

CLAIMS

1. A method for an electronic device to generate a neural network model configured to control a second game element in a game to interact with a first game element controlled by a user through a first terminal, the method being executed by a server, and the first terminal and a second terminal being respectively connected to the server by using a network, comprising:

determining a hyperparameter value corresponding to a hyperparameter in a first neural network model from a hyperparameter value set,

the first neural network model comprising an input layer, a structural layer having the hyperparameter value, and an output layer, the input layer, the structural layer, and the output layer being connected in a target connection manner;

obtaining a first model accuracy of a second neural network model obtained by training the first neural network model; and

updating hyperparameter values of some hyperparameters corresponding to the hyperparameter value of the structure layer in the first neural network model to corresponding target hyperparameter values in the hyperparameter value set in a case that the first model accuracy is lower than a target accuracy, to obtain a third neural network model,

obtaining a first training sample set from a target application in the first terminal, and training the third neural network model by using the first training sample set obtained from the target application, to obtain a fourth neural network model;

delivering the fourth neural network model to the second terminal, to enable the second terminal to predict operation data to be performed by the second game element in the game based on the fourth neural network model, and implementing a corresponding behavior by controlling the second game element in the game to execute the operation data, thereby interacting with the first game element controlled by the user through the first terminal;

a second model accuracy of detecting a verification sample set by using ~~a the~~ the fourth neural network model being higher than or equal to the target accuracy, the fourth neural network model being obtained by training the third neural network model wherein image detection and/or image segmentation are performed on to-be-detected data in the target application by using the fourth neural network model.

2. The method according to claim 1, wherein the structural layer comprises a first residual

network and a second residual network, and the determining the hyperparameter value corresponding to the hyperparameter in the first neural network model from the hyperparameter value set comprises:

determining a first hyperparameter value corresponding to a first hyperparameter of the first residual network from a first hyperparameter value subset,

a plurality of hyperparameters of the first residual network comprising the first hyperparameter; and

determining a second hyperparameter value corresponding to a second hyperparameter of the second residual network from a second hyperparameter value subset,

a plurality of hyperparameters of the second residual network comprising the second hyperparameter, and the hyperparameter value set comprising the first hyperparameter value subset and the second hyperparameter value subset.

3. The method according to claim 2, wherein the structural layer comprises a plurality of first residual networks and a plurality of second residual networks, the hyperparameter value set comprises a plurality of first hyperparameter value subsets and a plurality of second hyperparameter value subsets, the plurality of first residual networks are in a one-to-one correspondence with the plurality of first hyperparameter value subsets, and the plurality of second residual networks are in a one-to-one correspondence with the plurality of second hyperparameter value subsets;

the determining the first hyperparameter value corresponding to the first hyperparameter of the first residual network from the first hyperparameter value subset comprises:

determining a first hyperparameter value corresponding to a first hyperparameter of a target first residual network from each first hyperparameter value subset in the plurality of first hyperparameter value subsets, and

the target first residual network being a first residual network corresponding to each first hyperparameter value subset in the plurality of first hyperparameter value subsets.

4. The method according to claim 3, wherein the determining the second hyperparameter value corresponding to the second hyperparameter of the second residual network from the second hyperparameter value subset comprises:

determining a second hyperparameter value corresponding to a second hyperparameter of a target second residual network from each second hyperparameter value subset in the plurality of second hyperparameter value subsets, and

the target second residual network being a second residual network corresponding to each second hyperparameter value subset in the plurality of second hyperparameter value subsets.

5. The method according to claim 4, wherein the updating hyperparameter values of some hyperparameters in the first neural network model to corresponding target hyperparameter values in the hyperparameter value set comprises at least one of:

updating first hyperparameter values corresponding to first hyperparameters of some first residual networks to third hyperparameter values corresponding to the some first residual networks,

the third hyperparameter values being hyperparameter values in the first hyperparameter value subset; and

updating second hyperparameter values corresponding to second hyperparameters of some second residual networks to fourth hyperparameter values corresponding to the some second residual networks,

the fourth hyperparameter values being hyperparameter values in the second hyperparameter value subset.

6. The method according to claim 2, wherein the structural layer comprises a first residual network and a second residual network, the first hyperparameter comprises a convolution kernel size of a first convolution kernel in convolution kernels comprised in the first residual network, the second hyperparameter comprises a quantity of concatenated second residual networks, and the determining the hyperparameter value corresponding to the hyperparameter in the first neural network model from the hyperparameter value set comprises:

determining the convolution kernel size of the first convolution kernel in the first residual network from a third hyperparameter value subset as a target convolution kernel size value; and

determining the quantity of concatenated second residual networks from a fourth hyperparameter value subset as a target quantity,

the hyperparameter value set comprising the third hyperparameter value subset and the fourth hyperparameter value subset.

7. The method according to claim 1, wherein the obtaining the first model accuracy of the second neural network model obtained by training the first neural network model comprises:

training the first neural network model by using a ~~first~~second training sample set obtained from ~~the~~a target application, to obtain the second neural network model;

detecting, by using the second neural network model, each verification sample in the

verification sample set obtained from the target application, to obtain a detection result corresponding to each verification sample in the verification sample set,

the verification sample set comprising a plurality of verification samples obtained from the target application and a target detection result corresponding to each verification sample; and

determining a proportion of a quantity of matches in a total quantity of the plurality of verification samples as the first model accuracy,

the quantity of matches being used for indicating a quantity of verification samples of which detection results corresponding to the verification samples match target detection results corresponding to the verification samples.

8. The method according to claim 1, wherein after ~~the updating hyperparameter values of some hyperparameters in the first neural network model to corresponding target hyperparameter values in the hyperparameter value set, to obtaining the third~~ fourth neural network model, the method further comprises:

~~training the third neural network model by using a second training sample set obtained from a target application, to obtain a fourth neural network model; and~~

detecting to-be-detected data in the target application by using the fourth neural network model.

9. The method according to claim 8, wherein the ~~second~~ first training sample set comprises scene data and operation data corresponding to the scene data, and the training the third neural network model by using the ~~second~~ first training sample set obtained from the target application, to obtain the fourth neural network model comprises:

initializing a loss function comprising an input layer, an output layer, a structural layer, and a third neural network model parameter;

inputting the scene data in the ~~second~~ first training sample set into the third neural network model in each iterative training process of the third neural network model, to obtain predicted operation data;

substituting operation data selected from the ~~second~~ first training sample set and the predicted operation data into the loss function, to solve a corresponding third neural network model parameter in a case that a minimum value of the loss function is obtained; and

updating the third neural network model according to the third neural network model parameter that is solved, to obtain the fourth neural network model.

10. The method according to any one of claims 1 to 8, wherein the input layer comprises a convolutional layer, a batch normalization layer, and an activation layer, the output layer comprises a fully-connected layer and a loss function layer, and the structural layer comprises four layers of first residual networks and four layers of second residual networks.

11. The method according to claim 10, wherein the first neural network model is a neural network model obtained by connecting the input layer, the structural layer having the hyperparameter value, and the output layer in the target connection manner, and the target connection manner comprises:

concatenating the convolutional layer, the batch normalization layer, and the activation layer, to obtain the input layer;

concatenating the fully-connected layer and the loss function layer to obtain the output layer;

concatenating a first layer of the first residual networks, a first layer of the second residual networks, a second layer of the first residual networks, a second layer of the second residual networks, a third layer of the first residual networks, a third layer of the second residual networks, a fourth layer of the first residual networks, and a fourth layer of the second residual networks to obtain the structural layer, the hyperparameter value of the structural layer comprising: a convolution kernel size of each layer of first residual network in the four layers of first residual networks, and a quantity of concatenated second residual networks in each layer of the four layers of second residual networks; and

connecting the input layer, the structural layer having the hyperparameter value, and the output layer in a concatenation manner, to obtain the first neural network model.

12. An apparatus for generating a neural network model, the neural network model is configured to control a second game element in a game to interact with a first game element controlled by a user through a first terminal, the apparatus being in a server, and the first terminal and a second terminal being respectively connected to the server by using a network, comprising:

a determining module, configured to determine a hyperparameter value corresponding to a hyperparameter in a first neural network model from a hyperparameter value set,

the first neural network model being a neural network model obtained by connecting at least an input layer, a structural layer having the hyperparameter value, and an output layer in a target connection manner;

an obtaining module, configured to obtain a first model accuracy of a second neural network model obtained by training the first neural network model; and

an update module, configured to update hyperparameter values of some hyperparameters corresponding to the hyperparameter value of the structure layer in the first neural network model to corresponding target hyperparameter values in the hyperparameter value set in a case that the first model accuracy is lower than a target accuracy, to obtain a third neural network model,

a training module, configured to obtain a first training sample set from a target application in the first terminal, and train the third neural network model by using the first training sample set obtained from the target application, to obtain a fourth neural network model; and

a delivering module, configured to deliver the fourth neural network model to the second terminal, to enable the second terminal to predict operation data to be performed by the second game element in the game based on the fourth neural network model, and implement a corresponding behavior by controlling the second game element in the game to execute the operation data, thereby interacting with the first game element controlled by the user through the first terminal;

a second model accuracy of detecting a verification sample set by using ~~a the~~ the fourth neural network model being higher than or equal to the target accuracy, the fourth neural network model being obtained by training the third neural network model wherein image detection and/or image segmentation are performed on to-be-detected data in the target application by using the fourth neural network model.

13. The apparatus according to claim 12, wherein the structural layer comprises a first residual network and a second residual network, and the determining module comprises:

a first determining unit, configured to determine a first hyperparameter value corresponding to a first hyperparameter of the first residual network from a first hyperparameter value subset,

a plurality of hyperparameters of the first residual network comprising the first hyperparameter; and

a second determining unit, configured to determine a second hyperparameter value corresponding to a second hyperparameter of the second residual network from a second hyperparameter value subset,

a plurality of hyperparameters of the second residual network comprising the second hyperparameter, and the hyperparameter value set comprising the first hyperparameter value subset and the second hyperparameter value subset.

14. The apparatus according to claim 13, wherein the structural layer comprises a plurality of first residual networks and a plurality of second residual networks, the hyperparameter value set

comprises a plurality of first hyperparameter value subsets and a plurality of second hyperparameter value subsets, the plurality of first residual networks are in a one-to-one correspondence with the plurality of first hyperparameter value subsets, and the plurality of second residual networks are in a one-to-one correspondence with the plurality of second hyperparameter value subsets;

the first determining unit is configured to determine a first hyperparameter value corresponding to a first hyperparameter of a target first residual network from each first hyperparameter value subset in the plurality of first hyperparameter value subsets, and

the target first residual network being a first residual network corresponding to each first hyperparameter value subset in the plurality of first hyperparameter value subsets.

15. The apparatus according to claim 14, wherein the second determining unit is configured to determine a second hyperparameter value corresponding to a second hyperparameter of a target second residual network from each second hyperparameter value subset in the plurality of second hyperparameter value subsets, and

the target second residual network being a second residual network corresponding to each second hyperparameter value subset in the plurality of second hyperparameter value subsets.

16. The apparatus according to claim 13, wherein the structural layer comprises the first residual network and the second residual network, the first hyperparameter comprises a convolution kernel size of a first convolution kernel in convolution kernels comprised in the first residual network, the second hyperparameter comprises a quantity of concatenated second residual networks, and the determining module comprises:

a third determining unit, configured to determine the convolution kernel size of the first convolution kernel in the first residual network from a third hyperparameter value subset as a target convolution kernel size value; and

a fourth determining unit, configured to determine the quantity of concatenated second residual networks from a fourth hyperparameter value subset as a target quantity,

the hyperparameter value set comprising the third hyperparameter value subset and the fourth hyperparameter value subset.

17. The apparatus according to claim 12, further comprising:

~~a training module, configured to train, after the training module hyperparameter values of the some hyperparameters in the first neural network model are updated to the corresponding target hyperparameter values in the hyperparameter value set to obtaining the third ~~fourth~~ neural network~~

model, ~~the third neural network model by using a second training sample set obtained from a target application, to obtain the fourth neural network model; and~~

a detection module, configured to detect to-be-detected data in the target application by using the fourth neural network model.

18. The apparatus according to claim 17, wherein the ~~second~~first training sample set comprises scene data and operation data corresponding to the scene data, and the training module comprises:

an initializing unit, configured to initialize a loss function comprising an input layer, an output layer, a structural layer, and a third neural network model parameter;

an inputting unit, configured to input the scene data in the ~~first~~second training sample set into the third neural network model in each iterative training process of the third neural network model, to obtain predicted operation data;

a substituting unit, configured to substitute operation data selected from the ~~first~~second training sample set and the predicted operation data into the loss function, to solve a corresponding third neural network model parameter in a case that a minimum value of the loss function is obtained; and

an updating unit, configured to update the third neural network model according to the third neural network model parameter that is solved, to obtain the fourth neural network model.

19. A computer-readable storage medium, storing a computer program which, when being executed by a processor, causes the processor to perform the method according to any one of claims 1 to 11.

20. An electronic device, comprising a memory and a processor, the memory storing a computer program, and the processor being configured to perform the method according to any one of claims 1 to 11 by using the computer program.