CLAIMS

1. An image identification method, comprising:

obtaining a first image comprising a physical stack formed by stacking one or more first physical objects; and

obtaining, by inputting the first image to a first neural network pre-trained, category information of each of the one or more first physical objects output by the first neural network,

wherein the first neural network is trained with both of a second image and a fourth image, the second image is generated based on a virtual stack that is generated by stacking a three-dimensional model of at least one second physical object, and the fourth image comprises a physical stack formed by stacking the at least one second physical object.

2. The method according to claim 1, further comprising:

obtaining a plurality of three-dimensional models for the at least one second physical object; and

performing spatial stacking on the plurality of the three-dimensional models to obtain the virtual stack.

3. The method according to claim 2, wherein obtaining the plurality of three-dimensional models for the at least one second physical object comprises:

copying a three-dimensional model of one or more of the at least one second physical object; and

obtaining, by performing translation and/or rotation on the copied

three-dimensional model, the plurality of the three-dimensional models for the at least one second physical object.

4. The method according to claim 3, wherein the at least one second physical object belong to a plurality of categories;

copying the three-dimensional model of the one or more of the at least one second physical object comprises:

for each of the plurality of categories,

determining at least one target physical object of the at least one second physical object, wherein the at least one target physical object belongs to the category; and

copying a three-dimensional model of one of the at least one target physical object.

5. The method according to any of claims 1 to 4, further comprising:

after obtaining the virtual stack, performing rendering process on the virtual stack to obtain a rendering result; and

generating the second image by performing style transfer on the rendering result.

6. The method according to claim 5, wherein performing style transfer on the rendering result comprises:

inputting the rendering result and the fourth image to a second neural network to obtain the second image with the same style as the fourth image.

7. The method according to any of claims 1 to 6, wherein the first neural network comprises a first sub-network for extracting a feature from the first image and a second sub-network for predicting category information of each of the at least one second physical object based on the feature;

wherein the first neural network is trained by:

performing first training on the first sub-network and the second sub-network based on the second image; and

performing, based on the fourth image, second training on the second sub-network after the first training; or

the first neural network is trained by:

performing first training on the first sub-network and a third sub-network based on the second image; wherein the first sub-network and the third sub-network are configured to form a third neural network, and the third neural network is configured to classify objects in the second image; and

performing, based on the fourth image, second training on the second sub-network and the first sub-network after the first training.

8. The method according to any of claims 1 to 7, further comprising:

determining a performance of the first neural network based on category information of each of the one or more first physical objects output by the first neural network; and

in response to determining that the performance of the first neural network does not satisfy a pre-determined condition, correcting network parameter values of the first neural network based on a fifth image, wherein the fifth image comprises a

physical stack formed by stacking the one or more first physical objects.

9. The method according to any of claims 1 to 8, wherein the one or more first physical objects comprise one or more sheet-like objects, and a stacking direction of the physical stack and a stacking direction of the virtual stack are a thickness direction of the one or more sheet-like objects.

10. A method of training a neural network, comprising:

obtaining three-dimensional models and category information of one or more objects, wherein the three-dimensional models of the one or more objects are generated based on a two-dimensional image of the one or more objects;

stacking a plurality of the three-dimensional models to obtain a virtual stack;

converting the virtual stack into a two-dimensional image of the virtual stack as a sample image;

generating category information of the two-dimensional image of the virtual stack based on category information of multiple virtual objects in the virtual stack; and

training a first neural network with both of the sample image and the two-dimensional image of the one or more objects, the first neural network being configured to identify category information of each physical object in a physical stack.

11. An image identification apparatus, comprising:

a first obtaining module, configured to obtain a first image comprising a physical stack formed by stacking one or more first physical objects; and

an inputting module, configured to obtain, by inputting the first image to a first neural network pre-trained, category information of each of the one or more first physical objects output by the first neural network;

wherein the first neural network is trained with both of a second image and a fourth image, the second image is generated based on a virtual stack that is generated by stacking a three-dimensional model of at least one second physical object, and the fourth image comprises a physical stack formed by stacking the at least one second physical object.

12. A computer device, comprising:

a memory,

a processor, and

a computer program stored in the memory and executable on the processor,

wherein when the processor executes the computer program, the method according to any one of claims 1 to 10 is implemented.

13. A computer program stored on a storage medium, wherein when the computer program is executed by a processor, the method according to any one of claims 1 to 10 is implemented.