, training is often carried out through a labeled image.

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[0003] In the process of performing a labeling on the image, a labeled region is often determined through drawing a graphic on the image.

SUMMARY

[0004] The present disclosure provides a labeling method.

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[0005] According to an aspect of the present disclosure, there provides a labeling method, comprising:

[0006] receiving a first labeling operation on a target image, wherein the first labeling operation is used for drawing, in the target image, a first drawn graphic indicating a first image region; and

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[0007] in response to a second drawn graphic and the first drawn graphic in the target image at least partially overlapping, adjusting the first drawn graphic to obtain a labeling result corresponding to the first labeling operation.

[0008] In a possible implementation, before adjusting the first drawn graphic, further comprising:

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[0009] detecting whether there is a drawn graphic, partially overlapping with the first drawn graphic, in at least one previous drawn graphic in the target image.

[0010] In a possible implementation,, before adjusting the first drawn graphic, further comprising:

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[0011] receiving a first user instruction, the first user instruction being used for instructing an adjustment to the first drawn graphic.

[0012] In a possible implementation,, the adjusting the first drawn graphic to obtain the labeling result corresponding to the first labeling operation includes:

[0013] as the labeling result corresponding to the first labeling operation, using a drawn graphic obtained by removing a part from the first drawn graphic, the part being overlapped with the second drawn graphic.

[0014] In a possible implementation, adjusting the first drawn graphic to obtain the labeling result corresponding to the first labeling operation includes:

[0015] in response to the first drawn graphic and the second drawn graphic being bounding box graphics, determining a first line segment element in the second drawn graphic and a second line segment element in the first drawn graphic based on positions of the first drawn graphic and the second drawn graphic, wherein the first line segment element is located in the first drawn graphic and the second line segment element is located outside the second drawn graphic; and

[0016] using a drawn graphic formed by the first line segment element and the second line segment element as the labeling result corresponding to the first labeling operation.

[0017] In a possible implementation, after receiving the first labeling operation on the target image, further comprising:

[0018] displaying the target image and a plurality of drawn graphics of the target image, which include the first drawn graphic, on a display interface;

[0019] receiving a second user instruction, the second user instruction being used for selecting the first drawn graphic from the plurality of drawn graphics; and

[0020] determining the first drawn graphic to be selected, based on a position indicated by the second user instruction in the display interface and positions of the plurality of drawn graphics in the display interface.

[0021] In a possible implementation, the target image is displayed on a web interface.

[0022] In a possible implementation, the first labeling operation is used for performing a semantic segmentation labeling of the target image.

[0023] According to an aspect of the present disclosure, there provides a labeling apparatus, comprising:

[0024] a receiving module configured to receive a first labeling operation on a target image, wherein the first labeling operation is used for drawing, in the target image, a first drawn graphic indicating a first image region; and

[0025] an adjusting module configured to adjust the first drawn graphic to obtain a labeling result corresponding to the first labeling operation, in response to a second drawn graphic and the first drawn graphic in the target image at least partially overlapping.

[0026] In a possible implementation, the apparatus further includes:

[0027] a detecting module configured to detect whether a drawn graphic partially overlapping with the first drawn graphic exists in at least one previous drawn graphic in the target image.

[0028] In a possible implementation, the apparatus further includes:

5 **[0029]** a first user instruction receiving module configured to receive a first user instruction, the first user instruction being used for instructing an adjustment to the first drawn graphic.

[0030] In a possible implementation, the adjusting module is configured to use a drawn graphic obtained by removing a part in the first drawn graphic, which overlaps with the second drawn graphic, from the first drawn graphic as the labeling result corresponding to the first
10 labeling operation.

[0031] In a possible implementation, the adjusting module is configured to: in a case that the first drawn graphic and the second drawn graphic are bounding box graphics, according to positions of the first drawn graphic and the second drawn graphic, determine a first line segment element in the second drawn graphic, which is located in the first drawn graphic, and a
15 second line segment element in the first drawn graphic, which is located outside the second drawn graphic; and use a drawn graphic formed by the first line segment element and the second line segment element as the labeling result corresponding to the first labeling operation.

[0032] In a possible implementation, the apparatus further includes:

[0033] a display module configured to display the target image and multiple drawn graphics
20 of the target image, which include the first drawn graphic, on a display interface;

[0034] a second user instruction receiving module configured to receive a second user instruction, the second user instruction being used for selecting the first drawn graphic from the multiple drawn graphics; and

[0035] a determining module configured to determine the first drawn graphic to be selected
25 according to a position indicated by the second user instruction in the display interface and positions of the multiple drawn graphics in the display interface.

[0036] In a possible implementation, the target image is displayed on a web interface.

[0037] In a possible implementation, the first labeling operation is used for carrying out semantic segmentation labeling of the target image.

30 **[0038]** According to an aspect of the present disclosure, there provides an electronic device, comprising: a processor; and a memory for storing processor executable instructions, wherein the processor is configured to execute the instructions stored in the memory so as to implement the above method.

[0039] According to an aspect of the present disclosure, there provides a computer readable
35 storage medium storing computer program instructions that cause a processor to implement the

above method.

[0040] According to an aspect of the present disclosure, there provides a computer program, comprising a computer readable code that causes a processor in an electronic device to implement the above method.

5 **[0041]** In embodiments of the present disclosure, in the process of labeling a target image, in a case that a second drawn graphic and a first drawn graphic in the target image at least partially overlap, the first drawn graphic drawn by a user for a first labeling operation on the target image may be automatically adjusted to obtain a labeling result corresponding to the first labeling operation. Compared with manually adjusting the first drawn graphic, the efficiency of performing a labeling on the target image is improved, and the labeling time is saved. Particularly, for the case that an outer contour of the second drawn graphic is relatively complex, the user does not need to carry out additional manual adjustment on the contour part, so that resource consumption caused to the user in repeating part of labeling process is reduced.

10 **[0042]** It should be understood that the general description above and the detail description below are merely exemplary and explanatory, but not intended to limit the present disclosure. According to the detailed illustration below on the exemplary embodiments with reference to the accompanying drawings, other features and aspects of the present disclosure will become clear.

20 **BRIEF DESCRIPTION OF THE DRAWINGS**

[0043] The accompanying drawings herein are incorporated into the specification and constitute part of the specification, and these accompanying drawings show embodiments in conformity with the present disclosure and are used for illustrating the present disclosure together with the specification.

25 **[0044]** FIG. 1 shows a flow chart of a labeling method according to an embodiment of the present disclosure.

[0045] FIG. 2 shows a schematic diagram of a drawn graphic according to an embodiment of the present disclosure.

30 **[0046]** FIG. 3 shows a schematic diagram of a labeling result according to an embodiment of the present disclosure.

[0047] FIG. 4 shows a schematic diagram of a drawn graphic according to an embodiment of the present disclosure.

[0048] FIG. 5 shows a schematic diagram of a labeling result according to an embodiment of the present disclosure.

35 **[0049]** FIG. 6 shows a flow chart of a labeling method according to an embodiment of the

present disclosure.

[0050] FIG. 7 shows a block diagram of a labeling apparatus according to an embodiment of the present disclosure.

[0051] FIG. 8 shows a block diagram of an electronic device according to an embodiment of the present disclosure.

[0052] FIG. 9 shows a block diagram of an electronic device according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0053] Various exemplary embodiments, features and aspects of the present disclosure will be illustrated in detail below with reference to the accompanying drawings. The same reference signs in the accompanying drawings represent elements with the same or similar functions. Although various aspects of the embodiments are shown in the accompanying drawings, unless otherwise specified, the accompanying drawings do not need to be drawn to scale.

[0054] The special word “exemplary” herein refers to “serving as an example, embodiment, or illustration”. Any embodiment “exemplarily” illustrated herein should not be explained to be superior to or better than other embodiments.

[0055] The term “and/or” herein is merely to describe a relationship of associated objects and represents that there may be three relationships, for example, A and/or B may represent three cases that: there is only A, there are both A and B, and there is only B. In addition, the term “at least one” herein represents any one of multiple types or a random combination of at least two of multiple types, and for example, including at least one of A, B, and C may represent including any one or more elements selected from a set formed by A, B, and C.

[0056] In addition, in order to illustrate the present disclosure better, numerous details are given out in the specific embodiments below. Those skilled in the art should understand that without certain details, the present disclosure may also be implemented. In some examples, methods, means, components and circuits well-known to those skilled in the art are not described in detail so as to highlight the purport of the present disclosure.

[0057] FIG. 1 shows a flow chart of a labeling method according to an embodiment of the present disclosure. As shown in FIG. 1, the labeling method includes:

[0058] In step S11, a first labeling operation on a target image is received, wherein the first labeling operation is used for drawing, in the target image, a first drawn graphic indicating a first image region.

[0059] The target image may be an image to be labeled, the image may be an image in a random format, and the embodiments of the present disclosure do not make any limit to it.

Optionally, the target image may be a sample image of carrying out machine learning, and the sample image may be used for supervised learning in machine learning after being labeled.

[0060] A user such as a labeler may label a first image region in the target image through the first labeling operation. In some embodiments, the user may determine the first image region to be labeled through drawing a graphic, optionally, the graphic drawn by the user may be of a polygon shape, or may be a circle shape, the drawn graphic may be a regular or irregular graphic, and the embodiments of the present disclosure do not make any limit to it. The user may give meanings at the semantic level to image information of the determined first image region through adding labeling information into the first image region.

[0061] For example, a content in the target image is that a person stands in a lawn, and in the process of labeling the lawn, the user may draw a drawn graphic of which the shape is matched with that of an image region where the lawn is located, and then adds labeling information of “lawn” into the drawn graphic so as to give a semantic meaning of “lawn” to the selected image region.

[0062] In step S12, in a case that a second drawn graphic and the first drawn graphic in the target image at least partially overlap, the first drawn graphic is adjusted to obtain a labeling result corresponding to the first labeling operation.

[0063] The second drawn graphic may also be a graphic drawn by the user or may be a graphic obtained in other ways, for example, may be a graphic drawn obtained by an image recognition on the target image through a neural network.

[0064] In a possible implementation, the second drawn graphic may be a drawn graphic specified by the user, i.e., in the case that the first drawn graphic and the second drawn graphic specified by the user at least partially overlap, the first drawn graphic is automatically adjusted. The user may specify the second drawn graphic through carrying out the selection operation on the drawn graphics in the target image, or the user may specify the second drawn graphic through selecting information such as an identifier of the drawn graphic and the like, and the embodiments of the present disclosure do not make any limit to the specific implementation of specifying the second drawn graphic.

[0065] In a possible implementation, the second drawn graphic may be one or more drawn graphics in drawn graphics included in the target image, and for example, the second drawn graphic may be a drawn graphic, at least partially overlapping with the first drawn graphic, in the drawn graphics included in the target image, so that in a case that there is a drawn graphic at least partially overlapping with the first drawn graphic in the target image, the first drawn graphic is automatically adjusted, and the user does not need to specify the second drawn graphic, thereby improving convenience of the user.

[0066] The case that the first drawn graphic and the second drawn graphic at least partially overlap may be that the image region specified by the second drawn graphic is at least partially the same as the image region specified the first drawn graphic. For example, with reference to FIG. 2, an image content of the target image is that a person stands in a lawn, a region box-selected by the lower polygon (the first drawn graphic) is a lawn region, a region box-selected by the leftmost polygon (the second drawn graphic) is a portrait, the legs of the portrait shield part of the lawn, and the part of portrait other than the legs does not shield the lawn. The first drawn graphic includes an image region where the lawn is located and also includes an image region where the leg shielding part of the lawn is located, the second drawn graphic includes an image region where the portrait is located, and obviously, the first drawn graphic and the second drawn graphic partially overlap.

[0067] In the case that the first drawn graphic and the second drawn graphic partially overlap, the first drawn graphic may be automatically adjusted, there may be many specific adjusting methods, and for example, an overlapping part may be removed from the first drawn graphic to obtain the first drawn graphic of which the overlapping part is removed, or the overlapping part in the first drawn graphic may be reduced. For example, with reference to FIG. 3, after the overlapping part in the first drawn graphic is removed, the obtained adjusted first drawn graphic is as shown in FIG. 3, the first drawn graphic no longer contains the legs shielding the lawn in the second drawn graphic.

[0068] After adjustment on the first drawn graphic is completed, an image region labeled by the adjusted first drawn graphic may be used as an image region labeled by a first labeling operation so as to obtain the labeling result corresponding to the first labeling operation. The labeled target image may be used for supervised learning in machine learning, and in the embodiments of the present disclosure, interference information in the first drawn graphic is removed or reduced by removing or reducing the overlapping part from the first drawn graphic, so that the accuracy of the neural network obtained by machine learning can be improved.

[0069] In the embodiments of the present disclosure, in the process of performing a labeling on the target image, in the case that the second drawn graphic and the first drawn graphic in the target image at least partially overlap, the first drawn graphic drawn by the user for the first labeling operation on the target image may be automatically adjusted to obtain the labeling result corresponding to the first labeling operation. Compared with manually adjusting the first drawn graphic, the efficiency of performing a labeling on the target image is improved, and the labeling time is saved.

[0070] There may also be many video processing methods provided by the present disclosure, and in a possible implementation, before adjusting the first drawn graphic, the method further

includes: detecting whether a drawn graphic partially overlapping with the first drawn graphic exists in at least one previous drawn graphic in the target image.

[0071] The previous drawn graphic may be a graphic drawn before the first drawn graphic, and the previous drawn graphic may be a graphic drawn by the user, or may be a graphic obtained in other ways, and for example, may be a graphic drawn obtained by an image recognition on the target image through the neural network. Taking the case that the previous drawn graphic is the graphic drawn by the user as an example herein, after the user draws the previous drawn graphic and then draws the first drawn graphic, it may be detected whether the previous drawn graphic partially overlaps with the first drawn graphic.

[0072] In some embodiments, the detecting step in this implementation may be carried out after it is determined that drawing of the first drawn graphic is completed, and in other words, execution of the detecting step may be triggered after drawing of the first drawn graphic is completed without receiving a user instruction or carrying out other operations of the user, so that the user executes fewer operations, and the convenience is higher.

[0073] In this implementation, there may be many specific detecting processes, and optionally, it may be detected whether a drawn graphic partially overlapping with the first drawn graphic exists in at least one previous drawn graphic in the target image based on position coordinates of the at least one previous drawn graphic and position coordinates of the first drawn graphic in the target image.

[0074] In the embodiments of the present disclosure, the drawn graphic may be a bounding box graphic, or may be a filled graphic, wherein the bounding box graphic may be a graphic which only includes lines of a bounding box, and the filled graphic may be a graphic including the bounding box and contents filled in the bounding box.

[0075] In a case that both the previous drawn graphic and the first drawn graphic are bounding box graphics, it may be determined whether at least part of a bounding box of the previous drawn graphic exists in a bounding box of the first drawn graphic according to the coordinates of the previous drawn graphic and the coordinates of the first drawn graphic, and in a case that it is determined that at least part of the bounding box of the previous drawn graphic exists in the bounding box of the first drawn graphic, it is determined that a drawn graphic partially overlapping with the first drawn graphic exists in the previous drawn graphic. In addition, it may also be determined whether at least part of point sets constituting the previous drawn graphic exist in the bounding box of the first drawn graphic, and in a case that it is determined that at least part of the point sets constituting the previous drawn graphic exist in the bounding box of the first drawn graphic, it is determined that a drawn graphic partially overlapping with the first drawn graphic exists in the previous drawn graphic.

[0076] In a case that both the previous drawn graphic and the first drawn graphic are filled graphics, it may be determined whether there are pixels with the same coordinates in the previous drawn graphic and the first drawn graphic, and in a case that it is determined that there are the pixels with the same coordinates in the previous drawn graphic and the first drawn graphic, it is determined that a drawn graphic partially overlapping with the first drawn graphic exists in the previous drawn graphic.

[0077] In a possible implementation, before adjusting the first drawn graphic, the method further includes: receiving a first user instruction, the first user instruction being used for instructing an adjustment to the first drawn graphic.

[0078] The user sends out the first user instruction to indicate a terminal device or a server to adjust the first drawn graphic, wherein optionally, the user may send out the first user instruction through operating a specific control in an application of the terminal device. For example, after the first drawn graphic is drawn, the user may execute a designated operation on the specific control of an operation interface of the application so as to send out the first user instruction, the control may be displayed on the interface in a form of a touch button, the designated operation may be a click operation or other operations. After the designated operation is detected out, the application may be triggered to automatically adjust the first drawn graphic. In some embodiments, the user may also send out the first user instruction through a network connection (e.g., a connection to the server through a specific URL link) or send out the first user instruction in other ways, and the embodiments of the present disclosure do not make any limit to it.

[0079] In some embodiments, after the first user instruction is received, it may be detected whether a drawn graphic partially overlapping with the first drawn graphic exists in at least one previous drawn graphic in the target image, and in a case that it is detected that a drawn graphic partially overlapping with the first drawn graphic exists in the target image, the first drawn graphic is automatically adjusted.

[0080] Or, in some embodiments, it may also be detected whether a drawn graphic partially overlapping with the first drawn graphic exists in at least one previous drawn graphic in the target image first, in the case that it is detected that a drawn graphic partially overlapping with the first drawn graphic exists in the target image, a prompt is sent out to the user in a user interface of the terminal device so as to prompt the user that there is the second drawn graphic overlapping the first drawn graphic, the user selects whether to automatically adjust the first drawn graphic, and at the moment, the user may send out the first user instruction to indicate to automatically adjust the first drawn graphic.

[0081] In the case that it is detected that a drawn graphic partially overlapping with the first

drawn graphic exists in the target image, the first drawn graphic and the second drawn graphic which partially overlap may be displayed in a display pattern different from other drawn graphics so as to facilitate viewing of the user. For example, the first drawn graphic and the second drawn graphic which partially overlap may be displayed with red bounding boxes, and
5 other drawn graphics may be displayed with gray bounding boxes.

[0082] In a possible implementation, adjusting the first drawn graphic to obtain the labeling result corresponding to the first labeling operation includes: using a drawn graphic obtained by removing a part in the first drawn graphic, which overlaps with the second drawn graphic, from the first drawn graphic as the labeling result corresponding to the first labeling operation.

10 **[0083]** In the embodiments of the present disclosure, a semantic meaning of an image region indicated by the overlapping part of the first drawn graphic and the second drawn graphic may be the same with that of an image region indicated by the second drawn graphic, but different from that of an image region in the first image region outside the overlapping part. In this case, the drawn graphic obtained by removing the part in the first drawn graphic, which overlaps
15 with the second drawn graphic, from the first drawn graphic may be used as the labeling result corresponding to the first labeling operation. Therefore, in the obtained labeling result, the image region in the first image region, of which the semantic meaning is the same with that of a second image region, is removed, the semantic meaning of the first image region indicated by the obtained first drawn graphic is more accurate, and accuracy of the neural network obtained
20 by machine learning can be improved. Meanwhile, the user does not need to manually adjust the first image region, so that the user executes fewer operations, the convenience is higher, the efficiency of performing a labeling on the target image is improved, and the labeling time is saved.

[0084] In a possible implementation, adjusting the first drawn graphic to obtain the labeling
25 result corresponding to the first labeling operation includes: in a case that the first drawn graphic and the second drawn graphic are bounding box graphics, based on positions of the first drawn graphic and the second drawn graphic, determining a first line segment element in the second drawn graphic, which is located in the first drawn graphic, and a second line segment element in the first drawn graphic, which is located outside the second drawn graphic;
30 and using a drawn graphic formed by the first line segment element and the second line segment element as the labeling result corresponding to the first labeling operation.

[0085] The position of the drawn graphic may be represented by coordinates of the line segment elements constituting the drawn graphic, or may be represented by coordinates of points constituting the drawn graphic.

35 **[0086]** In some embodiments, the drawn graphic may be of a polygon shape, the polygon

may be regarded as a graphic constituting the line segment elements, the positions of the line segment elements may be represented by coordinates of line segment endpoints, for example, the line segment elements may be represented as (x_1, y_1, x_2, y_2) , and (x_1, y_1) and (x_2, y_2) respectively represent coordinates of two vertexes of the line segment elements. Therefore, coordinates of multiple line segment elements constituting the drawn graphic may represent the position of the drawn graphic.

[0087] In some embodiments, the bounding box of the drawn graphic is formed by a series of point sets, for example, the drawn graphic may be regarded as a set formed by pixels, and then coordinates of the pixels constituting the drawn graphic may represent the position of the drawn graphic.

[0088] In the process of drawing the graphic by the user, the coordinates of the pixels and/or the coordinates of the endpoints of the line segment elements constituting the drawn graphic may be obtained by detecting coordinates of a drawing tool for drawing the graphic in the target image in the drawing process. The drawing tool herein may be a brush pencil, a paintbrush or other tools, and the coordinates of the drawing tool in the target image may be changed through moving a mouse, or may be changed by touching a display screen/touchpad and the like.

[0089] A first line segment element in the second drawn graphic, which is located in the first drawn graphic, and a second line segment element in the first drawn graphic, which is located outside the second drawn graphic, may be determined according to the coordinates of the pixels of the first drawn graphic and the second drawn graphic. Or, the first line segment element in the second drawn graphic, which is located in the first drawn graphic, and the second line segment element in the first drawn graphic, which is located outside the second drawn graphic, may be determined according to the coordinates of the endpoints of the line segment elements of the first drawn graphic and the second drawn graphic.

[0090] Particularly, a coordinate range of a first pixel constituting the first drawn graphic may be denoted by $(x_{\min} \text{ to } x_{\max}, y_{\min} \text{ to } y_{\max})$, and if the x value and the y value of coordinates of a certain pixel of the second drawn graphic fall within the coordinate range, it may be determined that the pixel is located in the first drawn graphic, or else it may be determined that the pixel is located outside the first drawn graphic. Therefore, the first line segment element in the second drawn graphic, which is located in the first drawn graphic, and the second line segment element in the first drawn graphic, which is located outside the second drawn graphic, may be determined.

[0091] Or, if the x values and the y values of the endpoints of the line segment elements of the second drawn graphic all fall within the coordinate range, it may be determined that the

endpoints are located in the first drawn graphic, or else it may be determined that the endpoints are located outside the first drawn graphic. In addition, intersections of the line segment elements of the first drawn graphic and the second drawn graphic may also be determined, and according to the intersections and the endpoints of the line segment elements of the second drawn graphic, which are located in the first drawn graphic, as well as the endpoints of the line segment elements of the second drawn graphic, which are located outside the first drawn graphic, the first line segment element in the second drawn graphic, which is located in the first drawn graphic, and the second line segment element in the first drawn graphic, which is located outside the second drawn graphic, may be determined.

[0092] After the first line segment element and the second line segment element are determined, the drawn graphic formed by the first line segment element and the second line segment element may be used as the labeling result corresponding to the first labeling operation.

[0093] For example, as shown in FIG. 4, a set of the line segment elements of the first drawn graphic P1 may be represented by $\{a_1a_2, a_2b_3, b_3a_4, a_4a_3, a_3b_2, b_2a_1\}$, and a set of the line segment elements of the second drawn graphic P2 may be represented by $\{b_1b_2, b_2b_3, b_3b_4, b_4b_5, b_5b_6, b_6b_7, b_7b_1\}$, where a_1 to a_4 and b_1 to b_7 are endpoints of line segments. The line segment elements $\{b_3a_4, a_4a_3, a_3b_2\}$ of the P1 are located in the P2, and the line segment elements $\{b_1b_2, b_3b_4, b_4b_5, b_5b_6, b_6b_7, b_7b_1\}$ are located outside the P2. As shown in FIG. 5, the drawn graphic formed by the line segment elements $\{b_3a_4, a_4a_3, a_3b_2\}$ and $\{b_1b_2, b_3b_4, b_4b_5, b_5b_6, b_6b_7, b_7b_1\}$ may be used as the labeling result corresponding to the first labeling operation, and the set of the line segment elements of the second drawn graphic may be kept unchanged.

[0094] In the embodiments of the present disclosure, in the case that the first drawn graphic and the second drawn graphic are bounding box graphics, based on the positions of the first drawn graphic and the second drawn graphic, the first line segment element in the second drawn graphic, which is located in the first drawn graphic, and the second line segment element in the first drawn graphic, which is located outside the second drawn graphic, are determined, so that the drawn graphic formed by the first line segment element and the second line segment element may be used as the labeling result corresponding to the first labeling operation, the labeling result of the first labeling operation can be rapidly obtained, the efficiency of the labeling operation is improved, and the user experience is good.

[0095] In a possible implementation, after receiving the first labeling operation on the target image, the method further includes: displaying the target image and a plurality of drawn graphics of the target image, which include the first drawn graphic, on a display interface; receiving a second user instruction, the second user instruction being used for selecting the first

drawn graphic from the plurality of drawn graphics; and based on a position indicated by the second user instruction in the display interface and positions of the plurality of drawn graphics in the display interface, determining the first drawn graphic to be selected.

[0096] The user selects the first drawn graphic from the plurality of drawn graphics through sending out the second user instruction, wherein optionally, the user may select the first drawn graphic through carrying out the selection operation on the drawn graphics in the target image. Particularly, when the user triggers the second instruction, a position indicated by a mouse or a touch point in the display interface when the second instruction is triggered may be determined, the positions of the plurality of drawn graphics in the display interface may be determined after the graphics are drawn, and in a case that it is determined that the position indicated by the second user instruction is located inside the first drawn graphic, the first drawn graphic to be selected may be determined. As a result, the first drawn graphic selected by the second user instruction may be determined.

[0097] Or, the user may select the first drawn graphic through selecting information such as an identifier of the drawn graphic and the like, and the present disclosure will not repeat it herein.

[0098] In the embodiments of the present disclosure, the user designate the first drawn graphic through sending out the second user instruction, and the user may autonomously designate the first drawn graphic to be adjusted, which is convenient for the user to adjust the drawn graphic which needs to be adjusted, so that the accuracy of the neural network obtained by machine learning can be improved, diversified user demands can be met, and the user experience is good.

[0099] In the field of artificial intelligence, semantic segmentation is an important research content in the field of computer vision, and image semantic segmentation may be applied to numerous application scenarios, e.g., the fields of target recognition, target detection and the like. Through semantic segmentation, an image may be segmented into regions with different semantic information, and for example, semantic tags (e.g., sky, lawn, person, tree, small animal and the like) may be added for objects in an image after the image is subjected to semantic segmentation.

[00100] In the process of labeling for an image, a graphic may be drawn on the image to indicate a labeled region, and generally, regions with the same semantic meaning may be box-selected by polygons. In an image to be subjected to semantic segmentation, objects may often shield each other, for example, the content of the target image is that a person stands on a lawn, the legs of the person shields part of the lawn in the image. The edge of the shielded part is a boundary of semantic segmentation, and the semantic meanings are different between two

sides of the boundary. In the process of labeling semantic units with different semantic meanings in the image, if regions on two sides of the boundary are respectively labeled, the position of the boundary may be labeled for twice, and since the shape of the boundary is often irregular, carrying out labeling for twice will result in low efficiency of image labeling.

5 **[00101]** In the application scenario of semantic segmentation, the present disclosure provides a possible implementation. In this implementation, the first labeling operation is used for carrying out semantic segmentation labeling of the target image. The semantic meaning of the image region indicated by the overlapping part of the first drawn graphic and the second drawn graphic may be the same with that of the image region indicated by the second drawn graphic,
10 but different from that of the image region in the first image region outside the overlapping part. For example, with reference to the above-mentioned examples, the first image region is the region where the lawn is located and contains the legs shielding the lawn, and the second image region is a region in the image, where the person is located. In this case, the overlapping part is removed from the first drawn graphic, so that the semantic meaning of the first image region indicated by the obtained first drawn graphic is more accurate, and the accuracy of the
15 neural network obtained by machining learning can be improved. Meanwhile, after the user draws the second drawn graphic, in a case that the user has labeled the boundary between two semantic units through drawing the second drawn graphic, the user does not need to draw the boundary between two semantic units again in the process of the drawing the first drawn
20 graphic, and the user does not need to manually adjust the first drawn graphic, either, and thus, the user executes fewer operations, convenience is higher, the efficiency of performing a labeling on the target image is improved, and the labeling time is saved.

[00102] In a possible implementation, the target image is displayed on a web interface, and the web interface, for example, may be a web interface coded by the HTML5 language. Then, in
25 the process of drawing the graphics, the graphics may be drawn through a canvas in the HTML5 so as to implement labeling on the target image.

[00103] The labeling method provided by the present disclosure will be exemplarily illustrated below by taking the case that the target image is displayed on the web interface as an example and taking the case that the first labeling operation is used for carrying out semantic
30 segmentation labeling of the target image as a specific application scenario of the present disclosure, the contents which are not elaborated in this part can refer to the related description of the above, and similarly, the contents in this part may also be used for exemplarily illustrating the contents above.

[00104] With reference to FIG. 6, in a possible application scenario provided by the present
35 disclosure, a labeling method provided by the present disclosure includes:

[00105] S201: displaying a target image on a web page.

[00106] S202: drawing graphics on the target image through a canvas in the HTML5 to obtain multiple drawn graphics.

[00107] The drawn graphics may be of a polygon shape, and the specific process of drawing the graphics is as follows:

[00108] Firstly, creation of points of the polygon is implemented through mouseup in the JavaScript language. Specifically, after the user clicks on a left button (presses down the left button and then releases it), in response to a user operation that the left button is released, the canvas may create a starting point of a new graphic or add a new polygon vertex to the newly created graphic; and after the user clicks on a right button (presses down the right button and then releases it), in response to a user operation that the right button is released, the canvas may connect the starting point and a terminal of the graphic so as to implement closing of the created polygon.

[00109] Through an e event attribute in a callback event of mousemove in the JavaScript language, a position of the mouse in a browser is captured to determine a position of the operation of the user on the target image so as to determine a position of the drawn graphic drawn by the user on the target image.

[00110] There are multiple drawn graphics, and the drawn graphics are graphics drawn by the user for to-be-labeled regions in the target image.

[00111] S203: receiving a selection operation instruction, and determining a first drawn graphic according to the selection operation instruction.

[00112] The selection operation instruction is used for selecting a graphic to be subjected to adjustment processing from the multiple drawn graphics, the selection operation instruction is the second user instruction as mentioned above, and the graphic to be adjusted is referred to as the first drawn graphic herein.

[00113] According to a position indicated by the selection operation instruction in the web page and positions of the multiple drawn graphics in the web page, when it is determined that the position indicated by the selection operation instruction in the web page is located inside the first drawn graphic, the first drawn graphic to be selected may be determined.

[00114] S204: receiving an adjustment operation instruction.

[00115] The adjustment operation instruction is used for indicating to carry out adjustment processing on the first drawn graphic in the web page, and a segmentation operation instruction is the first user instruction as mentioned above.

[00116] S205: in response to the adjustment operation instruction, detecting whether a second drawn graphic partially overlapping with the first drawn graphic exists in the multiple drawn

graphics in the target image.

[00117] The first drawn graphic and the second drawn graphic have an overlapping part, for example, a content of the image is that a person stands on a lawn, the legs of the person in the image shield part of the lawn, the first drawn graphic drawn by the user may be a region where the lawn is located, and since the edge of the lawn is generally relatively straight and is of a regular shape, in order to facilitate rapidly drawing the first drawn graphic by the user, the first drawn graphic includes a region where the legs of the person on the lawn are located, and the second drawn graphic may be a region where the person is located.

[00118] S206: removing the overlapping part of the first drawn graphic and the second drawn graphic from the first drawn graphic to obtain an adjustment result.

[00119] In a case that the first drawn graphic is a bounding box graphic, according to positions of the first drawn graphic and the second drawn graphic, a first line segment element in the second drawn graphic, which is located in the first drawn graphic, and a line segment element in the first drawn graphic, which is located outside the second drawn graphic, may be determined; and then a graphic formed by the first line segment element and the line segment elements in the first drawn graphic, which is located outside the second drawn graphic, is used as the adjustment result on the first drawn graphic, and the adjusted first drawn graphic is used for labeling semantic information of a first image region in the target image.

[00120] In addition, according to the positions of the first drawn graphic and the second drawn graphic, a second line segment element in the first drawn graphic, which is located in the second drawn graphic, is determined, and then the second line segment element is removed, so that there are no other line segment elements inside the second drawn graphic.

[00121] With respect to the first drawn graphic, the region in the second drawn graphic is removed in the adjustment result on the first drawn graphic for labeling semantic units in the target image, and in a case that the user has labeled a boundary between two semantic units through drawing the second drawn graphic, in the process of drawing another semantic unit, the user does not need to draw the boundary between two semantic units again, so that the labeling efficiency is improved, and the labeling time is saved.

[00122] In a possible implementation, the labeling method may be executed by an electronic device, such as a terminal device or a server and the like, the terminal device may be a User Equipment (UE), a mobile device, a user terminal, a terminal, a cellular phone, a cordless telephone, a Personal Digital Assistant (PDA), a handheld device, a computing device, a vehicle-mounted device, a wearable device and the like, and the method may be implemented with a processor by calling computer readable instructions stored in a memory. Or, the method may be executed by the server.

[00123] It should be understood that all the method embodiments mentioned in the present disclosure, without departure from the principle logic, can be combined with each other to form combined embodiments, and the present disclosure will not repeat it herein due to limited space. Those skilled in the art should understand that in the method in the specific implementations, the specific execution sequence of each step should be determined based on the function and possible internal logic thereof.

[00124] In addition, the present disclosure further provides a labeling apparatus, an electronic device, a computer readable storage medium, and a program, which all can be used for implementing any one labeling method provided by the present disclosure. The corresponding technical solutions and descriptions may refer to the corresponding records of the method part, and are not repeated herein.

[00125] FIG. 7 shows a block diagram of a labeling apparatus according to an embodiment of the present disclosure. As shown in FIG. 7, the apparatus includes:

a receiving module 301 configured to receive a first labeling operation of a target image, wherein the first labeling operation is used for drawing, in the target image, a first drawn graphic indicating a first image region; and

an adjusting module 302, configured to, in response to a second drawn graphic and the first drawn graphic in the target image at least partially overlapping, adjust the first drawn graphic to obtain a labeling result corresponding to the first labeling operation.

[00126] In a possible implementation, the apparatus further includes:

a detecting module configured to detect whether a drawn graphic partially overlapping with the first drawn graphic exists in at least one previous drawn graphic in the target image.

[00127] In a possible implementation, the apparatus further includes:

a first user instruction receiving module configured to receive a first user instruction, the first user instruction being used for instructing an adjustment to the first drawn graphic.

[00128] In a possible implementation, the adjusting module 302 is configured to use a drawn graphic obtained by removing a part in the first drawn graphic, which overlaps with the second drawn graphic, from the first drawn graphic as the labeling result corresponding to the first labeling operation.

[00129] In a possible implementation, the adjusting module 302 is configured to: in a case that the first drawn graphic and the second drawn graphic are bounding box graphics, according to positions of the first drawn graphic and the second drawn graphic, determine a first line segment element in the second drawn graphic, which is located in the first drawn graphic, and a second line segment element in the first drawn graphic, which is located outside the second drawn graphic; and use a drawn graphic formed by the first line segment element and the

second line segment element as the labeling result corresponding to the first labeling operation.

[00130] In a possible implementation, the apparatus further includes:

a display module configured to display the target image and multiple drawn graphics of the target image, which include the first drawn graphic, on a display interface;

5 a second user instruction receiving module configured to receive a second user instruction, the second user instruction being used for selecting the first drawn graphic from the multiple drawn graphics; and

a determining module configured to determine the first drawn graphic to be selected according to a position indicated by the second user instruction in the display interface and positions of
10 the multiple drawn graphics in the display interface.

[00131] In a possible implementation, the target image is displayed on a web interface.

[00132] In a possible implementation, the first labeling operation is used for carrying out semantic segmentation labeling of the target image.

[00133] In some embodiments, the functions or the included modules of the apparatus
15 provided by the embodiment of the present disclosure may be used for executing the method described in the method embodiments above, and the specific implementation and technical effects of the apparatus may refer to descriptions of the method embodiments above, and are not repeated herein for simplicity.

[00134] An embodiment of the present disclosure further discloses a computer readable
20 storage medium in which computer program instructions are stored. When the computer program instructions are executed by the processor, the above-mentioned method is implemented. The computer readable storage medium may be a nonvolatile computer readable storage medium.

[00135] An embodiment of the present disclosure further discloses an electronic device,
25 including: a processor; and a memory for storing processor executable instructions, wherein the processor is configured to call the instructions stored in the memory so as to execute the above-mentioned method.

[00136] An embodiment of the present disclosure further provides a computer program
product, including a computer readable code. When the computer readable code runs on a
30 device, a processor in the device executes an instruction for implementing the labeling method as provided by any one of the embodiments above.

[00137] An embodiment of the present disclosure further provides another computer program
product for storing computer readable instructions. When the instructions are executed, a
computer is caused to execute the operation of the labeling method provided by any one of the
35 above-mentioned embodiments.

[00138] The electronic device may be provided as a terminal, a server or devices in other forms.

[00139] FIG. 8 shows a block diagram of an electronic device 800 according to an embodiment of the present disclosure. For example, the electronic device 800 may be a mobile phone, a computer, a digital broadcast terminal, a message transceiver, a game console, a tablet device, medical equipment, fitness equipment, a PDA or any other terminal.

[00140] With reference to FIG. 8, the electronic device 800 may include one or more of the following components: a processing component 802, a memory 804, a power supply component 806, a multimedia component 808, an audio component 810, an Input/Output (I/O) interface 812, a sensor component 814, and a communication component 816.

[00141] The processing component 802 generally controls the overall operation of the electronic device 800, such as operations related to display, phone call, data communication, camera operation and record operation. The processing component 802 may include one or more processors 820 to execute instructions so as to complete all or some steps of the above method. In addition, the processing component 802 may include one or more modules for interaction between the processing component 802 and other components. For example, the processing component 802 may include a multimedia module to facilitate the interaction between the multimedia component 808 and the processing component 802.

[00142] The memory 804 is configured to store various types of data to support the operations on the electronic device 800. Examples of the data include instructions for any application or method operated on the electronic device 800, contact data, telephone directory data, messages, pictures, videos, etc. The memory 804 may be any type of volatile or nonvolatile storage devices or a combination thereof, such as a Static Random Access Memory (SRAM), an Electrically Erasable Programmable Read-Only Memory (EEPROM), an Erasable Programmable Read-Only Memory (EPROM), a Programmable Read-Only Memory (PROM), a Read-Only Memory (ROM), a magnetic memory, a flash memory, a magnetic disk or a compact disc.

[00143] The power supply component 806 supplies power to various components of the electronic device 800. The power supply component 806 may include a power supply management system, one or more power supplies, and other components related to the power generation, management and allocation for the electronic device 800.

[00144] The multimedia component 808 includes a screen which provides an output interface between the electronic device 800 and a user. In some embodiments, the screen may include a Liquid Crystal Display (LCD) and a Touch Panel (TP). If the screen includes the touch panel, the screen may be implemented as a touch screen to receive an input signal from the user. The

touch panel includes one or more touch sensors to sense the touch, sliding and gestures on the touch panel. The touch sensor may not only sense a boundary of the touch or sliding action, but also detect the duration and the pressure related to the touch or sliding operation. In some embodiments, the multimedia component 808 includes a front camera and/or a rear camera.

5 When the electronic device 800 is in an operating mode, such as a shooting mode or a video mode, the front camera and/or the rear camera may receive external multimedia data. Each of front camera and rear camera may be a fixed optical lens system or have a focal length or an optical zooming ability.

[00145] The audio component 810 is configured to output and/or input an audio signal. For example, the audio component 810 includes a microphone (MIC), and when the electronic device 800 is in an operating mode such as a call mode, a record mode and a voice recognition mode, the microphone is configured to receive an external audio signal. The received audio signal may be further stored in the memory 804 or sent by the communication component 816. In some embodiments, the audio component 810 further includes a loudspeaker which is
15 configured to output the audio signal.

[00146] The I/O interface 812 provides an interface between the processing component 802 and a peripheral interface module. The peripheral interface module may be a keyboard, a click wheel, buttons, etc. These buttons may include but are not limited to a homepage button, a volume button, a start button and a lock button.

20 **[00147]** The sensor component 814 includes one or more sensors which are configured to provide state evaluation in various aspects for the electronic device 800. For example, the sensor component 814 may detect an on/off state of the electronic device 800 and relative positions of the components such as a display and a small keyboard of the electronic device 800. The sensor component 814 may also detect the position change of the electronic device
25 800 or that of a component of the electronic device 800, presence or absence of a user contact with the electronic device 800, directions or acceleration/deceleration of the electronic device 800, and the temperature change of the electronic device 800. The sensor component 814 may include a proximity sensor configured to detect the presence of objects nearby without any physical contact. The sensor component 814 may further include an optical sensor, such as a
30 Complementary Metal Oxide Semiconductor (CMOS) or Charge Coupled Device (CCD) image sensor, for use in an imaging application. In some embodiments, the sensor component 814 may further include an acceleration sensor, a gyroscope sensor, a magnetic sensor, a pressure sensor or a temperature sensor.

[00148] The communication component 816 is configured to facilitate a wired or wireless
35 communication between the electronic device 800 and other devices. The electronic device 800

may access a wireless network based on the communication standards, such as Wi-Fi, 2G or 3G, or a combination thereof. In one exemplary embodiment, the communication component 816 receives a broadcast signal or broadcast related information from an external broadcast management system via a broadcast channel. In an exemplary embodiment, the communication component 816 further includes a Near Field Communication (NFC) module to promote the short range communication. For example, the NFC module may be implemented based on a Radio Frequency Identification (RFID) technology, an Infrared Data Association (IrDA) technology, an Ultra Wide Band (UWB) technology, a Bluetooth (BT) technology and other technologies.

[00149] In an exemplary embodiment, the electronic device 800 may be implemented by one or more Application Specific Integrated Circuits (ASICs), Digital Signal Processors (DSPs), Digital Signal Processing Devices (DSPD), Programmable Logic Devices (PLDs), a Field Programmable Gate Arrays (FPGAs), controllers, microcontrollers, microprocessors or other electronic components, and is used to execute the above method.

[00150] In an exemplary embodiment, a nonvolatile computer readable storage medium, such as a memory 804 including computer program instructions, is also provided. The computer program instructions may be executed by the processor 820 of the electronic device 800 to implement the above method.

[00151] FIG. 9 shows a block diagram of an electronic device 1900 according to an embodiment of the present disclosure. For example, the electronic device 1900 may be provided as a server. With reference to FIG. 9, the electronic device 1900 includes a processing component 1922 which further includes one or more processors, and memory resources represented by a memory 1932 and configured to store instructions executed by the processing component 1922, such as an application program. The application program stored in the memory 1932 may include one or more modules each corresponding to a group of instructions. In addition, the processing component 1922 is configured to execute the instructions so as to execute the above method.

[00152] The electronic device 1900 may further include a power supply component 1926 configured to perform power supply management on the electronic device 1900, a wired or wireless network interface 1950 configured to connect the electronic device 1900 to a network, and an input/output (I/O) interface 1958. The electronic device 1900 may run an operating system stored in the memory 1932, such as Windows Server™, Mac OS X™, Unix™, Linux™, FreeBSD™ or the like .

[00153] In an exemplary embodiment, a nonvolatile computer readable storage medium, such as a memory 1932 including computer program instructions, is also provided. The computer

program instructions may be executed by the processing component 1922 of the electronic device 1900 to execute the above method.

[00154] The present disclosure may be implemented by a system, a method, and/or a computer program product. The computer program product may include a computer readable storage medium having computer readable program instructions for causing a processor to carry out the aspects of the present disclosure stored thereon.

[00155] The computer readable storage medium may be a tangible device that can retain and store instructions used by an instruction executing device. The computer readable storage medium may be, but not limited to, e.g., electronic storage device, magnetic storage device, optical storage device, electromagnetic storage device, semiconductor storage device, or any proper combination thereof. A non-exhaustive list of more specific examples of the computer readable storage medium includes: portable computer diskette, hard disk, random access memory (RAM), read-only memory (ROM), erasable programmable read-only memory (EPROM or Flash memory), static random access memory (SRAM), portable compact disc read-only memory (CD-ROM), digital versatile disk (DVD), memory stick, floppy disk, mechanically encoded device (for example, punch-cards or raised structures in a groove having instructions recorded thereon), and any proper combination thereof. A computer readable storage medium referred herein should not to be construed as transitory signal *per se*, such as radio waves or other freely propagating electromagnetic waves, electromagnetic waves propagating through a waveguide or other transmission media (e.g., light pulses passing through a fiber-optic cable), or electrical signal transmitted through a wire.

[00156] Computer readable program instructions described herein can be downloaded to individual computing/processing devices from a computer readable storage medium or to an external computer or external storage device via network, for example, the Internet, local area network, wide area network and/or wireless network. The network may comprise copper transmission cables, optical fiber transmission, wireless transmission, routers, firewalls, switches, gateway computers and/or edge servers. A network adapter card or network interface in each computing/processing device receives computer readable program instructions from the network and forwards the computer readable program instructions for storage in a computer readable storage medium in the respective computing/processing device.

[00157] Computer program instructions for implementing the operations of the present disclosure may be assembly instructions, instruction-set-architecture (ISA) instructions, machine instructions, machine-related instructions, microcode, firmware instructions, state-setting data, or source code or object code written in any combination of one or more programming languages, including an object oriented programming language, such as

Smalltalk, C++ or the like, and the conventional procedural programming languages, such as the "C" programming language or similar programming languages. The computer readable program instructions may be executed completely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer, or completely on a remote computer or a server. In the scenario with a remote computer, the remote computer may be connected to the user's computer through any type of network, including local area network (LAN) or wide area network (WAN), or connected to an external computer (for example, through the Internet connection from an Internet Service Provider). In some embodiments, an electronic circuitry, such as a programmable logic circuitry, a field-programmable gate array (FPGA), or a programmable logic array (PLA), may be customized with state information of the computer readable program instructions; the electronic circuitry may execute the computer readable program instructions, so as to achieve the aspects of the present disclosure.

[00158] Aspects of the present disclosure have been described herein with reference to the flowcharts and/or the block diagrams of the method, device (system), and computer program product according to the embodiments of the present disclosure. It will be appreciated that each block in the flowcharts and/or the block diagrams, and combinations of blocks in the flowcharts and/or block diagrams, can be implemented by the computer readable program instructions.

[00159] These computer readable program instructions may be provided to a processor of a general purpose computer, a dedicated computer, or other programmable data processing devices, to produce a machine, such that the instructions create means for implementing the functions/acts specified in one or more blocks in the flowcharts and/or block diagrams when executed by the processor of the computer or other programmable data processing devices.

These computer readable program instructions may also be stored in a computer readable storage medium, wherein the instructions cause a computer, a programmable data processing device and/or other devices to function in a particular manner, such that the computer readable storage medium having instructions stored therein comprises a product that includes instructions for implementing aspects of the functions/acts specified in one or more blocks in the flowcharts and/or block diagrams.

[00160] The computer readable program instructions may also be loaded onto a computer, other programmable data processing devices, or other devices to have a series of operational steps performed on the computer, other programmable devices or other devices, so as to produce a computer implemented process, such that the instructions executed on the computer, other programmable devices or other devices implement the functions/acts specified in one or

more blocks in the flowcharts and/or block diagrams.

[00161] The flowcharts and block diagrams in the drawings illustrate the architecture, function, and operation that may be implemented by the system, method and computer program product according to the various embodiments of the present disclosure. In this regard, each block in the flowcharts or block diagrams may represent a part of a module, a program segment, or a portion of instructions, which comprises one or more executable instructions for implementing the specified logical function(s). In some alternative implementations, the functions denoted in the blocks may occur in an order different from that denoted in the drawings. For example, two contiguous blocks may, in fact, be executed substantially concurrently, or sometimes they may be executed in a reverse order, depending upon the functions involved. It will also be noted that each block in the block diagrams and/or flowcharts, and combinations of blocks in the block diagrams and/or flowcharts, can be implemented by dedicated hardware-based systems performing the specified functions or acts, or by combinations of dedicated hardware and computer instructions

[00162] The computer program product can be realized by hardware, software or a combination thereof. In one optional embodiment, the computer program product is embodied as a computer storage medium, and in another optional embodiment, the computer program product is embodied as a software product, such as a software development kit (SDK) and the like.

[00163] Although the embodiments of the present disclosure have been described above, it will be appreciated that the above descriptions are merely exemplary, but not exhaustive; and that the disclosed embodiments are not limiting. A number of variations and modifications may occur to one skilled in the art without departing from the scopes and spirits of the described embodiments. The terms in the present disclosure are selected to provide the best explanation on the principles and practical applications of the embodiments and the technical improvements to the arts on market, or to make the embodiments described herein understandable to one skilled in the art.

CLAIMS

1. A labeling method, comprising:

receiving a first labeling operation on a target image, wherein the first labeling operation
5 is used for drawing, in the target image, a first drawn graphic indicating a first image region;
and

in response to a second drawn graphic and the first drawn graphic in the target image at
least partially overlapping, adjusting the first drawn graphic to obtain a labeling result
corresponding to the first labeling operation.

10 2. The method according to claim 1, before adjusting the first drawn graphic, further
comprising:

detecting whether there is a drawn graphic, partially overlapping with the first drawn
graphic, in at least one previous drawn graphic in the target image.

15 3. The method according to claim 1 or 2, before adjusting the first drawn graphic, further
comprising:

receiving a first user instruction, the first user instruction being used for instructing an
adjustment to the first drawn graphic.

4. The method according to any one of claims 1-3, wherein the adjusting the first drawn
graphic to obtain the labeling result corresponding to the first labeling operation includes:

20 as the labeling result corresponding to the first labeling operation, using a drawn graphic
obtained by removing a part from the first drawn graphic, the part being overlapped with the
second drawn graphic.

5. The method according to any one of claims 1-4, wherein adjusting the first drawn
graphic to obtain the labeling result corresponding to the first labeling operation includes:

25 in response to the first drawn graphic and the second drawn graphic being bounding box
graphics, determining a first line segment element in the second drawn graphic and a second
line segment element in the first drawn graphic based on positions of the first drawn graphic
and the second drawn graphic, wherein the first line segment element is located in the first
drawn graphic and the second line segment element is located outside the second drawn
30 graphic; and

using a drawn graphic formed by the first line segment element and the second line
segment element as the labeling result corresponding to the first labeling operation.

6. The method according to any one of claim 1-5, after receiving the first labeling
operation on the target image, further comprising:

35 displaying the target image and a plurality of drawn graphics of the target image, which

include the first drawn graphic, on a display interface;

receiving a second user instruction, the second user instruction being used for selecting the first drawn graphic from the plurality of drawn graphics; and

determining the first drawn graphic to be selected, based on a position indicated by the second user instruction in the display interface and positions of the plurality of drawn graphics in the display interface.

7. The method according to any one of claims 1-6, wherein the target image is displayed on a web interface.

8. The method according to any one of claims 1-7, wherein the first labeling operation is used for performing a semantic segmentation labeling of the target image.

9. A labeling apparatus, comprising:

a receiving module configured to receive a first labeling operation on a target image, wherein the first labeling operation is used for drawing, in the target image, a first drawn graphic indicating a first image region; and

an adjusting module configured to adjust the first drawn graphic to obtain a labeling result corresponding to the first labeling operation, in response to a second drawn graphic and the first drawn graphic in the target image at least partially overlapping.

10. An electronic device, comprising:

a processor; and

a memory for storing processor executable instructions,

wherein the processor is configured to execute the instructions stored in the memory so as to implement the method according to any one of claims 1-8.

11. A computer readable storage medium storing computer program instructions that cause a processor to implement the method according to any one of claims 1-8.

12. A computer program, comprising a computer readable code that causes a processor in an electronic device to implement the method according to any one of claims 1-8.