

SPECIFICATION

CONTENT MATCHING SYSTEM AND CONTENT MATCHING METHOD

TECHNICAL FIELD

5 [0001]

The present invention relates to a content matching system and a content matching method, and particularly to a content matching system and a content matching method suitable for displaying a content in which a demander is interested, and promoting sales in a booth for exhibiting a commodity or a service.

10

BACKGROUND ART

[0002]

15 In event booths and street advertisements, a method of installing a large display and inquiring about commodities or services to event participants and passersby is generally performed. At this time, it is important for event exhibitors and advertising exhibitors how to attract the attention of customers, provide efficient information, and advertise.

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[0003]

For example, Patent Document 1 discloses an advertisement system that analyzes an image of a potential customer, determines the degree of interest, and controls the content of the advertisement based on the degree of interest. Patent

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Document 2 discloses a display device that analyzes the clothes worn by a commodity purchaser of a vending machine from the captured image and displays commodity information or advertisement information corresponding to the result of the analysis.

CITATION LIST

PATENT DOCUMENT

[0004]

10 Patent Document 1: JP 2013-50945 A

Patent Document 2: JP 2018-84775 A

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

15 [0005]

Patent Document 1 in the related art discloses a technique for determining the degree of interest of a customer based on the line of sight of the customer and a body posture direction. Patent Document 2 discloses a technique for providing commodity information or advertisement information corresponding to the customer attribute of the captured image.

[0006]

However, the above techniques are not enough as an indicator to measure the interest of the people in an event booth.

[0007]

In event booths and street advertisements, stopping can be used as an important indicator of interest. Furthermore, it is necessary to increase the degree of interest of people who enter in the booth is even higher, and to select the display details of the content in consideration of such a customer. Classification by gender and age groups as customer attributes is also an important factor in content display. In the event booth, factors such as the exhibition place or the advertising place, and the time are also required to be considered when providing information and advertising. In the above related art, a technique for displaying an appropriate content to a person who may be a potential customer in consideration of such a viewpoint is not provided.

15 [0008]

An object of the present invention is to provide a content matching system and a content matching method suitable for displaying a content in which a demander is interested in accordance with customer attributes or places, and time, and promoting sales in a booth for exhibiting a commodity or a service.

SOLUTIONS TO PROBLEMS

[0009]

25 According to a configuration of a content matching system

in the present invention, preferably, there is provided a content matching system for matching content details, a content provision place, and provision date/time.

The content matching system includes means for storing
5 pieces of position information of a plurality of booths
connected to a network and attributes thereof, as booth
installation places, in association with each other, sensing
means for capturing information on surrounding of the booth,
means for analyzing a degree of customer attraction of the
10 booth and a degree of attention from a passerby based on a
sensing result, for each booth, and means for selecting a
candidate for a booth to be recommended for desired content
provision date/time received from a user, based on the
analysis result and the attributes.

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EFFECTS OF THE INVENTION

[0010]

According to the present invention, it is possible is to
provide a content matching system and a content matching
20 method suitable for displaying a content in which a demander
is interested in accordance with customer attributes or places,
and time, and promoting sales in a booth for exhibiting a
commodity or a service or a street advertisement.

25 BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Fig. 1 is a diagram illustrating a system configuration of a content matching system.

Fig. 2 is a functional block diagram of a management
5 server.

Fig. 3 is a diagram illustrating an example of a facility data table.

Fig. 4 is a diagram illustrating an example of a place data table.

10 Fig. 5A is a diagram (part 1) illustrating an example of an application/use status data table.

Fig. 5B is a diagram (part 2) illustrating an example of the application/use status data table.

Fig. 6 is a diagram illustrating an example of a passerby
15 attribute table.

Fig. 7 is a diagram illustrating an example of a matching data table.

Fig. 8 is a flowchart illustrating an overall process of the content matching system.

20 Fig. 9 is a flowchart illustrating sensing of a passerby and an attribute analysis process.

Fig. 10 is a flowchart illustrating a customer-attracting effect analysis process.

Fig. 11A is a flowchart illustrating a matching analysis
25 process (pull type).

Fig. 11B is a flowchart illustrating a matching analysis process (push type).

Fig. 12 is a functional block diagram of a management server.

5 Fig. 13 is a functional block diagram of a control terminal.

MODE FOR CARRYING OUT THE INVENTION

[0012]

10 Hereinafter, embodiments of the present invention will be described with reference to Figs. 1 to 13.

[Embodiment 1]

[0013]

15 Embodiment 1 of the present invention will be described below with reference to Figs. 1 to 11B.

First, a configuration of a content matching system according to Embodiment 1 will be described with reference to Figs. 1 and 2.

[0014]

20 A system configuration of the content matching system according to Embodiment 1 will be described with reference to Fig. 1.

As illustrated in Fig. 1, the content matching system has a configuration in which a management server 100 and a control
25 terminal 200 installed in each booth 50 are connected to each

other by a network 5. The network 5 may be a local area network (LAN) or a global network such as the Internet. The booth 50 is a section for providing information on commodities and services installed at an exhibition event and the like to
5 appeal to customers. In the present embodiment, it is assumed that the booth 50 has a system configuration in which an exhibitor authenticates a user and the authenticated person can use the booth.

[0015]

10 The management server 100 is a server that analyzes the information collected by the control terminal 200 and transmits the matched content to the control terminal 200 in each booth. The control terminal 200 is an information processing apparatus that collects information on people
15 inside and outside the booth, uploads the collected information to the management server 100, and displays the content transmitted from the management server 100 on a display device such as a display.

[0016]

20 The management server 100 can be realized by a general server device having the hardware configuration illustrated in Fig. 1.

[0017]

The management server 100 has a form in which a processor
25 (Central Processing Unit) 101, a main memory 102, a

communication I/F 103, an input/output I/F 104, and an HDD 110 are coupled to each other by a bus.

[0018]

The processor 101 controls each unit of the management
5 server 100 and loads a necessary program into the main memory 102 to execute the program.

[0019]

The main memory 102 is generally configured by a volatile
memory such as a RAM, and stores a program executed by the
10 processor 101 and data to be used as a reference.

[0020]

The communication I/F 103 is an interface for a
connection to the network 5.

[0021]

15 The input/output I/F 104 is an interface for connecting
an input/output device 120 or a display device 130. As the
input/output device 120, for example, a keyboard, a mouse such
as a pointing device, a printer, or the like is connected.

[0022]

20 The HDD 110 has a large storage capacity, and stores a
program and necessary data for executing the present
embodiment.

[0023]

The control terminal 200 can be realized by a general
25 information processing apparatus having the hardware

configuration illustrated in Fig. 1.

[0024]

The control terminal 200 has a form in which a processor 201, a main memory 202, a communication I/F 203, an input/output I/F 204, and an HDD 210 are coupled to each other by a bus. The function of each unit is similar to the corresponding component of the service device.

[0025]

A user authentication device 220, an internal sensing device 230, an external sensing device 240, and a content display device 250 are connected to the input/output I/F 204 of the control terminal 200.

[0026]

The user authentication device 220 is a device that authenticates the exhibitor for using this booth. The user authentication device may be a device of biometric authentication such as a fingerprint or face authentication, or be a device for performing password authentication. The internal sensing device 230 is a device that collects information on a person inside the booth 50, and is, for example, a video camera installed inside the booth 50. On the contrary, the external sensing device 240 is a device that collects information on a person outside the booth 50, and is, for example, a video camera installed outside the booth 50. The content display device 250 is, for example, a large-screen

display device that displays contents related to a commodity or service.

[0027]

Next, a functional configuration of the management server and data to be saved will be described with reference to Fig. 2.

As the functional configuration, as illustrated in Fig. 2, the management server 100 includes a reservation management unit 301, an entrance/exit management unit 302, a customer-attracting effect analysis unit 303, a matching analysis unit 304, an image recognition/attribute analysis unit 305, a user authentication unit 306, a sensing-device I/F unit 307, and a content display-device I/F unit 308.

[0028]

The reservation management unit 301 is a functional unit that manages the reservation of a user in each booth and performs appropriate assignment to the user. The entrance/exit management unit 302 is a functional unit that appropriately manages the entry and exit of the booth 50 so as to permit the entry and exit of the authenticated user and not to permit the entry and exit of the unauthenticated person. The customer-attracting effect analysis unit 303 is a functional unit that performs a customer-attracting effect analysis process of performing an analysis of an effect of attracting customers by contents. The matching analysis unit 304 is a functional unit

that performs a matching analysis process of selecting an appropriate content by matching determined from the passerby attribute of the content. The image recognition/attribute analysis unit 305 is a functional unit that performs image
5 recognition on the captured image of a passerby (person inside or outside the booth 50) and analyzes the attributes (gender, age, occupation estimated by clothes, and the like). The user authentication unit 306 is a functional unit that performs user authentication on a user who uses contents. The sensing-
10 device I/F unit 307 is a functional unit that transmits and receives information to and from the internal sensing device 230 and the external sensing device 240. The content display-device I/F unit 308 is a functional unit that transmits and receives information to and from the content display device
15 250.

[0029]

The functions of the above units can be realized by installing a program for performing the function and the processor 101 executing the program loaded into the main
20 memory 102.

[0030]

A process of sensing a passerby and performing image recognition/attribute analysis, the customer-attracting effect analysis process, and the matching analysis process will be
25 specifically described later.

[0031]

The management server 100 saves a facility data table 410, a place data table 420, an application/use status data table 430, a passerby attribute table 440, and a matching data table 450, as data. The tables will be specifically described later.

[0032]

Next, a data structure used in the content matching system will be described with reference to Figs. 3 to 7.

[0033]

10 The facility data table 410 is a table for saving information regarding the facilities of a booth. As illustrated in Fig. 3, the facility data table includes fields of a booth ID 410a, an installation place 410b, and the like. An identifier for uniquely identifying the booth is stored in 15 the booth ID 410a. The installation place of the booth, for example, a station or a place name is described in the installation place 410b.

[0034]

The place data table 420 is a table for describing the 20 characteristics of the place in which the booth is installed. As illustrated in Fig. 4, the place data table includes fields of an installation place 420a, a place attribute 420b, and the like. The name of the place to be described is stored in the installation place 420a. Attributes of the installation place 25 in the installation place 420a, for example, information on

business, sightseeing, transfer, an event, a school city, and the like is stored in the place attribute 420b.

[0035]

The application/use status data table 430 is a table for storing application when the user uses a booth, information on a booth to be recommended, and information regarding the previous use records. As illustrated in Figs. 5A and 5B, the application/use status data table includes fields of a business operator 430a, a usage 430b, a content keyword 430c, content details 430d, a target customer group 430e, desired start date/time 430f, desired end date/time 430g, a desired booth 430h, recommended start date/time 430i, recommended end date/time 430j, a recommended booth 430k, a reservation ID 430l, reservation start date/time 430m, reservation end date/time 430n, a reserved booth 430o, actual start date/time 430p, actual end date/time 430q, an actual booth 430r, and the like.

[0036]

The business operator 430a, the usage 430b, the content keyword 430c, the content details 430d, and the target customer group 430e correspond to user attributes input when the user applies for the booth. The desired start date/time 430f, the desired end date/time 430g, and the desired booth 430h correspond to desired conditions when the user uses the booth. The recommended start date/time 430i, the recommended

end date/time 430j, and the recommended booth 430k correspond to conditions of a booth to be recommended by a matching process. The reservation ID 430l, the reservation start date/time 430m, the reservation end date/time 430n, and the reserved booth 430o correspond to conditions when the user makes a reservation of using the booth. The actual start date/time 430p, the actual end date/time 430q, and the actual booth 430r refer to record information obtained by the user using the booth.

10 [0037]

A name or an identifier for identifying the user is stored in the business operator 430a. The usage of the booth by the user, for example, "retail", "exhibition", or "advertisement" is stored in the usage 430b. A keyword to attracting attentions in a content exhibited in the booth by the user is stored in the content keyword 430c. A description in which the details of the content exhibited by the user are briefly described is stored in the content details 430d. Information on the classification set as the main customer group by the user who exhibits the content is stored in the target customer group 430e. The start date/time and the end date/time of the booth desired to be used are stored in the desired start date/time 430f and the desired end date/time 430g, respectively. Details of the booth desired by the user are stored in the desired booth 430h. For example, "within a

range of XX" designates an "exhibition booth within 5 minutes from the station on the Yamanote Line". The start date/time and the end date/time of the booth to be recommended by the matching process are stored in the recommended start date/time 430i, the recommended end date/time 430j, respectively. A unique identifier of the booth to be recommended by the matching process is stored in the recommended booth 430k. A unique identifier representing that reservation has been made is stored in the reservation ID 430l. The start date/time and the end date/time of the reserved booth are stored in the reservation start date/time 430m and the reservation end date/time 430n, respectively. A unique identifier representing the reserved booth is stored in the reserved booth 430o. The start date/time and the end date/time as a record of the used booth are stored in the actual start date/time 430p and the actual end date/time 430q, respectively. A unique identifier representing the booth having a record of being used is stored in the actual booth 430r.

[0038]

The passerby attribute data 440 is a table for storing record information obtained by operating the booth. As illustrated in Fig. 6, the passerby attribute table includes fields of a booth ID 440a, start date/time 440b, end date/time 440c, presence/absence of content 440d, the number 440e of passersby outside the booth, a passerby attribute 440f outside

the booth, the number 440g of persons watching the booth, an attribute 440h of the person watching the booth, the number 440i of stopped passersby, an attribute 440j of the stopped passerby, the number 440k of persons in the booth, an
5 attribute 440l of the person in the booth, and the like.

[0039]

A unique identifier for identifying the booth is stored in the booth ID 440a. The start date/time at which the booth is operated is stored in the start date/time 440b. The end
10 date/time at which the booth is operated is stored in the end date/time 440c. A flag indicating whether or not a content is exhibited in the booth is stored in the presence/absence of content 440d. For example, when the content having details wanted to be presented by the exhibitor is displayed in the
15 content display device, the flag indicates the "presence". When the content is not displayed, the flag indicates the "absence". The number of passersby outside the booth, which is measured by the external sensing device 240 is stored in the number 440e of passersby outside the booth. The attribute of a
20 passerby outside the booth is stored in the passerby attribute 440f outside the booth, as a result by image recognition of an image captured by the external sensing device 240. The number of passersby analyzed to carefully watch the target booth by image recognition of an image captured by the external sensing
25 device 240, and by an analysis of the line of sight or an

analysis of the posture is stored in the number 440g of persons watching the booth. The attribute as a result obtained by performing image recognition on a person who carefully watches the booth is stored in the attribute 440h of the person watching the booth. The number of passersby determined to be stopped, by image recognition of an image captured by the external sensing device 240, is stored in the number 440i of stopped passersby. The attribute as a result obtained by performing image recognition on a passerby determined to be stopped is stored in the attribute 440j of the stopped passerby. The number of persons entering in the booth, which are captured by the internal sensing device 230, is stored in the number 440k of persons in the booth. The attribute as a result obtained by performing image recognition on the person entering in the booth is stored in the attribute 440l of the person in the booth.

[0040]

Generally, it can be estimated that the interest in the exhibited content of the booth increases in order of (just a passerby outside the booth) $\leq$ the person who carefully watches the booth $\leq$ the stopped person $\leq$ person entering in the booth.

[0041]

The matching data table 450 is a table for storing information for estimating an actual customer-attracting effect of the booth. The matching data table is a table for

extracting a booth as a recommendation candidate by searching and aggregating this table with various keys. As illustrated in Fig. 7, the matching data table 450 includes fields of a booth ID 450a, a usage 450b, a content keyword 450c, a target customer group 450d, an installation place 450e, aggregation date/time 450f, an attribute proportion 450g of a passerby when there is no content, the number 450h of attracted customers, a degree 450i of attention, an attribute proportion 450j of an interested person, a degree 450k of high interest, a highly-interested attribute proportion 450l, a held content keyword 450m of a neighboring booth, a degree of matching 450n, a neighboring booth-related index 450o, and the like.

[0042]

A unique identifier for identifying the booth is stored in the booth ID 450a. The usage of the booth by the user, for example, "retail", "exhibition", or "advertisement" is stored in the usage 450b. A keyword to attracting attentions in a content exhibited in the booth by the user is stored in the content keyword 450c. Information on the classification set as the main customer group by the user who exhibits the content is stored in the target customer group 450d. The usage 450b, the content keyword 450c, and the target customer group 450d are types of information corresponding to the usage 430b, the content keyword 430c, the content details 430d, and the target customer group 430e in the application/use status data table

430 illustrated in Fig. 5A, respectively. An installation
place of the booth is stored in the installation place 450e.
The date/time at which information regarding the record of
using the booth is collected is stored in the aggregation
5 date/time 450f. A result obtained by an attribute analysis on
a passerby when the content is not displayed (when the
presence/absence of content 440d indicates "absence") is
stored in the attribute proportion 450g of a passerby when
there is no content. The difference between passersby per unit
10 time when the content is displayed and the passersby per unit
time when the content is not displayed is stored in the number
450h of attracted customers. Thus, it is possible to predict
the effect obtained by displaying the content. The proportion
of the stopped person (interested person) when the content is
15 displayed is stored in the degree 450i of attention. The
proportion using the watching person as the interested person
when the content is displayed may be defined as the degree of
attention in the degree 450i of attention. Proportion
information of the attribute of the stopped person or the
20 watching person when the content is displayed is stored in the
attribute proportion 450j of an interested person. The
proportion of the person (highly interested person) who
actually enters in the booth among stopped persons or watching
persons is stored in the degree 450k of high interest.
25 Proportion information of the attribute of a person entering

in the booth when the content is displayed is stored in the highly-interested attribute proportion 450l. A content keyword defined in a booth held near the corresponding booth (for example, on both sides of the booth and next to the booth) is stored in the held content keyword 450m of a neighboring booth. This is because the passerby may be interested in the details of not only the booth but also booths held near the booth, and may visit several booths. The proportion of a person having an attribute of which the user is designated as the target customer group among interested persons is stored in the degree 450n of matching. For example, when there are 50 women in thirties and 39 women in forties among 100 interested persons, and thirties and forties women are designated as the target customer group 430e of the user, the degree of matching is 89%. The degree of matching may be defined as the proportion of a person having an attribute of which the user is designated as the target customer group among highly interested persons. The neighboring booth-related index 450o is an index representing the similarity of the content keyword between the corresponding booth and the neighboring booth. Although not illustrated, the neighboring booth-related index may be set to be obtained, for example, in a manner that a score table for each keyword ("cosmetics-cosmetics: 0.8", "cosmetics-toner: 0.6", and the like) is saved, the score is added when there is the corresponding person, and the sum is

obtained.

[0043]

Next, processes of the content matching system will be described with reference to Figs. 8 to 12.

5 [0044]

First, an overall process of the content matching system will be described with reference to Fig. 8.

The process up to the first half of the overall process will be described separately for a pull type and a push type.

10 Here, the pull type means that a user who uses a booth works on a system to take an action to use the booth. On the contrary, the push type means that the system selects a user having a possibility of using the booth and presents a recommended booth.

15 [0045]

In the case of the pull type, a user registers registration information such as the content keyword, the desired date/time, the content details, and the target customer group of the content wanted to be exhibited, in the application/use status data table 430 (S100a).

[0046]

Then, the content matching system searches the matching data table 450 with a combination of content keywords wanted to be exhibited by the user, and outputs a combination of the place and the date/time having a customer-attracting effect

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(matching analysis) (S101a). The meaning of "having the customer-attracting effect" and the details of the pull-type matching analysis process will be described later.

[0047]

5 Then, the content matching system refers to the application/use status data table 430 for the output combination of the date/time and outputs a combination of the place and the date/time, which can be reserved and has the most customer-attracting effect (S102a).

10 [0048]

 In the case of the push type, the content matching system refers to the application/use status data table 430 to check the use status of the booth and extract candidates for an empty place and available date/time (S100b).

15 [0049]

 Then, the matching data table 450 is searched by using the empty place and the available date/time as keys, and the results are aggregated. Thus, a combination of the content keyword having the customer-attracting effect in the
20 corresponding place and time section is output (S101b). The meaning of "having the customer-attracting effect" and the details of the push-type matching analysis process will be described later.

[0050]

25 Then, a user having the combination of the content

keyword having the most customer-attracting effect is searched, and the user is recommended to exhibit the booth at the corresponding place and time section, and is displayed (S102b).

[0051]

5 Then, the user reserves a booth at that place and date/time with reference to the place and date/time presented by the system (S103). The details of the reservation are applied to the application/use status data table 430.

[0052]

10 Then, the user goes to the booth reserved on the reserved date/time, and user authentication is performed by the user authentication device 220 (S104).

[0053]

 Then, the user enters into the reserved booth to start
15 using (S105).

[0054]

 Then, a content such as the assigned advertisement is displayed on the content display device 250 of the booth (S106).

20 [0055]

 Then, when using is completed, the user leaves the booth. The use record of the user in this booth is registered in the application/use status data table 430 (S107).

[0056]

25 Then, the matching data table 450 is updated using the

use record in the application/use status data table 430 and
information of the passerby attribute data table 440
(customer-attracting effect analysis) (S108). The details of
the customer-attracting effect analysis process will be
5 described later.

[0057]

Next, sensing of a passerby and an attribute analysis
process will be described with reference to Fig. 9.

First, the external sensing device 240 and the internal
10 sensing device 230 installed inside and outside the booth 50
sense the outside and the inside of the booth 50, and
accumulate information regarding passersby (S200).

[0058]

It is determined whether or not a timing of a
15 predetermined interval has come (S201). When the timing of a
predetermined interval has come (S201: YES), the process
proceeds to S202. When the timing of the predetermined
interval does not have come (S201: No), the process proceeds
to S205.

20 [0059]

When the timing of the predetermined interval does not
have come, it is determined whether or not the exhibition of
the booth is out of business hours (S205). When the exhibition
of the booth is out of business hours (S205: YES), the process
25 is ended. When the exhibition of the booth is in the business

hours (S205: No), the process returns to S200.

[0060]

When the timing of a predetermined interval has come, with image recognition and the attribute analysis process, a passerby included in sensing information for the predetermined interval is detected, and attributes such as gender, clothes, and age groups are determined, based on the sensing information (S202).

[0061]

10 Then, in particular, when the content is displayed in the booth, a passerby who carefully watches the booth and a stopped passerby are extracted from the sensing information for the outside of the booth (S203).

[0062]

15 Then, the number of persons is counted for each attribute of the sensing information for the inside and the outside of the booth, and is recorded in the passerby attribute data table 440 (S204).

[0063]

20 Next, the customer-attracting effect analysis process will be described with reference to Fig. 10.

The customer-attracting effect analysis process is performed after the exhibition using the booth of the user is ended, and use record information (actual start date/time 430p, 25 actual end date/time 430q, and actual booth 430r) illustrated

in Fig. 5A is registered.

[0064]

First, the proportion of the passerby attribute of no content is calculated from the records for the corresponding place in the passerby attribute data table 440 (S300).

[0065]

The record included in the corresponding place and time section in the passerby attribute data table 440 is extracted (S301).

10 [0066]

Then, the number of attracted customers (difference between passersby outside the booth per unit time when there is the content and passersby outside the booth per unit time when there is no content) is calculated (S302).

15 [0067]

Then, the degree of attention (proportion of the stopped person or the watching person (interested person) when the content is displayed) and the attribute proportion of the interested person (attribute distribution of the interested person) are calculated (S303).

[0068]

Then, the degree of high interest (proportion of the person (highly interested person) who actually enters in the booth among the interested persons) and the attribute proportion of high interest (attribute distribution of the

25

highly interested person) are calculated (S304).

[0069]

Then, a record of the booth that has the content and has been exhibited is searched in a predetermined neighboring range (for example, both sides of this booth) in the same time section to examine the content keyword. Then, the neighboring booth-related index indicating the similarity of the content keyword is calculated (S305).

[0070]

10 Then, the degree of matching indicating the degree of coincidence of the attributes between the highly interested person and the target customer group desired by the user is calculated (S306).

[0071]

15 Finally, the values calculated in S302 to S306 are stored in the respective fields in the matching data table 450 (S307).

[0072]

Next, the matching analysis process (pull type) will be described with reference to Fig. 11A.

20 This process corresponds to S101a in Fig. 8.

First, the content matching system searches a record in the matching data table 450 by the logical sum (OR) of the combination of the content keywords 430c wanted to be exhibited by the user (S400).

25 [0073]

Then, the record in which the degree of matching 450n is smaller than a predetermined threshold value in the search result is further excluded from the analysis target (S401).

[0074]

5 Then, for the narrowed records in the matching data table 450, the number of attracted customers 450h $\times$ degree of attention 450i = the number of interested persons in unit time is calculated. The records are sorted in descending order of the number of interested persons in unit time (S402).

10 [0075]

Then, among the records sorted in S402, the records are sorted in descending order of the values of the portions that matches the target user group in the attribute proportion 450j of the interested person. The record smaller than a
15 predetermined threshold value is excluded from the analysis target (S403).

[0076]

Then, among the records sorted in S403, data is sorted in descending order of the degree of high interest 450k. The
20 record smaller than a predetermined threshold value is excluded from the analysis target (S404).

[0077]

Then, among the records sorted in S404, the records are sorted in descending order of the values of the portions that
25 matches the target user group in the attribute proportion 450l

of the highly interested person. The record smaller than a predetermined threshold value is excluded from the analysis target (S405).

[0078]

5 Then, from the sorted results, some candidates for the booth from the top (for example, from the top to the third, this value may be user-definable) are extracted (S406). At this time, the candidates for the booth may be extracted in consideration of the keyword-related index 450o of the
10 neighboring booth. For example, among the records sorted by the processes up to S405, a process of, for example, upward sorting records having the keyword-related index 450o which is greater than a predetermined value among the lower records may be performed on the records having a small difference in the
15 degree 450k of high interest and the attribute proportion 450l of the highly interested person. For the booths being the higher-ranked candidates, the frequency distribution that appears as the previous actual booth 450r may be calculated, and the candidates may be extracted in descending order of the
20 appearance frequency.

[0079]

 Then, among the candidates obtained by the processes up to S406, a booth that matches the time section (desired start date/time 430f, desired start date/time 430g) desired by the
25 user is presented to the user (S407). Here, the same time

section can include the time section desired by the user, the date/time of the booth previous exhibited, and the viewpoint of matching or being similar in a unit of season, month, date, time, or the like. That is, even though the time section does
5 not match the time zone desired by the user, when the time zone desired by the user is compared with the date and time of the extracted candidate, and the time zones are close to each other to some extent (for example, when the time zone desired by the user is 13:00 to 15:00 and the date/time of the
10 extracted candidate is 13:30 to 15:30), this point and the date/time may be presented to the user together.

[0080]

In the above matching analysis process (pull type), there are some interested persons (watching persons, stopped
15 persons) and some highly interested persons (persons who entered in the booth). A booth that matches the target customer attribute desired by the user among the above people to some extent is selected. Thus, the meaning of "having the customer-attracting effect" described in S101a is defined as
20 that such interested persons and highly interested persons exist to some extent and the people matches the target customer attribute desired by the user to some extent.

[0081]

Next, the matching analysis process (push type) will be
25 described with reference to Fig. 11B.

This process corresponds to S101b in Fig. 8.

The content matching system refers to the application/use status data table 430 to obtain a vacant booth and the date/time, and to search the matching data table 450 using the
5 vacant booth and the date/time as keys (S500). Regarding the date/time, it is not an exact match, but the vicinity (for example, 30 minutes before and after, 1 hour before and after) is also searched.

Then, the record in which the degree of matching is
10 smaller than a predetermined threshold value in the search result in S500 is further excluded from the analysis target (S501).

[0082]

Then, for the records in the matching data table 450,
15 which are narrowed in S501, the number of attracted customers $450h \times \text{degree of attention } 450i = \text{the number of interested persons in unit time}$ is calculated. The records are sorted in descending order of the number of interested persons in unit time, and the record smaller than a predetermined threshold
20 value is excluded from the analysis target (S502).

[0083]

Then, among the records sorted in S502, the record is sorted in descending order of the degree of high interest 450k. The record smaller than a predetermined threshold value is
25 excluded from the analysis target (S503).

[0084]

Then, the number of appearances of the content keyword being the higher-ranked candidate is counted from the result obtained by sorting in S503. A keyword set is created with a combination of the keyword having a large number of
5 appearances and is output (S504).

[0085]

Even in the above matching analysis process (push type), the content keyword of the booth in which there are some
10 interested persons (watching persons, stopped persons) and some highly interested persons (persons entering in the booth) is selected. Thus, the meaning of "having the customer-attracting effect" described in S101b is defined as that such interested persons and highly interested persons exist to some
15 extent.

[0086]

According to the content matching system in the present embodiment, using a booth in which the target customer group of the user is matched, the content displayed in a booth to be
20 exhibited is similar, and the degree of attention is high (many people who are watching or stopped) or a booth having the degree of high interest (many people who enters in the booth) is recommended based on the records of the booth previously exhibited. Thus, it is possible to cause the user
25 who exhibits commodities or services in the booth to

efficiently display the content of interest to the demander and promote sales.

[Embodiment 2]

[0087]

5 A content matching system according to Embodiment 2 will be described below with reference to Figs. 12 and 13.

[0088]

 The present embodiment will be described focusing on only a difference from Embodiment 1.

10 The hardware system configuration of the content matching system in the present embodiment is similar to that in Embodiment 1. Details of the tables and the processes are similar to those in Embodiment 1. In the present embodiment, only the functional configurations of a management server 100
15 and a control terminal 200 are different.

[0089]

 In the present embodiment, as the functional configuration, as illustrated in Fig. 12, the management server 100 includes a reservation management unit 301, an
20 entrance/exit management unit 302, a customer-attracting effect analysis unit 303, and a matching analysis unit 304.

[0090]

 That is, compared with Embodiment 1, the management server does not include the image recognition/attribute
25 analysis unit 305, the user authentication unit 306, the

sensing-device I/F unit 307, and the content display-device I/F unit 308.

[0091]

The present embodiment is similar to Embodiment 1 in that
5 the management server 100 saves the facility data table 410, the place data table 420, the application/use status data table 430, the passerby attribute table 440, and the matching data table 450, as data.

[0092]

10 In the present embodiment, as the functional configuration, as illustrated in Fig. 13, the control terminal 200 includes an image recognition/attribute analysis unit 205, a user authentication unit 206, a sensing-device I/F unit 207, and a content display-device I/F unit 208.

15 [0093]

That is, the image recognition/attribute analysis unit 205, the user authentication unit 206, the sensing-device I/F unit 207, and the content display-device I/F unit 208 are realized by the control terminal 200 performing the functions
20 of the image recognition/attribute analysis unit 305, the user authentication unit 306, the sensing-device I/F unit 307, and the content display-device I/F unit 308 of the management server 100 illustrated in Fig. 2 in Embodiment 1.

[0094]

25 Thus, data processing is performed on the control

terminal 200 side in the present embodiment, and the results are stored in the respective tables. Accordingly, it is possible to reduce the amount of data communication between the management server 100 and the control terminal 200 and to
 5 reduce the load on the management server 100.

REFERENCE SIGNS LIST

[0095]

	100	Management server
10	120	Input/output device
	130	Display device
	200	Control terminal
	220	User authentication device
	230	Internal sensing device
15	240	External sensing device
	250	Content display device
	301	Reservation management unit
	302	Entrance/exit management unit
	303	Customer-attracting effect analysis unit
20	304	Matching analysis unit
	305	Image recognition/attribute analysis unit
	306	User authentication unit
	307	Sensing-device I/F unit
	308	Content display-device I/F unit
25	410	Facility data table

- 420 Place data table
- 430 Application/use status data table
- 440 Passerby attribute table
- 450 Matching data table

CLAIMS

1. A content matching system for matching content details, a content provision place, and provision date/time,
 - (a) the content matching system comprising:
 - (i) means for storing pieces of position information of a plurality of booths connected to a network and attributes thereof, as booth installation places, in association with each other;
 - (ii) sensing means for capturing information on surrounding of the booth;
 - (iii) means for analyzing a degree of customer attraction of the booth and a degree of attention from a passerby based on a sensing result, for each booth; and
 - (iv) means for selecting a candidate for a booth to be recommended for desired content provision date/time received from a user, based on the analysis result and the attributes;
 - (b) a management server; and
 - (c) a control terminal connected to the management server,
 - (i) wherein the management server saves a first table for storing a condition of an exhibition desired by the user, a second table for storing passerby information as an exhibition record of the booth, and a third table for storing booth exhibition information and a result obtained by analyzing the passerby information, in association with each other, the booth exhibition information containing a content keyword of a content exhibited in the booth and exhibition date/time of the booth,
 - (ii) wherein the control terminal includes a sensing device that captures a passerby inside or outside the booth,

- (iii) wherein the management server receives, from the user, desired exhibition date/time of the booth, a content keyword of a content to be exhibited in the booth, and a target customer attribute targeting the user, and stores the desired exhibition date/time, the content keyword, and the target customer attribute in the first table,
- (iv) wherein the control terminal transmits an image of the passerby captured by the sensing device,
- (v) wherein the management server performs attribute analysis of the passerby by image-analyzing the image of the passerby and stores attribute analysis information of the passerby in each booth, in the second table,
- (vi) wherein the management server refers to the second table to
 - (1) calculate a difference between a number of passersby outside the booth per unit time when the content is displayed in the booth and when the content is not displayed in the booth, as the number of attracted customers,
 - (2) calculate, as a degree of attention, a proportion of interested persons to a total number of passersby by setting, as the interested person, a person who carefully watches the exhibited booth or a person who is a passerby outside the booth and stopped at the exhibited booth among passersby when the content is exhibited in the booth,
 - (3) calculate a proportion of attributes of the interested persons to the attributes of the passersby, as an attribute proportion of the interested persons, and
 - (4) store the number of attracted customers, the degree of attention, and the attribute proportion

of the interested persons for each booth, in the third table, and

(vii) wherein the management server selects the candidate for the booth to be recommended based on the desired exhibition date/time of the booth input from the user, the content keyword of a content to be exhibited in the booth, and the target customer attribute targeting the user, the content keyword of each booth stored in the third table, the exhibition date/time of the booth, the calculated number of attracted customers of each booth, the degree of attention, and the attribute proportion of the interested persons.

2. The content matching system according to claim 1, wherein

the management server further

sets a person who has entered in the booth when the content is displayed in the booth, as a highly interested person, and calculates a proportion of the highly interested persons to the interested persons as a degree of high interest,

calculates a proportion of attributes of the highly interested persons as an attribute proportion of the highly interested person,

stores the degree of high interest of each booth and the attribute proportion of the highly interested person in the third table, and

selects the candidate for the booth to be recommended based on the degree of high interest and the attribute proportion of the highly interested person.

3. The content matching system according to claim 2, wherein

the management server calculates a proportion of persons having an attribute of which the user is designated as a target customer group among the interested persons or the highly interested persons for each booth, as a degree of matching, and stores the degree of matching in the third table, and

the management server selects the candidate for the booth to be recommended excluding the booth having the degree of matching which is smaller than a predetermined threshold value.

4. The content matching system according to claim 1, wherein

the third table includes a field of a neighboring booth-related index for comparison of a content keyword of a booth held near each booth and a similarity between the content keyword of each booth and the content keyword of the booth held near the booth, and

the candidate for the booth to be recommended is selected along with reference to the neighboring booth-related index.

5. A content matching method for matching content details, a content provision place, and provision date/time, the content matching method comprising:

- (a) a step of storing pieces of position information of a plurality of booths connected to a network and attributes thereof, as booth installation places, in association with each other;
- (b) a step of capturing information on the surrounding of the booth;
- (c) a step of analyzing a degree of customer attraction of the booth and a degree of attention from a passerby based on a

sensing result, for each booth;

(d) a step of selecting a candidate for a booth to be recommended for desired content provision date/time received from a user, based on the analysis result and the attributes;

(e) a step of saving a first table for storing a condition of an exhibition desired by the user, a second table for storing passerby information as an exhibition record of the booth, and a third table for storing booth exhibition information and a result obtained by analyzing the passerby information, in association with each other, the booth exhibition information containing a content keyword of a content exhibited in the booth and exhibition date/time of the booth, by an information processing apparatus including a sensing device that captures a passerby inside or outside the booth;

(f) a step of receiving, from the user, desired exhibition date/time of the booth, a content keyword of a content to be exhibited in the booth, and a target customer attribute targeting the user, and storing the desired exhibition date/time, the content keyword, and the target customer attribute in the first table, by the information processing apparatus;

(g) a step of performing attribute analysis of the passerby by image-analyzing an image of the passerby captured by the sensing device, and storing attribute analysis information of each passerby of each booth in the second table, by the information processing apparatus;

(h) a step of referring to the second table to

(i) calculate a difference between a number of passersby outside the booth per unit time when the content is displayed in the booth and when the content is not displayed in the booth, as the number of attracted customers,

- (ii) calculate, as a degree of attention, a proportion of interested persons to a total number of passersby by setting, as the interested person, a person who carefully watches the exhibited booth or a person who is a passerby outside the booth and stopped at the exhibited booth among passersby when the content is exhibited, and
- (iii) calculate a proportion of attributes of the interested persons to the attributes of the passersby, as an attribute proportion of the interested persons, by the information processing apparatus; and
- (i) a step of storing the number of attracted customers of each booth, the degree of attention, and the attribute proportion of the interested person in the third table, by the information processing apparatus; and
- (j) a step of selecting the candidate for the booth to be recommended based on the desired exhibition date/time of the booth input from the user, the content keyword of a content to be exhibited in the booth, and the target customer attribute targeting the user, the content keyword of each booth stored in the third table, the exhibition date/time of the booth, the calculated number of attracted customers of each booth, the degree of attention, and the attribute proportion of the interested persons, by the information processing apparatus.

6. The content matching method according to claim 5, further comprising:

by the information processing apparatus, a step of setting a person who has entered in the booth when the content is displayed in the booth, as a highly interested person, calculating a proportion of the highly interested persons to the interested persons as a degree of high interest, and
 calculating a proportion of attributes of the highly

interested persons as an attribute proportion of the highly interested person;

by the information processing apparatus, a step of storing the degree of high interest and the attribute proportion of the highly interested person in a third table; and

by the information processing apparatus, a step of selecting the candidate for the booth to be recommended based on the degree of high interest and the attribute proportion of the highly interested person.

7. The content matching method according to claim 6, further comprising:

a step of calculating a proportion of persons having an attribute of which the user is designated as a target customer group among the interested persons or the highly interested persons for each booth, as a degree of matching, and stores the degree of matching in the third table, by the information processing apparatus; and

selecting the candidate for the booth to be recommended excluding the booth having the degree of matching which is smaller than a predetermined threshold value, by the information processing apparatus.

8. The content matching method according to claim 5, wherein

the third table includes a field of a neighboring booth-related index for comparison of a content keyword of a booth held near each booth and a similarity between the content keyword of each booth and the content keyword of the booth held near the booth, and

the candidate for the booth to be recommended is selected along with reference to neighboring booth-related

index by the information processing apparatus.