

METHOD AND APPARATUS FOR IDENTITY INFORMATION VERIFICATION

Technical Field

The present application relates to the field of information verification technologies, and, in particular, to an identity information verification method and an identity information verification apparatus.

Background

With the maturing and promotion of network technologies and the development of device hardware technologies, network user groups have grown significantly. Moreover, network users browse network information in various manners.

Generally, by collecting behavioral data of some users and analyzing the behavioral data, a network platform provides services for the users more precisely, for example, pushing news or some other specific activities.

Currently, behavioral data of a user is generally recorded by using the Cookie technology. Specifically, when the user visits a website, the website may permanently implant a piece of information containing a universally unique identifier (UUID) into a current browser Cookie of the user, and associate all behaviors of the user by using the information.

However, many security tools and browsers can disable the Cookie function. When the Cookie function is disabled, the website cannot identify the user, and therefore can hardly collect behavioral data of the user.

Therefore, a technical problem to be urgently solved by persons skilled in the art is how to provide an identity information verification mechanism to improve a success rate of identification of the identity information.

Summary of the Invention

A technical problem to be solved by embodiments of the present application is to provide an identity information verification mechanism to improve a success rate of identification of the identity information.

Correspondingly, the embodiments of the present application further provide an identity information verification apparatus, to guarantee the implementation and application of the foregoing method.

To solve the foregoing problem, an embodiment of the present application discloses an identity information verification method, including:

receiving image information sent by a client terminal and rendered by the client terminal;

extracting characteristic information from the image information;

matching the characteristic information with pre-collected characteristic judgment information, the characteristic judgment information having associated identity information; and

judging, when the matching succeeds, that the client terminal fits the identity information.

Preferably, the image information is a vector graph.

Preferably, the image information is obtained by the client terminal through rendering according to scalable vector graphics.

Preferably, the step of matching the characteristic information with pre-collected characteristic judgment information includes:

calculating a similarity degree between the characteristic information and the pre-collected characteristic judgment information;

judging whether the similarity degree is greater than a preset similarity degree

threshold;

if yes, judging that the matching between the characteristic information and the pre-collected characteristic judgment information succeeds; and

if no, judging that the matching between the characteristic information and the pre-collected characteristic judgment information fails.

Preferably, the characteristic information includes at least one of shape characteristic information and color characteristic information;

the characteristic judgment information includes at least one of shape characteristic judgment information and color characteristic judgment information; and

the step of calculating a similarity degree between the characteristic information and the pre-collected characteristic judgment information includes:

calculating a similarity degree between at least one of the shape characteristic information and the color characteristic information and at least one of the corresponding shape characteristic judgment information and color characteristic judgment information.

Preferably, the method further includes:

configuring new identity information for the client terminal when the matching fails; and

establishing an association between the characteristic information and the new identity information.

An embodiment of the present application further discloses an identity information verification apparatus, including:

an image information receiving module configured to receive image information sent by a client terminal and rendered by the client terminal;

a characteristic information extraction module configured to extract characteristic information from the image information;

a characteristic information judgment module configured to match the characteristic information with pre-collected characteristic judgment information, the characteristic judgment information having associated identity information; and

an identity information judgment module configured to judge, when the matching succeeds, that the client terminal fits the identity information.

Preferably, the image information is a vector graph.

Preferably, the image information is obtained by the client terminal through rendering according to scalable vector graphics.

Preferably, the characteristic information judgment module includes:

a similarity degree calculation sub-module configured to calculate a similarity degree between the characteristic information and the pre-collected characteristic judgment information;

a preset judgment sub-module configured to judge whether the similarity degree is greater than a preset similarity degree threshold; if yes, call a first judgment sub-module; if no, call a second judgment sub-module;

the first judgment sub-module configured to judge that the matching between the characteristic information and the pre-collected characteristic judgment information succeeds; and

the second judgment sub-module configured to judge that the matching between the characteristic information and the pre-collected characteristic judgment information fails.

Preferably, the characteristic information includes at least one of shape characteristic information and color characteristic information;

the characteristic judgment information includes at least one of shape characteristic judgment information and color characteristic judgment information; and

the similarity degree calculation sub-module includes:

a characteristic similarity degree calculation sub-module configured to calculate a similarity degree between at least one of the shape characteristic information and the color characteristic information and at least one of the corresponding shape characteristic judgment information and color characteristic judgment information.

Preferably, the apparatus further includes:

an identity information configuration module configured to configure new identity information for the client terminal when the matching fails; and

an association establishment module configured to establish an association between the characteristic information and the new identity information.

Compared with the background art, the embodiments of the present application have the following advantages:

The embodiments of the present application extract characteristic information from image information rendered by a client terminal, match the characteristic information with pre-collected characteristic judgment information, and judge, when the matching succeeds, that the client terminal fits identity information associated with the characteristic judgment information; a user is identified on the basis of different client terminal environments and the uniqueness of the image information rendered by the client terminal, thus ensuring the accuracy of identifying user identity information, and meanwhile avoiding the problem that the user identity information cannot be identified because the client terminal disables the Cookie, thereby improving a success rate of identification of the identity information.

Brief Description of the Drawings

FIG. 1 is a step flowchart of an embodiment of an identity information verification method according to the present application;

FIG. 2 is a diagram of an example of image information obtained through rendering

according to Scalable Vector Graphics (SVG) according to the present application; and

FIG. 3 is a structural block diagram of an embodiment of an identity information verification apparatus according to the present application.

Detailed Description

To make the foregoing objectives, features, and advantages of the present application clearer and easier to understand, the present application is further described in detail below with reference to the accompanying drawings and specific implementations.

Refer to FIG. 1, which is a step flowchart of an embodiment of an identity information verification method according to the present application. The method may include the following steps:

Step 101: receiving image information sent by a client terminal and rendered by the client terminal.

In a specific implementation, a user may send a webpage loading request to a webpage server by means of a client terminal such as a browser or an application with a built-in browser component.

For example, the user may request loading of a webpage by clicking a link, or request loading of a webpage by entering a URL in an address bar, or the like. When the user clicks a link, it is equivalent to reception of a webpage loading request; likewise, when the user enters a URL in the address bar and clicks an OK button or presses an Enter key, it is also equivalent to reception of a webpage loading request.

The webpage server performs processing after receiving the webpage loading request, and finally returns a response to the client terminal. The client terminal may receive a webpage document from the webpage server, and the client terminal may parse and display the webpage document, where the webpage document may include webpage resources such

as text information and image information.

In a specific implementation, the image information may be a vector graph.

The vector graph is a graphic drawn according to geometric characteristics, a vector may be a point or a line, and the vector graph can only be generated relying on applications (client terminals such as a browser); the file occupies a relatively small internal space because the image file of this type includes independent separate images that can be freely recombined without any limitation. A feature thereof is that an image will not be distorted after being enlarged, which has nothing to do with resolution.

In a preferred example of this embodiment of the present application, the image information may be obtained by the client terminal through rendering according to Scalable Vector Graphics (SVG).

The SVG is a label of HTML5 (the fifth significant modification of the HyperText Markup Language), specifically may refer to a language defined by using an Extensible Markup Language (XML), and is used to describe two-dimensional vectors and vector/grid graphics.

The SVG provides 3 types of graphic objects: vector graphic shape (such as a path formed by a straight line and a curve), image, and text.

An example of the SVG may be shown as follows:

```
<svg version=" 1.1"    baseProfile="full" xmlns="http://www.w3.org/2000/svg">
  <rect width="100%" height="100%" fill="red" />
  <circle cx="150" cy="100" r="80" fill="green" />
  <text x="150"y="125"          font-size="60"          text-anchor="middle"
fill="white">SVG</text>
</svg>
```

Image information rendered by the client terminal according to the above example of

the SVG is as shown in FIG. 2.

From a macroscopic perspective, different client terminals use different rendering engines (for example, rendering engines with a Trident kernel, a Gecko kernel, a Webkit kernel, and a Presto kernel are different), render options set in the rendering engines may also be different, and graphic hardware required for rendering (for example, a Central Processing Unit (CPU), a Graphic Processing Unit (GPU), and the like) may also be different; all these factors would affect image information rendered by the client terminals.

From the perspective of pixels, operating systems to which the client terminals belong use different settings (for example, render hardware and software settings used by the systems) and algorithms to perform anti-aliasing and subpixel rendering operations respectively; all these factors would also affect the image information rendered by the client terminals.

Generally, it is almost impossible that terminal devices to which different client terminals belong have identical configurations, and for rendering of the image information, processing on the operating system and client terminal level would be involved. Therefore, different client terminals may render different image information. If the image information has a tiny characteristic change, even if the change is a small change in some pixels or the color, it can still be identified.

Certainly, the above judgment image information is merely used as an example, and during implementation of this embodiment of the present application, other image information may be set according to actual conditions, as long as the uniqueness of the rendered image information can be implemented, which is not limited in this embodiment of the present application. In addition, apart from the foregoing image information, persons skilled in the art may also use other image information according to an actual need, which is not limited in this embodiment of the present application either.

In an actual application, when obtaining the image information by means of rendering, the client terminal may send the image information to the webpage server or another sever, which is not limited in this embodiment of the present application.

Step 102: extracting characteristic information from the image information.

It should be noted that, the characteristic information may refer to information that represents image features.

In a preferred example of this embodiment of the present application, the characteristic information may include at least one of shape characteristic information and color characteristic information;

wherein, the shape characteristic information may refer to information representing an image shape feature, and the color characteristic information may refer to information representing an image color feature.

There are mainly two types of methods for representing the shape characteristic information, one is region characteristic, which is mainly specific to the whole shape region of an image; and the other is contour characteristic, which is specific to an outer boundary of an object.

Typical method for extracting the shape characteristic information include a boundary characteristic value method (an outer boundary of the image), a geometric parameter method (geometric parameterization processing of the image), a shape moment invariant method (finding a moment invariant characteristic of the image), a Fourier shape description method (Fourier transform method), and the like.

The color characteristic information may be described by using a color characteristic of the image or image region, and it has integrality.

Typical methods for extracting the color characteristic information include color histogram, color set, color moment, and the like.

Certainly, the above judgment characteristic information is merely used as an example, and during implementation of this embodiment of the present application, other characteristic information may be set according to actual conditions, which is not limited in this embodiment of the present application. In addition, apart from the foregoing characteristic information, persons skilled in the art may also use other characteristic information according to an actual need, which is not limited in this embodiment of the present application either.

Step 103: matching the characteristic information with pre-collected characteristic judgment information;

Terminal devices such as mobile phones and personal computers are generally personal belongings, and are used by users to whom they belong; most features of the client terminal and the terminal device to which it belongs are stable, and the client terminal can render image information with uniqueness. Therefore, in this embodiment of the present application, the user may be identified by using the image information.

When this embodiment of the present application is applied, characteristic information of the image information may be collected in advance, a user identifier is configured for the client terminal, and an association between the characteristic information and the user identifier is established and stored in a database, for example, a relational database MySQL or the like. The characteristic information may be set as characteristic judgment information; in this case, the characteristic judgment information may have associated identity information, for use in subsequent user identifier query and identification, and if necessary, query may be performed according to a query statement provided by the database.

The user identifier may refer to a unique identifier of the user, for example, a user Identity (ID), or the like.

In a preferred example of this embodiment of the present application, the

characteristic judgment information may include at least one of shape characteristic judgment information and color characteristic judgment information.

Specifically, if the pre-collected characteristic information includes the shape characteristic information of the image information, the shape characteristic information associated with the user identifier may be set as the shape judgment characteristic information; if the pre-collected characteristic information includes the color characteristic information of the image information, the shape characteristic information associated with the user identifier may be set as the color judgment characteristic information.

In a preferred embodiment of the present application, step 103 may include the following substeps:

Substep S11: calculating a similarity degree between the characteristic information and the pre-collected characteristic judgment information;

In specific implementation, the similarity degree between the characteristic information and the pre-collected characteristic judgment information may be calculated by means of a Bhattacharyya distance, a chi-square distance, a cosine distance, an Euclidean distance, histogram intersection, a normalized Euclidean distance, normalized histogram intersection, and the like, which are not limited in this embodiment of the present application.

In a preferred example of this embodiment of the present application, substep S11 may include the following substep:

Substep S111: calculating a similarity degree between at least one of the shape characteristic information and the color characteristic information and at least one of the corresponding shape characteristic judgment information and color characteristic judgment information.

In this example, if the extracted characteristic information includes shape characteristic information, a similarity degree between the shape characteristic judgment

information may be calculated; if the extracted characteristic information includes color characteristic information, a similarity degree between the color characteristic judgment information may be calculated.

Substep S12: judging whether the similarity degree is greater than a preset similarity degree threshold; if yes, executing substep S13; if no, executing substep S14;

Substep S13: judging that the matching between the characteristic information and the pre-collected characteristic judgment information succeeds.

Substep S14: judging that the matching between the characteristic information and the pre-collected characteristic judgment information fails.

In this embodiment of the present application, a certain gray value may be allowed according to an actual need; in other words, if the characteristic information of the image information satisfies a probability in a particular interval, an error may be allowed.

In this case, if most characteristics of the client terminal and the terminal device to which it belongs are stable, and there are merely several differences due to user settings, fitting to the same user identifier is also allowed.

Specifically, a similarity degree threshold (such as 80%) may be preset based on training of a large volume of data, and if the similarity degree between the characteristic information and the characteristic judgment information is greater than the similarity degree threshold, it may indicate that the characteristic information matches the characteristic judgment information; otherwise, it may indicate that the characteristic information does not match the characteristic judgment information.

Step 104: judging, when the matching succeeds, that the client terminal fits the identity information.

When the matching succeeds, it may be considered that the client terminal rendering the image information to which the characteristic information belongs and the client terminal

rendering the image information to which the characteristic judgment information belongs are the same client terminal, the verification of the identity information is passed, and it can be considered that the current client terminal fits the preconfigured identity information.

After the identity information fitting the current client terminal is identified, corresponding business processing may be performed.

For example, behavior information such as webpage browsing and video watching of the user may be recorded, to analyze behavior characteristics of the user.

For another example, information conforming to behavior characteristics of the user, such as advertisements and news, may be pushed to the user.

Certainly, this embodiment of the present application may further carry out other business processing, which is not limited in this embodiment of the present application.

This embodiment of the present application extracts characteristic information from image information rendered by a client terminal, matches the characteristic information with pre-collected characteristic judgment information, and judges, when the matching succeeds, that the client terminal fits identity information associated with the characteristic judgment information; a user is identified on the basis of different client terminal environments and the uniqueness of the image information rendered by the client terminal, thus ensuring the accuracy of identifying user identity information, and meanwhile avoiding the problem that the user identity information cannot be identified because the client terminal disables the Cookie, thereby improving a success rate of identification of the identity information.

In a preferred embodiment of the present application, the following steps may further be included:

Step 105: configuring new identity information for the client terminal when the matching fails;

Step 106: establishing an association between the characteristic information and the

new identity information.

When the matching between the characteristic information and the pre-collected characteristic judgment information fails, it can be considered that the database does not store information of the current client terminal; therefore, a user identifier is configured for the client terminal, and an association between the characteristic information and the user identifier is established and stored in the database, where the characteristic information may be set as the characteristic judgment information, for use in subsequent user identifier query and identification.

It should be noted that, for ease of description, the method embodiment is expressed as a series of action combinations. However, persons skilled in the art should understand that the embodiments of the present application are not limited to the described order of actions, because some steps may be performed in other order or simultaneously according to the embodiments of the present application. Secondly, persons skilled in the art should also understand that the embodiments described in the specification are all preferred embodiments, and the involved actions are not mandatory to the embodiments of the present application.

Refer to FIG. 3, which is a structural block diagram of an embodiment of an identity information verification apparatus according to the present application, and the apparatus may specifically include the following modules:

an image information receiving module 301 configured to receive image information sent by a client terminal and rendered by the client terminal;

a characteristic information extraction module 302 configured to extract characteristic information from the image information;

a characteristic information judgment module 303 configured to match the characteristic information with pre-collected characteristic judgment information, the characteristic judgment information having associated identity information; and

an identity information judgment module 304 configured to judge, when the matching succeeds, that the client terminal fits the identity information.

In specific implementation, the image information may be a vector graph.

In a preferred example of this embodiment of the present application, the image information may be obtained by the client terminal through rendering according to scalable vector graphics.

In a preferred embodiment of the present application, the characteristic information judgment module 303 may include the following sub-modules:

- a similarity degree calculation sub-module configured to calculate a similarity degree between the characteristic information and the pre-collected characteristic judgment information;

- a preset judgment sub-module configured to judge whether the similarity degree is greater than a preset similarity degree threshold; if yes, call a first judgment sub-module; if no, call a second judgment sub-module;

- the first judgment sub-module configured to judge that the matching between the characteristic information and the pre-collected characteristic judgment information succeeds; and

- the second judgment sub-module configured to judge that the matching between the characteristic information and the pre-collected characteristic judgment information fails.

In a preferred example of this embodiment of the present application, the characteristic information includes at least one of shape characteristic information and color characteristic information;

the characteristic judgment information includes at least one of shape characteristic judgment information and color characteristic judgment information; and

the similarity degree calculation sub-module may include the following sub-modules:

a characteristic similarity degree calculation sub-module configured to calculate a similarity degree between at least one of the shape characteristic information and the color characteristic information and at least one of the corresponding shape characteristic judgment information and color characteristic judgment information.

In a preferred embodiment of the present application, the apparatus may further include the following modules:

an identity information configuration module configured to configure new identity information for the client terminal when the matching fails; and

an association establishment module configured to establish an association between the characteristic information and the new identity information.

The apparatus embodiment is described in a relatively simple way because it is basically similar to the method embodiment; for related parts, refer to partial description in the method embodiment.

Various embodiments in the specification are described in a progressive manner. In each embodiment, the portion that is different from other embodiments is focused on and described. The same or similar parts between the embodiments may be referenced to one another.

Persons skilled in the art should understand that, the embodiments of the present application may be provided as a method, an apparatus, or a computer program product. Therefore, the embodiments of the present application may be implemented in the form of a completely hardware embodiment, a completely software embodiment, or an embodiment combining software and hardware. Moreover, the embodiments of the present application may employ the form of a computer program product implemented on one or more computer usable storage media (including, but not limited to, a magnetic disk memory, a CD-ROM, an optical memory, and the like) including computer usable program codes.

In a typical configuration, the computer device includes one or more Central Processing Units (CPUs), an I/O interface, a network interface, and a memory. The memory may include computer readable media such as a volatile memory, a Random Access Memory (RAM), and/or a non-volatile memory, e.g., Read-Only Memory (ROM) or flash RAM, and so on. The memory is an example of a computer readable medium. Computer readable media include permanent, non-permanent, mobile and non-mobile media, which can implement information storage through any method or technology. The information may be computer readable instructions, data structures, program modules or other data. Examples of storage media of computers include, but are not limited to, a Phase-change RAM (PRAM), a Static RAM (SRAM), a Dynamic RAM (DRAM), other types of Random Access Memories (RAMs), a Read-Only Memory (ROM), an Electrically Erasable Programmable Read-Only Memory (EEPROM), a flash memory or other memory technologies, a Compact Disk Read-Only Memory (CD-ROM), a Digital Versatile Disc (DVD) or other optical memories, a cassette, a cassette and disk memory or other magnetic memory devices or any other non-transmission media, which can be used for storing information accessible to the computation device. According to the definitions herein, the computer readable media exclude transitory computer readable medium (transitory media), such as modulated data signals and carriers.

The embodiments of present application are described with reference to flowcharts and/or block diagrams of the method, terminal device (system), and computer program product according to the embodiments of the present application. It should be understood that computer program instructions may be used to implement each process and/or block in the flowcharts and/or block diagrams as well as a combination of a process and/or a block in the flowcharts and/or the block diagrams. These computer program instructions may be provided for a general-purpose computer, a special-purpose computer, an embedded processor, or a

processor of any other data programmable processing terminal device to generate a machine, so that the instructions executed by a computer or a processor of any other programmable data processing terminal device generate an apparatus for implementing a function specified in one or more processes in the flowcharts and/or in one or more blocks in the block diagrams.

These computer program instructions may also be stored in a computer readable memory that can instruct the computer or any other programmable data processing terminal device to work in a particular manner, such that the instructions stored in the computer readable memory generate an article of manufacture that includes an instruction apparatus. The instruction apparatus implements a function specified in one or more processes in the flowcharts and/or in one or more blocks in the block diagrams.

These computer program instructions may also be loaded onto a computer or another programmable data processing terminal device, such that a series of operating steps are performed on the computer or another programmable terminal device, thereby generating computer-implemented processing. Therefore, the instructions executed on the computer or another programmable terminal device provide steps for implementing a function specified in one or more processes in the flowcharts and/or in one or more blocks in the block diagrams.

Although the preferred embodiments of the embodiments of the present application have been described above, once knowing the basic creative concept, persons skilled in the art may make other alterations and modifications to these embodiments. Therefore, the appended claims are intended to be interpreted as including the preferred embodiments and all alterations and modifications that fall in the scope of the embodiments of the present application.

Finally, it should be further noted that, relational terms such as "first" and "second" herein are merely used for distinguishing one entity or operation from another entity or

operation, but do not necessarily require or imply the presence of any such actual relation or sequence between these entities or operations. Moreover, the terms "include", "comprise", or any other variants thereof are intended to cover a non-exclusive inclusion, such that a process, a method, an article, or a terminal device that includes a series of elements not only includes such elements but also includes other elements not specified expressly, or further includes inherent elements of the process, method, article, or terminal device. In the absence of more restrictions, an element limited by "include a/an..." does not exclude other same elements existing in the process, method, article, or terminal device that includes the element.

An identity information verification method and an identity information verification apparatus provided by the present application are described in detail above. Specific examples are used herein to illustrate the principle and implementations of the present application, and the above description of the embodiments is merely for helping understand the method of the present application and the core idea thereof; meanwhile, for persons of ordinary skills in the art, changes may be made to the specific implementations and application scopes according to the idea of the present application. In conclusion, the content of the specification should not be construed as a limitation to the present application.

Claims

1. An identity information verification method comprising:
receiving image information sent by a client terminal and rendered by the client terminal;
extracting characteristic information from the image information;
matching the characteristic information with pre-collected characteristic judgment information, the characteristic judgment information having associated identity information;
and
judging, when the matching succeeds, that the client terminal fits the identity information.
2. The method of claim 1, wherein the image information is a vector graph.
3. The method of claim 2, wherein the image information is obtained by the client terminal through rendering according to scalable vector graphics.
4. The method of claim 1, 2, or 3, wherein the step of matching the characteristic information with pre-collected characteristic judgment information comprises:
calculating a similarity degree between the characteristic information and the pre-collected characteristic judgment information; and
judging whether the similarity degree is greater than a preset similarity degree threshold;
if yes, judging that the matching between the characteristic information and the pre-collected characteristic judgment information succeeds; or
if no, judging that the matching between the characteristic information and the

pre-collected characteristic judgment information fails.

5. The method of claim 4, wherein,

the characteristic information comprises at least one of shape characteristic information and color characteristic information;

the characteristic judgment information comprises at least one of shape characteristic judgment information and color characteristic judgment information; and

the step of calculating a similarity degree between the characteristic information and the pre-collected characteristic judgment information comprises:

calculating a similarity degree between at least one of the shape characteristic information and the color characteristic information and at least one of the corresponding shape characteristic judgment information and color characteristic judgment information.

6. The method of claim 1, 2, 3, or 5, further comprising:

configuring new identity information for the client terminal when the matching fails;
and

establishing an association between the characteristic information and the new identity information.

7. An identity information verification apparatus comprising:

an image information receiving module configured to receive image information sent by a client terminal and rendered by the client terminal;

a characteristic information extraction module configured to extract characteristic information from the image information;

a characteristic information judgment module configured to match the characteristic

information with pre-collected characteristic judgment information, the characteristic judgment information having associated identity information; and

an identity information judgment module configured to judge, when the matching succeeds, that the client terminal fits the identity information.

8. The apparatus of claim 7, wherein the image information is a vector graph.

9. The apparatus of claim 8, wherein the image information is obtained by the client terminal through rendering according to scalable vector graphics.

10. The apparatus of claim 7, 8, or 9, wherein the characteristic information judgment module comprises:

a similarity degree calculation sub-module configured to calculate a similarity degree between the characteristic information and the pre-collected characteristic judgment information;

a preset judgment sub-module configured to judge whether the similarity degree is greater than a preset similarity degree threshold; if yes, call a first judgment sub-module; if no, call a second judgment sub-module;

the first judgment sub-module configured to judge that the matching between the characteristic information and the pre-collected characteristic judgment information succeeds; and

the second judgment sub-module configured to judge that the matching between the characteristic information and the pre-collected characteristic judgment information fails.

11. The apparatus of claim 10, wherein,

the characteristic information comprises at least one of shape characteristic information and color characteristic information;

the characteristic judgment information comprises at least one of shape characteristic judgment information and color characteristic judgment information; and

the similarity degree calculation sub-module comprises:

a characteristic similarity degree calculation sub-module configured to calculate a similarity degree between at least one of the shape characteristic information and the color characteristic information and at least one of the corresponding shape characteristic judgment information and color characteristic judgment information.

12. The apparatus of claim 7, 8, 9, or 11, further comprising:

an identity information configuration module configured to configure new identity information for the client terminal when the matching fails; and

an association establishment module configured to establish an association between the characteristic information and the new identity information.