DESCRIPTION

TITLE

METHOD, INFORMATION PROCESSING DEVICE, AND NON-TRANSITORY COMPUTER-READABLE MEDIUM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Japanese Patent Application No. 2024-032490, filed on March 4, 2024, the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a method, an information processing apparatus, and a program.

BACKGROUND

[0003] Conventionally, there exists technology related to services provided by connecting a vehicle and a terminal apparatus used by a user. For example, Patent Literature (PTL) 1 discloses that, in a vehicle information communication system communicable with an in-vehicle apparatus from an information terminal used by a user via a management center, when the in-vehicle apparatus detects a different information terminal from before, the management center performs user verification processing to verify a user of the vehicle.

CITATION LIST

Patent Literature

[0004] PTL 1: JP 2007-265223 A

SUMMARY

(Technical Problem)

[0005] It is difficult for a user to experience services provided by connecting a vehicle and a terminal apparatus, using an actual vehicle before purchasing the vehicle. Thus, there is room for improvement in technology related to services provided by connecting a vehicle and a terminal apparatus.

(Solution to Problem)

[0006] A method according to the present disclosure is a method performed by an information processing apparatus including a communication interface configured to communicate with a terminal apparatus and a vehicle, and a controller, the method including:

receiving, by the controller from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determining, by the controller, an expiration period of an operation interface used for the remote service;

transmitting, by the controller to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generating, by the controller based on the operation request signal, an instruction signal for controlling the vehicle; and

transmitting, by the controller, the instruction signal to the vehicle via the communication interface.

[0007] An information processing apparatus according to the present disclosure includes:

a communication interface configured to communicate with a terminal apparatus and a vehicle; and

a controller configured to:

receive, from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determine an expiration period of an operation interface used for the remote service;

transmit, to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generate, based on the operation request signal, an

instruction signal for controlling the vehicle; and

transmit the instruction signal to the vehicle via the communication interface.

[0008] A program according to the present disclosure is configured to cause a computer as an information processing apparatus to execute operations, the information processing apparatus including a communication interface configured to communicate with a terminal apparatus and a vehicle, and a controller, the operations including:

receiving, from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determining an expiration period of an operation interface used for the remote service;

transmitting, to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generating, based on the operation request signal, an instruction signal for controlling the vehicle; and

transmitting the instruction signal to the vehicle via the communication interface.

(Advantageous Effect)

[0009] According to the present disclosure, it becomes possible to improve technology related to services provided by connecting a vehicle and a terminal apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] In the accompanying drawings:

FIG. 1 is a diagram illustrating a schematic configuration of a system according to an embodiment of the present disclosure;

FIG. 2A is a flowchart illustrating operations of an information processing apparatus according to the embodiment of the present disclosure; and

FIG. 2B is a flowchart illustrating operations of the information

processing apparatus according to the embodiment of the present disclosure.

DETAILED DESCRIPTION

[0011] An embodiment of the present disclosure will be described below, with reference to the drawings. In the drawings, the same or corresponding portions are denoted by the same reference numerals. In the descriptions of the present embodiment, detailed descriptions of the same or corresponding portions are omitted or simplified as appropriate.

[0012] A configuration of a system 1 according to the present embodiment will be described with reference to FIG. 1. The system 1 includes an information processing apparatus 10, a terminal apparatus 20, and a vehicle 30. The apparatuses are communicably connected to each other via a network 40 including the Internet, for example.

[0013] The information processing apparatus 10 is a computer installed in a facility such as a data center. The information processing apparatus 10 is, for example, a server that belongs to a cloud computing system or another type of computing system.

[0014] The terminal apparatus 20 is held by a user. The terminal apparatus 20 is, for example, a mobile device such as a mobile phone, a smartphone, or a tablet, or a PC. The term "PC" is an abbreviation of personal computer. In the present embodiment, the terminal apparatus 20 is used by the user considering the purchase of the vehicle 30.

[0015] The vehicle 30 may be any type of automobile, such as a gasoline vehicle, a diesel vehicle, a Battery Electric Vehicle (BEV), a Hybrid Electric Vehicle (HEV), a Plug-in Hybrid Electric Vehicle (PHEV), or a Fuel Cell Electric Vehicle (FCEV). The vehicle 30 may be capable of moving using automated driving. The automated driving may include any level from Level 1 to Level 5 as defined by the Society of Automotive Engineers (SAE), for example, but is not limited to these, and may be defined freely. In the present embodiment, the vehicle 30 is one that is placed at a store of a vehicle sales operator. The vehicle 30 may be one that the user considering the purchase of the vehicle 30 temporarily test drives. Not limited to this, the vehicle 30 may be a vehicle managed by a rental car operator or the like.

[0016] The network 40 includes the Internet, at least one WAN, at least one MAN, or any combination thereof. The term "WAN" is an abbreviation of wide area network. The term "MAN" is an abbreviation of metropolitan area

network. The network 40 may include at least one wireless network, at least one optical network, or any combination thereof. The wireless network is, for example, an ad hoc network, a cellular network, a wireless LAN, a satellite communication network, or a terrestrial microwave network. The term "LAN" is an abbreviation of local area network.

[0017] An outline of the present embodiment will be first described, and details thereof will be described later. The information processing apparatus 10 receives, from the terminal apparatus 20, a start request signal requesting the start of remote services related to the vehicle 30. The information processing apparatus 10 determines an expiration period of an operation interface used for the remote services, and transmits, to the terminal apparatus 20, information causing the terminal apparatus 20 to function as the operation interface. Upon receiving, from the terminal apparatus 20 within the expiration period, an operation request signal indicating an operation request for a remote service inputted using the operation interface, the information processing apparatus 10 generates, based on the operation request signal, an instruction signal for controlling the vehicle 30. The information processing apparatus 10 transmits the instruction signal to the vehicle 30.

[0018] According to the present embodiment, it becomes possible to smoothly provide a demonstration of the remote services to be offered after the purchase of the vehicle 30, temporarily to the user using the actual vehicle. As described below, since the user can freely operate the vehicle 30 in a secured state, a representative of the vehicle sales operator can recommend a temporary experience of the remote services to the user with confidence in security. For the user, the experience of the remote services can be used as a factor in determining whether to purchase the vehicle 30. Therefore, technology related to services provided by connecting a vehicle and a terminal apparatus can be improved.

[0019] A configuration of the information processing apparatus 10 according to the present embodiment will be described with reference to FIG. 1. The information processing apparatus 10 includes a controller 11, a memory 12, and a communication interface 13.

[0020] The controller 11 includes at least one processor, at least one programmable circuit, at least one dedicated circuit, or any combination thereof. The processor is a general purpose processor such as a CPU or a GPU, or a dedicated processor that is dedicated to specific processing. The term

"CPU" is an abbreviation of central processing unit. The term "GPU" is an abbreviation of graphics processing unit. The programmable circuit is, for example, an FPGA. The term "FPGA" is an abbreviation of field-programmable gate array. The dedicated circuit is, for example, an ASIC. The term "ASIC" is an abbreviation of application specific integrated circuit. The controller 11 executes processes related to operations of the information processing apparatus 10 while controlling components of the information processing apparatus 10.

[0021] The memory 12 includes at least one semiconductor memory, at least one magnetic memory, at least one optical memory, or any combination thereof. The semiconductor memory is, for example, RAM, ROM, or flash memory. The term "RAM" is an abbreviation of random access memory. The term "ROM" is an abbreviation of read only memory. The RAM is, for example, SRAM or DRAM. The term "SRAM" is an abbreviation of static random access memory. The term "DRAM" is an abbreviation of dynamic random access memory. The ROM is, for example, EEPROM. The term "EEPROM" is an abbreviation of electrically erasable programmable read only memory. The flash memory is, for example, SSD. The term "SSD" is an abbreviation of solid-state drive. The magnetic memory is, for example, HDD. The term "HDD" is an abbreviation of hard disk drive. The memory 12 functions as, for example, a main memory, an auxiliary memory, or a cache memory. The memory 12 stores information to be used in operations of the information processing apparatus 10 and information obtained by operations of the information processing apparatus 10.

[0022] The communication interface 13 includes at least one communication module. The communication module is, for example, a module compatible with a wired LAN communication standard such as Ethernet® (Ethernet is a registered trademark in Japan, other countries, or both), or a wireless LAN communication standard such as IEEE 802.11. The name "IEEE" is an abbreviation of Institute of Electrical and Electronics Engineers. The communication interface 13 communicates with apparatuses other than the information processing apparatus 10. The communication interface 13 receives information to be used in operations of the information processing apparatus 10, and transmits information obtained by operations of the information processing apparatus 10.

[0023] With reference again to FIG. 1, a configuration of the terminal

apparatus 20 according to the present embodiment will be described. The terminal apparatus 20 includes a controller 21, a memory 22, a communication interface 23, an input interface 24, an output interface 25, and a positioner 26.

[0024] The controller 21 includes at least one processor, at least one programmable circuit, at least one dedicated circuit, or any combination thereof. The processor is a general purpose processor such as a CPU or a GPU, or a dedicated processor that is dedicated to specific processing. The programmable circuit is, for example, an FPGA. The dedicated circuit is, for example, an ASIC. The controller 21 executes processes related to operations of the terminal apparatus 20 while controlling components of the terminal apparatus 20.

[0025] The memory 22 includes at least one semiconductor memory, at least one magnetic memory, at least one optical memory, or any combination thereof. The semiconductor memory is, for example, RAM, ROM, or flash memory. The RAM is, for example, SRAM or DRAM. The ROM is, for example, EEPROM. The flash memory is, for example, SSD. The magnetic memory is, for example, HDD. The memory 22 functions as, for example, a main memory, an auxiliary memory, or a cache memory. The memory 22 stores data to be used in operations of the terminal apparatus 20 and data obtained by operations of the terminal apparatus 20.

[0026] The communication interface 23 includes at least one interface for communication. The interface for communication is, for example, an interface compatible with a mobile communication standard such as LTE, the 4G standard, or the 5G standard, or a wireless LAN communication standard such as IEEE 802.11. The term "LTE" is an abbreviation of Long Term Evolution. The term "4G" is an abbreviation of 4th generation. The term "5G" is an abbreviation of 5th generation. The communication interface 23 communicates with apparatuses other than the terminal apparatus 20. The communication interface 23 receives data to be used in operations of the terminal apparatus 20, and transmits data obtained by operations of the terminal apparatus 20.

[0027] The input interface 24 includes at least one interface for input. The interface for input is, for example, a physical key, a capacitive key, a pointing device, a touch screen integrally provided with a display, a camera, or a microphone. The input interface 24 accepts operations for inputting data to be used in operations of the terminal apparatus 20. The input interface 24 may be

connected to the terminal apparatus 20 as an external input device, instead of being included in the terminal apparatus 20. As an interface for connection, an interface compliant with a standard such as USB, HDMI® (HDMI is a registered trademark in Japan, other countries, or both), or Bluetooth® (Bluetooth is a registered trademark in Japan, other countries, or both) can be used. The term "USB" is an abbreviation of Universal Serial Bus. The term "HDMI®" is an abbreviation of High-Definition Multimedia Interface.

[0028] The output interface 25 includes at least one interface for output. The interface for output is, for example, a display or a speaker. The display is, for example, an LCD or an organic EL display. The term "LCD" is an abbreviation of liquid crystal display. The term "EL" is an abbreviation of electro luminescent. The output interface 25 outputs data obtained by operations of the terminal apparatus 20. The output interface 25 may be connected to the terminal apparatus 20 as an external output device, instead of being included in the terminal apparatus 20. As an interface for connection, an interface compliant with a standard such as USB, HDMI®, or Bluetooth® can be used.

[0029] The positioner 26 includes at least one GNSS receiver. The term "GNSS" is an abbreviation of global navigation satellite system. GNSS is, for example, GPS, QZSS, BDS, GLONASS, or Galileo. The term "GPS" is an abbreviation of Global Positioning System. The term "QZSS" is an abbreviation of Quasi-Zenith Satellite System. QZSS satellites are called quasi-zenith satellites. The term "BDS" is an abbreviation of BeiDou Navigation Satellite System. The term "GLONASS" is an abbreviation of Global Navigation Satellite System. The positioner 26 measures the location of the terminal apparatus 20, and outputs the location to the controller 21.

[0030] With reference again to FIG. 1, a configuration of the vehicle 30 according to the present embodiment will be described. The vehicle 30 includes a controller 31, a memory 32, a communication interface 33, an input interface 34, an output interface 35, and a positioner 36.

[0031] The controller 31 includes at least one processor, at least one programmable circuit, at least one dedicated circuit, at least one ECU, or any combination thereof. The term "ECU" is an abbreviation of electronic control unit. The processor is a general purpose processor such as a CPU or a GPU, or a dedicated processor that is dedicated to specific processing. The programmable circuit is, for example, an FPGA. The dedicated circuit is, for example, an ASIC. The controller 31 executes processes related to operations

of the vehicle 30 while controlling components of the vehicle 30.

[0032] The memory 32 includes at least one semiconductor memory, at least one magnetic memory, at least one optical memory, or any combination thereof. The semiconductor memory is, for example, RAM or ROM. The RAM is, for example, SRAM or DRAM. The ROM is, for example, EEPROM. The memory 32 functions as, for example, a main memory, an auxiliary memory, or a cache memory. The memory 32 stores data to be used in operations of the vehicle 30 and data obtained by operations of the vehicle 30.

[0033] The communication interface 33 includes at least one interface for communication. The interface for communication is, for example, an interface compliant with a mobile communication standard such as LTE, the 4G standard, or the 5G standard, an interface compliant with a short-range wireless communication standard such as Bluetooth®, or a LAN interface. The communication interface 33 receives data to be used in operations of the vehicle 30, and transmits data obtained by operations of the vehicle 30.

[0034] The input interface 34 includes at least one interface for input. The interface for input is, for example, a physical key, a capacitive key, a pointing device, a touch screen integrally provided with a display, a camera, or a microphone. The input interface 34 accepts operations for inputting data to be used in operations of the vehicle 30. The input interface 34 may be connected to the vehicle 30 as an external input device, instead of being provided in the vehicle 30. As a connection method, for example, any method such as USB, HDMI®, or Bluetooth® can be used.

[0035] The output interface 35 includes at least one interface for output. The interface for output is, for example, a display or a speaker. The display is, for example, an LCD or an organic EL display. The output interface 35 outputs data obtained by operations of the vehicle 30. The output interface 35 may be connected to the vehicle 30 as an external output device, instead of being included in the vehicle 30. As a connection method, for example, any method such as USB, HDMI®, or Bluetooth® can be used.

[0036] The positioner 36 includes at least one GNSS receiver. GNSS is, for example, GPS, QZSS, BDS, GLONASS, or Galileo. QZSS satellites are called quasi-zenith satellites. The positioner 36 measures the location of the vehicle 30, and outputs the location to the controller 31.

[0037] The functions of the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30 are realized by executing a program according

to the present embodiment by a processor serving as the controller 11, the controller 21, or the controller 31. That is, the functions of the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30 are realized by software. The program causes a computer to execute operations of the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30, thereby causing the computer to function as the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30. That is, the computer executes operations of the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30 in accordance with the program to thereby function as the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30.

[0038] The program can be stored on a non-transitory computer readable medium. The non-transitory computer readable medium is, for example, flash memory, a magnetic recording device, an optical disc, a magneto-optical recording medium, or ROM. The program is distributed, for example, by selling, transferring, or lending a portable medium such as an SD card, a DVD, or a CD-ROM on which the program is stored. The term "SD" is an abbreviation of Secure Digital. The term "DVD" is an abbreviation of digital versatile disc. The term "CD-ROM" is an abbreviation of compact disc read only memory. The program may be distributed by storing the program in a storage of a server and transferring the program from the server to another computer. The program may be provided as a program product.

[0039] For example, the computer temporarily stores, in a main memory, the program stored in the portable medium or the program transferred from the server. Then, the computer reads the program stored in the main memory using the processor, and executes processes in accordance with the read program using the processor. The computer may read the program directly from the portable medium, and execute processing in accordance with the program. The computer may, each time a program is transferred from the server to the computer, sequentially execute processes in accordance with the received program. Instead of transferring the program from the server to the computer, processes may be executed by a so-called ASP type service that realizes functions only by execution instructions and result acquisitions. The term "ASP" is an abbreviation of application service provider. The program encompasses information that is to be used for processes by an electronic computer and is thus equivalent to a program. For example, data that is not a

direct command to a computer but has a property that regulates processes of the computer is "equivalent to a program" in this context.

[0040] Some or all of the functions of the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30 may be realized by a programmable circuit or a dedicated circuit serving as the controller 11, the controller 21, or the controller 31. That is, some or all of the functions of the information processing apparatus 10, the terminal apparatus 20, or the vehicle 30 may be realized by hardware.

[0041] Operations of the information processing apparatus 10 according to the present embodiment will be described with reference to FIGS. 2A and 2B. The operations in FIGS. 2A and 2B correspond to a method according to the present embodiment. In the following, communications between the information processing apparatus 10 and external apparatuses are carried out via the communication interface 13 and the network 40.

[0042] In S101 of FIG. 2A, the controller 11 of the information processing apparatus 10 receives, from the terminal apparatus 20, a start request signal requesting the start of remote services related to the vehicle 30. The remote services related to the vehicle 30 include services that enable remote control of various apparatuses of the vehicle 30. Not limited to this, the remote services may include causing an external apparatus, including the terminal apparatus 20, to display various statuses of the vehicle 30.

[0043] The start request signal may be transmitted from the terminal apparatus 20 to the information processing apparatus 10 in response to any trigger. For example, when the terminal apparatus 20 reads, using a camera or the like, a predetermined code including the vehicle identification number and the like of the vehicle 30, the start request signal may be transmitted to the information processing apparatus 10. The code may be a QR Code® (QR Code is a registered trademark in Japan, other countries, or both), a barcode, or the like, and may be provided at the store of the vehicle sales operator. The controller 21 of the terminal apparatus 20 may transmit the start request signal to the information processing apparatus 10 according to an application made by the user on a predetermined web page. At this time, identification information that identifies the terminal apparatus 20, such as the phone number of the terminal apparatus 20 or an identifier of the terminal apparatus 20, may also be transmitted to the information processing apparatus 10.

[0044] In S102, the controller 11 receives terminal location information

indicating the location of the terminal apparatus 20 from the terminal apparatus 20, and receives vehicle location information indicating the location of the vehicle 30 from the vehicle 30.

[0045] In S103, the controller 11 determines whether the distance between the location of the terminal apparatus 20 indicated by the terminal location information received in S102 and the location of the vehicle 30 indicated by the vehicle location information is less than a predetermined distance. The predetermined distance may be preset and stored in the memory 12. The predetermined distance may be a distance that fits within the premises of the vehicle sales operator in which the vehicle 30 is placed, such as 10 meters, for example. When the distance is less than the predetermined distance (S103: YES), the operation of the controller 11 proceeds to S105. When the distance is greater than or equal to the predetermined distance (S103: NO), the operation of the controller 11 proceeds to S104.

[0046] In S104, the controller 11 rejects the start request signal from the terminal apparatus 20. Subsequently, the operation of the controller 11 returns to the beginning. As a result, only the terminal apparatus 20 that is within the predetermined distance from the location of the vehicle 30 can remotely operate the vehicle 30. The remote services are temporarily provided only to the user of the terminal apparatus 20, thereby ensuring security more reliably.

[0047] In S105, the controller 11 determines an expiration period of an operation interface used for the remote services. For example, the controller 11 may communicate with a terminal apparatus used by the representative of the vehicle sales operator, receive, from this terminal apparatus, information indicating a termination date and time for providing the remote services, and determine this termination date and time as the expiration period. For example, the controller 11 may refer to information indicating a time that is stored in advance in the memory 12, add this time to the current time, and determine the calculated date and time as the expiration period. The time may be one hour or the like. After determining the expiration period, the controller 11 may start a countdown until the expiration period.

[0048] In S106, the controller 11 transmits, to the terminal apparatus 20, information causing the terminal apparatus 20 to function as the operation interface. This information includes the address of a web application that the terminal apparatus 20 connects to and uses, settings for launching the web application, and the like. The address includes a connection URL and the like.

The term "URL" is an abbreviation of uniform resource locator. The web application is provided by the information processing apparatus 10. The settings for launching the web application may include any information such as a token or a code. In this case, the controller 21 of the terminal apparatus 20 connects to the web application using the settings, from the address indicated by the information received from the information processing apparatus 10. The controller 11 of the information processing apparatus 10 may permit the connection from the terminal apparatus 20 based on the settings. This enables only remote operations via the web application provided by the information processing apparatus 10, thereby ensuring security more reliably in the temporary provision of the remote services.

[0049] The controller 11 may transmit an SMS containing the address to the terminal apparatus 20 using the phone number of the terminal apparatus 20. The term "SMS" is an abbreviation for Short Message Service. For example, the controller 21 may accept, through the input interface 24, an user operation for selecting the address included in the SMS to connect to the web application. Transmitting the SMS with the address allows the user to reselect the address and open the web application even when the user has accidentally closed the web application in a browser of the terminal apparatus 20 within the expiration period.

[0050] The screens of the web application displayed on the output interface 25 of the terminal apparatus 20 may be similar to those of an application downloaded and used after the purchase of the vehicle 30. The screens of the web application may display icons or the like used by the user to input operation requests for the vehicle 30. In the web application, a message exchange function or a chat function with the information processing apparatus 10 may be available. The terminal apparatus 20 can thereby temporarily function as the operation interface.

[0051] In S107, the controller 11 transmits, to the vehicle 30, a start notification of the remote services. Additionally, the controller 11 rejects subsequent start request signals from other terminal apparatuses 20 that differ from the terminal apparatus 20. The controller 31 of the vehicle 30 receives the start notification, and sets each apparatus of the vehicle 30 to an operable state. Therefore, the controller 31 of the vehicle 30 can smoothly control each apparatus of the vehicle 30 in response to an instruction signal described below.

[0052] As illustrated in S107, the controller 11 rejects the start request signals from the other terminal apparatuses that differ from the terminal apparatus 20 within the expiration period. This enables rejection of remote operations of the vehicle 30 by other people while the user is receiving the provision of the remote services, thereby ensuring security more reliably in the temporary provision of the remote services.

[0053] In S108, the controller 11 receives, from the terminal apparatus 20, an operation request signal indicating an operation request for a remote service. Operation requests for the remote services include a request for remotely unlocking and locking the vehicle 30, a request for remotely operating each apparatus included in the vehicle 30, and the like. Apparatuses of the vehicle 30 include windows, lights, an air conditioner, interior lighting, an audio device, wireless communication devices, and the like. The operation request signal may be generated by the controller 21 of the terminal apparatus 20 based on user input to the web application displayed on the output interface 25 of the terminal apparatus 20. In this example, the operation request for the remote service is unlocking of the vehicle 30.

[0054] In S109, the controller 11 determines whether the transmission of the operation request signal is within the expiration period. When the transmission is within the expiration period (S109: YES), the operation of the controller 11 proceeds to S110. When the transmission is past the expiration period (S109: NO), the operation of the controller 11 proceeds to S118. As described below, after the operations of S118 and S119, the operation of the controller 11 ends.

[0055] In S110 of FIG. 2B, the controller 11 generates, based on the operation request signal, an instruction signal for controlling the vehicle 30. In this example, the controller 11 generates the instruction signal for unlocking of the vehicle 30.

[0056] In S111, the controller 11 transmits the generated instruction signal to the vehicle 30. Subsequently, the controller 31 of the vehicle 30 that has received the instruction signal controls each apparatus of the vehicle 30 based on the instruction signal. For example, the controller 31 controls unlocking or locking of the vehicle 30, as well as opening and closing of the windows. In this example, the controller 31 of the vehicle 30 controls the door lock of the vehicle 30, to unlock the doors.

[0057] As illustrated in S105 to S111, upon receiving, from the terminal

apparatus 20 within the expiration period, the operation request signal indicating the operation request for the remote service inputted via the operation interface, the controller 11 generates, based on the operation request signal, the instruction signal for controlling the vehicle 30. According to the present embodiment, the instruction signal based solely on the operation request signal within the expiration period is transmitted to the vehicle 30. This prevents operations on the vehicle 30 from being performed for an unnecessarily long time, thereby ensuring security more reliably.

[0058] In S112, the controller 11 determines whether the current time is within the expiration period. When the current time is within the expiration period (S112: YES), the operation of the controller 11 proceeds to S113. When the current time is past the expiration period (S112: NO), the operation of the controller 11 proceeds to S118. As described below, after the operations of S118 and S119, the operation of the controller 11 ends.

[0059] In S113, the controller 11 determines whether a termination request signal requesting the termination of the remote services has been received from the terminal apparatus 20. When the termination request signal is received (S113: YES), the operation of the controller 11 proceeds to S117. When the termination request signal is not received (S113: NO), the operation of the controller 11 proceeds to S114.

[0060] First, a case in which the controller 11 determines in S113 that the termination request signal has not been received will be described. In S114, the controller 11 receives terminal location information from the terminal apparatus 20, and receives vehicle location information indicating the location of the vehicle 30, from the vehicle 30.

[0061] In S115, the controller 11 determines whether the distance between the location of the terminal apparatus 20 and the location of the vehicle 30 indicated by the terminal location information and the vehicle location information received in S114 is greater than or equal to a predetermined distance. The predetermined distance may be preset and stored in the memory 12. When the distance is greater than or equal to the predetermined distance (S115: YES), the operation of the controller 11 proceeds to S116. When the distance is less than the predetermined distance (S115: NO), the operation of the controller 11 returns to S108.

[0062] In S116, the controller 11 rejects an operation request signal from the terminal apparatus 20. This prevents remote operations by the user from

outside an expected range in the temporary provision of the remote services, thereby ensuring security more reliably. Subsequently, the operation of the controller 11 returns to S108.

[0063] In S116, the controller 11 may generate, in a text message or a similar format, information indicating that the user is away from the vehicle 30, and transmit the information to the terminal apparatus 20. The controller 21 of the terminal apparatus 20 that has received this information outputs the information through the output interface 25. This allows the user to easily realize that the user is further away from the vehicle 30 than the necessary distance for remote operation.

[0064] Next, a case in which the controller 11 determines in S113 that the termination request signal has been received will be described. In S117, the controller 11 rejects subsequent operation request signals from the terminal apparatus 20 as the operation interface.

[0065] As illustrated in S113 and S117, upon receiving, from the terminal apparatus 20, the termination request signal requesting the termination of the remote services, the controller 11 rejects the subsequent operation request signals from the terminal apparatus 20. This enables the user to terminate remote operations of the vehicle 30 at preferred timing. This improves convenience for the representative of the vehicle sales operator because the effort required for a manual procedure for terminating the temporary provision of the remote services is eliminated.

[0066] In S118, the controller 11 transmits, to the vehicle 30, a termination notification indicating the termination of the remote services. Upon receiving the termination notification, the controller 31 of the vehicle 30 terminates control over each apparatus of the vehicle 30.

[0067] As illustrated in S112 to S118, when the expiration period elapses or when the controller 11 receives, from the terminal apparatus 20, the termination request signal requesting the termination of the remote services, the controller 11 transmits, to the vehicle 30, the termination notification indicating the termination of the remote services. This ensures the reliable termination of remote operations of the vehicle 30, thereby improving convenience for both the user and the representative of the vehicle sales operator.

[0068] In S119, the controller 11 transmits, to the vehicle 30, a signal instructing that the state of the vehicle 30 be returned to the state (hereinafter

referred to as "initial state") prior to the transmission of the start notification. Specifically, this signal instructs that all apparatuses, provided in the vehicle 30, that can be remotely operated via the remote services be returned to initial states. Upon receiving this signal, the controller 31 of the vehicle 30 returns the states of the all apparatuses of the vehicle 30 to the initial states. Subsequently, the operation of the controller 11 of the information processing apparatus 10 ends.

[0069] The signal transmitted by the controller 11 is not limited to the above, and may also be a signal instructing that only some apparatuses of the vehicle 30 be returned to initial states, or a signal instructing that all or some apparatuses, provided in the vehicle 30, that can be remotely operated via the remote services be returned to predetermined states (hereinafter referred to as "default states"). The default states include, for example, a state in which the windows of the vehicle 30 are fully closed, a state in which the doors are locked, a state in which the inclination or arrangement of the seats is returned to a specified position, and the like. Information indicating the default states may be stored in the memory 12. This allows any apparatus of the vehicle 30 to be returned to any default state. For example, the representative of the vehicle sales operator can save the effort required for manually returning the state of the vehicle 30, making it possible to prepare for the next temporary provision of the remote services more smoothly.

[0070] The present disclosure is not limited to the embodiment described above. For example, two or more blocks described in the block diagram may be integrated, or a block may be divided. Instead of executing two or more steps described in the flowchart in chronological order in accordance with the description, the steps may be executed in parallel or in a different order according to the processing capability of the apparatus that executes each step, or as required. Other modifications can be made without departing from the spirit of the present disclosure.

[0071] As a variation of the present embodiment, the controller 11 of the information processing apparatus 10 may further communicate with a master terminal apparatus 20M that is different from the terminal apparatus 20 used by a user. The master terminal apparatus 20M is a management terminal apparatus used by the representative of the vehicle sales operator. The controller 11 of the information processing apparatus 10 receives, from the master terminal apparatus 20M, management information indicating

permission or denial for the provision of the remote services to the terminal apparatus 20.

[0072] In this variation, a controller 21 of the master terminal apparatus 20M may acquire the management information, by accepting input of permission or denial from the representative of the vehicle sales operator through an input interface 24 and generating the management information. The management information may be stored in advance in a memory 22 of the master terminal apparatus 20M. When the management information received from the master terminal apparatus 20M indicates permission, the controller 11 of the information processing apparatus 10 permits the start request signal received from the terminal apparatus 20 in S101 above. When the management information indicates denial, the controller 11 of the information processing apparatus 10 rejects the start request signal. This facilitates direct permission or denial of the provision of the remote services by the representative of the vehicle sales operator, enabling the representative to operate the vehicle 30 safely.

[0073] Upon receiving, from the master terminal apparatus 20M via the communication interface 13, a master start request signal requesting the start of the remote services, the controller 11 may reject subsequent operation request signals from the terminal apparatus 20. In this case, the controller 11 may thereafter generate instruction signals for the vehicle 30 based solely on operation request signals from the master terminal apparatus 20M and transmit the instruction signals to the vehicle 30. Thereby, remote operations by the master terminal apparatus 20M are prioritized over remote operations by the terminal apparatus 20. This allows safer and more appropriate operations of the vehicle 30.

[0074] Additionally, upon receiving, from the master terminal apparatus 20M, information indicating an instruction to extend the expiration period, the controller 11 may update the expiration period according to the instruction, and start a countdown to the updated expiration period. This enables the representative of the vehicle sales operator to temporarily provide the remote services to the user more flexibly.

[0075] As another variation of the present embodiment, when the controller 11 determines, in S103 above, that the distance between the location of the terminal apparatus 20 and the location of the vehicle 30 is greater than or equal to the predetermined distance, the controller 11 may generate

information indicating that the user is away from the vehicle 30, as described above in S116, and transmit the information to the terminal apparatus 20. This allows the user to easily grasp the distance required for remote operations of the vehicle 30, at the initial stage of the experience of the remote services.

[0076] As yet another variation of the present embodiment, the information processing apparatus 10 may be provided in the vehicle 30. In this case, the terminal apparatus 20 and the vehicle 30 are connected using terminal identification information on the network 40, such as an IP address, via short-range wireless communication, such as Wi-Fi. The term "IP" is an abbreviation of Internet Protocol. In this variation, when the terminal apparatus 20 connects to the vehicle 30 via Wi-Fi, using the vehicle 30 as an access point, information indicating a web page for selecting a request to start the remote services is transmitted from the vehicle 30, which is provided with the information processing apparatus 10, to the terminal apparatus 20. Based on the information, the controller 21 of the terminal apparatus 20 transitions the screen displayed on the output interface 25 to the screen of the web page. The controller 21 accepts user input for requesting the start of remote operations via the input interface 24. Based on the accepted user input, the controller 21 transmits a start request signal to the information processing apparatus 10, which is provided in the vehicle 30.

[0077] The controller 11 of the information processing apparatus 10 may perform predetermined authentication processing, such as entering a password, and when authentication is successful, may determine an expiration period and transmit, to the terminal apparatus 20, information causing the terminal apparatus 20 to function as an operation interface, as in S105 and S106 above. The terminal apparatus 20 receives the information, displays an operation screen of the web application related to the above embodiment, and transmits, to the information processing apparatus 10, an operation request signal indicating an operation request inputted by the user. As in S109 to S111 above, the controller 11 of the information processing apparatus 10 generates an instruction signal for controlling the vehicle 30, based on the operation request signal received within the expiration period, and outputs the instruction signal to the controller 31 of the vehicle 30. The controller 31 of the vehicle 30 controls each apparatus of the vehicle 30 based on the instruction signal. Thus, when the information processing apparatus 10 is connected to the terminal apparatus 20 via Wi-Fi, the controller 11 of the

information processing apparatus 10 accepts the operation request signal received from the terminal apparatus 20. When there is no connection, that is, when the distance from the vehicle 30 exceeds a predetermined distance, the controller 11 does not accept the operation request signal, resulting in the rejection of the operation request signal. According to this variation, it becomes possible for the information processing apparatus 10 to impose operation restrictions based on distance on the terminal apparatus 20, without using terminal location information obtained by GPS or the like.

[0078] Examples of some embodiments of the present disclosure are described below. However, it should be noted that the embodiments of the present disclosure are not limited to these examples.

[Appendix 1] A method performed by an information processing apparatus including a communication interface configured to communicate with a terminal apparatus and a vehicle, and a controller, the method comprising:

receiving, by the controller from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determining, by the controller, an expiration period of an operation interface used for the remote service;

transmitting, by the controller to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generating, by the controller based on the operation request signal, an instruction signal for controlling the vehicle; and

transmitting, by the controller, the instruction signal to the vehicle via the communication interface.

[Appendix 2] The method according to appendix 1, further comprising rejecting, by the controller, a start request signal from another terminal apparatus different from the terminal apparatus, within the expiration period.

[Appendix 3] The method according to appendix 1 or 2, further comprising:

receiving, by the controller from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receiving, by the controller from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determining, by the controller, whether a distance between the terminal apparatus and the vehicle is less than a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is less than the predetermined distance, rejecting, by the controller, a start request signal from another terminal apparatus different from the terminal apparatus.

[Appendix 4] The method according to any one of appendices 1 to 3, further comprising, upon receiving, from the terminal apparatus via the communication interface within the expiration period, a termination request signal requesting termination of the remote service, rejecting, by the controller, a subsequent operation request signal from the terminal apparatus.

[Appendix 5] The method according to any one of appendices 1 to 4, further comprising:

receiving, by the controller from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receiving, by the controller from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determining, by the controller, whether a distance between the terminal apparatus and the vehicle is greater than or equal to a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is greater than or equal to the predetermined distance, rejecting, by the controller, the start request signal from the terminal apparatus.

[Appendix 6] The method according to any one of appendices 1 to 5, further comprising:

upon receiving the start request signal from the terminal apparatus, transmitting, by the controller to the vehicle via the communication interface, a start notification indicating the start of the remote service; and

when the expiration period elapses or when receiving, from the terminal apparatus via the communication interface, a termination request signal requesting termination of the remote service, transmitting, by the controller to the vehicle via the communication interface, a termination

notification indicating the termination of the remote service.

[Appendix 7] The method according to appendix 6, further comprising transmitting, by the controller to the vehicle via the communication interface, a signal instructing that a state of the vehicle be returned to a state prior to transmission of the start notification.

[Appendix 8] The method according to any one of appendices 1 to 7, further comprising:

receiving, by the controller from a master terminal apparatus different from the terminal apparatus via the communication interface, management information indicating permission or denial of provision of the remote service to the terminal apparatus; and

when the management information indicates denial, rejecting, by the controller, the start request signal from the terminal apparatus.

[Appendix 9] The method according to appendix 8, further comprising, upon receiving, from the master terminal apparatus via the communication interface, a master start request signal requesting start of the remote service, rejecting, by the controller, a subsequent operation request signal from the terminal apparatus.

[Appendix 10] The method according to any one of appendices 1 to 9, wherein the information causing the terminal apparatus to function as the operation interface includes an address to a web application and/or a setting for launching the web application.

[Appendix 11] An information processing apparatus comprising:

a communication interface configured to communicate with a terminal apparatus and a vehicle; and

a controller configured to:

receive, from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determine an expiration period of an operation interface used for the remote service;

transmit, to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request

signal indicating an operation request for the remote service inputted using the operation interface, generate, based on the operation request signal, an instruction signal for controlling the vehicle; and

transmit the instruction signal to the vehicle via the communication interface.

[Appendix 12] The information processing apparatus according to appendix 11, wherein the controller is configured to reject a start request signal from another terminal apparatus different from the terminal apparatus, within the expiration period.

[Appendix 13] The information processing apparatus according to appendix 11 or 12, wherein the controller is configured to:

receive, from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receive, from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determine whether a distance between the terminal apparatus and the vehicle is less than a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is less than the predetermined distance, reject a start request signal from another terminal apparatus different from the terminal apparatus.

[Appendix 14] The information processing apparatus according to any one of appendices 11 to 13, wherein the controller is configured to, upon receiving, from the terminal apparatus via the communication interface within the expiration period, a termination request signal requesting termination of the remote service, reject a subsequent operation request signal from the terminal apparatus.

[Appendix 15] The information processing apparatus according to any one of appendices 11 to 14, wherein the controller is configured to:

receive, from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receive, from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determine whether a distance between the terminal apparatus and the vehicle is greater than or equal to a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is greater than or equal to the predetermined distance, reject the start request signal from the terminal apparatus.

[Appendix 16] The information processing apparatus according to any one of appendices 11 to 15, wherein the controller is configured to:

upon receiving the start request signal from the terminal apparatus, transmit, to the vehicle via the communication interface, a start notification indicating the start of the remote service; and

when the expiration period elapses or when receiving, from the terminal apparatus via the communication interface, a termination request signal requesting termination of the remote service, transmit, to the vehicle via the communication interface, a termination notification indicating the termination of the remote service.

[Appendix 17] The information processing apparatus according to appendix 16, wherein the controller is configured to transmit, to the vehicle via the communication interface, a signal instructing that a state of the vehicle be returned to a state prior to transmission of the start notification.

[Appendix 18] The information processing apparatus according to any one of appendices 11 to 17, wherein the controller is configured to:

receive, from a master terminal apparatus different from the terminal apparatus via the communication interface, management information indicating permission or denial of provision of the remote service to the terminal apparatus; and

when the management information indicates denial, reject the start request signal from the terminal apparatus.

[Appendix 19] The information processing apparatus according to appendix 18, wherein the controller is configured to, upon receiving, from the master terminal apparatus via the communication interface, a master start request signal requesting start of the remote service, reject a subsequent operation request signal from the terminal apparatus.

[Appendix 20] A program configured to cause a computer as an information processing apparatus to execute operations, the information processing apparatus including a communication interface configured to communicate with a terminal apparatus and a vehicle, and a controller, the operations comprising:

receiving, from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to

the vehicle;

determining an expiration period of an operation interface used for the remote service;

transmitting, to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generating, based on the operation request signal, an instruction signal for controlling the vehicle; and

transmitting the instruction signal to the vehicle via the communication interface.

REFERENCE SIGNS LIST

[0079]

1	system
10	information processing apparatus
11	controller
12	memory
13	communication interface
20	terminal apparatus
21	controller
22	memory
23	communication interface
24	input interface
25	output interface
26	positioner
30	vehicle
31	controller
32	memory
33	communication interface
34	input interface
35	output interface
36	positioner
40	network

CLAIMS

[Claim 1] A method performed by an information processing apparatus including a communication interface configured to communicate with a terminal apparatus and a vehicle, and a controller, the method comprising:

receiving, by the controller from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determining, by the controller, an expiration period of an operation interface used for the remote service;

transmitting, by the controller to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generating, by the controller based on the operation request signal, an instruction signal for controlling the vehicle; and

transmitting, by the controller, the instruction signal to the vehicle via the communication interface.

[Claim 2] The method according to claim 1, further comprising rejecting, by the controller, a start request signal from another terminal apparatus different from the terminal apparatus, within the expiration period.

[Claim 3] The method according to claim 1, further comprising:

receiving, by the controller from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receiving, by the controller from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determining, by the controller, whether a distance between the terminal apparatus and the vehicle is less than a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is less than the predetermined distance, rejecting, by the controller, a start request signal from another terminal apparatus

different from the terminal apparatus.

[Claim 4] The method according to claim 1, further comprising, upon receiving, from the terminal apparatus via the communication interface within the expiration period, a termination request signal requesting termination of the remote service, rejecting, by the controller, a subsequent operation request signal from the terminal apparatus.

[Claim 5] The method according to claim 1, further comprising:

receiving, by the controller from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receiving, by the controller from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determining, by the controller, whether a distance between the terminal apparatus and the vehicle is greater than or equal to a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is greater than or equal to the predetermined distance, rejecting, by the controller, the start request signal from the terminal apparatus.

[Claim 6] The method according to claim 1, further comprising:

upon receiving the start request signal from the terminal apparatus, transmitting, by the controller to the vehicle via the communication interface, a start notification indicating the start of the remote service; and

when the expiration period elapses or when receiving, from the terminal apparatus via the communication interface, a termination request signal requesting termination of the remote service, transmitting, by the controller to the vehicle via the communication interface, a termination notification indicating the termination of the remote service.

[Claim 7] The method according to claim 6, further comprising transmitting, by the controller to the vehicle via the communication interface, a signal instructing that a state of the vehicle be returned to a state prior to transmission of the start notification.

[Claim 8] The method according to claim 1, further comprising:

receiving, by the controller from a master terminal apparatus different from the terminal apparatus via the communication interface, management information indicating permission or denial of provision of the remote service to the terminal apparatus; and

when the management information indicates denial, rejecting, by the controller, the start request signal from the terminal apparatus.

[Claim 9] The method according to claim 8, further comprising, upon receiving, from the master terminal apparatus via the communication interface, a master start request signal requesting start of the remote service, rejecting, by the controller, a subsequent operation request signal from the terminal apparatus.

[Claim 10] The method according to any one of claims 1 to 9, wherein the information causing the terminal apparatus to function as the operation interface includes an address to a web application and/or a setting for launching the web application.

[Claim 11] An information processing apparatus comprising:

a communication interface configured to communicate with a terminal apparatus and a vehicle; and

a controller configured to:

receive, from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determine an expiration period of an operation interface used for the remote service;

transmit, to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generate, based on the operation request signal, an

instruction signal for controlling the vehicle; and

transmit the instruction signal to the vehicle via the communication interface.

[Claim 12] The information processing apparatus according to claim 11, wherein the controller is configured to reject a start request signal from another terminal apparatus different from the terminal apparatus, within the expiration period.

[Claim 13] The information processing apparatus according to claim 11, wherein the controller is configured to:

receive, from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receive, from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determine whether a distance between the terminal apparatus and the vehicle is less than a predetermined distance, based on the terminal location information and the vehicle location information; and

when the distance is less than the predetermined distance, reject a start request signal from another terminal apparatus different from the terminal apparatus.

[Claim 14] The information processing apparatus according to claim 11, wherein the controller is configured to, upon receiving, from the terminal apparatus via the communication interface within the expiration period, a termination request signal requesting termination of the remote service, reject a subsequent operation request signal from the terminal apparatus.

[Claim 15] The information processing apparatus according to claim 11, wherein the controller is configured to:

receive, from the terminal apparatus via the communication interface, terminal location information indicating a location of the terminal apparatus;

receive, from the vehicle via the communication interface, vehicle location information indicating a location of the vehicle;

determine whether a distance between the terminal apparatus and the vehicle is greater than or equal to a predetermined distance, based on the

terminal location information and the vehicle location information; and

when the distance is greater than or equal to the predetermined distance, reject the start request signal from the terminal apparatus.

[Claim 16] The information processing apparatus according to claim 11, wherein the controller is configured to:

upon receiving the start request signal from the terminal apparatus, transmit, to the vehicle via the communication interface, a start notification indicating the start of the remote service; and

when the expiration period elapses or when receiving, from the terminal apparatus via the communication interface, a termination request signal requesting termination of the remote service, transmit, to the vehicle via the communication interface, a termination notification indicating the termination of the remote service.

[Claim 17] The information processing apparatus according to claim 16, wherein the controller is configured to transmit, to the vehicle via the communication interface, a signal instructing that a state of the vehicle be returned to a state prior to transmission of the start notification.

[Claim 18] The information processing apparatus according to claim 11, wherein the controller is configured to:

receive, from a master terminal apparatus different from the terminal apparatus via the communication interface, management information indicating permission or denial of provision of the remote service to the terminal apparatus; and

when the management information indicates denial, reject the start request signal from the terminal apparatus.

[Claim 19] The information processing apparatus according to claim 18, wherein the controller is configured to, upon receiving, from the master terminal apparatus via the communication interface, a master start request signal requesting start of the remote service, reject a subsequent operation request signal from the terminal apparatus.

[Claim 20] A non-transitory computer readable medium storing a program

configured to cause a computer as an information processing apparatus to execute operations, the information processing apparatus including a communication interface configured to communicate with a terminal apparatus and a vehicle, and a controller, the operations comprising:

receiving, from the terminal apparatus via the communication interface, a start request signal requesting start of a remote service related to the vehicle;

determining an expiration period of an operation interface used for the remote service;

transmitting, to the terminal apparatus via the communication interface, information causing the terminal apparatus to function as the operation interface;

upon receiving, from the terminal apparatus via the communication interface within the expiration period, an operation request signal indicating an operation request for the remote service inputted using the operation interface, generating, based on the operation request signal, an instruction signal for controlling the vehicle; and

transmitting the instruction signal to the vehicle via the communication interface.