CLAIMS

What is claimed is:

1. A method for recommending information, executed by a recommendation server, and comprising:

acquiring a click through rate of recommended information by predicting a feature vector of the recommended information by a recommendation model, wherein model parameters corresponding to features that are the same as features of the feature vector and have frequencies less than or equal to a first threshold are removed from the recommendation model; and

issuing the recommended information based on the click through rate, wherein the recommended information is data content corresponding to a current issue request and is looked up by the recommendation server based on a received issue from a client;

wherein the recommendation model is generated by a system for training the model through performing:

sequentially updating model parameters corresponding to features with frequencies greater than the first threshold in a machine learning model based on the click through rate of a history feature vector of history recommended information in a preset machine learning model, wherein each of the features in the history feature vector of history recommended information in the machine learning model is preset initial values of model parameters corresponding to features, and a frequency of each of the features in the machine learning model is updated using a preset frequency attenuation coefficient upon completion of the training of the machine learning model; and

removing model parameters corresponding to features with frequencies less than or equal to the first threshold upon completion of the training of the machine learning model, and generating the recommendation model based on latest remaining model parameters, wherein the remaining model parameters are model parameters corresponding to the features with the frequencies greater than the first threshold in the machine learning model;

wherein generating the recommendation model based on the latest remaining model parameters comprises:

filtering, in the case that a machine learning model scale reaches a memory limit, model parameters corresponding to features with frequencies less than or equal to a second threshold from the remaining model parameters, and generating the recommendation model based on remaining model parameters acquired upon the filtering, wherein the second threshold is greater than the first threshold.

2. The method according to claim 1, wherein acquiring the click through rate of the recommended information by predicting the feature vector of the recommended information by the recommendation model comprises:

acquiring remaining model parameters from the recommendation model upon the removal of the model parameters corresponding to the features that are the same as the features of the feature vector and have the frequencies less than or equal to the first threshold; and

calculating the click through rate of the recommended information based on the remaining model parameters and features corresponding to the remaining model parameters in the feature vector.

3. The method according to claim 1, wherein sequentially updating the model parameters corresponding to the features with the frequencies greater than the first threshold in the machine learning model based on the click through rate of the history feature vector of the history recommended information in the preset machine learning model comprises:

acquiring a corresponding current click through rate by predicting history feature vector of current history recommended information by the machine learning model; and

calculating a loss coefficient of the current click through rate at the model parameters corresponding to the features with the frequencies greater than the first threshold by a preset loss function, modifying the corresponding model parameters in the machine learning model by the loss coefficient, predicting a history feature vector of the next history recommended information by the machine learning model, and modifying the model parameters corresponding to the features with the frequencies greater than the first threshold in the machine learning model until training of the machine learning model is completed.

4. The method according to claim 1, wherein upon sequentially updating the model parameters corresponding to the features with the frequencies greater than the first threshold in the machine learning model, the method further comprises:

setting the model parameters corresponding to the features with the frequencies less than or equal to the first threshold in the machine learning model as preset sparsity values to remove the model parameters set as the preset sparsity values upon completion of the training of the machine learning model.

5. The method according to claim 1, wherein removing the model parameters corresponding to the features with the frequencies less than or equal to the first threshold upon completion of the

training of the machine learning model, and generating the recommendation model based on the latest remaining model parameters comprise:

upon completion of the training of the machine learning model within a current time period, updating the frequencies of different features in the machine learning model by a preset frequency attenuation coefficient, filtering model parameters corresponding to features with frequencies less than or equal to a third threshold from the remaining model parameters upon the removal of the model parameters corresponding to the features with the frequencies less than or equal to the first threshold, and generating the recommendation model based on remaining model parameters acquired upon the filtering within the current time period.

6. The method according to any one of claims 1, and 4 to 5, wherein upon generating the recommendation model based on the latest remaining model parameters, the method further comprises:

publishing the recommendation model online.

7. The method according to any one of claims 1 to 5, wherein the model parameter is a weight coefficient of different features in the recommendation model.

8. The method according to claim 1, wherein issuing the recommended information based on the click through rate comprises:

ranking the recommended information based on the click through rate, and creating a corresponding issue list to issue the recommended information to a user.

9. An apparatus for recommending information, comprising:

a click predicting module, configured to acquire a click through rate of recommended information by predicting a feature vector of the recommended information by a recommendation model, wherein model parameters corresponding to features that are the same as features of the feature vector and have frequencies less than or equal to a first threshold are removed from the recommendation model; and

an information recommending module, configured to issue the recommended information based on the click through rate, wherein the recommended information is data content corresponding to a current issue request and is looked up by the recommendation server based on a received issue from a client;

wherein the recommendation model is generated by a system for training the model through performing:

a model parameters updating module, configured to sequentially update model parameters corresponding to features with frequencies greater than the first threshold in a machine learning model based on the click through rate of a history feature vector of history recommended information in a preset machine learning model, wherein each of the features in the history feature vector of history recommended information in the machine learning model is preset initial values of model parameters corresponding to features, and a frequency of each of the features in the machine learning model is updated using a preset frequency attenuation coefficient upon completion of the training of the machine learning model; and

a recommendation model generating module, configured to remove model parameters corresponding to features with frequencies less than or equal to the first threshold upon completion of the training of the machine learning model, and generate the recommendation model based on latest remaining model parameters, wherein the remaining model parameters are model parameters corresponding to the features with the frequencies greater than the first threshold in the machine learning model;

wherein generating the recommendation model based on the latest remaining model parameters comprises:

filtering, in the case that the machine learning model scale reaches a memory limit, model parameters corresponding to features with frequencies less than or equal to a second threshold from the remaining model parameters, and generating the recommendation model based on remaining model parameters acquired upon the filtering, wherein the second threshold is greater than the first threshold.

10. A recommendation server for recommending information, comprising:

one or more processors; and

a memory configured to store the one or more programs;

wherein the one or more programs, when loaded and run by the one or more processors, cause the one or more processors to perform the method for recommending information as defined in any one of claims 1 to 8.

11. A system for training a model, comprising a training server cluster, a parameter server cluster and a recommendation server, wherein

the parameter server cluster is configured to store model parameters corresponding to different features in a preset machine learning model, wherein each of the features in a history feature vector of history recommended information in the machine learning model is preset initial values of model parameters corresponding to features;

the training server cluster is configured to sequentially acquire latest model parameters corresponding to different features in the machine learning model from the parameter server cluster, acquire a corresponding click through rate by processing the history feature vector of history recommended information based on the model parameter, calculate a loss coefficient of model parameters corresponding to features with frequencies greater than a first threshold in the machine learning model, and return the loss coefficient to the parameter server cluster;

the parameter server cluster is further configured to update the corresponding model parameters by the loss coefficient and feed the updated model parameters back to the training server cluster, remove model parameters corresponding to features with frequencies less than or equal to the first threshold upon completion of the training of the machine learning model, and generate a corresponding recommendation model based on the remaining model parameters, wherein a frequency of each of the features in the machine learning model is updated using a preset frequency attenuation coefficient upon completion of the training of the machine learning model; and

the recommendation server is configured to perform the method for recommending information as defined in claim 1

wherein upon completion of the training of the machine learning model, the parameter server cluster is further configured to filter, in the case that a machine learning model scale reaches a memory limit, the model parameters corresponding to the features with the frequencies less than or equal to a second threshold from the remaining model parameters, and generate the recommendation model based on the remaining model parameters acquired upon the filtering, wherein the second threshold is greater than the first threshold.

12. The system according to claim 11, wherein

the training server cluster is further configured to set the model parameters corresponding to the features with the frequencies less than or equal to the first threshold in the machine learning model as preset sparsity values, and return the preset sparsity values to the parameter server cluster; and

the parameter server cluster is further configured to modify the model parameters corresponding to the features with the frequencies less than or equal to the first threshold in the

machine learning model as the preset sparsity values, and remove the model parameters set as the preset sparse values upon completion of the training of the machine learning model.

13. The system according to claim 11, wherein upon completion of the training of the machine learning model within a current time period, the parameter server cluster is further configured to update the frequencies of the different features in the machine learning model by a preset frequency attenuation coefficient, filter model parameters corresponding to features with frequencies less than or equal to a third threshold from the remaining model parameters upon the removal of the model parameters corresponding to the features with the frequencies less than or equal to the first threshold, and generates the recommendation model based on the remaining model parameters acquired upon the filtering within a current time period.

14. The system according to any one of claims 11 to 13, further comprising the recommendation server as defined in claim 10, wherein the parameter server cluster is further configured to publish the generated recommendation model to the recommendation server.

15. A non-volatile computer-readable storage medium, storing a computer program; wherein the computer program, when loaded and run by a processor, causes a server to perform the method for recommending information as defined in any one of claims 1 to 8.