CLAIMS

1. A product recommendation method, applied on a server comprising a processor, and the method comprising:

determining, by the processor, a target product potential expectation value and a target gradient value of a target user, wherein the target product potential expectation value indicates a favorite comprehensive value of the target user to a plurality of products, and the target gradient value represents a change trend of a favorite degree of the target user to a target product; wherein the target product potential expectation value is obtained by a second calculation model according to a weight value of each of the plurality of products and a target penalty factor of each of the plurality of products; the second calculation model is represented as $UP = \sum_{i \in \mathrm{R}} Item_i * C_i$, where UP is the target product potential expectation value, $\mathrm{Item_i}$ represents a weight or proportion of a product i in a category, $\mathrm{C_i}$ represents a target penalty factor of the product i, and $\sum_{i \in R} C_i = 1$, and R represents the plurality of products; the target gradient value is calculated by a formula as follows: the target gradient value = (a change amount of the target product potential expectation value)/(a change amount of the favorite degree of the target product); the favorite degree of the target product is a target penalty factor of the target product, and the target penalty factor of the target product is calculated according to a browsing frequency corresponding to the target product;

determining, by the processor, a similar user set based on the target product potential expectation value and the target gradient value;

acquiring, by the processor,, from the similar user set, a plurality of gradient values of each user corresponding to a plurality of to-be-recommended products, and forming a similar user gradient value set by the plurality of gradient values; and

determining, by the processor, at least one recommended gradient value from the similar user gradient value set, and transmitting, by a communication interface, information of at least one to-be-recommended product corresponding to the at least one recommended gradient value to a client of the target user for display.

2. The product recommendation method of claim 1, wherein determining, by the processor, the target product potential expectation value and the target gradient value of the target user comprises:

acquiring, by the processor, historical browsing data of the target user after identifying that the target user performs a browsing operation on the target product;

determining, by the processor, a browsed product set corresponding to the target user according to the historical browsing data, and acquiring a target penalty factor of each product in the browsed product set, wherein the browsed product set comprises the target product and is composed by the plurality of products;

calculating, by the processor, the target product potential expectation value based on the target penalty factor of each product in the browsed product set; and

obtaining, by the processor, the target gradient value based on the target product potential expectation value and a first calculation model.

3. The product recommendation method of claim 2, wherein acquiring, by the processor, the target penalty factor of each product in the browsed product set comprises:

determining, by the processor, a browsing frequency corresponding to each product in the browsed product set according to the historical browsing data, and determining a total browsing frequency corresponding to the browsed product set; and

calculating, by the processor, a ratio of the browsing frequency corresponding to each product to the total browsing frequency, and determining the calculated ratio as the target penalty factor of each product.

4. The product recommendation method of claim 2, wherein obtaining, by the processor, the target gradient value based on the target product potential expectation value and the first calculation model comprises:

acquiring, by the processor, a pre-browsing product potential expectation value of the target user, and performing a subtraction operation between the target product potential expectation value and the pre-browsing product potential expectation value, to obtain a product potential expectation difference;

acquiring, by the processor, a pre-browsing penalty factor and the target penalty factor of the target product, and performing a subtraction operation between the target penalty factor and the pre-browsing penalty factor, to obtain a penalty factor difference; and

calculating, by the processor, a ratio of the product potential expectation difference to the penalty factor difference, to obtain the target gradient value of the target user.

5. The product recommendation method of claim 1, wherein determining, by the processor, the similar user set based on the target product potential expectation value and the target gradient value comprises:

determining, by the processor, a similar product potential expectation range according to the target product potential expectation value and a first preset confidence interval;

determining, by the processor, a plurality of first users based on the similar product potential expectation range, wherein product potential expectation values of the plurality of first users are within the similar product potential expectation range;

determining, by the processor, a similar gradient value range based on the target gradient value and a second preset confidence interval; and

determining, by the processor, a plurality of second users from the plurality of first users based on the similar gradient value range, and determining the plurality of second users as the similar user set, wherein gradient values of the plurality of second users for the target product are within the similar gradient value range.

6. The product recommendation method of any one of claims 1 to 5, wherein determining, by the processor, the at least one recommended gradient value from the similar user gradient value set comprises:

sorting, by the processor, a plurality of gradient values in the similar user gradient value set in order of values of the plurality of gradient values; and

determining, by the processor, the at least one recommended gradient value according to a result of the sorting.

7. A product recommendation apparatus, applied on a server, and the apparatus comprising:

an acquisition unit, configured to determine a target product potential expectation value and a target gradient value of a target user, wherein the target product potential expectation value indicates a favorite comprehensive value of the target user to a plurality of products, and the target gradient value represents a change trend of a favorite degree of the target user to a target product; wherein the target product potential expectation value is obtained by a second calculation model according to a weight value of each of the plurality of products and a target penalty factor of each of the plurality of products; the second calculation

model is represented as $UP = \sum_{i \in R} Item_i * C_i$, where UP is the target product potential expectation value, $Item_i$ represents a weight or proportion of a product i in a category, C_i represents a target penalty factor of the product i, and $\sum_{i \in R} C_i = 1$, and R represents the plurality of products; the target gradient value is calculated by a formula as follows: the target gradient value = (a change amount of the target product potential expectation value)/(a change amount of the favorite degree of the target product); the favorite degree of the target product is a target penalty factor of the target product, and the target penalty factor of the target product is calculated according to a browsing frequency corresponding to the target product;

a screening unit, configured to determine a similar user set based on the target product potential expectation value and the target gradient value;

a collection unit, configured to acquire, from the similar user set, a plurality of gradient values of each user corresponding to a plurality of to-be-recommended products, and form a similar user gradient value set by the plurality of gradient values; and

a recommendation unit, configured to determine at least one recommended gradient value from the similar user gradient value set, and transmitting, by a communication interface, information of at least one to-be-recommended product corresponding to the at least one recommended gradient value to a client the target user for display.

8. A product recommendation apparatus, comprising a memory and a processor,

wherein the memory is configured to store a computer program executable by the processor, and

the processor is configured to execute steps of the method of any one of claims 1 to 6 when running the computer program.

9. A computer storage medium, having stored thereon a product recommendation program, wherein the product recommendation program, when executed by at least one processor, implements steps of the method of any one of claims 1 to 6.

10. A product recommendation system, comprising at least the product recommendation apparatus of claim 7 or 8.