

CLAIMS

What is claimed is:

1.- ____ A method, comprising:

~~providing~~identifying a multi-classifier, the multi-classifier including a first classifier and a plurality of second classifiers;

performing classification prediction on a feature data related to an entity based on the first classifier of the multi-classifier to obtain a first prediction data;

~~identifying~~selecting a target second classifier from the plurality of second classifiers of the multi-classifier ~~based on~~by comparing the feature data with a data distribution of each of the plurality of second classifiers, a similarity between a data distribution of the target ~~sub-second~~ classifier and the feature data being highest among the plurality of second classifiers, a data distribution of a second classifier of the plurality of second classifiers being one or more of a distribution of data received and classified by the second classifier or a distribution of sample data used to train the second classifier, and having one or more of a center point or a Gaussian mixture model parameter;

performing classification prediction on the feature data based on the target second classifier to obtain a second prediction data;

combining the first prediction data and the second prediction data to obtain a third prediction data; and

~~recommending a to-be-recommended~~lassifying the entity to a user based on the third prediction data.

2.- The method according to claim 1, wherein the identifying the target second classifier comprises:

determining that each of the plurality of second classifiers has a center point of data distribution; and

selecting a second classifier whose center point is closest to a data vector of the feature data among the plurality of second classifiers as the target second classifier.

3.- The method according to claim 1, wherein the obtaining the target second classifier comprises:

determining that each of the plurality of second classifiers has ~~thea~~ Gaussian mixture model ~~with a parameter in~~ data distribution ~~parameter~~; and

selecting a second classifier whose ~~data distribution~~Gaussian mixture model parameter has a highest similarity with that of the feature data among the plurality of second classifiers as the target second classifier.

~~4.— The method according to claim 1, further comprising recommending the entity to a user based on a result of the classifying the entity.~~

~~45.-~~ The method of claim ~~14~~, further comprising:

after the recommending the to-be-recommended entity to the user, detecting a response of the user to the recommending the to-be-recommended entity; and

updating a parameter of one or more of the target second classifier ~~and/or~~ the first classifier based on the response of the user.

~~56.-~~ The method according to claim ~~45~~, wherein the updating the parameter of the one or more of the target second classifier ~~and/or~~ the first classifier comprises:

providing one of positive feedback or negative feedback to the multi-classifier based on the response of the user; and

updating the parameter of the one or more of the target second classifier ~~and/or~~ the primary classifier based on the one of the positive feedback or the negative feedback.

67.- The method according to claim 2, further comprising:

after the performing the classification prediction on the feature data based on the target second classifier, updating the center point of the target second classifier based on the data vector of the feature data.

78.- The method according to claim 67, wherein the updating the center point of the target second classifier based on the data vector of the feature data uses an algorithm:

$$P_{t+1} = P_t + \frac{x_t - P_t}{n_i}, n_{i+1} = n_i + 1,$$

wherein P_{t+1} indicates the center point of the target second classifier after the updating; P_t indicates the center point of the target second classifier before the updating; x_t indicates the data vector; n_i indicates an amount of data allocated to the target second classifier before the updating; and n_{i+1} indicates an amount of data of the target second classifier after the updating.

89.- The method of claim 1, further comprising forming the feature data by combining a feature of the entity and a feature of the user.

910.- A device, comprising:

a first classification unit, configured to perform classification prediction on a feature data based on a primary classifier of a multi-classifier to obtain a first prediction data, the feature data related to an entity;

a search unit, configured to ~~obtain~~select a target sub-classifier, ~~based on the feature data,~~ from a plurality of sub-classifiers of the multi-classifier by comparing the feature data with a data distribution of each of the plurality of sub-classifiers, a similarity between a data distribution of the target sub-classifier and the feature data being highest among the plurality of sub-classifiers, a data distribution of a sub-classifier of the plurality of sub-classifiers being one or more of a

distribution of data received and classified by the sub-classifier or a distribution of sample data used to train the sub-classifier, and having one or more of a center point or a Gaussian mixture model parameter;

a second classification unit, configured to perform classification prediction on the feature data based on the target sub-classifier to obtain a second prediction data;

a combining unit, configured to combine the first prediction data and the second prediction data based on an algorithm to obtain a third prediction data; and

a recommending unit, configured to recommend the to-be-recommended entity to a user based on the third prediction data.

101.- The device according to claim 910, wherein the search unit is configured to:

determine that each of the plurality of sub-classifiers has a center point of data distribution; and

select a sub-classifier whose center point is closest to a data vector of the feature data among the plurality of sub-classifiers as the target sub-classifier.

112.- The device according to claim 910, wherein the search unit is configured to:

determine that each of the plurality of sub-classifiers has the Gaussian mixture model with a parameter in data distribution ~~parameter~~; and

select a sub-classifier whose ~~data distribution~~ Gaussian mixture model parameter has a highest similarity with that of the feature data among the plurality of sub-classifiers as the target sub-classifier.

~~1243~~. - The device according to claim ~~940~~, further comprising an updating unit configured to:

after the to-be-recommended entity is recommended to the user, detect whether the user selects the to-be-recommended entity recommended to the user; and

update a parameter of one or more of the target sub-classifier ~~and/or~~ the primary classifier based on whether the user selects the to-be-recommended entity recommended to the user.

~~134~~. - The device according to claim ~~1244~~, wherein the updating unit is configured to:

in response to that the user selects the to-be-recommended entity recommended to the user, update the parameter of one or more of the target sub-classifier and the primary classifier based on positive feedback; and

in response to the user does not select the to-be-recommended entity recommended to the user, update the parameter of the one or more of the target sub-classifier and the primary classifier based on negative feedback.

~~145~~. - The device according to claim ~~104~~, further comprising:

an updating unit, configured to: after the second classification unit has performed the classification prediction on the feature data based on the target sub-classifier to obtain the second prediction data, update the center point of the target sub-classifier based on the data vector of the feature data.

156.- The device according to claim 145, wherein the updating unit is configured to update the center point of the target sub-classifier based on an equation:

$$P_{t+1} = P_t + \frac{x_t - P_t}{n_i}, n_{i+1} = n_i + 1,$$

wherein P_{t+1} indicates the center point of the target sub-classifier after the updating; P_t indicates the center point of the target sub-classifier before the updating; x_t indicates the data vector; n_i indicates an amount of data allocated to the target sub-classifier before the updating; and n_{i+1} indicates an amount of data of the target sub-classifier after the updating.

167.- A computer readable storage medium storing a computer program, which when executed by a processor, configures the processor to implement acts including:

providing identifying a multi-classifier including a first classifier and a plurality of second classifiers;

performing a first classification prediction on a feature data corresponding to an entity based on the first classifier of the multi-classifier to obtain a first prediction score;

selecting a target second classifier from the plurality of second classifiers of the multi-classifier by comparing the feature data with a data distribution of each of the plurality of second classifiers, a similarity between a data distribution of the target second classifier and the feature data being highest among the plurality of second classifiers, a data distribution of a second classifier of the plurality of second classifiers being one or more of a distribution of data received and classified by the second classifier or a distribution of sample data used to train the second classifier, and having one or more of a center point or a Gaussian mixture model parameter;

performing a second classification prediction on the feature data based on the target second classifier of the multi-classifier to obtain a second prediction score;

combining the first prediction score and the second prediction score to obtain a third prediction score; and

recommending a to-be-recommendedthe entity to a user based on the third prediction score.

~~18. — The computer readable storage medium of claim 17, wherein the multi-classifier includes a plurality of classifiers each different from the first classifier, and the second classifier is selected from the plurality of classifiers based on the feature data.~~

~~19. —~~ 17. An electronic device, the electronic device comprising one or more processor and a memory storing one or more programs, which when executed by the one or more processors, configures the one or more processors to perform acts including:

forming a feature data including a first feature of an entity and a second feature of a user;

performing classification prediction~~classifying on~~ the feature data using a first classifier to obtain a first prediction data;

selecting a second classifier, ~~based on the feature data,~~ among a plurality of classifiers that are different from the first classifier by comparing the feature data with a data distribution of each of the plurality of classifiers, a similarity between a data distribution of the selected second classifier and the feature data being highest among the plurality of classifiers, a data distribution of a classifier of the plurality of classifiers being one or more of a distribution of data received and classified by the classifier or a distribution of sample data used to train the classifier, and having one or more of a center point or a Gaussian mixture model parameter;

performing classification prediction ~~onying~~ the feature data using the second classifier to obtain a second prediction data;

combining the first prediction data and the second prediction data to obtain a third prediction data; and

determining a match between the entity and the user based on the third prediction data.

-18. The computer readable storage medium of claim 16, wherein the acts further comprise:

after the recommending the to-be-recommended entity to the user, detecting a response of the user to the recommending the to-be-recommended entity; and

updating a parameter of one or more of the target second classifier or the first classifier based on the response of the user.

1920. The electronic device of claim 179, wherein the ~~selecting the~~ second classifier ~~is randomly selected from~~includes:

in response to determining that each of the plurality of classifiers has a center point of data distribution, selecting a classifier whose center point is closest to a data vector of the feature data among the plurality of classifiers as a second classifier; and

in response to determine that each of the plurality of classifiers has a Gaussian mixture model parameter in data distribution, selecting a classifier whose Gaussian mixture model parameter has a highest similarity with that of the feature data among the plurality of classifiers as a second classifier.