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INFORMATION DELIVERY APPARATUS

BACKGROUND OF THE INVENTION



1. Field of the Invention

159159

The present invention relates to an information delivery apparatus for delivering a present service situation in a trouble occurrence section to a user of the trouble occurrence section which is in a situation in which a train schedule is not kept due to a signal breakdown, a train accident, a storm or the like, for example, a service stop section or a train delay section.

2. Description of Related Art

Conventionally, there has been an information delivery apparatus in which various kinds of informations, such as an advertisement provided by an advertiser, news, and weather forecast, are delivered to a user on the basis of the registered contents of the user. In the conventional information delivery apparatus, attribute information, for example, an interest or a taste, is registered for each user, delivery information suitable for the user is prepared on the basis of the attribute information, and the delivery information prepared here is delivered to a delivery destination designated by the user in advance.

Besides, there is proposed an information delivery system in which delivery information is delivered to a portable terminal (especially, a cellular phone) of a user who passes through a passage of an automatic ticket gate, which is installed at a ticket gate of a station, to enter the station or to exit from the station. In this information delivery system, two stations of both ends of a use section are registered for each user, and in the case where the user enters one of the stations, the delivery information relating to the vicinity of the other station and satisfying the interest and taste of the user is delivered. Besides, in the case where the user exits from one of the stations, the delivery information relating to the vicinity of the one exit station and satisfying the interest and taste of the user is delivered.

In a system in which delivery information to be delivered to a user is prepared and delivered after it is detected that the user has passed through a passage of an automatic ticket gate, since it takes a long time to prepare the delivery information, there has been a case where the timing when the delivery information is delivered to the user becomes late and the delivery information can not be delivered at the timing when the user can effectively use it. Then, it is proposed that

delivery informations (four kinds of delivery informations) to be delivered at the time of entrance and at the time of exit are previously prepared for each user with respect to two stations of both ends of a use section during the night when trains are not operated. In this case, since the delivery information can be immediately delivered when it is detected that the user has passed through the passage of the automatic ticket gate, the delivery information can be delivered at the timing when the user can effectively use.

However, in the foregoing system in which delivery information for a user is previously prepared, it has been impossible to deliver a present service situation of a trouble occurrence section to a user who is now going to use the section in which the service of trains is stopped due to a signal breakdown, a train accident, a storm, etc., or the section in which delay of trains occurs (the trouble occurrence section in which the train schedule is not kept). Thus, there has been a problem that the service to the user is not satisfactory.

Incidentally, if the present service situation of the trouble occurrence section is delivered to all users, the present service situation in the trouble occurrence section is also delivered to the user who does not use the trouble occurrence section. Even if the present

service situation of the trouble occurrence section is delivered, the user who does not use the trouble occurrence section merely feels annoyance. Besides, in the information delivery apparatus, since the present service situation of the trouble occurrence section is delivered to all users, the load of the main body is greatly increased. Thus, there has been a problem that a probability that the information delivery apparatus goes down is raised, and the reliability of the system is lowered.

Besides, although there has been proposed an apparatus in which in the case where a delivery request for a present service situation is made by a user, the present service situation is delivered to the user (JP-A-10-24849, JP-A-11-59422), it is very unlikely that a user who does not realize that a section to be used from now is a trouble occurrence section makes the delivery request for the present service situation. Accordingly, the proposed apparatus delivers the present service situation of the trouble occurrence section to the user who realizes that the section to be used from now is the trouble occurrence section, and does not deliver the present service situation of the trouble occurrence section to the user who does not realize that the section to be used from now is the trouble occurrence section.

SUMMARY OF THE INVENTION

An object of the invention is to provide an information delivery apparatus for delivering a present service situation in a trouble occurrence section to a user who is now going to use the trouble occurrence section in which a train schedule is not kept.

An information delivery apparatus of the invention has the following structure to solve the above problems.

(1) There are included

route specifying means for estimating, about an entrant who has entered an entraining station, a destination station of the entrant, presuming a route from the entraining station to the destination station estimated here, identifying whether a transfer station exists in the route presumed here, and specifying the transfer station when the transfer station exists,

trouble occurrence section acquisition means for acquiring, as a trouble occurrence section, a section in a situation in which a train schedule is not kept,

judgment means for judging, with respect to the entrant about whom the transfer station exists in the route specified by the route specifying means, whether an overlap section exists between the route from the transfer station to the destination station and the

trouble occurrence section acquired by the trouble occurrence section acquisition means, and

delivery means for delivering a present service situation in the trouble occurrence section to a delivery destination corresponding to the entrant about whom the judgment means judges that the overlap section exists between the route from the transfer station to the destination station and the trouble occurrence section.

In this structure, the route specifying means estimates, about the entrant having entered the entraining station, the destination station of the entrant, presumes the route from the entraining station to the destination station, and specifies the transfer station when the transfer station exists in the route presumed here. Besides, the trouble occurrence section acquisition means acquires, as the trouble occurrence section, the section in which the train schedule is not kept. Further, the judgment means judges, with respect to the entrant about whom the route specifying means judged that the transfer station exists, whether the route from the transfer station to the destination station overlaps with the trouble occurrence section. Here, that the route from the transfer station to the destination station overlaps with the trouble occurrence section means that a part of or the whole of the trouble occurrence section is

included in the route from the transfer station to the destination station. With respect to the entrant about whom the judgment means judges that the route from the transfer station to the destination station overlaps with the trouble occurrence section, the delivery means delivers the present service situation in the trouble occurrence section to the delivery destination corresponding to the entrant.

Accordingly, the present service situation in the trouble occurrence section is delivered to the entrant meeting the following conditions (1) and (2).

(1) The transfer station exists between the entrance station where the entrance has been made and the destination station.

(2) The route from the transfer station to the destination station overlaps with the trouble occurrence section.

By this, the present service situation in the trouble occurrence section is not delivered to the user who has no transfer station between the entrance station and the destination station. On the other hand, there is a case where the route from the entrance station of the user to the destination station overlaps with the trouble occurrence section. However, in the route including the trouble occurrence section, the present service situation

in the trouble occurrence section is announced in a station yard or in a train running on the route. Thus, since the user who has no transfer station between the entrance station and the destination station hears a broadcast concerning the present service situation in the trouble occurrence section in the station yard or the train running on the route, even if the present service situation in the trouble occurrence section is not delivered, there is no problem.

Accordingly, it is possible to narrow down the entrants to whom the present service situation in the trouble occurrence section is to be delivered, and the service to the user can be improved, and further, the load of the apparatus main body can be suppressed, so that the reliability is not lowered.

(2) There is included transfer station arrival entrant acquisition means for acquiring the entrant whose arrival at the transfer station is detected by an automatic ticket gate installed in the transfer station,

wherein the delivery means does not deliver the present service situation in the trouble occurrence section to the delivery destination corresponding to the entrant whose arrival at the transfer station is acquired by the transfer station arrival entrant acquisition means.

In this structure, since the entrant whose arrival at the transfer station is detected hears the present service situation in the trouble occurrence section in a station yard or a boarding train (transfer train), there is no problem that even if the present service situation in the trouble occurrence section is not delivered. By this, the entrants to whom the present service situation in the trouble occurrence section is to be delivered can be further narrowed down, and the load of the apparatus body can be sufficiently suppressed.

(3) The judgment means differentiates an up line from a down line and judges whether the overlap section exists between the route from the transfer station to the destination station and the trouble occurrence section.

In this structure, the judgment means differentiates the up line from the down line and judges whether the overlap section exists between the route from the transfer station to the destination station and the trouble occurrence section. For example, in the case where the trouble occurrence section is on the up line, with respect to the entrant utilizing the down line which is not influenced, it is judged that the overlap section does not exist between the route from the transfer station to the destination station and the trouble occurrence section, and the present service situation in

the trouble occurrence section is not delivered. By this, the entrants to whom the present service situation in the trouble occurrence section is to be delivered can be further narrowed down, and the load of the apparatus main body can be further suppressed.

(4) There are included

use section information acquisition means for acquiring use section information indicating a use section of a user,

trouble occurrence section acquisition means for acquiring, as a trouble occurrence section, a section in a situation in which a train schedule is not kept,

judgment means for judging, about each user, when the trouble occurrence section acquisition means acquires the trouble occurrence section, whether an overlap section exists between the use section acquired by the use section information acquisition means and the trouble occurrence section, and

delivery means for delivering a present service situation in the trouble occurrence section to a delivery destination corresponding to the user about whom the judgment means judges that the overlap section exists between the use section and the trouble occurrence section.

In this structure, when the trouble occurrence section acquisition means acquires, as the trouble occurrence section, the section in which the train schedule is not kept, the use section information acquisition means acquires the use section of the user, and the judgment means judges whether about the user, the use section overlaps with the trouble occurrence section, that is, whether the user is influenced. When the judgment means judges that about the user, the use section and the trouble occurrence section overlap with each other, the delivery means delivers the present service situation in the trouble occurrence section to the delivery destination corresponding to the user.

By this, the users to whom the present service situation in the trouble occurrence section is to be delivered can be narrowed to the user who is influenced by the trouble occurrence section, and the service to the user can be improved, and further, the load of the apparatus main body can be suppressed, and the lowering of reliability can be prevented.

(5) There is included last exit station storage means for storing a last exit station of the user,

wherein the judgment means regards the last exit station stored in the last exit station storage means as an entraining station, differentiates an up line from a

down line, and judges whether the overlap section exists between the use section and the trouble occurrence section.

In this structure, the last exit station storage means stores the last exit station of the user, and the last exit station is regarded as the next entrance station, so that it is possible to judge whether the user next uses the up line or the down line. Besides, as described in the above paragraph (3), the up line and the down line are differentiated, and it is judged whether the overlap section exists between the use section and the trouble occurrence section, so that the users to whom the present service situation in the trouble occurrence section is to be delivered can be further narrowed down, and the load of the apparatus main body can be sufficiently suppressed.

(6) There is included exit times count means for counting the number of times the user exits from a station in one day,

wherein the delivery means does not deliver the present service situation in the trouble occurrence section to a delivery destination corresponding to a user about whom a count value by the exit times count means is not an odd number.

In this structure, the delivery means does not deliver the present service situation in the trouble occurrence section to the user about whom the number of exit times in one day counted by the exit times count means is not the odd number.

In general, a user using trains enters a station and exits from a station twice a day at the time of attending office or school from home and at the time of going home from the office or school. Accordingly, with respect to the user about whom the number of exit times is not an odd number, there is a high probability that he/she has already gotten home, and a probability that he/she uses a train to move in that day is very low. As stated above, even if the present service situation in the trouble occurrence section is not delivered to the user about whom the probability of using a train to move is very low, there is no specific problem. On the contrary, the load of the apparatus main body can be suppressed by not delivering the present service situation in the trouble occurrence section to the user about whom the probability of using the train to move is very low.

(7) There is included exit times clear means for clearing the count value by the exit times count means at a predetermined timing.

In this structure, since the exit times clear means clears the count value by the exit times count means at the predetermined timing, the count value by the exit times count means is cleared every day at, for example, night when the train service is ended, so that it is possible to prevent the occurrence of such a problem that the present service situation in the trouble occurrence section is not delivered to the user who made a stopover at the time of attending office or going home and is brought into a situation in which he/she is influenced by the trouble occurrence section on and after the next day.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a view showing a structure of an information delivery system to which an information delivery apparatus of an embodiment of the invention is applied.

Fig. 2 is a view for explaining information recorded on a commutation ticket.

Fig. 3 is a block diagram showing a structure of the information delivery apparatus of the embodiment of the invention.

Fig. 4 is a view showing personal information stored in the information delivery apparatus of the embodiment of the invention.

Fig. 5 is a view for explaining delivery requested information.

Fig. 6 is a view for explaining a moving registrant record stored in a moving registrant information storage part.

Fig. 7 is a block diagram showing a structure of an automatic ticket gate.

Fig. 8 is a view showing an outer appearance of the automatic ticket gate.

Fig. 9 is a view showing a structure of a delivery information storage part.

Fig. 10 is a flowchart showing an operation of the information delivery apparatus of the embodiment of the invention.

Fig. 11 is a flowchart showing the operation of the information delivery apparatus of the embodiment of the invention.

Fig. 12 is a flowchart showing the operation of the information delivery apparatus of the embodiment of the invention.

Fig. 13 is a view for explaining the relation of an entrance station, a transfer station and an exit station.

Fig. 14 is a view for explaining trouble occurrence section data.

Fig. 15 is a view showing a display screen example of a cellular phone to which a present service situation in a trouble occurrence section has been delivered.

Fig. 16 is a block diagram showing a structure of an information delivery apparatus of another embodiment of the invention.

Fig. 17 is a view for explaining a registrant situation record stored in a registrant situation storage part.

Fig. 18 is a flowchart showing an operation of the information delivery apparatus of the another embodiment of the invention.

Fig. 19 is a flowchart showing the operation of the information delivery apparatus of the another embodiment of the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Hereinafter, an information delivery system to which an information delivery apparatus of an embodiment of the invention is applied will be described.

Fig. 1 is a view showing a structure of the information delivery system to which the information delivery apparatus of the embodiment of the invention is applied. In Fig. 1, reference numeral 1 denotes a station; and 2, an information delivery center. An automatic ticket gate 11, an automatic fare adjustment

machine 12, a ticket dispenser 13 and the like are installed in the station 1. Besides, the automatic ticket gate 11, the automatic fare adjustment machine 12 and the ticket dispenser 13 are connected to a host apparatus 14 for controlling passengers getting on and off trains in the station 1. The host apparatus 14 is connected to a not-shown server apparatus of a railway company through a dedicated line or a public line network 3. An information delivery apparatus 21 of the embodiment of the invention is installed in the information delivery center 2. The host apparatus 14 installed in the station 1 and the information delivery apparatus 21 installed in the information delivery center 2 can be connected to an internet 4 through the public line network 3. Besides, the host apparatus 14 and the information delivery apparatus 21 are configured so that they can communicate with each other. A communication path between the host apparatus 14 and the information delivery apparatus 21 may be a dedicated line or may be a path through the public line network 3 or the Internet 4. Further, the information delivery apparatus 21 is connected with the not-shown server apparatus of the railway company through the dedicated line or the public line network 3 so that they can communicate with each other.

Besides, in Fig. 1, reference numeral 5 denotes a user(registrant); 6, a cellular phone owned by the user 5; and 7, a commutation ticket owned by the user 5. The cellular phone 6 has a function to connect with the Internet 4, and a mail address is given so that transmission/reception of e-mail can be performed through the Internet 4. Information such as an identification code for identification of the user 5, a valid period, and a valid section is stored on the commutation ticket 7 (see Fig. 2).

Here, it is assumed that the passenger is specified by the identification code stored on the commutation ticket 7 inserted into a main body by the passenger when passing through a passage of the automatic ticket gate 11, and the description will be given below.

Incidentally, the invention may be structured such that a member card storing an identification code in advance is issued to the user 5, and at the time of passing through the passage of the automatic ticket gate 11, the member card, together with a passenger ticket, is inserted in the apparatus main body, and the passenger having passed through the passage of the automatic ticket gate 11 is specified by the identification code stored on the member card. The information delivery system may have any structure as long as the passenger having passed

through the passage of the automatic ticket gate 11 can be specified.

Besides, in the following description, the user 5 means a person using the commutation ticket 7 to enter the station 1 or to exit therefrom, and the registrant 5 means a person whose attribute information described later is registered in the information delivery apparatus 21.

Fig. 3 is a block diagram showing a structure of the information delivery apparatus of the embodiment of the invention. The information delivery apparatus 21 includes a control part 211 for controlling the operation of a main body, a delivery requested information storage part 212 for storing many pieces of various information (hereinafter referred to as delivery requested information), such as an advertisement requested to be delivered to the registrant from an advertiser such as a company or a store, news, weather forecast, and traffic information, a personal information storage part 213 for storing personal information of the registrant, for example, attribute information such as a name, an age, a gender, an interest, and a taste, and two stations of both ends indicating a use section, which is made to correspond to the identification code of the commutation ticket 7 for each registrant 5, a delivery information

storage part 214 for storing delivery information prepared for each registrant 5, a delivery part 215 for delivering (transmitting) the delivery information to the registrant 5, a reception part 216 for receiving information transmitted from another equipment, a moving registrant information storage part 217 for storing information of an unexited registrant 5 whose entrance is conformed at any station and whose exit is not confirmed at any station, and a delivery requested information reception part 218 for receiving delivery requested information and trouble information.

The personal information storage part 213 stores, as the personal information, a name, an age, a gender, and an occupation of the registrant 5, classification of delivery information requested to be delivered, delivery information not requested to be delivered, necessity/unnecessity of delivery of a train timetable, necessity/unnecessity of delivery of train delay information, a transmission destination (mail address of the cellular phone 6) of the delivery information, the presence or absence of delivery request at the time of getting on, the presence or absence of delivery request at the time of getting off, a mainly used boarding section (two stations of both ends of a use section in the invention), a home telephone number, a telephone

number of place of work, and the like, which are made to correspond to the identification code (identification code of the commutation ticket 7) for each registrant 5, as shown in Fig.4.

Incidentally, even if the user 5 uses the commutation ticket 7, the user 5 whose personal information is not stored in the personal information storage part 213 is not the registrant 5.

The deliver request information stored in the delivery requested information storage part 212 includes information acquired through the internet 4. A delivery condition for differentiating the registrant 5 to whom delivery may be made from the registrant 5 to whom delivery is inhibited is attached to the delivery requested information stored in the delivery requested information storage part 212. This delivery condition can be freely set by an advertiser as a provider of the delivery requested information. For example, in the case where the delivery requested information for women is provided, by attaching the delivery condition to limit the registrant 5 to whom delivery is made to women, it is possible to prevent delivery to men. Besides, an age group (twenties, thirties, etc.), the number of times of delivery, and the like can also be attached as the delivery condition.

Fig. 5 is a view showing an example of the delivery requested information stored in the delivery requested information storage part. The delivery requested information storage part 212 causes the delivery condition (see Fig. 5(A)) to correspond to the delivery requested information (see Fig. 5(B)) and stores them. Besides, the delivery requested information is given a delivery requested information number for identification of the delivery requested information. The example of the delivery condition shown in Fig. 5(A) is the example in which the registrant 5 to whom the delivery requested information may be delivered is limited to women and the age of 20 to 29. Besides, the valid period of the delivery requested information is limited to a period of from September 1, 2001 to October 31, 2001. When the valid period expires, this delivery requested information is not delivered to the registrant 5. The limiting number of times of delivery is 300, and it is not delivered to a total of 301 or more registrants 5. Further, the delivery requested information number is K0001.

The moving registrant information storage part 217 stores an unexited registrant record in which as shown in Fig. 6, an entrance station which the registrant enters, an exit station (a destination station in the invention)

which is estimated to be a station from which the registrant exits, a transfer station in a route from the entrance station to the exit station, and transfer station passing information indicating whether the registrant 5 passes through the transfer station, are made to correspond to the identification code. The information delivery apparatus 21 prepares the unexited registrant record composed of the entrance station, the exit station, the transfer station, and the transfer station passing information for the registrant 5 whose entrance is detected at any station, and the record prepared here is stored in the moving registrant information storage part 217. At this time, the exit station is estimated by using the station 1 which the registrant 5 enters, and the two stations 1 of both ends indicating the use section registered as the personal information of the registrant 5. Besides, about the registrant 5 whose exit is detected at any station, the unexited registrant record stored in the moving registrant information storage part 217 is deleted.

The automatic ticket gate 11 is an apparatus for restricting the entrance of the user not having an appropriate passenger ticket (commutation ticket, ordinary ticket, prepaid card, etc.) into the station yard or the exit thereof from the station yard. The

automatic fare adjustment machine 12 is an apparatus by which the user 5 having ridden past adjusts an excess fare and acquires a fare-adjustment card in order to exit from the station yard. The ticket dispenser 13 is an apparatus by which the user 5 now entering the station yard purchases an ordinary ticket corresponding to a boarding section.

Fig. 7 is a block diagram showing a structure of the automatic ticket gate, and Fig. 8 is a view showing the outer appearance of the automatic ticket gate.

The automatic ticket gate 11 includes a control part 111 for controlling the operation of a main body, a storage part 112 for storing information used at the time of the operation and information generated at the time of the operation, a clocking part 113 for clocking the present time, a transmission part 114 for outputting information to the host apparatus 14, an insertion detection part 115 for detecting that a passenger ticket such as a commutation ticket, an ordinary ticket or a prepaid card is inserted in the main body, a conveyance part 116 for conveying the passenger ticket inserted in the main body, a read part 117 for reading out magnetic data recorded on the passenger ticket under conveyance, and a door drive part 118 for opening and closing a door 118a to restrict the passing of the user 6. The automatic

ticket gate 11 closes the door 118a to close up the passage formed by the automatic ticket gate 11 and to forbid the user 5 to enter the station 1 or to exit from the station 1 (passing of the passage).

The automatic ticket gate 11 includes an insertion port 116a for the insertion of the passenger ticket at the right side of an entrance of the passage, and a release port 116b for the release of the passenger ticket inserted in the main body at the right side of an exit. A conveyance path 116c for conveying the passenger ticket is provided between the insertion port 116a and the release port 116b. Besides, in the middle of the conveyance path 116c, there are provided a collection path (not shown) for conveying the ordinary ticket or the fare-adjustment card inserted in the insertion port 116a to a collection box (not shown), and a conveyance path changeover mechanism part (not shown) for changing the conveyance destination of the passenger ticket inserted in the insertion port 116a to one of the release port 116b and the collection box. An insertion detection sensor 115a for detecting the insertion of the passenger ticket is provided at the insertion port 116a. When this insertion detection sensor 115a detects the insertion of the passenger ticket, the conveyance part 116 conveys the passenger ticket inserted in the insertion port 116a to

the release port 116b. Besides, a magnetic head 117a reads out data recorded on the passenger ticket under conveyance along the conveyance path 116c.

The automatic ticket gate 11 for entrance is installed so that the passing direction shown in Fig. 8 is the direction toward the station yard, and the automatic ticket gate 11 for exit is installed so that the passing direction shown in Fig. 8 is the direction toward the outside from the station yard. Besides, the storage part 112 stores a gate code for identification of its own apparatus, and entrance/exit information indicating whether its own apparatus is for entrance or exit.

Incidentally, when the automatic ticket gate 11 for entrance and the automatic ticket gate 11 for exit are arranged to be opposite to each other at both sides of a passage, the one passage can be used for two-way (entrance direction and exit direction) passing.

Hereinafter, the operation of the information delivery apparatus of this embodiment will be described.

The information delivery apparatus 21 prepares delivery information to be delivered at the time of entrance and delivery information to be delivered at the time of exit with respect to two stations of both ends of the use section registered for each registrant 5 during

the night when there is no user 5 entering the station 1 or exiting from the station 1.

For example, in the case of the registrant 5 about whom an A station and a B station are two stations of both ends of the use section,

(1) delivery information to be delivered at the time of entrance into the A station,

(2) delivery information to be delivered at the time of exit from the B station,

(3) delivery information to be delivered at the time of entrance into the B station, and

(4) delivery information to be delivered at the time of exit from the A station, (four pieces of delivery information in total) are prepared.

With respect to the delivery information to be delivered at the time of entrance into the A station, delivery requested information which is information of the vicinity of the B station (object place) and meets the interest and taste of the registrant 5 stored in the personal information storage part 213 is extracted from the delivery requested information stored in the delivery requested information storage part 212, and the delivery information including the delivery requested information extracted here is prepared. Besides, with respect to the delivery information to be delivered at the time of exit

from the B station, delivery requested information which is information of the vicinity of the B station (object place) and meets the interest and taste of the registrant 5 stored in the personal information storage part 213 is extracted from the delivery requested information stored in the delivery requested information storage part 212, and the delivery information including the delivery requested information extracted here is prepared.

Incidentally, the information delivery apparatus 21 prepares the delivery information so that the same delivery requested information is not included in the delivery information to be delivered at the time of entrance into the A station and the delivery information to be delivered at the time of exit from the B station.

Besides, with respect to the delivery information to be delivered at the time of entrance into the B station, delivery requested information which is information of the vicinity of the A station (object place) and meets the interest and taste of the registrant 5 stored in the personal information storage part 213 is extracted from the delivery requested information stored in the delivery requested information storage part 212, and the delivery information including the delivery requested information extracted here is prepared. Besides, with respect to the delivery information to be delivered at the time of exit

from the A station, delivery requested information which is information of the vicinity of the A station (object place) and meets the interest and taste of the registrant 5 stored in the personal information storage part 213 is extracted from the delivery requested information stored in the delivery requested information storage part 212, and the delivery information including the delivery requested information extracted here is prepared.

Incidentally, information delivery apparatus 21 prepares the delivery information so that the same delivery requested information is not included in the delivery information to be delivered at the time of exit from the A station and the delivery information to be delivered at the time of entrance into the B station.

The delivery information storage part 214 stores the delivery information prepared by the above processing for each registrant 5. In the delivery information storage part 214, the database for storing the delivery information to be delivered to the registrant 5 is divided into parts for the respective stations 1 as shown in Fig. 9. In each database, with respect to the registrant 5 about whom the corresponding station 1 is one of the two stations of both ends of the use section, the delivery information to be delivered at the time of entrance and the delivery information to be delivered at

the time of exit are made to correspond to the identification code and are stored. For example, in the database of the A station, with respect to each registrant 5 about whom one of the two stations of both ends of the use section registered is the A station, the delivery information to be delivered at the time of entrance and the delivery information to be delivered at the time of exit are made to correspond to the identification code and are stored.

Next, the operation of the information delivery apparatus 21 at the time when the user 5 enters the station 1 or exits from the station 1 will be described with reference to Figs. 10 to 12. Figs. 10 to 12 are flowcharts showing the operation of the information delivery apparatus.

The user 5 inserts the commutation ticket 7 in the insertion port 116a of the automatic ticket gate 11, passes through the passage of the automatic ticket gate 11, and enters the station 1 or exits from the station 1. The automatic ticket gate 11 reads out information, such as an identification code, a valid period, and a valid section, from the commutation ticket 7 inserted in the main body, judges whether the passing of the passage is allowed, and controls the opening/closing of the door 118a for opening/closing the passage in accordance with

the judgment result. When allowing the passing of the user, the automatic ticket gate 11 transmits passing information including the identification code read out from the commutation ticket 7 inserted in the main body, the gate code for identification of its own machine, and entrance/exit information indicating whether the user 5 has entered the station 1 or exited from the station 1 to the host apparatus 14. The host apparatus 14 transfers the passing information from the automatic ticket gate 11 to the information delivery apparatus 21.

Besides, in a station where two or more lines are joined, the automatic ticket gate 21 is installed at a transfer gate where the transfer is made from one line to another line. The automatic ticket gate 11 installed at the transfer gate transmits transfer information including the identification code of the user 5, line information for identification of a line to which the user 5 transfers, and the gate code for identification of its own machine to the host apparatus 14. The host apparatus 14 transfers the transfer information from the automatic ticket gate 11 to the information delivery apparatus 21.

The information delivery apparatus 21 waits for the passing information, the transfer information from the host apparatus 14, or trouble occurrence section

information from the server apparatus of the railway company (s1 to s3). The trouble occurrence section information includes an occurrence notification for notifying the occurrence of a section (hereinafter referred to as a trouble occurrence section) in a situation where a train schedule is not kept due to a signal breakdown, a train accident, a storm, or the like, a renewal notification for notifying the change of the present service situation in the trouble occurrence section, for example, that the service delay time in the trouble occurrence section is shortened from 20 minutes to 10 minutes, and a restoration notification for notifying the restoration of the trouble occurrence section.

First, the operation of the information delivery apparatus 21 at the time when the passing information is received will be described. The information delivery apparatus 21 uses the identification code of the commutation ticket 7 included in the passing information transmitted from the host apparatus 14 to judge whether the user 5 having passed through the passage of the automatic ticket gate 21 to enter the station 1 or to exit from the station 1 is the registrant 5 (s4). Here, when it is judged that the user 5 is not the registrant 5, it returns to s1. When judging at s4 that the user 5 is

the registrant 5, the information delivery apparatus 21 judges whether the registrant 5 has entered the station 1 or exited therefrom (s5).

When judging at s5 that the registrant 5 has entered the station 1, the information delivery apparatus 21 judges whether the station 1 which the registrant 5 has entered is one of the two stations of both the ends of the use section registered in the personal information storage part 213, or another station (hereinafter referred to as an intermediate station) between the two stations of both the ends of the use section (s6). When judging at s6 that it is one of the two stations of both the ends of the use section, the information delivery apparatus 21 presumes a route (route from an entrance station to an estimated exit station) of a section in which an exit station (destination station in this invention) of the registrant 5 is assumed to be the other station of both the ends of the use section. Further, it is judged whether a transfer station exists in the route presumed here, and if the transfer station exists, the transfer station is specified, and the unexited registrant record shown in Fig. 6 is prepared and is registered in the moving registrant information storage part 217 (s7).

For example, as shown in Fig. 13, in the case where a line X connecting an A station and a B station intersects with a line Y connecting a C station and a D station at an E station, if the estimated exit station with respect to the registrant 5 having entered the A station is the B station, it is judged that the transfer station does not exist, and if the estimated exit station with respect to the registrant 5 having entered the A station is the D station, it is judged that the transfer station is the E station. In the E station, the automatic ticket gate 11 is installed at the transfer gate of the line X and the line Y. The user inserts a passenger ticket, such as the commutation ticket 7 or an ordinary ticket, in the automatic ticket gate 11 installed at the transfer gate, passes through the passage of the automatic ticket gate 11, and changes trains. Besides, the transfer station passing information of the unexited registrant record registered in the moving registrant information storage part 217 at s7 is non-passing.

When completing the registration of the unexited registrant record at s7, the information delivery apparatus 21 reads out the delivery information, stored in the delivery information storage part 214, to be delivered at the time of entrance of the registrant 5 from the database of the station 1 which the registrant 5

has entered, and delivers it to the mail address (mail address of the cellular phone 6) registered as the personal information of the registrant 5 (s8).

Incidentally, the processings of s7 and s8 may be reversed.

When judging at s6 that it is an intermediate station, the information delivery apparatus 21 estimates the two stations of both the ends of the use section of the registrant 5 to be exit stations. The information delivery apparatus 21 prepares unexited registrant records concerning the two exit stations estimated here, respectively, and registers the two unexited registrant records in the moving registrant information storage part 217 (s9).

Although there is a probability that the registrant 5 having entered the intermediate station goes to one of the two stations of both the ends of the use section, it is difficult to estimate to which station the registrant goes. From this, this embodiment is structured such that the two stations of both the ends of the use section are estimated as the exit stations, respectively, the two unexited registrant records are prepared, and these are registered in the moving registrant information storage part 217.

When completing the processing of s8 or s9, the information delivery apparatus 21 judges whether a trouble occurrence section exists (s10), and if the trouble occurrence section does not exist, it returns to s1. A case where it is judged at s10 that the trouble occurrence section exists will be described later.

Next, a case where the information delivery apparatus 21 makes the judgment of the exit at s5 will be described. The information delivery apparatus 21 deletes the unexited registrant record of the registrant 5, who has exited, stored in the moving registrant information storage part 217 (s11). In the case of the registrant 5 having entered the intermediate station, the two unexited registrant records are deleted at s11. The information delivery apparatus 21 judges whether the station from which the registrant 5 has exited is one of the two stations of both the ends of the use section (s12). When it is judged at s12 that the station from which the registrant 5 has exited is one of the two stations of both the ends of the use section, the delivery information, stored in the delivery information storage part 214, to be delivered at the time of exit of the registrant 5 is read out from the database of the station 1 from which the registrant 5 has exited, and this is delivered to the mail address registered as the personal

information of the registrant 5 (s13). When the information delivery apparatus 21 completes the processing of s13, it returns to s1.

Incidentally, when judging at s12 that the station 1 from which the registrant 5 has exited is an intermediate station which is not the two stations of both the ends of the use section, the information delivery apparatus 21 does not deliver the delivery information to the registrant 5 at s13 but returns to s1.

As stated above, when the registrant 5 enters some station 1, the information delivery apparatus 21 of the embodiment prepares the unexited registrant record about the registrant 5, and registers it in the moving registrant information storage part 217. When the registrant 5 exits from some station 1, the unexited registrant record registered in the moving registrant information storage part 217 about the registrant 5 is deleted. The information delivery apparatus 21 manages the registrant 5 who has entered some station 1 and does not exit from any station 1 in the moving registrant information storage part 217.

Besides, when receiving the transfer information outputted from the automatic ticket gate 11 installed at the transfer gate at s2, the information delivery apparatus 21 judges whether the unexited registrant

record corresponding to the identification code of the commutation ticket 7 included in the transfer information is registered in the moving registrant information storage part 217 (s14). When the unexited registrant record is not registered, the information delivery apparatus 21 judges that the user 5 having passed through the passage of the automatic ticket gate 11 installed at the transfer gate is not the registrant 5, and returns to s1. On the contrary, when the unexited registrant record is registered, it rewrites the transfer station passing information of the unexited registrant record from non-passing to passing (s15), and returns to s1.

The transfer station passing information is used for judgment as to whether the registrant 5 has already arrived at the transfer station. Specifically, it is judged that the registrant 5 whose transfer station passing information is the non-passing has not arrived at the transfer station, and the registrant 5 whose transfer station passing information is the passing has already arrived at the transfer station.

Next, the operation of the information delivery apparatus 21 at the time when the trouble occurrence section information is received from the server apparatus of the railway company will be described with reference to Fig. 12.

The information delivery apparatus 21 judges that the received trouble occurrence section information is which of the occurrence notification, the renewal notification and the restoration notification (s16, s17). When judging at s16 that it is the occurrence notification, the information delivery apparatus 21 prepares trouble occurrence section situation data (see Fig. 14) including a trouble occurrence section, contents of an occurring trouble, and the present service situation in the trouble occurrence section, on the basis of the occurrence notification transmitted from the server apparatus of the railway company (s18), and stores it in a memory (not shown) provided in the control part 211 (s19).

When storing the trouble occurrence section situation data in the memory at s19, for each unexited registrant record registered in the moving registrant information storage part 217, the information delivery apparatus 21 judges

(1) whether the route from the transfer station to the exit station overlaps with the trouble occurrence section in the trouble occurrence section situation data stored this time (s20), and

(2) whether the registrant 5 about whom it is judged in the above (1) that they are overlapped with each other

has already arrived at the transfer station (whether the transfer station passing information is the non-passing) (s21).

When judging that the registrant 5 has not arrived at the transfer station (in the case where the transfer station passing information is the non-passing), the information delivery apparatus 21 extracts the identification code of the registrant 5 (s22). The information delivery apparatus 21 judges whether the processing of s20 to s22 is ended on all unexited registrant records registered in the moving registrant information storage part 217 (s23), and if it is not ended, the processing of s20 to s22 is carried out for unprocessed unexited registrant records.

Besides, at s20, the up line and the down line are differentiated, and it is judged whether the route from the transfer station to the exit station overlaps with the trouble occurrence section of the trouble occurrence section situation data stored this time. For example, even if the route from the transfer station to the exit station is from the E station to the D station shown in Fig. 13, and the trouble occurrence section is between the E station and the D station, in case the route used by the registrant 5 from the transfer station to the exit station is on the up line, and the trouble occurrence

section is on the down line between the E station and the D station, it is judged at s20 that they do not overlap with each other. Besides, that the route from the transfer station to the exit station overlaps with the trouble occurrence section indicates the case where a part of or all of the trouble occurrence section is included in the route from the transfer station to the exit station.

When judging at s23 that the processing of s20 to s22 is ended for all the unexited registrant records, the information delivery apparatus 21 prepares the text of e-mail indicating the present service situation in the trouble occurrence section on the basis of the trouble occurrence section situation data stored at s19 (s24). The information delivery apparatus 21 broadcasts the text of the e-mail prepared at s24 to, as the delivery destination, the mail address registered in the personal information of the registrant 5 identified for each identification code extracted at s22 (s25). When the information delivery apparatus 23 completes the processing of s25, it returns to s1.

Fig. 15 shows an example of a display screen of the cellular phone 6 having received the e-mail indicating the present service situation in the trouble occurrence section from the information delivery apparatus 21.

By the above processing of s18 to s25, when there occurs the section (trouble occurrence section) of the situation where the train schedule is not kept due to the signal breakdown, train trouble, storm or the like, the present service situation in the trouble occurrence section is delivered to the registrant 5 who has entered some station 1 (the registrant 5 does not exit), about whom the route from the transfer station to the exit station overlaps with the trouble occurrence section, and who has not arrived at the transfer station.

In general, in the line where a train runs in the trouble occurrence section, the present service situation in the trouble occurrence section is announced on a platform or the train running on the line. The registrant 5 who has already moved to the platform of the line including the trouble occurrence section (the registrant 5 about whom the transfer station passing information is the passing), or the registrant 5 who does not originally change the lines hears the announcement on the platform or in the train, and confirms the present service situation in the trouble occurrence section, and therefore, even if the information delivery apparatus 21 does not deliver the present service situation in the trouble occurrence section by e-mail, there is no specific problem.

As stated above, when there occurs the section of the situation where the train schedule is not kept due to the signal breakdown, train trouble, storm or the like, the information delivery apparatus 21 of the embodiment narrows down the registrants 5 to whom the present service situation in the trouble occurrence section is to be delivered, and suppresses the increase of the load of the information delivery apparatus 21. Accordingly, the reliability of the system is not lowered.

Besides, at s25, since the present service situation in the trouble occurrence section is delivered to the plural registrants 5 at a time by the broadcasting, the load of the information delivery apparatus 21 can be further suppressed.

Next, the operation in the case where the trouble occurrence section information received by the information delivery apparatus 21 from the server apparatus of the railway company is the renewal notification will be described. The information delivery apparatus 21 renews the trouble occurrence section situation data stored in the memory of the control part 211 on the basis of the renewal notification received this time (s26), and returns to s1. The renewal notification is, for example, information notifying that the service situation in the trouble occurrence section

is restored from a delay of 20 minutes to a delay of 10 minutes, or information notifying that the service situation in the trouble occurrence section is changed from service stop to service reopening with a delay of 30 minutes. The information delivery apparatus 21 rewrites the present service situation in the trouble occurrence section data to the notified situation at s26.

The operation in the case where the trouble occurrence section information received by the information delivery apparatus 21 from the server apparatus of the railway company is the restoration notification will be described below.

The information delivery apparatus 21 deletes the trouble occurrence section situation data of the trouble occurrence section stored in the memory of the control part 211 on the basis of the restoration notification received this time (s27) and returns to s1. By this, the information delivery apparatus 21 stores only the present service situation in the section (trouble occurrence section) of the situation where the train schedule is not kept, in the memory of the control part 211. Accordingly, the capacity of the memory can be suppressed.

Next, the case where the information delivery apparatus 21 judges at s10 that the trouble occurrence section exists will be described with reference to Fig.

11. The judgment at s10 is made based on whether the trouble occurrence section situation data is stored in the memory of the control part 211. When judging at s10 that the trouble occurrence section exists, the information delivery apparatus 21 judges whether a transfer station exists in the unexited registrant record prepared at s7 or s9 (s30). When judging at s30 that the transfer station does not exist, the information delivery apparatus 21 returns to s1. On the contrary, when it is judged at s30 that the transfer station exists, it is judged whether the trouble occurrence section situation data in which the route from the transfer station to the exit station overlaps with the trouble occurrence section is stored in the memory of the control part 211 (s31). When judging at s31 that the trouble occurrence section situation data in which the route from the transfer station to the exit station overlaps with the trouble occurrence section is not stored in the memory of the control part 211, the information delivery apparatus 21 returns to s1.

When judging at s31 that the trouble occurrence section situation data in which the route from the transfer station to the exit station overlaps with the trouble occurrence section is stored in the memory of the control part 211, the information delivery apparatus 21

prepares the text of e-mail indicating the present service situation in the trouble occurrence section overlapping with the route from the transfer station to the exit station (s32). The information delivery apparatus 21 delivers the text of the e-mail prepared at s32 to the mail address registered as the personal information of the registrant 5 having entered the station 1 this time (s33), and returns to s1.

As described above, since the information delivery apparatus 21 of the embodiment efficiently narrows down the registrants 5 to whom the present service situation in the trouble occurrence section where the train schedule is not kept is to be delivered, the increase of the load of the main body of the information delivery apparatus 21 can be suppressed. Accordingly, it is possible to prevent the lowering of the reliability of the system to which the information delivery apparatus 21 is applied.

Besides, contrary to the prior art, even if the registrant 5 does not make the delivery request for the present service situation in the trouble occurrence section, the present service situation in the trouble occurrence section can be delivered to the registrant 5 who is influenced by the trouble occurrence section, and

therefore, the service to the registrant 5 can be improved.

Incidentally, in the embodiment, although the two stations of both the ends indicating the use section are registered as the personal information for each registrant 5, a structure may be such that the passing information outputted by the automatic ticket gate 11 is made to include two stations of both ends indicating the valid section of the commutation ticket 7, and the two stations of both the ends indicating the valid section are used as the two stations of both the ends indicating the use section described in the above embodiment.

Besides, in the above embodiment, although the automatic ticket gate 11 is installed at the transfer gate where the user 5 passes when transferring from one line to another line at the transfer station, since there is also a station 1 where the automatic ticket gate 11 is not installed at the transfer gate (station 1 where the transfer of lines can be made without passing through the transfer gate where the automatic ticket gate 11 is installed), the transfer station passing information in the embodiment may be removed. In this case, the processing of s21 described in the above embodiment has only to be removed. Besides, the processings of s2, s14 and s15 also become unnecessary.

Further, with respect to the registrant 5 having entered through the intermediate station, since the two stations of both the ends of the use section are respectively made the exit stations and the unexited registrant records are prepared, when the registrant 5 is influenced by the trouble occurrence section even if he/she moves to which of the two stations of both the ends of the use section, the present service situation in the trouble occurrence section can be certainly delivered.

Next, another embodiment of the invention will be described. In the above embodiment, although an object to which the present service situation in the trouble occurrence section is delivered is the registrant 5 who has entered any given station and does not exit from any station 1, in this embodiment, the registrant 5 who has exited from any given station 1 and does not enter any station 1 is an object to whom the present service situation in the trouble occurrence section is delivered.

Although an information delivery system to which an information delivery apparatus 21 of this embodiment is applied has substantially the same structure as the above embodiment, the structure of the information delivery apparatus 21 is slightly different. Fig. 16 is a block diagram showing the structure of the information delivery apparatus 21 of this embodiment. The structure of the

information delivery apparatus 21 of this embodiment is different in that instead of the moving registrant information storage part 217, a registrant situation storage part 219 for storing the present situation of the registrant 5 is provided. In the registrant situation storage part 219, as shown in Fig. 17, a last entrance station indicating a station 1 of last entrance, a last exit station indicating a station 1 of last exit, whether or not the registrant 5 is in "unentered", and the number of times that the registrant 5 exits from the station 1 are made to correspond to the identification code (identification code of a commutation ticket 7) for each registrant 5 and are stored. The above "unentered" indicates a state in which exit is detected at some station 1, and then, entrance is not detected at any station. On the contrary, a state (state of "entered") which is not the "unentered" is a state in which entrance is detected at some station 1, and then, exit is not detected at any station.

As described in the above embodiment, the information delivery apparatus 21 of this embodiment prepares delivery information to be delivered at the time of entrance and at the time of exit with respect to two stations of both ends of a use section for each registrant 5 during the night when there is no person

entering the station 1, and stores it in a delivery information storage part 214.

The operation of the information delivery apparatus 21 of this embodiment will be described with reference to Figs. 18 and 19. Figs. 18 and 19 are flowcharts showing the operation of the information delivery apparatus of this embodiment.

The information delivery apparatus 21 waits for passing information outputted by the automatic ticket gate 11, or occurrence notification notifying the occurrence of a trouble occurrence section from the server apparatus of the railway company (s41, s42). When receiving the passing information, the information delivery apparatus 21 judges whether the user 5 having passed through the automatic ticket gate 11 is the registrant 5 (s43). When the information delivery apparatus 21 judges at s43 that the user 5 is not the registrant 5, it returns to s41.

When judging at s43 that the user 5 is the registrant 5, the information delivery apparatus 21 judges whether the registrant 5 has entered the station 1 or has exited from the station 1 (s44). When it is judged at s44 that the registrant has entered the station 1, it is judged whether the station 1 which the registrant 5 has entered is one of the two stations of both the ends

of the use section or an intermediate station (s45). If it is not the intermediate station, the information delivery apparatus 21 reads out delivery information, stored in the delivery information storage part 214, to be delivered at the time of entrance of the registrant 5 from the database of the station 1 which the registrant has entered, and delivers the delivery information read out here to a mail address registered as the personal information of the registrant 5 (s46). Thereafter, the information delivery apparatus 21 renews the last entrance station with the station 1 which the registrant 5 has entered this time with respect to the record of the registrant 5 registered in the registrant situation storage part 219, renews the "unentered" with the "entered" (s47), and returns to s41.

Besides, when judging at s44 that the registrant 5 has exited from the station 1, the information delivery apparatus 21 judges whether the station 1 from which the registrant 5 has exited is one of the two stations of both the ends of the use section or the intermediate station (s48). If it is not the intermediate station, the information delivery apparatus 21 reads out delivery information, stored in the delivery information storage part 214, to be delivered at the time of exit of the registrant 5 from the database of the station 1 from

which the registrant 5 has exited, and delivers the delivery information read out here to the mail address registered as the personal information of the registrant 5 (s49). Thereafter, the information delivery apparatus 21 renews the last exit station with the station 1 from which the registrant 5 has exited this time with respect to the record of the registrant 5 registered in the registrant situation storage part 219, renews the "entered" with the "unentered", increments the number of times of exit by one (s50), and returns to s41.

Next, the operation at the time when the information delivery apparatus 21 receives the occurrence notification of a trouble occurrence section from the server apparatus of the railway company at s42 will be described with reference to Fig. 19. The information delivery apparatus 21 performs the following processings:

(1) whether the present state is the "unentered" (s51),

(2) if the "unentered", whether the number of times of exit is an odd number (s52),

(3) if the number of times of exit is an odd number, a route of the registrant 5 to an exit station in the case where the last exit station is made the entrance station, is presumed (s53),

(4) whether the route presumed at s53 overlaps with the trouble occurrence section by the occurrence notification received at s42 (s54), and

(5) if overlaps, the identification code of the registrant 5 is extracted (s55),

the above processings of (1) to (5) are executed for all the registrants 5 stored in the registrant situation storage part 219 (s56).

Most of the users 5 using the commutation ticket 7 for attending company or school enter the station 1 near the home in the morning and exit from the station 1 near the company or school. Besides, when the work or lesson on the day is ended, they enter the station 1 near the company or school and exit from the station near the home.

Incidentally, the valid section of the commutation ticket 7 is a section between the station 1 near the home and the station 1 near the company or school.

From this, it is judged that most of the users 5 of the commutation ticket 7 exit twice a day from the station 1. Thus, the user 5 about whom the number of times of exit from the station 1 is an odd number (one) has a very high probability that he/she again enters the station 1 and uses a train to move. On the contrary, the user 5 about whom the number of times of exit from the station 1 is an even number (two) has a very low

probability that he/she again enters the station 1 and uses a train to move.

The above (2) is the processing for narrowing down the registrants 5 to whom the present service situation in the trouble occurrence section is to be delivered by removing the registrant 5 having the very low probability of again entering the station 1 from the registrants 5 to whom the present service situation in the trouble occurrence section is to be delivered.

Besides, in the above (3), if the last exit station is one of the two stations of both the ends of the use section, the route in which the last exit station is made the entrance station and the other station of both the ends of the use section is made the exit station, is presumed to be the route when the registrant 5 performs next. Besides, if the last exit station is an intermediate station which is not the two stations of both the ends of the use section, two kinds of routes in which the last exit station is made the entrance station and the two stations of both the ends of the use section are respectively made the exit stations, are presumed.

Besides, in the above (4), as described in the above embodiment, the classification of the up line and the down line is also considered, and it is judged whether

the route presumed at s53 overlaps with the trouble occurrence section notified this time.

When completing the processings of the above (1) to (5) with respect to all the registrants 5, the information delivery apparatus 21 prepares the text of e-mail indicating the present service situation in the trouble occurrence section notified this time (s57). The information delivery apparatus 21 broadcasts the text of the e-mail prepared at s57 to, as the delivery destination, the mail address registered in the personal information of the registrant 5 identified for each identification code extracted at s55 (s58), and returns to s41.

As stated above, similarly to the information delivery apparatus of the above embodiment, the information delivery apparatus 21 of this embodiment can also narrow down the registrants 5 to whom the present service situation in the trouble occurrence section where the train schedule is not kept is to be delivered, so that the increase of the load of the main body of the information delivery apparatus 21 can be suppressed and the reliability is not lowered. Besides, even if the registrant 5 does not make the delivery request for the present service situation in the trouble occurrence section, the present service situation in the trouble

occurrence section can be delivered to the registrant 5 who uses the trouble occurrence section, and the service to the user can be improved.

Besides, it is preferable to clear the number of times of exit of the registrant 5 registered in the registrant situation storage part 219 during the night when the information delivery apparatus 21 prepares the delivery information to be delivered at the time of entrance and at the time of exit with respect to the stations of both the ends of the use section for each registrant 5. By doing so, it is possible to prevent, at s52, such an erroneous judgment that for example, the registrant 5 who made a stopover the day before (the registrant 5 who exited three times in one day) is the registrant 5 having a very low probability of again entering the station 1.

As described above, according to this invention, even if the registrant does not make the delivery request for the present service situation in the trouble occurrence section, the present service situation in the trouble occurrence section can be delivered to the registrant using the trouble occurrence section, and the service to the user can be improved. Besides, since it is possible to efficiently narrow down the registrants to whom the present service situation in the trouble

occurrence section where the train schedule is not kept is to be delivered, the increase of the load of the apparatus body can be suppressed, and the reliability is not lowered.

What is claimed is:

1. An information delivery apparatus, comprising:

route specifying means for estimating, about an entrant who has entered an entraining station, a destination station of the entrant, presuming a route from the entraining station to the destination station estimated here, identifying whether a transfer station exists in the route presumed here, and specifying the transfer station when the transfer station exists;

trouble occurrence section acquisition means for acquiring, as a trouble occurrence section, a section in a situation in which a train schedule is not kept;

judgment means for judging, with respect to the entrant about whom the transfer station exists in the route specified by the route specifying means, whether an overlap section exists between the route from the transfer station to the destination station and the trouble occurrence section acquired by the trouble occurrence section acquisition means; and

delivery means for delivering a present service situation in the trouble occurrence section to a delivery destination corresponding to the entrant about whom the judgment means judges that the overlap section exists between the route from the transfer station to the destination station and the trouble occurrence section.

2. An information delivery apparatus according to claim 1, further comprising transfer station arrival entrant acquisition means for acquiring the entrant whose arrival at the transfer station is detected by an automatic ticket gate installed in the transfer station,

wherein the delivery means does not deliver the present service situation in the trouble occurrence section to the delivery destination corresponding to the entrant whose arrival at the transfer station is acquired by the transfer station arrival entrant acquisition means.

3. An information delivery apparatus according to claim 1 or 2, wherein the judgment means differentiates an up line from a down line and judges whether the overlap section exists between the route from the transfer station to the destination station and the trouble occurrence section.

4. An information delivery apparatus, comprising:
use section information acquisition means for acquiring use section information indicating a use section of a user;

trouble occurrence section acquisition means for acquiring, as a trouble occurrence section, a section in a situation in which a train schedule is not kept,

judgment means for judging, about each user, when the trouble occurrence section acquisition means acquires

the trouble occurrence section, whether an overlap section exists between the use section acquired by the use section information acquisition means and the trouble occurrence section; and

delivery means for delivering a present service situation in the trouble occurrence section to a delivery destination corresponding to the user about whom the judgment means judges that the overlap section exists between the use section and the trouble occurrence section.

5. An information delivery apparatus according to claim 4, further comprising last exit station storage means for storing a last exit station of the user,

wherein the judgment means regards the last exit station stored in the last exit station storage means as an entraining station, differentiates an up line from a down line, and judges whether the overlap section exists between the use section and the trouble occurrence section.

6. An information delivery apparatus according to claim 4 or 5, further comprising exit times count means for counting the number of times the user exits from a station in one day,

wherein the delivery means does not deliver the present service situation in the trouble occurrence

section to a delivery destination corresponding to a user about whom a count value by the exit times count means is not an odd number.

7. An information delivery apparatus according to claim 6, further comprising exit times clear means for clearing the count value by the exit times count means at a predetermined timing.