

Description

Title of the Invention: VEHICLE MANAGEMENT SYSTEM

Technical Field

[0001] The present invention relates to a vehicle management system that collects and manages position information of a vehicle, which is to be disposed of.

Background Art

[0002] IC (Integrated Circuit) tags have been used when a vehicle such as an automobile is to be disposed of to manage work processes of the disposal. As an example of using such an IC tag to manage the work process, Patent Literature 1 discloses that information including a work process is stored in an IC tag, information is read from the IC tag as appropriate in the work process, and information is written in the IC tag (see Patent Literature 1).

Citation List

Patent Literature

[0003] Patent Literature 1: Japanese Patent Laid-Open No. 2007-157094

Summary of Invention

Technical Problem

[0004] In Patent Literature 1, a vehicle is brought into a disposal facility and dismantled in the disposal facility.

[0005] However, in some cases, a vehicle to be disposed of is not brought into the disposal facility and left abandoned in an inappropriate place. In such a case, an example of a problem is that the vehicle cannot be appropriately disposed of.

[0006] An object of the present invention, which has been made in view of the conventional problem, is to provide a vehicle management system capable of tracking an abandoned vehicle in order to appropriately dispose of the vehicle.

Solution to Problem

[0007] In order to solve such a problem, a vehicle management system of the present invention is a vehicle management system that manages position information of a vehicle, the vehicle management system including: a terminal device including: an identification-information acquiring unit configured to acquire identification information from an information retainer attached to the vehicle and retaining the identification information; a specific-information acquiring unit configured to acquire specific information for specifically identifying one vehicle with the information retainer attached thereto; a position-information acquiring unit configured to acquire position information of the vehicle, the position information being information concerning a position of the one vehicle; and a transmitting unit configured to transmit association information associating the identification information, the vehicle specific information, and the position information of the vehicle with each other to an outside; and a server device including: a receiving unit configured to receive the association information; and a storing unit configured to store the received association information.

Brief Description of Drawings

[0008] [FIG. 1] FIG. 1 is a general view of a vehicle management system according to a first embodiment.

[FIG. 2] FIG. 2 is a block diagram of a handy terminal shown in FIG. 1.

[FIG. 3] FIG. 3 is a block diagram of a server device shown in FIG. 1.

[FIG. 4] FIG. 4 is a diagram showing a data structure of a vehicle information database shown in FIG. 3.

[FIG. 5] FIG. 5 is an explanatory diagram for explaining a form of use of the vehicle management system according to the first embodiment.

[FIG. 6] FIG. 6 is an example of a processing flow for transmitting information by the handy terminal shown in FIG. 1.

[FIG. 7] FIG. 7 is an example of a processing flow for processing data by the server device shown in FIG. 1.

[FIG. 8] FIG. 8 is an example of a processing flow of a vehicle management system according to a second embodiment.

[FIG. 9] FIG. 9 is a block diagram of a smartphone shown in FIG. 8.

[FIG. 10] FIG. 10 is an explanatory diagram for explaining a display form of the smartphone shown in FIG. 8.

[FIG. 11] FIG. 11 is an example of a processing flow of a vehicle management system according to a third embodiment.

Description of Embodiments

[0009] Embodiments of the present invention will be explained more in detail below with reference to the drawings. However, the embodiments may be altered or combined as appropriate. In the following explanation and the accompanying drawings, substantially the same or equivalent portions are denoted by the same reference signs and explained.

First Embodiment

[0010] FIG. 1 shows an overall configuration of a vehicle management system 100 in a first embodiment. As shown in FIG. 1, a handy terminal 10 functioning as a terminal device is connected to a server device 20 via a network NW. Therefore, the handy terminal 10 and the server device 20 are connected via the network NW to be capable of perform data communication with each other.

[0011] An external server 30 is, for example, a server owned by an automobile company that is obliged to recycle automobiles. The external server 30 is connected to the server device 20 via the network NW. Therefore, the external server 30 and the server device 20 are connected via the network NW to be capable of performing data communication each other. Note that the external server 30 includes a storage device (not shown) capable of storing data transmitted from the server device 20.

[0012] In FIG. 1, the handy terminal 10 includes, for example, a display DS that displays operation information of the handy terminal 10. The display DS includes, for example, a liquid crystal monitor.

[0013] The handy terminal 10 includes a keyboard KB capable of inputting character information such as alphanumeric characters and alphabets. Therefore, a user performs

input operation of the keyboard KB, whereby the handy terminal 10 can obtain input information. Note that the keyboard KB may be a touch panel displayed on the display DS.

[0014] The handy terminal 10 includes, for example, as an information retainer that retains a two-dimensional code functioning as identification information, a printer PR capable of printing a sticker on which the two-dimensional code is printed. The user operates the keyboard KB, whereby the printer PR can print the two-dimensional code on the sticker.

[0015] The handy terminal 10 includes, for example, a camera CM capable of imaging the two-dimensional code. The camera CM is a reading unit that reads an optically readable two-dimensional code. The user operates the keyboard KB, whereby the camera CM can perform imaging.

[0016] FIG. 2 shows functional blocks of the handy terminal 10 of the vehicle management system 100. As shown in FIG. 2, in the handy terminal 10, an input unit 11, a position-information acquiring unit 12, a communication unit 13, an output unit 14, and a control unit 15 are connected to one another via a system bus 16.

[0017] As explained above, the display DS is a display device that displays operation information of the handy terminal 10.

[0018] As explained above, the printer PR is a printing device capable of printing a two-dimensional code.

[0019] As explained above, the camera CM is an imaging device capable of imaging the two-dimensional code printed from the printer PR.

[0020] As explained above, the keyboard KB is an input device capable of inputting character information.

[0021] A GPS (Global Positioning System) device GD is a device configured to receive a signal (a GPS signal) from a GPS satellite. The GPS device GD acquires position information of the handy terminal 10.

[0022] The input unit 11 is an interface unit connected to the camera CM and the keyboard KB be capable of acquiring data from the camera CM and the keyboard KB. The handy terminal 10 can acquire, via the input unit 11, an image captured by the camera

CM. The handy terminal 10 can acquire, via the input unit 11, input information input to the keyboard KB.

[0023] The position-information acquiring unit 12 is an interface unit connected to the GPS device GD to be capable of acquiring data from the GPS device GD. The handy terminal 10 can acquire position information of the handy terminal 10 via the position-information acquiring unit 12.

[0024] The communication unit 13 is an interface connected to the server device 20 and the external server 30 to be capable of communicating with the server device 20 and the external server 30 via the network NW. That is, the communication unit 13 functions as a transmitting unit capable of transmitting various kinds of information to the server device 20.

[0025] The output unit 14 is an interface unit connected to the printer PR to be capable of transmitting data to the printer PR. The handy terminal 10 can cause, via the output unit 14, the printer PR to print a two-dimensional code.

[0026] The control unit 15 is realized by a computer including a CPU (Central Processing Unit) 15a functioning as an arithmetic processing device, a ROM (Read Only Memory) 15b functioning as a main storage device, and a RAM (Random Access Memory) 15c. The CPU 15a reads a program corresponding to processing content from the ROM 15b, develops the program in the RAM 15c, and cooperates with the developed program to realize various functions.

[0027] The control unit 15 can control the operations of the units of the handy terminal 10 including the camera CM, the GPS device GD, and the printer PR.

[0028] For example, if a plurality of two-dimensional codes are stored in the ROM 15b in advance, based on input operation to the keyboard KB, the control unit 15 can read the plurality of two-dimensional codes stored in the ROM 15b and causing the printer PR to print the plurality of two-dimensional codes.

[0029] The control unit 15 can cause, based on input operation to the keyboard KB, the camera CM to perform imaging. For example, the control unit 15 can cause the camera CM to image a two-dimensional code printed from the printer PR. Note that the control

unit 15 may be capable of reading information included in the imaged two-dimensional code.

[0030] The control unit 15 can acquire, for example, a vehicle body number of one vehicle based on input information input by the keyboard KB. The vehicle body number of the one vehicle is specific information capable of identifying the one vehicle. In this embodiment, the vehicle body number is explained as the specific information.

[0031] Note that the vehicle body number may be acquired from an image captured by the camera CM. In this case, for example, the control unit 15 may have a character recognition function and apply character recognition to a captured image of the vehicle body number to acquire the vehicle body number. Therefore, the control unit 15 functions as a specific-information acquiring unit that acquires specific information for specifically identifying the one vehicle.

[0032] The control unit 15 can acquire position information from the GPS device GD. That is, the control unit 15 can acquire position information of the handy terminal 10. The control unit 15 can acquire position information of a vehicle, the position information being information concerning the position of the one vehicle. Note that, in this specification, information including a vehicle body number of a vehicle with a two-dimensional code attached thereto and position information of the vehicle is described as vehicle information.

[0033] The control unit 15 can transmit association information associating the two-dimensional code attached to the one vehicle, the specific information, and the position information of the vehicle from the communication unit 13 with each other to the server device 20.

[0034] A comment concerning the one vehicle may be included in the association information. The comment is, for example, a comment that the user inputs using the keyboard KB of the handy terminal 10. In the comment, for example, a state of the vehicle at the time when the two-dimensional code is attached to the vehicle.

[0035] A photograph of the one vehicle may be included in the association information. The photograph of the one vehicle is, for example, an exterior photograph of the one vehicle.

[0036] FIG. 3 shows functional blocks of the server device 20 of the vehicle management system 100. As shown in FIG. 3, in the server device 20, a communication unit 21, a storing unit 22, and a control unit 23 are connected to one another via a system bus 24.

[0037] The communication unit 21 is an interface communicably connected to the handy terminal 10 and the external server 30 via the network NW. The communication unit 21 can receive, for example, the association information transmitted by the handy terminal 10 from the communication unit 13 of the handy terminal 10. Therefore, the communication unit 21 functions as a receiving unit capable of receiving various kinds of information including the association information transmitted from the handy terminal 10.

[0038] The storing unit 22 includes, for example, a hard disk, a flash memory, an SSD (Solid State Drive), or a RAM (Random Access Memory). A vehicle information database (hereinafter, database is described as DB) 22a is stored in the storing unit 22. The information such as the association information received by the communication unit 21 is stored in the association information DB 22a. Note that the storing unit 22 stores various programs such as BIOS (Basic Input Output System) and software.

[0039] The control unit 23 is realized by, for example, a computer including a CPU (Central Processing Unit) that performs arithmetic processing. The control unit 23 can control the operations of the units of the server device 20 including the communication unit 21. The control unit 23 can acquire the association information and the like from the handy terminal 10 via the communication unit 21 and causing the storing unit 22 to store the association information and the like. Note that a CPU 23a reads a program corresponding to processing content from a ROM 23b or the storing unit 22, executes the read program, and realizes various functions.

[0040] When receiving the association information transmitted by the handy terminal 10, the control unit 23 stores the received association information in the association information DB 22a. When receiving a plurality of kinds of association information concerning one vehicle, the control unit 23 updates the association information in order of dates and times when the kinds of association information are created.

[0041] When it is determined that the received association information already has identification information and specific information associated with each other, the control

unit 23 can notify the handy terminal 10 that the specific information included in the received association information is already acquired.

[0042] FIG. 4 shows an example of a data structure of the association information data stored in the association information DB 22a of the storing unit 22 of the server device 20. As shown in FIG. 4, as the association information, data is stored for each one vehicle in the association information DB 22a.

[0043] A two-dimensional code attached to one vehicle is included in the association information. The two-dimensional code is, for example, printed from the printer PR of the handy terminal 10. As the two-dimensional code, a unique two-dimensional code is used for each vehicle.

[0044] A vehicle body number serving as specific information for identifying the one vehicle is included in the association information. As the vehicle body number, in FIG. 4, the vehicle body number of the one vehicle is stored as "AABBCCDDEEFF". Note that the specific information is not limited to the vehicle body number and may be, for example, a manufacturer name or a vehicle model name of the vehicle.

[0045] A GPS log of the one vehicle is included in the association information. The GPS log is information indicating position information acquired by the handy terminal 10. The GPS log includes latitude and longitude. In this figure, the GPS log is shown as "139.777475, 35.668017, -7".

[0046] A comment concerning the one vehicle may be included in the association information. In this figure, in a comment field, it is recorded that "an engine is absent" in the vehicle in the position of the GPS log. A comment described in the comment field may be a state of the vehicle such as presence or absence of a traveling component such as an engine, presence or absence of a vehicle body component such as a door, presence or absence of a suspension component such as a tire, or a situation of damage of a flood damage car such as submerging.

[0047] Information concerning a dismantling status of the one vehicle may be included in the association information. For example, information indicating whether the vehicle is already dismantled and a time period required for the dismantling of the vehicle may be included in the association information. In FIG. 4, the information indicating whether the

vehicle is already dismantled is represented by "not finished" indicating that the vehicle is not dismantled and "finished" indicating that the vehicle is dismantled. A processing time may be recorded about a dismantled vehicle. In this figure, association information concerning the dismantled vehicle is present in a second stage. In the association information, "01:00" is recorded to indicate that one hour was required as a dismantling time of the dismantled vehicle.

[0048] Note that these kinds of information concerning the dismantling status may be input by a user in a dismantling factory in charge of dismantling of vehicles. When a work machine that performed the disassembling work retains information concerning the dismantling status, information concerning the dismantling such as a disassembling time may be transmitted from the work machine to the server device 20.

[0049] A photograph of the one vehicle may be included in the association information. The user can grasp a state such as a damage state of the vehicle by viewing the photograph of the vehicle information.

[0050] An overview of the vehicle management system 100 will be explained with reference to FIG. 5. It is assumed that the user finds, for example, a vehicle M, which is to be disposed of.

[0051] When finding the vehicle M, which is to be disposed of, the user operates the keyboard KB of the handy terminal 10 and causes the printer PR to issue a sticker 60 retaining a two-dimensional code 50. The user sticks, to the vehicle M, the sticker 60, on which the two-dimensional code 50 is printed, issued from the printer PR. Note that the two-dimensional code 50 printed on mere paper by the printer PR may be generated. In that case, the paper may be stuck to the vehicle M by a transparent sticker, an adhesive, or the like.

[0052] The user inputs a vehicle body number of the vehicle M from the keyboard KB of the handy terminal 10. The user operates the keyboard KB of the handy terminal 10 and creates a comment for the vehicle M.

[0053] The user operates the keyboard KB of the handy terminal 10 and images the two-dimensional code 50 and the vehicle M with the camera CM. In the imaging, imaging

data is desirably generated to be linked with position information acquired by the GPS device GD.

[0054] The user operates the keyboard KB of the handy terminal 10 and causes the handy terminal 10 to transmit association information to the server device 20. When receiving the association information, the server device 20 stores the association information in the association information DB 22a of the storing unit 22.

[0055] Note that, once the association information is stored in the association information DB 22a, the imaging data of the two-dimensional code 50 linked with the position information of the vehicle M may be transmitted to the server device 20. Consequently, it is possible to update the position information of the vehicle M.

[0056] For example, when the user finds the vehicle M to which the sticker 60 retaining the two-dimensional code 50 is stuck, the user operates the keyboard KB of the handy terminal 10 and causes the camera CM to image the vehicle M. In the imaging, the control unit 15 of the handy terminal 10 acquires position information from the GPS device GD, links the acquired position information with imaging data captured by the camera CM, and saves the imaging data in the ROM 15b.

[0057] The user operates the keyboard KB of the handy terminal 10 and causes the handy terminal 10 to transmit the imaging data of the two-dimensional code 50 linked with the position information from the handy terminal 10 to the server device 20.

[0058] When receiving the imaging data of the two-dimensional code 50 linked with the position information, the server device 20 reads the position information from the imaging data and updates the position information of the vehicle stored in the association information DB 22a of the storing unit 22. Note that, as the update of the position information of the vehicle, position information of the vehicle in the past may be saved for each time series or may be overwritten.

[0059] FIG. 6 shows transmission processing for the association information by the handy terminal 10. For example, the control unit 15 starts the transmission processing based on a start of the application program. As shown in FIG. 6, for example, the control unit 15 displays a selection message on the display DS to enable the user to select whether

registration is new registration for a new registering information concerning a vehicle (step S101).

[0060] After step S101, the control unit 15 determines, based on information selected by the user, whether the registration is new registration (step S102).

[0061] When it is determined in the determination in step S102 that the registration is new registration, that is, new registration is selected by the user (step S102: Y), the control unit 15 issues the two-dimensional code 50 (step S103). Specifically, the control unit 15 reads, for example, two-dimensional code data stored in the ROM 15b and prints and issues the two-dimensional code 50 from the printer PR.

[0062] The control unit 15 displays, on the display DS, an input message for urging an input of a vehicle body number of the vehicle, a comment concerning a vehicle state, and the like (step S104). Note that it is desirable to display that an input of a vehicle body number of the vehicle is an essential input item.

[0063] The control unit 15 determines whether an input of a vehicle body number is performed by the user (step S105). Note that the determination in step S105 is repeatedly performed until an input of a vehicle body number is performed (step S105: N).

[0064] When it is determined in the determination in step S105 that a vehicle body number is input (step S105: Y), the control unit 15 acquires the input vehicle body number as specific information (step S106). That is, the control unit 15 functions as a specific-information acquiring unit that acquires a vehicle body number serving as specific information for specifically identifying one vehicle with the sticker 60 functioning as the information retainer attached thereto.

[0065] After step S106, the control unit 15 displays, on the display DS, a photographing message for urging the user to photograph the two-dimensional code 50 (step S107). Note that, in step S107, the control unit 15 may display, on the display DS, a message for urging photographing of an exterior of the vehicle in addition to the two-dimensional code 50.

[0066] After step S107, the control unit 15 determines whether the two-dimensional code 50 is photographed by the user (step S108). The determination in step S108 is repeated until it is determined that the two-dimensional code 50 is photographed (step S108: N).

[0067] When it is determined in the determination in step S108 that the two-dimensional code 50 is photographed (step S108: Y), the control unit 15 acquires, as identification information, the two-dimensional code 50 read from the captured image (step S109). Therefore, in step S109, the control unit 15 functions as an identification-information acquiring unit that acquires identification information from the information retainer attached to the vehicle and retaining the identification information.

[0068] After step S109, the control unit 15 acquires position information with the GPS device GD (step S110). That is, the control unit 15 functions as a position-information acquiring unit that acquires position information of the vehicle, the position information being information concerning the position of one vehicle.

[0069] The control unit 15 treats, as vehicle information, information including the vehicle body number input by the user and the acquired position information of the vehicle.

Note that a comment for the vehicle input by the user and a photograph of the exterior of the vehicle may be included in the vehicle information.

[0070] After step S110, the control unit 15 transmits, to the server device 20, association information associating the imaging data of the imaged two-dimensional code 50 and the vehicle information with each other (step S111) and ends the processing.

[0071] When it is determined in the determination in step S102 that the registration is not new registration, that is, when new registration is not selected by the user (step S102: N), the control unit 15 displays, on the display DS, a photographing message for urging the user to photograph the two-dimensional code 50 (step S112). Note that, in step S112, the control unit 15 may display, on the display DS, a message for urging photographing of the exterior of the vehicle in addition to the two-dimensional code 50. The control unit 15 may display, on the display DS, an input message for urging an input of a comment concerning a state of the vehicle in addition to the photographing message.

[0072] After step S112, the control unit 15 determines whether the two-dimensional code 50 is photographed by the user (step S113). The determination in step S113 is repeated until it is determined that the two-dimensional code 50 is photographed (step S113: N).

[0073] When it is determined in the determination in step S113 that the two-dimensional code 50 is photographed (step S113: Y), the control unit 15 acquires, as identification

information, the two-dimensional code 50 read from the captured image (step S114). Therefore, in step S114, the control unit 15 functions as an identification-information acquiring unit that acquires identification information from an information retainer attached to the vehicle and retaining identification information.

[0074] After step S114, the control unit 15 acquires position information with the GPS device GD (step S115). That is, the control unit 15 functions as a position-information acquiring unit that acquires position information of a vehicle, the position information being information concerning the position of one vehicle.

[0075] After step S115, the control unit 15 transmits the imaging data of the two-dimensional code 50 and the vehicle information to the server device 20 as update information (step S116) and ends the processing.

[0076] FIG. 7 shows registration processing for association information and update processing for position information of a vehicle by the server device 20. As shown in FIG. 7, the control unit 23 of the server device 20 determines whether association information or update information is received (step S201).

[0077] When it is determined in the determination in step S201 that association information or update information is not received (step S201: N), the control unit 23 ends the processing.

[0078] When it is determined in the determination in step S201 that association information or update information is received (step S201: Y), the control unit 23 determines whether the two-dimensional code 50 included in the association information or the update information transmitted from the handy terminal 10 is the two-dimensional code 50 already registered (step S202).

[0079] In the determination in step S202, the control unit 23 determines whether the two-dimensional code 50 is already registered by, for example, determining whether the two-dimensional code 50 of the association information or the update information coincides with the two-dimensional code 50 stored in the association information DB 22a of the storing unit 22.

[0080] When it is determined in step S202 that the two-dimensional code 50 is not the two-dimensional code 50 already registered (step S202: N), the control unit 23 stores the

received association information in the association information DB 22a (step S203) and ends the processing.

[0081] When it is determined in the determination in step S202 that the two-dimensional code 50 is already registered (step S202: Y), the control unit 23 determines whether a vehicle body number is included in the received data (step S204).

[0082] When it is determined in the determination in step S204 that a vehicle body number is not included (step S204: N), the control unit 23 updates, about information other than identification information and specific information in the association information associated with the relevant two-dimensional code, information different from existing information (step S205) and ends the processing.

[0083] When it is determined in the determination in step S204 that a vehicle body number is included (step S204: Y), the control unit 23 notifies the handy terminal 10 that the specific information included in the association information or the update information is already acquired (step S206). That is, in step S206, the control unit 23 functions as a notifying unit that, when it is determined that the identification information and the specific information are associated, notifies a terminal device that the specific information is already acquired.

[0084] After the processing in step S206, the control unit 23 determines whether the vehicle body number of the association information of the relevant two-dimensional code 50 is the same (step S207).

[0085] When it is determined in the determination in step S207 that the vehicle body number of the association information of the relevant two-dimensional code 50 is the same (step S207: Y), the control unit 23 updates, about the information other than the identification information and the specific information in the association information of the relevant two-dimensional code 50, information different from the existing information (step S208) and ends the processing.

[0086] When it is determined in the determination in step S207 that the vehicle body number of the association information of the relevant two-dimensional code 50 is not the same (step S207: N), the control unit 23 discards the received association information or update information (step S209) and ends the processing.

[0087] The server device 20 may transmit the association information of the association information DB 22a to the external server 30. By receiving the association information of the association information DB 22a, the external server 30 can obtain position information of a vehicle to be disposed of. Consequently, an owner of the external server 30 can appropriately dispose of the vehicle, which is to be disposed of.

[0088] As explained above, with the vehicle management system 100 according to this embodiment, the association information associating the information specific to the vehicle: retainer such as the sticker 60, on which the two-dimensional code is printed, attached to the one vehicle; the vehicle body number, and the like and the position information with each other acquired by the handy terminal 10, which is the terminal device, are sequentially accumulated in the storing unit 22 of the server device 20. Therefore, it is easy to grasp the position of the one vehicle based on the association information.

[0089] When the sticker 60, on which the two-dimensional code 50 is printed, is attached to a vehicle, it is possible to easily track the vehicle simply by imaging the two-dimensional code without using information peculiar to the vehicle. Therefore, it is possible to make it easy to collect and track the position of a vehicle, which is to be disposed of. It is possible to perform tracking of the vehicle in order to appropriately dispose of the vehicle.

[0090] When the association information of the server device 20 is updated, imaging data of the two-dimensional code 50 linked with the position information of the vehicle is desirably transmitted. That is, the handy terminal 10 can update the position information of the vehicle of the association information simply by transmitting the imaged two-dimensional code and the position information of the vehicle to the server device 20. Therefore, the user can easily update the position information of the vehicle of the association information stored in the storing unit 22.

[0091] The user who uses the handy terminal 10, which is the terminal device, can recognize that the server device 20 already has the specific information associated with the identification information. As a result, the user can efficiently perform information collection without transmitting the specific information again.

[0092] With a vehicle management method of the present invention, the association information associating the two-dimensional code 50 attached to the one vehicle and the vehicle information acquired by the handy terminal 10, which is the terminal device, with each other is sequentially stored. Therefore, it is easy to grasp the position of the one vehicle based on the association information. The user can update the position information of the vehicle of the association information simply by causing the reading unit to read the two-dimensional code 50 and transmitting the two-dimensional code 50 and the position information of the vehicle to the server device. Therefore, the user can easily grasp the position of a vehicle, which is to be disposed of and perform tracking of the vehicle in order to appropriately dispose of the vehicle.

Second Embodiment

[0093] The vehicle management system 100 according to a second embodiment will be explained. The vehicle management system 100 according to the second embodiment is different from the vehicle management system 100 according to the first embodiment in that the vehicle management system 100 according to the second embodiment includes a smartphone as a terminal device. Otherwise, the vehicle management system 100 according to the second embodiment has the same configuration as the vehicle management system 100 according to the first embodiment. Therefore, explanation about the configuration is omitted.

[0094] When updating position information of a vehicle of association information, the terminal device only has to be able to acquire imaging data of the two-dimensional code 50 and the position information of the vehicle. The terminal device does not always need to include all the components of the handy terminal 10. When updating the position information of the vehicle of the association information, the terminal device may perform the update with, for example, the smartphone instead of the handy terminal 10.

[0095] FIG. 8 shows the configuration of the vehicle management system 100 according to the second embodiment. As shown in FIG. 8, a smartphone 40 functioning as the terminal device is connected to the server device 20 via the network NW. Therefore, the smartphone 40 and the server device 20 are connected via the network NW to be capable of performing data communication with each other.

[0096] The smartphone 40 includes, for example, a display DS2 that displays operation information of the smartphone 40. The display DS2 includes, for example, a liquid crystal monitor. The display DS2 can display a touch panel capable of inputting information such as characters.

[0097] FIG. 9 shows functional blocks of the smartphone 40. As shown in FIG. 9, in the smartphone 40, an input unit 41, a position-information acquiring unit 42, a communication unit 43, an output unit 44, and a control unit 45 are connected to one another via a system bus 46.

[0098] As explained above, the display DS2 is a display device that displays operation information of the smartphone 40. The display DS2 is connected to the smartphone 40 to be capable of performing data communication by wire or radio.

[0099] A camera CM2 is an imaging device capable of imaging the two-dimensional code 50 as explained above. The camera CM2 is connected to the smartphone 40 to be capable of performing data communication by wire or radio.

[0100] A touch panel TP is an input device capable of inputting character information as explained above. A button displayed on the display DS2 of the smartphone 40 is pressed, whereby the touch panel TP receives an input.

[0101] A GPS device GD2 is a device configured to receive a signal (a GPS signal) from a GPS satellite. The GPS device GD2 acquires position information of the smartphone 40. The GPS device GD2 is connected to the smartphone 40 to be capable of performing data communication by wire or radio.

[0102] The input unit 41 is an interface unit connected to the camera CM2 and the touch panel TP to be capable of acquiring data from the camera CM2 and the touch panel TP. The smartphone 40 can receive an image from the camera CM2 via the input unit 41. The smartphone 40 can receive character information from the touch panel TP via the input unit 41.

[0103] The position-information acquiring unit 42 is an interface unit connected to the GPS device GD2 to be capable of acquiring data from the GPS device GD2. The smartphone 40 can acquire position information of the smartphone 40 via the position-information acquiring unit 42.

[0104] The communication unit 43 is an interface connected to the server device 20 and the external server 30 via the network NW to be capable of communicating with the server device 20 and the external server 30. That is, the communication unit 43 functions as a transmitting unit capable of transmitting various kinds of information to the server device 20.

[0105] The output unit 44 is an interface unit connected to the display DS2 to be capable of displaying data on the display DS2. The smartphone 40 can cause, via the output unit 44, the display DS2 to display data.

[0106] The control unit 45 is realized by a computer including a CPU (Central Processing Unit) 45a functioning as an arithmetic processing device, a ROM (Read Only Memory) 45b functioning as a main storage device, and a RAM (Random Access Memory) 45c. The CPU 45a reads a program corresponding to processing content from the ROM 45b, develops the program in the RAM 45c, and cooperates with the developed program to realize various functions. Note that a plurality of two-dimensional codes 50 are stored in the ROM 45b. The control unit 45 can control the operations of the units of the smartphone 40 including the communication unit 43.

[0107] The control unit 45 can cause, based on input information input in the touch panel TP, the camera CM2 to perform imaging. For example, the control unit 45 can cause the camera CM2 to image the two-dimensional code 50 stuck to the vehicle. Note that the control unit 45 can read information included in the imaged two-dimensional code 50.

[0108] The control unit 45 can cause, based on input information input in the touch panel TP, the GPS device GD2 to acquire position information. That is, the control unit 45 can acquire position information of the smartphone 40.

[0109] The control unit 45 can transmit association information associating the two-dimensional code 50 attached to one vehicle and vehicle information from the communication unit 43 with each other to the server device 20.

[0110] As explained above, with the vehicle management system 100 according to this embodiment, the association information associating the two-dimensional code 50 attached to the one vehicle and the vehicle information acquired by the handy terminal 10 and the smartphone 40, which are terminal devices, with each other is sequentially

accumulated in the storing unit 22 of the server device 20. Therefore, it is easy to grasp the position of the one vehicle based on the association information. Therefore, it is possible to easily grasp the position of a vehicle, which is to be disposed of. It is possible to perform tracking of the vehicle in order to appropriately dispose of the vehicle.

[0111] In particular, by using the handy terminal 10 and the smartphone 40 as the terminal devices, a large number of users can provide position information of vehicles. Therefore, it is possible to increase an update frequency of the position information of the vehicles.

[0112] Note that, the first embodiment and the second embodiment are explained using the two-dimensional code 50 as an example of the identification information. However, the identification information is not limited to the two-dimensional code 50 and may be other figures or characters that can be distinguished from one another. For example, the identification information may be a one-dimensional code such as a barcode. The information retainer is not limited to the sticker 60 or the like on which the two-dimensional code 50 is retained by being printed and may be, for example, an IC tag. When the information retainer is the IC tag, the identification information is stored in the IC tag.

[0113] When the information retainer is the IC tag, IC tag readers only have to be included in the handy terminal 10 and the smartphone 40 instead of the cameras CM and CM2.

Third Embodiment

[0114] The vehicle management system 100 according to a third embodiment will be explained. The vehicle management system 100 according to the third embodiment is different from the vehicle management system 100 according to the first or second embodiment in that the vehicle management system according to the third embodiment calculates a reward that should be granted to, according to a form of reception of association information, a transmitter who transmits the association information of the handy terminal 10 or the smartphone 40. Otherwise, the vehicle management system 100 according to the third embodiment has the same configuration as the vehicle management system 100 according to the first or second embodiment. Therefore, explanation about the configuration is omitted.

[0115] The control unit 23 can generate reward information concerning a reward that should be granted to a transmitter of association information of a vehicle, the two-dimensional code 50, and position information of the vehicle. Therefore, the control unit 23 functions as a reward calculating unit that generates reward information concerning a reward that should be granted to a transmitter of association information of one vehicle, the two-dimensional code 50, and position information of the vehicle, that is, calculates the reward.

[0116] For example, the reward calculating unit calculates a reward according to a form of reception of association information of one vehicle, the two-dimensional code 50, and position information of the vehicle and generates reward information. Specifically, the reward calculating unit can determine whether association information acquired anew is changed from association information already acquired and, if there is a change, performing calculation of a reward corresponding to a degree of the change.

[0117] The reward information is, for example, information concerning money paid to a transmitter of association information and update information. Note that the reward information is not limited to the information concerning the money paid to the transmitter and may be, for example, a point of a point program granted to the transmitter.

[0118] The control unit 23 makes it possible to search for the position of one vehicle based on specific information and identification information and can cause the handy terminal 10 or the smartphone 40 to display position information of the vehicle.

[0119] For example, the server device 20 can transmit, according to a transmission request for position information of one vehicle from the smartphone 40, the position information of the vehicle to the smartphone 40. When receiving the transmission request for the position information of the one vehicle from the smartphone 40, for example, the server device 20 can read the position information of the vehicle from the vehicle information DB 22a according to a vehicle body number included in the transmission request and transmitting the position information to the smartphone 40.

[0120] FIG. 10 shows a display form of the display DS2 of the smartphone 40. In FIG. 10, the position information of the vehicle transmitted from the server device 20 is displayed on the display DS2 of the smartphone 40.

[0121] Specifically, the position information of the one vehicle is displayed on the display DS2 of the smartphone 40 together with a map and a date when association information is acquired. Positions of the one vehicle on respective dates are position information of the vehicle based on association information received by the server device 20 on the respective dates.

[0122] Position information of a vehicle of association information received by the server device 20 on February 1, 2019 is represented as an A point. Position information of the vehicle of association information received by the server device 20 on February 5, 2019 is represented as a B point. Position information of the vehicle of the association information received by the server device 20 on February 8, 2019 is represented as a C point.

[0123] In FIG. 10, for example, one vehicle moved from the A point to the B point between February 1 and February 5, 2019 and moved from the B point to the C point between February 5 and February 8, 2019.

[0124] The control unit 23 of the server device 20 can calculate a reward according to a form of received information. For example, association information has a larger information amount than update information. Therefore, the handy terminal 10 that transmits the association information may obtain a higher reward than the handy terminal 10 that transmits the update information.

[0125] A reward may be decided according to a volume of an information amount included in the association information and the update information. For example, when an exterior photograph of a vehicle or a comment concerning the vehicle is included in the association information and the update information, a reward increased from a normal reward may be decided.

[0126] A higher reward may be obtained when association information acquired anew is changed from association information already acquired. The association information acquired anew is changed from the association information already acquired, for example, when position information of the vehicle changes or an attaching state of components of the vehicle changes. When a vehicle state changes, for example, when tires are attached to the vehicle in the association information already acquired but tires are absent in the

association information acquired anew, a reward increased from the normal reward may be decided.

[0127] FIG. 11 shows an example of calculation processing for a reward by the control unit 23 of the server device 20. As shown in FIG. 11, the control unit 23 of the server device 20 determines whether association information or update information is received (step S301).

[0128] When it is determined in the determination in step S301 that association information or update information is not received (step S301: N), the control unit 23 ends the processing.

[0129] When it is determined in the determination in step S301 that association information or update information is received (step S301: Y), the control unit 23 determines whether the two-dimensional code 50 included in the association information or the update information transmitted from the handy terminal 10 is the two-dimensional code 50 already registered (step S302).

[0130] In the determination in step S302, for example, the control unit 23 determines whether the two-dimensional code 50 is already registered by determining whether the two-dimensional code 50 of the association information or the update information coincides with the two-dimensional code 50 stored in the association information DB 22a of the storing unit 22.

[0131] When it is determined in step S302 that the two-dimensional code 50 of the association information or the update information is not the two-dimensional code already registered (step S302: N), the control unit 23 calculates, as a first reward, a reward granted to the terminal (step S303) and generates first reward information. That is, the control unit 23 functions as a reward calculating unit that calculates a reward that should be granted to a transmitter who transmits the association information.

[0132] After step S303, for example, the control unit 23 transmits the first reward information to the external server 30, which manages the reward information, (step S304) and ends the processing.

[0133] When it is determined in the determination in step S302 that the received two-dimensional code 50 is already registered (step S302: Y), the control unit 23 determines

whether position information of a vehicle included in the received association information or update information is different from position information of the vehicle incidental to the two-dimensional code 50 already registered (step S305).

[0134] When it is determined in step S305 that the position information of the vehicle included in the received association information or update information is different from the position information of the vehicle incidental to the two-dimensional code 50 already registered (step S305: Y), the control unit 23 calculates, as a second reward, a reward granted to the terminal (step S306) and generates second reward information. That is, the control unit 23 functions as a reward calculating unit that calculates a reward that should be granted to the transmitter who transmits the association information.

[0135] After step S306, for example, the control unit 23 transmits the second reward information to the external server 30, which manages the reward information, (step S307) and ends the processing. Note that the second reward is desirably set to, for example, a reward lower than the first reward.

[0136] When it is determined in step S305 that the position information of the vehicle included in the received association information or update information is the same as the position information of the vehicle incidental to the two-dimensional code 50 already registered (step S305: N), the control unit 23 determines, based on vehicle information included in the received association information or update information, whether a vehicle state is different (step S308).

[0137] When it is determined in step S308 that the vehicle state is different (step S308: Y), the control unit 23 calculates, as a third reward, a reward granted to the terminal (step S309) and generates third reward information. That is, the control unit 23 functions as a reward calculating unit that calculates a reward that should be granted to the transmitter who transmits the association information.

[0138] After step S309, for example, the control unit 23 transmits the third reward information to the external server 30, which manages the reward information, (step S310) and ends the processing. Note that the third reward is desirable set to, for example, a reward lower than the first reward and equivalent to the second reward.

[0139] When it is determined in step S308 that the vehicle state is the same (step S308: N), the control unit 23 calculates, as a fourth reward, a reward granted to the terminal (step S311) and generates fourth reward information. That is, the control unit 23 functions as a reward calculating unit that calculates a reward that should be granted to the transmitter who transmits the association information.

[0140] After step S311, for example, the control unit 23 transmits the third reward information to the external server 30, which manages the reward information (step S312) and ends the processing. Note that the fourth reward is desirably set lower than the first reward, the second reward, and the third reward and may be set to, for example, "no reward".

[0141] An automobile company owning the external server 30 grants, based on the reward information transmitted to the external server 30, for example, when a reward is money, the reward by transfer to an account of the user registered in advance. For example, when the reward is a point program, the automobile company grants the reward to an ID card of the user registered in advance.

[0142] The reward granted to the user, who is the transmitter who acquires and transmits the association information with the terminal device in this way, whereby it is possible to promote volition of the user to collection work for various kinds of information included in the association information. Therefore, it is possible to increase a new registration frequency and an update frequency of the association information. It is possible to increase an information amount of the association information and the update information.

[0143] Since calculation of a reward corresponding to a change degree is performed, it is possible to particularly promote collection volition for useful information such as movement of a vehicle. It is possible to increase an update frequency of information and effectively collect information.

[0144] Further, as explained above, when the specific information is not limited to the vehicle body number, for example, when a manufacturer name and a vehicle model name of the vehicle are also treated as specific information, a reward may be changed according to whether the specific information of the vehicle included in the association information is the vehicle body number, the manufacturer name or the vehicle model name. For

example, the reward may be reduced in the order of the vehicle body number, the vehicle model name, and the manufacturer name in descending order of identifiability of the vehicle.

[0145] A rank of a reward may be determined according to a vehicle model of a vehicle desired by the owner of the external server 30. The rank of the reward is set in this way, whereby it is possible to efficiently obtain position information of the vehicle of the desired vehicle model.

[0146] The reward information is generated according to a form of reception of association information of one vehicle, the two-dimensional code 50, and position information of the vehicle in this way. Consequently, it is possible to motivate the user to preferentially collect information with high priority.

[0147] With the vehicle management system of the present invention, association information associating identification information, vehicle specific information, and position information of the vehicle acquired by the terminal device with each other is sequentially accumulated in the storing unit of the server device. Therefore, it is easy to grasp the position of one vehicle based on the association information. Therefore, it is possible to easily grasp the position of a vehicle, which is to be disposed of. It is possible to perform tracking of the vehicle in order to appropriately dispose of the vehicle.

[0148] The server device may include a reward calculating unit that calculates a reward that should be granted to a transmitter who transmits the association information.

[0149] According to such an aspect, the reward granted to the user, who is the transmitter who acquires and transmits the association information with the terminal device, is calculated. Consequently, it is possible to promote volition of the user to collection work for various kinds of information included in the association information. Therefore, it is possible to increase an update frequency of the association information.

[0150] Further, the server device determines whether the association information acquired anew is changed from the association information already acquired. When there is a change, the server device may perform calculation of a reward corresponding to a degree of the change.

[0151] According to such an aspect, since the calculation of the reward corresponding to the change degree is performed, it is possible to particularly promote collection volition for useful information such as movement of a vehicle. It is possible to increase an update frequency of information and effectively collect information.

[0152] Furthermore, the server device may include a notifying unit that, when it is determined that the identification information and the specific information are associated, notifies the terminal device that the specific information is already acquired.

[0153] According to such an aspect, the user who uses the terminal device can recognize that the server device already has the specific information associated with the identification information. As a result the user can efficiently perform information collection without transmitting the specific information again.

[0154] The server device may make it possible to search for the position of the vehicle based on the specific information and the identification information and cause the terminal device to display position information of the vehicle.

[0155] According to such an aspect, the user who uses the terminal device can easily grasp the position of the vehicle. Therefore, the user can easily grasp the position of a vehicle, which is to be disposed of, and perform tracking of the vehicle in order to appropriately dispose of the vehicle.

[0156] A vehicle management system of the present invention is a vehicle management system that manages position information of a vehicle, the vehicle management system including: a terminal device including: an identification-information acquiring unit configured to acquire identification information from an information retainer attached to the vehicle and retaining the identification information; a position-information acquiring unit configured to acquire the position information of the vehicle, the position information being information concerning a position of one vehicle; and a transmitting unit configured to transmit association information associating the identification information and the position information of the vehicle with each other to an outside; and a server device including: a receiving unit configured to receive the association information; a storing unit configured to store the received association information; and a calculating unit configured to compare a newly received association information with an already acquired association

information and perform calculation of a reward corresponding to a degree of a change of the association information.

[0157] With the vehicle management system of the present invention, the association information associating the identification information and the position information of the vehicle with each other acquired by the terminal device is sequentially accumulated in the storing unit of the server device. Therefore, it is easy to grasp the position of the one vehicle based on the association information. Therefore, it is possible to easily grasp the position of a vehicle, which is to be disposed of, and perform tracking of the vehicle in order to appropriately dispose of the vehicle. The server device can perform calculation of a reward according to a change degree of the association information. Therefore, the server device can encourage the user, who uses the terminal device, to update information.

Reference Signs List

[0158]

100 vehicle management system

10 handy terminal

13 communication unit

15 control unit

20 server device

21 communication unit

23 control unit

50 two-dimensional code

60 sticker

CM camera

Claims

[Claim 1]

A vehicle management system that manages position information of a vehicle, the vehicle management system comprising:

a terminal device including:

an identification-information acquiring unit configured to acquire identification information from an information retainer attached to the vehicle and retaining the identification information;

a specific-information acquiring unit configured to acquire specific information for specifically identifying one vehicle with the information retainer attached thereto;

a position-information acquiring unit configured to acquire the position information of the vehicle, the position information being information concerning a position of the one vehicle; and

a transmitting unit configured to transmit association information associating the identification information, the specific information, and the position information of the vehicle with each other to an outside; and

a server device including:

a receiving unit configured to receive the association information;

a storing unit configured to store the received association information; and

a calculating unit configured to compare a newly received association information with an already acquired association information and perform calculation of a reward corresponding to a degree of a change of the association information,

wherein the server device searches a position of the vehicle based on the specific information and the identification information.

[Claim 2]

The vehicle management system according to claim 1, wherein the server device associates the identification information and the specific information with a date when the association information was acquired, and stores in the storing unit.