CLAIMS

1. An object recognition method, performed by a server and comprising:

obtaining relevant object data of at least one object to be recognized;

predicting, for each object to be recognized, a first label of the object to be recognized by an object recognition model on the basis of the relevant object data of the object to be recognized, the first label representing an object type, to which the object belongs, among a plurality of object types;

obtaining a reference data set, the reference data set comprising relevant object data and second labels of a plurality of first sample objects with annotation labels, the annotation label of one first sample object representing a real object type, to which the first sample object belongs, among the plurality of object types, and a second label representing a probability that one object belongs to each of the plurality of object types;

determining first association relationships between the at least one object to be recognized and the plurality of first sample objects according to the relevant object data of each object to be recognized and the relevant object data of each first sample object;

determining a second label of each object to be recognized according to the first label of each object to be recognized, the corresponding annotation label and a second label of each first sample object, and the first association relationship; and

determining, for each object to be recognized, a recognition result of the object to be recognized according to the second label of the object to be recognized.

2. The method according to claim 1, wherein the determining the second label of each object to be recognized according to the first label of each object to be recognized, the corresponding annotation label and second label of each first sample object, and the first association relationship comprises:

taking the first label of each object to be recognized as an annotation label and an initial second label of the object to be recognized;

performing at least one label propagation between the object to be recognized and the first sample object on the basis of the first association relationship according to the annotation label and second label of each object to be recognized and the annotation label and second label of the first

sample object, and obtaining an updated fifth label of each object to be recognized and an updated fifth label of the first sample object; and

fusing, for each object to be recognized according to the first association relationships, the updated fifth labels of the objects having the first association relationships with the object to be recognized, to obtain the second label of the object to be recognized.

3. The method according to claim 2, wherein each label propagation comprises the following operations:

for each object of the object to be recognized and the first sample object:

updating the second label of the object according to the first association relationship on the basis of the second labels of the objects having association relationships with the object; and

fusing an updated second label of the object with the annotation label of the object to obtain a fifth label of the object, and taking the fifth label of the object as a second label of the object in next label propagation.

4. The method according to any one of claims 1 to 3, wherein the relevant object data comprises at least one type of relevant object data, and the first association relationship comprises a type of association relationship corresponding to each type of relevant object data; and

the determining a second label of each object to be recognized according to the first label of each object to be recognized, the annotation label and second label of each first sample object, and the first association relationship comprises:

obtaining a weight corresponding to each type of association relationship; and

determining the second label of each object to be recognized according to the first label of each object to be recognized, the annotation label and second label of each first sample object, each type of association relationship, and the weight corresponding to each type of association relationship.

5. The method according to any one of claims 1 to 3, further comprising:

determining, for each object of the at least one object to be recognized and the plurality of first sample objects, an influence of the object according to the relevant object data, wherein the influence of the object refers to a social ability of the object to influence other objects; and

the determining the second label of each object to be recognized according to the first label of each object to be recognized, the corresponding annotation label and second label of the first sample object, and the first association relationship comprising:

determining the second label of each object to be recognized according to the first label of each object to be recognized, the annotation label and second label of each first sample object, the influences of each object to be recognized and each first sample object, and the first association relationship.

6. The method according to claim 5, wherein the relevant object data comprises at least one type of relevant object data; the first association relationship comprises a type of association relationship corresponding to each type of relevant object data; and the influence of each of the at least one object to be recognized and the plurality of first sample objects comprises an influence corresponding to each type of association relationship of each object.

7. The method according to any one of claims 1 to 3, further comprising:

determining a proportion of a number of objects of each object type of the at least one object to be recognized and the plurality of first sample objects according to the first label of each object to be recognized and the annotation label of each first sample object; and

the determining the second label of each object to be recognized according to the first label of each object to be recognized, the corresponding annotation label and second label of each first sample object, and the first association relationship comprising:

taking the proportion of the number of objects of each object type as a weight, weighting the first labels of the corresponding object type of the at least one object to be recognized, and weighting the annotation labels of the corresponding object type of the plurality of first sample objects; and

determining the second label of each object to be recognized according to a weighted first label of each object to be recognized, a weighted annotation label and a weighted second label of each first sample object, and the first association relationship.

8. The method according to claim 1, wherein the object recognition model is trained by:

obtaining a first training data set, the first training data set comprising relevant object data of a plurality of second sample objects with annotation labels and relevant object data of a plurality of unlabeled third sample objects, and real object types of the plurality of second sample objects comprising each of the plurality of object types;

training an initial classification model on the basis of the relevant object data of the plurality of second sample objects, and obtaining a first classification model until a first training end condition is satisfied;

predicting, for each third sample object, an object type of the third sample object through the first classification model on the basis of the relevant object data of the third sample object, and determining an annotation label of the third sample object according to the object type; and

training the first classification model on the basis of the relevant object data of the plurality of second sample objects and the relevant object data of the plurality of third sample objects with the annotation labels, and obtaining the object recognition model until a second training end condition is satisfied.

9. The method according to claim 1, wherein the reference data set is obtained by:

obtaining a second training data set, the second training data set comprising the relevant object data of the plurality of first sample objects with the annotation labels;

determining second association relationships between the first sample objects in the second training data set according to the relevant object data of each first sample object; and

taking the annotation label of each first sample object as an initial third label of the first sample object, repeatedly performing the following operations until updated third labels of the plurality of first sample objects satisfy a preset condition, and determining that the third label of each first sample object when the preset condition is satisfied is the second label of the first sample object:

obtaining, on the basis of the second association relationships and the annotation labels and third labels of the first sample objects, an updated fourth label of each first sample object by performing label propagation between the plurality of first sample objects; and fusing, for each first sample object according to the second association relationships, the fourth labels of the first sample objects having the association relationships with the first sample object, to obtain a new third label of the first sample object.

10. The method according to claim 9, wherein after each label propagation, the method further comprises:

obtaining newly added data, the newly added data comprising relevant object data of at least one fourth sample object with an annotation label;

taking each fourth sample object in the newly added data as a newly added first sample object in the second training data set, to update the second training data set;

determining a second association relationship between the first sample objects in an updated second training data set according to the relevant object data of each first sample object in the updated second training data set, to obtain an updated second association relationship; and

the obtaining, on the basis of the second association relationships and the annotation labels and third labels of the first sample objects, an updated fourth label of each first sample object by performing label propagation between the plurality of first sample objects comprises:

taking the annotation label of each newly added first sample object as the third label of the first sample object, and obtaining, on the basis of the updated second association relationships and the annotation labels and third labels of the updated first sample objects, the fourth label of each updated first sample object by performing label propagation between the plurality of updated first sample objects.

11. The method according to claim 10, wherein the annotation labels of the fourth sample objects in the newly added data are obtained by:

obtaining relevant object data of at least one unlabeled fourth sample object; and

predicting, for each fourth sample object among the at least one unlabeled fourth sample object, the first label of the fourth sample object through the object recognition model on the basis of the relevant object data of the fourth sample object, and taking the first label of the fourth sample object as the annotation label of the fourth sample object.

12. The method according to claim 9, further comprising:

determining similar object pairs among the plurality of first sample objects on the basis of the relevant object data of the plurality of first sample objects;

wherein the preset condition is satisfied comprises a value of a loss function satisfies a set condition; and

the loss function comprises a first loss function and a second loss function; for each label propagation, a value of the first loss function represents differences between the annotation labels and the new third labels of the first sample objects; and a value of the second loss function represents differences between the new third labels of the various similar object pairs.

13. An object recognition apparatus, comprising:

a first prediction module, configured to obtain relevant object data of at least one object to be recognized; and predict, for each object to be recognized a first label of the object to be recognized by an object recognition model on the basis of the relevant object data of the object to be recognized, the first label representing an object type, to which the object belongs, among a plurality of object types;

a reference data set obtaining module, configured to obtain a reference data set, the reference

data set comprising relevant object data and second labels of a plurality of first sample objects with annotation labels, the annotation label of one first sample object representing a real object type, to which the first sample object belongs, among the plurality of object types, and a second label representing a probability that one object belongs to each of the plurality of object types;

a second prediction module, configured to determine first association relationships between the at least one object to be recognized and the plurality of first sample objects according to the relevant object data of each object to be recognized and the relevant object data of each first sample object, and determine a second label of each object to be recognized according to the first label of each object to be recognized, the corresponding annotation label and a second label of each first sample object, and the first association relationship; and

a recognition result determining module, configured to determine a recognition result of each object to be recognized according to the second label of each object to be recognized.

14. An electronic device, comprising a memory, a processor, and a computer program stored on the memory, the processor executing the computer program to perform the steps of the method according to any one of claims 1 to 12.

15. A computer-readable storage medium storing a computer program which, when executed by a processor, performs the steps of the method of any of claims 1 to 12.

16. A computer program product, comprising a computer program which, when executed by a processor, performs the steps of the method of any one of claims 1 to 12.