

Description

Title of Invention:

ACTION PREDICTING APPARATUS, ACTION PREDICTING METHOD
AND DATA PROCESSING SYSTEM

5 Technical Field

[0001]

The embodiments of this invention relate to an action predicting apparatus, an action predicting method, and a data processing system.

10 Background Art

[0002]

In recent years, various types of service, each utilizing integrated circuit (IC) cards or smart cards, have been provided or proposed. The IC card is a portable card incorporating IC circuits that perform the recording function of recording information and the calculating function of processing information. Such portable cards, including smart cards, shall be hereinafter generally called "IC cards." Among the services utilizing IC cards are automatic ticket gates used in public transportation, such as train transportation and bus transportation, and automatic payment at retail sites, such as stores and vending machines.

[0003]

25 When set in contact with (or held near) a reading pad at a ticket gate or in a bus, the IC card records the event, e.g., entering or exiting the station or the bus, in

the form of action history information. Any retail event at stores or venting machines can also be recorded in the form of action history information. The history information includes the content of the event, the amount
5 paid, the date and time of the event, and the like. The content of the event includes the purpose of using the IC card, for example the entering or exiting at the ticket gate, buying articles in a retail shop or charging the IC card.

10 Citation List

[0004]

Patent Literature 1: Jpn. Pat. Appln. Disclosure

2012-28015

Summary of Invention

15 Technical Problem

[0005]

In most cases, the history information recorded in the IC card is stored in a database. The user of the IC card can refer to the history information stored in the
20 database. Most IC card users, however, do not refer to the history information, because they do not need it. If the history information is utilized well, a more useful service can be provided to the user.

[0006]

25 Accordingly, an object of this invention is to utilize the history information available from the IC card, thereby to provide a useful service to the user.

Solution to Problem

[0007]

An action predicting apparatus according to an embodiment comprises means for acquiring use history information recorded as an IC card is used, database means for accumulating the use history information, and action predicting means. The action predicting means uses the use history information accumulated in the database means, thereby predicting an action of the user of the IC card, and generates, from the action predicted, prediction information from which to generate guide information for the user of the IC card.

Brief Description of Drawings

[0008]

FIG. 1

FIG. 1 is a block diagram explaining the configuration of an action predicting apparatus and a system, both relating to an embodiment.

FIG. 2

FIG. 2 is a diagram showing an example of the use history of the IC card relating to the embodiment.

FIG. 3

FIG. 3 is a flowchart explaining the first example relating to the embodiment.

FIG. 4

FIG. 4 is a flowchart explaining the second example relating to the embodiment.

Description of Embodiment

[0009]

An embodiment will be described with reference to the accompanying drawings.

5 [0010]

[Configuration of the Action Predicting Apparatus and System]

As shown in FIG. 1, an action predicting apparatus 10 according to the embodiment is configured for use in a service system utilizing an IC card 20. The service system relating to the embodiment comprises an action predicting apparatus 10, a transport IC-card reading/writing device 21, a retail IC-card reading/writing device 31, a mobile terminal 40, and a network (the Internet 50).

15 [0011]

The action predicting apparatus 10 is realized by using a computer (hardware and software). The action predicting apparatus 10 has a retail history information database (retail history DB) 11, a public transport-use history information database (public transport-use history DB) 12, a user-motion history information database (motion history DB) 13, a control unit 14, an operation unit 15, and a communication unit 16.

[0012]

25 The DBs 11 to 13 are managed by the server connected to the network 50. They may be configured to be accessed by the action predicting apparatus 10 via the network 50.

[0013]

The retail history DB 11 stores the retail history information 11A generated when the user uses the IC card 20, paying for the article he has bought in a supermarket or a convenience store. The public transport-use history DB 12 stores the bus-use history information 12A showing that the user has used a bus, i.e., means of public transportation, and also the train-use history information 12B showing the user has used an electric train. The motion history DB 13 uses the mobile terminal 40, such as a smart phone or a mobile telephone, which has a global positioning system (GPS) function, and stores information showing where the user has moved by foot, bicycle and automobile. The motion history information includes GPS history information 13A, walking history information 13B, automobile-use history information 13C, and bicycle-use history information 13D.

[0014]

The control unit 14 is a controller for controlling the entire action predicting apparatus 10, and controls the input and output of information between the operation unit 15 and each of the DBs 11 to 13. The control unit 14 controls also the input and output of information between the communication unit 16 and each of the DBs 11 to 13. As will be described later, the operation unit 15 is a unit for performing a process of predicting actions. The control unit 14 and the operation unit 15 are realized by

using microprocessors, respectively. The communication unit 16 is a communication interface that may be connected to the network 50 and configured to perform data communication with the transport IC-card reading/writing device 21, the retail IC-card reading/writing device 31, or the mobile terminal 40.

[0015]

The data communication on the network 50 may be either wired communication or wireless communication. If a roadside unit configured to perform dedicated short range communication (DSRC) with vehicles is connected to the network 50, the action predicting apparatus 10 may be configured to perform data communication with the mobile terminal 40 or car-mounted terminal (not shown). The roadside unit is an apparatus arranged at a roadside and configured to perform wireless communication with any vehicle running on the road.

[0016]

The transport IC-card reading/writing device 21 is incorporated in the automatic ticket-gate machine and configured to write and read, for example, train-use history information, in and from the IC card 20. The transport IC-card reading/writing device 21 includes a reading unit 22, a recording (writing) unit 23, a display unit 24, a control unit 25, an operation processing unit 26, a communication unit 27, and a power supply 28. The transport IC-card reading/writing device 21 may be

incorporated in an apparatus other than the automatic ticket-gate machine.

[0017]

5 The reading unit 22 reads, for example, the train-use history information from the IC card 20. The writing unit 23 writes (records), for example, the train-use history information to the IC card 20. The control unit 25 is the controller that controls the other components of the device 21. As will be described later, the operation processing
10 unit 26 cooperates with the action predicting apparatus 10, processing information to display the transportation guide information at the display unit 24. The control unit 25 and the operation processing unit 26 are realized by using microprocessors. The communication unit 27 is a
15 communication interface that may be connected to the network, enabling the transport IC-card reading/writing device 21 to perform data communication with the action predicting apparatus 10.

[0018]

20 The retail IC-card reading/writing device 31 is installed in, for example, a convenience store or a supermarket, and is configured to write and read data, such as retail-use history information, to and from the IC card 20. The retail IC-card reading/writing device 31 includes
25 a reading unit 32, a recording unit (reading) unit 33, a display unit 34, a control unit 35, an operation processing unit 36, a communication unit 37, and a power supply 38.

[0019]

The reading unit 32 reads, for example, the retail-use history information from the IC card 20. The writing unit 33 writes (records), for example, the retail-use history information to the IC card 20. The control unit 35 is the controller that controls the other components of the device 31. As will be described later, the operation processing unit 36 cooperates with the action predicting apparatus 10, processing information to display the retail guide information at the display unit 34. The control unit 35 and the operation processing unit 36 are realized by using microprocessors. The communication unit 37 is a communication interface that may be connected to the network 50, enabling the retail IC-card reading/writing device 31 to perform data communication with the action predicting apparatus 10.

[0020]

The mobile terminal 40 is a portable information apparatus such as a smart phone or a mobile telephone. The mobile terminal 40 has a control unit 41, a reading unit 42, a GPS processing unit 43, an input unit 44, a display unit 45, a recording (writing) unit 46, an IC chip 47, and a communication unit 48. The mobile terminal 40 may comprise a gyro sensor (not shown) configured to estimate the moving state of the user.

[0021]

The control unit 41 controls the other components of

the mobile terminal 40, and is a controller realized by using a microprocessor that performs various types of data processing. The reading unit 42 reads information from the storage device included in the IC chip 4. The writing unit
5 46 writes information to the storage device included in the IC chip 47. The GPS processing unit 43 is a module that performs a GPS function of generating position information representing the position of the mobile terminal 40. The IC chip 47 includes a storage device, which can be replaced
10 by another. The communication unit 48 is a communication interface that may be connected to the network 50, enabling the mobile terminal 40 to communicate with the action predicting apparatus 10.

[0022]

15 Further, the system according to the embodiment has a car congestion analyzing apparatus 17 configured to analyze the congestion state in the electric train or bus. The car congestion analyzing apparatus 17 analyzes the congestion state in the car, and stores the result of the analysis car
20 congestion information 17A. The car congestion information 17A is input from the car congestion analyzing apparatus 17 to the action predicting apparatus 10. The action predicting apparatus 10 processes the car congestion information 17A, generating guide information about the
25 congestion state in the car, as will be described later. The system according to the embodiment further has a weather information database 18 that stores the data

representing the weather forecasts and weather conditions transmitted from an external system. The action predicting apparatus 10 receives the weather information from the weather information database 18 and utilizes the
5 information to generate guide information. The system according to the embodiment further has a vehicle congestion information database 19 that accumulates the car congestion information transmitted from an external system and representing the vehicle congestion on the roads such
10 as highways. As will be described later, the action predicting apparatus 10 receives the car congestion information and utilizes the car congestion information to generate guide information.

[0023]

15 FIG. 2 is a diagram showing an example of the use history of the IC card relating to this embodiment.

[0024]

The IC card 20 is a portable card medium incorporating an integrated circuit that performs an operation to record
20 and process information. The IC card 20 may be replaced by the IC chip 4 incorporated in the mobile terminal 40.

[0025]

As shown in FIG. 2, the use history information is recorded every time the user uses the IC card 20, passing
25 through a ticket gate or getting on or off a bus. The use history information has various items, i.e., use date, use time, use type, use place and balance. The use history

information further has a GPS item and weather item. The GPS item is data acquired from the GPS system, and the weather item is acquired from the weather information database 18. If the IC card 20 is the IC chip 4

5 incorporated in the mobile terminal 40, the GPS item is position information generated by the GPS processing unit 43.

[0026]

Of the items of use history information, the use type
10 may be entering or exiting a station, the purchase in a store or the charging of the IC card. The use place may be the entraining station, exit station or the store name. The other use type may be "enter" meaning getting on a bus, or "exit" meaning getting off the bus, in the case of a bus
15 service. In the first use shown in FIG. 2, the user charges the IC card 20 with money at the terminal installed in a store (AA), increasing the balance to 3000 yen. In the second use shown in FIG. 2, the user buys an article in the store (AA) on the same day and pays for it, and the
20 balance decreases to 2,300 yen.

[0027]

The user may set the IC card 20 in contact with (or hold the same near) the automatic ticket-gate machine at the entraining station (BB) of public transportation.
25 Then, the entrance to the station and the date (April 20) are recorded in the IC card 20. In the exit station (CC), the user sets the IC card 20 in contact with the automatic

ticket-gate machine. As a result, "exit" and "2,010 yen" are recorded as the other type and balance, respectively, in the IC card 20. Thereafter, the user may set the IC card 20 in contact with the automatic ticket-gate machine at the entraining station (CC) and then at the entraining station (DD), and the "entrances" at the stations (CC and DD) are similarly recorded, as types, in the IC card 20. Further, as the user sets the IC card 20 in contact with the automatic ticket-gate machines at the exit stations (DD, CC, BB), "exit" is recorded three times in the IC card 20, and three balances, each smaller than the preceding one, are recorded in the IC card 20.

[0028]

[Operation of the Embodiment]

How the action predicting apparatus according to the embodiment operates will be explained with reference to the accompanying drawings.

[0029]

The embodiment uses the use history information about the IC card 20 in the action predicting apparatus 10 and the system that are shown in FIG. 1, thereby giving useful guide information to the user.

[0030]

A first example relating to the embodiment, which is designed to provide a service, will be described with reference to the flowchart of FIG. 3.

[0031]

The first example is a process of giving the user information guiding him or her to the train car that is relatively uncrowded and at the track nearest to the ticket gate.

5 [0032]

As shown in FIG. 3, the system starts providing the user with transport-related services when the user sets the IC card 20 in contact with (or hold the same near) the automatic ticket-gate machine at the entraining station (Step S1, and YES in Step S2). Note that the retail IC-card reading/writing device 31 performs a retail-system process when the user uses the IC card 20 in any store to buy an article (NO in Step S2).

10

[0033]

15 The transport IC-card reading/writing device 21 writes the use history information, i.e., use date, use time, type and use place, etc., to the IC card 20 (Step S3). The transport IC-card reading/writing device 21 may write the position information provided by the GPS and the weather information (e.g., current weather condition) to the IC card 20. The user may use the IC chip 3 incorporated in the mobile terminal 40, in place of the IC card 20. In this case, the position information generated by the GPS processing unit 43 is recorded as a GPS item. That is, as shown in FIG. 2, the entraining station (BB) is recorded, as a use place, in the IC card 20. The transport IC-card reading/writing device 21 causes the display of the display

20

25

unit 24 to display the use history information, e.g.,
balance, recorded in the IC card 20.

[0034]

Next, the transport IC-card reading/writing device 21
5 transmits the use history information including the IC card
number and the entraining station (BB), from the
communication unit 27 to the action predicting apparatus 10
through the network 50 (Step S4). How the action
predicting apparatus 10 operates will be explained below.

10 [0035]

On receiving information from the transport IC-card
reading/writing device 21, the action predicting apparatus
10 stores the use history information, as train-use history
information 12B, in transport-use history DB12 (Step S11).
15 Further, the action predicting apparatus 10 reads the
train-use history information 12B associated with the IC
card number (Step S12). The IC card number associates the
train-use history information 12B with the transport-use
history DB12 in one-to-one relation.

20 [0036]

In the action predicting apparatus 10, the operation
unit 15 processes the train-use history information 12B,
statistically determining how often the user exits various
stations after entering a specific entraining station (BB).
25 That is, the operation unit 15 calculates the frequency the
user exits each exit station. Based on the statistical
results, the action predicting apparatus 10 selects the

exit station (CC) station as being most related to the entraining station (BB), thus predicting that the user will get off the train at the exit station (CC) (Step S13).

[0037]

5 The action predicting apparatus 10 then acquires the car congestion information from the car congestion analyzing apparatus 17 (Step S14). The car congestion analyzing apparatus 17 analyzes the congestion in each car of any electric train in service, from the weight of the
10 car. More precisely, each car has a weight sensor and the car congestion analyzing apparatus 17 monitors the output of the weight sensor and can therefore determine the weight of the car. Alternatively, the car congestion analyzing apparatus 17 may analyze the congestion in the car by
15 processing the image data transmitted from the monitor cameras installed in the car. The action predicting apparatus 10 refers to the weather information database 18, acquiring the weather information about the exit station (CC) predicted (e.g., current weather condition).

20 [0038]

 In the action predicting apparatus 10, the communication unit 16 transmits the prediction information to the transport IC-card reading/writing device 21 via the network 50 (Step S15). The prediction information
25 includes the exit station (CC) predicted, the weather information about the station (CC) and the car congestion information showing the congestion in each car of any

electric train in service. Thus, the action predicting
apparatus 10 generates and transmits prediction information
that will be used to generate information that guides the
user to a relatively uncrowded car close to the ticket gate
5 of the exit station. How the transport IC-card
reading/writing device 21 operates will be explained below.
[0039]

On receiving the prediction information including the
exit station (CC) predicted, weather information about the
10 station (CC) and car congestion information, the transport
IC-card reading/writing device 21 performs the process of
displaying the guide information at the display of the
display unit 24 (Steps S5 and S6). That is, the transport
IC-card reading/writing device 21 specifies the electric
15 train the user needs to get on to reach the exit station
(CC) predicted, on the basis of the timetable for all
trains stopping at the exit station (CC) predicted. The
transport IC-card reading/writing device 21 further
generates guide information showing a relatively uncrowded
20 car that is close to the ticket gate of the exit station
(CC) predicted. The display unit 24 displays the guide
information. The transport IC-card reading/writing device
21 may add the weather information showing the weather
condition (fair, rain or anything else) about the place
25 near the exit station (CC) predicted.
[0040]

These processes are performed in sequence, displaying

the guide information on the display of the display unit
24. The user can therefore obtain and confirm the guide
information as he or she passes through the automatic
ticket-gate machine at the entraining station (BB). In the
5 exit station, i.e., station (CC) predicted, the user can
choose a train car that is near the ticket gate of the exit
station and relatively uncrowded on the basis of the guide
information displayed. Further, the user can know the
weather condition around the exit station (CC). The
10 embodiment can therefore give the user helpful guide
information, providing the user with a useful service.

[0041]

In this embodiment, the transport IC-card
reading/writing device 21 is configured to perform the
15 process of generating guide information from the prediction
information supplied from the action predicting apparatus
10 and displaying the guide information so generated. The
invention is not limited to this embodiment. Rather, the
action predicting apparatus 10 may generate guide
20 information and give the guide information to the transport
IC-card reading/writing device 21.

[0042]

The user may use the IC chip 47 of the mobile terminal
40, instead of the IC card 20. In this case, the action
25 predicting apparatus 10 may be configured to transmit the
prediction information or guide information to the mobile
terminal 40 via the network 50. Then, the mobile terminal

40 generates guide information from the prediction
information transmitted to it. The guide information so
generated is displayed on the display of the display unit
24. In the mobile terminal 40, the guide information
5 received is displayed on the display of the display unit
45. The user can therefore confirm the guide information
displayed on the display of the mobile terminal 40, and can
choose, at the entraining station (BB), a train car that
will be near the ticket gate of the predicted exit station
10 (CC) and is relatively uncrowded.

[0043]

A second example, which is designed to provide a
service, will be described in detail, with reference to the
flowchart of FIG. 4. The second example is a process of
15 giving the user guiding information about the stores near
the station at which he or she gets on or off an electric
train.

[0044]

As shown in FIG. 4, the user may set the transport IC
20 card 20 in contact with (or hold the same near) the
transport IC-card reading/writing device 21 incorporated in
the automatic ticket-gate machine at the entraining station
(Step S21). In this case (YES in Step S22), a process is
started to provide a transport-related service. If NO in
25 Step S22, the retail IC-card reading/writing device 31
performs a retail-system process.

[0045]

As in the first example, the transport IC-card reading/writing device 21 writes use history information, such as use date, use time and use type, to the IC card 20 (Step S23). The transport IC-card reading/writing device
5 21 may write, as use history information, the position information provided by the GPS and the weather information (e.g., current weather condition). If the user uses the IC chip 47 incorporated in the mobile terminal 40, in place of the IC card 20, the position information generated by the
10 GPS processing unit 43 may be recorded as a GPS item.
[0046]

In this instance, the entraining station (BB) is recorded in the IC card 20, as the use place included in the use history information. The transport IC-card
15 reading/writing device 21 reads the use history information including the IC card number and the entraining station (BB) from the IC card 20, and transmits the use history information to the action predicting apparatus 10 through the network 50 (Step S24).
20 [0047]

The action predicting apparatus 10 receives the use history information from the transport IC-card reading/writing device 21. The use history information is stored in the transport-use history DB12, as train-use
25 history information 12B (Step S31). The action predicting apparatus 10 then reads the train-use history information 12B associated with the IC card number (Step S32). As

described above, the action predicting apparatus 10 processes train-use history information 12B, statistically determining the tendency (frequency) of the user's entry into the station (BB) and exit from any other station after entering the station (BB). The action predicting apparatus 10 then calculates the frequency of the user's exiting any other station. Further, the action predicting apparatus 10 extracts the exit station (CC) more related to the entraining station (BB) as the predicted exit station, on the basis of the statistical results (Sep S33).

[0048]

After the predicted exit station (CC) has been calculated, the action predicting apparatus 10 refers to the weather information stored in the weather information database 18, acquiring the weather information (e.g., current weather condition) around the exit station (CC) predicted (Step S34). Further, the action predicting apparatus 10 refers to the retail history DB 11, acquiring retail history information 11A (Step S35). The retail history information 11A is data generated when the user uses the IC card 20; paying for the article he or she has bought in a supermarket or a convenience store. The retail history information 11A includes the use place (AA), as shown in FIG. 2.

[0049]

In the action predicting apparatus 10, the communication unit 16 transmits the prediction information

to the transport IC-card reading/writing device 21 via the network 50 (Step S36), the prediction information including the weather information about the exit station (CC) predicted prediction information and the retail history information 11A about the exit station (CC) predicted. That is, the action predicting apparatus 10 generates prediction information from which to generate guide information (e.g., special-sale information later described) about any store near the exit station, to which the user is supposed to frequently visit, and then transmits the prediction information to the transport IC-card reading/writing device 21, as will be described later in detail.

[0050]

The transport IC-card reading/writing device 21 receives the information about the exit station (CC) predicted and the retail information from the action predicting apparatus 10 (Step S25). The transport IC-card reading/writing device 21 then performs a process to display the information on the display of the display unit 24. The transport IC-card reading/writing device 21 then determines whether it is raining or snowing at the exit station (CC) predicted, from the weather information (i.e., current weather condition) about the exit station (CC), which has been transmitted from the action predicting apparatus 10 (Sep S26).

[0051]

If it is not raining or snowing, but is fair or cloudy at the exit station (CC) (if NO in Step S26), the transport IC-card reading/writing device 21 generates guide information (e.g., special-sale information later described) about any store near the exit station (CC), to which the user is supposed to visit, and displays the guide information on the display of the display unit 24 (Step S28).

[0052]

If it is raining or snowing at the exit station (CC) predicted (if YES in Step S26), the transport IC-card reading/writing device 21 generates guide information showing some stores located near the exit station (CC) and selling rainwear (including umbrellas), and displays this guide information on the display of the display unit 24 (Step S27).

[0053]

These processes are performed in sequence, displaying the guide information on the display of the display unit 24 of the transport IC-card reading/writing device 21. The user can therefore obtain and confirm the guide information displayed by the display unit 24, as he or she passes through the automatic ticket-gate machine at the entraining station (BB). That is, the user can confirm, beforehand, the special-sale information about a store located near the exit station (CC) predicted. If it is raining or snowing at the exit station (CC), the user can confirm, beforehand,

a shop located near the exit station (CC) and selling rainwear (including umbrellas). The second example of the embodiment can thus provide a service of giving useful guide information to the user.

5 [0054]

As in the first example of the embodiment, the action predicting apparatus 10 may be configured to generate the guide information such as the special-sale information about a store located near the exit station predicted and
10 then to supply the guide information to the transport IC-card reading/writing device 21. If the user uses the IC chip 47 incorporated in the mobile terminal 40, in place of the IC card 20, the action predicting apparatus 10 may be configured to transmit the prediction information or guide
15 information from the communication unit 16 to the mobile terminal 40 via the network 50. In this case, the mobile terminal 40 generates guide information from the prediction information, and the guide information is displayed on the display of the display unit 45. That is, in the mobile
20 terminal 40, the display of the display unit 45 displays the guide information transmitted to the mobile terminal 40. The user can therefore confirm, beforehand, the special-sale information about a store located near the exit station.

25 [0055]

The embodiment is configured to cause the display of the transport IC-card reading/writing device 21 or the

display of the mobile terminal 40 to display guide
information that is useful to the user. The displaying of
the guide information is not limited to these methods.
Rather, the embodiment may be designed to display the guide
5 information on an electronic bulletin board, a digital
signage apparatus or the like.

[0056]

Moreover, the user may input his or her personal
information such as age, sex and health condition, not
10 identifying him or her but useful in the exit station
predicted, and may store the personal information in the IC
card in association with the IC card number. In this case,
the IC card displays more useful information to the user at
the exit station predicted. The personal information may
15 not be input by the user, but may instead be inferred from
the image analysis made by a camera or from the user's
action monitored by the GPS, gyro sensor or the like.

[0057]

Described above is the case where the embodiment
20 described above is used when the user utilizes the public
transportation means such as electric trains. The
embodiment can be used also in the case while the user's
car is running on a highway. In this case, the action
predicting apparatus 10 transmits the guide information to
25 the user's mobile terminal 40 via the network 50, and the
guide information can be displayed on the display unit 45.
More specifically, the action predicting apparatus 10

acquires the car congestion information about each highway section from the vehicle congestion information data base 19 in response to the inquiry from the user's mobile terminal 40. Further, the action predicting apparatus 10
5 acquires the weather information about each highway section from the weather information database 18.

[0058]

The action predicting apparatus 10 generates guide information including the vehicle congestion information
10 and weather information about any designated highway section, and can transmit this guide information to the user's mobile terminal 40 via the network 50. The user can therefore confirm the vehicle congestion and weather at the highway section, on the display of the display unit 45.
15 Thus, the embodiment can provide a service of giving valid guide information to the user seated in the automobile running on the highway.

[0059]

While certain embodiments of the inventions have been
20 described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions. Indeed, the novel methods described herein may be embodied in a variety of other forms. Furthermore, various omissions, replacements and changes can be made,
25 without departing from the spirit of the invention. The embodiments and modifications thereof fall within the scope and spirit of the invention, and also within the inventions.

recited in the claims and their equivalents.

Claims

1. An action predicting apparatus comprising:
means for acquiring use history information recorded
as an IC card is used;

5 database means for accumulating the use history
information; and

action predicting means for using the use history
information accumulated in the database means, thereby
predicting an action of the user of the IC card, and for
10 generating, from the action predicted, prediction
information from which to generate guide information for
the user of the IC card.

2. The action predicting apparatus according to
claim 1, further comprising information supplying means for
15 supplying the prediction information generated by the
action predicting means to information presenting means
configured to generate and display the guide information.

3. The action predicting apparatus according to
claim 1 or claim 2, wherein the use history information
20 contains weather information showing a weather condition.

4. The action predicting apparatus according to any
one of claims 1 to 3, wherein the action predicting means
uses, as the use history information accumulated in the
database means, transport-use history information including
25 the relation between any entraining station and any exit
station in the case where the user travels by train by
using the IC card, predicts an exit station from the

station the user has entered by using the IC card, and generates prediction information showing the exit station so predicted.

5 5. The action predicting apparatus according to claim 4, wherein the action predicting means predicts a train car near the ticket gate of the entraining station that is relatively uncrowded, from car congestion information acquired from a car congestion analyzing apparatus configured to analyze the congestion in each car
10 of any electric train arriving at the station the IC-card user has entered, and generates prediction information showing the exit station predicted and the train car predicted.

15 6. The action predicting apparatus according to claim 4, wherein the action predicting means uses retail history information showing the use of the IC card, as use history information accumulated in the database means, predicts retail information about a store located near the exit statin predicted, and generates prediction information
20 showing the exit station predicted and the retail information predicted.

 7. The action predicting apparatus according to claim 2, wherein the information supplying means transmits the prediction information generated by the action
25 predicting means via a network to the read/write device of the IC card connected to the network or to a mobile terminal connected to the network.

8. The action predicting apparatus according to any one of claims 1, 3, 4, 5 and 6, further comprising means for generating the guide information from the prediction information generated by the action predicting means.

5 9. The action predicting apparatus according to claim 1, further comprising database means for accumulating vehicle congestion information showing the congestion of vehicles running on a road,

wherein the action predicting means refers to the
10 vehicle congestion information and generates, as prediction information from which to generate guide information for the user of the IC card, the prediction information including the vehicle congestion information showing the congestion of vehicles running on the road.

15 10. A data processing system comprising:

means for acquiring use history information recorded as an IC card is used;

database means for accumulating the use history information;

20 action predicting means for using the use history information accumulated in the database means, thereby predicting an action of the user of the IC card, and for generating, from the action predicted, prediction information from which to generate guide information for
25 the user of the IC card;

information providing means for providing the prediction information generated by the action predicting means via

the information communication means; and

an information display device configured to generate the guide information from the prediction information provided by the information providing means and to display the guide information.

11. The data processing system according to claim 10, wherein the use history information contains weather information showing a weather condition.

12. The data processing system according to claim 10 or 11, wherein the information providing means is an IC card read/write device configured to enable the user to utilize a transportation means by using the IC card; the action predicting means uses, as the use history information accumulated in the database means, transport-use history information including the relation between any entraining station and any exit station in the case where the user travels by train by using the IC card, predicts an exit station from the station the user has entered by using the IC card, and generates prediction information showing the exit station so predicted; and the information providing means provides the prediction information to the IC card read/write device.

13. The data processing system according to any one of claims 10 to 12, wherein the action predicting means predicts a train car near the ticket gate of the entraining station that is relatively uncrowded, from car congestion information acquired from a car congestion analyzing

apparatus configured to analyze the congestion in each car of any electric train arriving at the station the IC-card user has entered, and generates prediction information showing the exit station predicted and the train car predicted.

14. The data processing system according to any one of claims 10 to 12, wherein the action predicting means uses retail history information showing the use of the IC card, as use history information accumulated in the database means, predicts retail information about a store located near the exit station predicted, and generates prediction information showing the exit station predicted and the retail information predicted.

15. The data processing system according to claim 10, further comprising database means for accumulating vehicle congestion information showing the congestion of vehicles running on a road,

wherein the action predicting means refers to the vehicle congestion information and generates, as prediction information from which to generate guide information for the user of the IC card, the prediction information including the vehicle congestion information showing the congestion of vehicles running on the road.

16. An action predicting method for use in an action predicting apparatus configured to utilize use history information recorded as an IC card is used, thereby to predict an action of the user of the IC card, the method

comprising:

acquiring use history information recorded as an IC card is used;

5 using the use history information, thereby predicting an action of the user of the IC card, and

generating, from the action predicted, prediction information from which to generate guide information for the user of the IC card.