DESCRIPTION

MOBILE COMMUNICATION TERMINAL

Technical Field

The present invention relates to a mobile communication terminal such as, for example, a portable telephone.

Background Art

Mobile communication terminals such as portable telephones display a reception standby screen on a liquid crystal display when in the state of waiting to receive a call (hereafter referred to as a reception standby state).

This reception standby screen is displayed based on data stored in a memory inside the mobile communication terminal. However, the types of reception standby screens are restricted to those prestored in the memory upon shipping of the product, thus making them lacking in interest to the user.

Disclosure of the Invention

The present invention has the purpose of offering a mobile communication terminal enabling users to easily customize the images displayed at the display portion as reception standby screens or the like.

In order to achieve this purpose, the mobile communication terminal of the present invention is characterized by comprising a communication portion for accessing a server network-connected through the mobile communication network through a radio channel, and downloading site screen data provided by the server; a display portion for displaying the downloaded site screen data; a recording portion for recording the site screen data in a non-volatile memory; and a display control portion for reading from the non-volatile memory the site screen data recorded by the recording portion and displaying it on the display portion.

This site screen data may include image data.

More preferably, the display control portion may display the site screen data on the display portion as a reception standby screen when the mobile communication terminal is in a reception standby state, or may display the site screen data on the display portion as a downloading screen when the mobile communication terminal downloads data from a server

network-connected to the mobile communication network.

Furthermore, the display control portion may display the site screen data so as to fit the size of a display region of the display portion, or may generate a repeating pattern of the site screen data to display on the display portion.

Preferably, the mobile communication terminal of the present invention further comprises a recordability determining portion for determining whether or not the site screen data may be recorded by the recording portion.

The recordability determining portion may perform the determination by referring to copyright information appended to the site screen data, or may perform the determination by referring to data size information appended to the site screen data.

More preferably, the mobile communication terminal of the present invention comprises a connecting portion for connecting a memory medium for storing communication setting information needed for communications through the mobile communication network; and a readout portion for reading the communication setting information from the memory medium; wherein the communication portion downloads predetermined information appended to the site screen data along with the data by accessing the server based on the read communication setting information; and the recordability determining portion performs the determination by referring to the predetermined information appended to the downloaded site screen data, and the communication setting information.

Alternatively, the mobile communication terminal of the present invention comprises a connecting portion for connecting a memory medium storing communication setting information needed for communications through the mobile communication network, and a key for decrypting the site screen data which has been encrypted; and a readout portion for reading the communication setting information and the key from the memory medium; wherein the communication portion downloads the site screen data which has been encrypted, by accessing the server based on the read communication setting information; and the recordability determining portion performs the determination according to whether or not a key to decrypt the downloaded site screen data is stored in the memory medium.

Furthermore, the mobile communication terminal of the present invention may be such that the recording portion records a plurality of types of the site screen data downloaded by the communication portion to the non-volatile memory; and comprises a selecting portion for selecting the site screen data to be displayed on the display portion from among the plurality of types of site screen data which are recorded; and wherein the display control portion reads the site screen data selected by the selecting portion from the

non-volatile memory and displays it on the display portion.

Moreover, the mobile communication terminal may be a portable telephone device.

The mobile communication terminal according to the present invention is characterized by comprising a communication portion for receiving through a radio channel image data sent from a second terminal device network-connected through the mobile communication network; a recording portion for recording the received image data in a non-volatile memory; a display portion for displaying a reception standby screen; and a display control portion for reading from the non-volatile memory the image data recorded by the recording portion, and displaying it on the display portion as a reception standby screen.

The mobile communication terminal according to the present invention is characterized by comprising a communication portion for receiving through a radio channel image data sent from a second terminal device network-connected through the mobile communication network; a recording portion for recording the received image data in a non-volatile memory; a display portion for displaying a data downloading screen; and a display control portion for reading the image data recorded by the recording portion from the non-volatile memory and displaying it on the display portion as a downloading screen.

The display control portion may display the image data so as to fit the size of a display region of the display portion, or may generate a repeating pattern of the image data to display on the display portion.

Preferably, the mobile communication terminal of the present invention comprises a recordability determining portion for determining whether or not the image data may be recorded by the recording portion.

The recordability determining portion may perform the determination by referring to copyright information appended to the image data, or may perform the determination by referring to data size information appended to the image data.

More preferably, the mobile communication terminal of the present invention comprises a connecting portion for connecting a memory medium for storing communication setting information needed for communications through the mobile communication network; and a readout portion for reading the communication setting information from the memory medium; wherein the communication portion downloads predetermined information appended to the image data along with the data sent from the second communication terminal based on the communication setting information; and the recordability determining portion performs the determination by referring to the predetermined information appended to the downloaded image data, and the communication setting information.

More preferably, the mobile communication terminal of the present invention comprises a connecting portion for connecting a memory medium storing communication

setting information needed for communications through the mobile communication network, and a key for decrypting the image data which has been encrypted; a readout portion for reading the communication setting information and the key from the memory medium; wherein the communication portion receives the image data which has been encrypted and sent from the second communication terminal based on the read communication setting information; and the recordability determining portion performs the determination according to whether or not a key to decrypt the downloaded image data is stored in the memory medium.

More preferably, the recording portion records a plurality of types of the image data downloaded by the communication means to the non-volatile memory; and comprises a selecting portion for selecting the image data to be displayed on the display portion from among the plurality of types of image data which are recorded; and wherein the display control portion reads the image data selected by the selecting portion from the non-volatile memory and displays it on the display portion.

Additionally, the mobile communication terminal may be a portable telephone device.

Brief Description of the Drawings

Fig. 1 is a block diagram showing the structure of a mobile communication system with a mobile station according to an embodiment of the present invention.

Fig. 2 is a block diagram showing the structure of a gateway server 34 in the same embodiment.

Fig. 3 is a block diagram showing the structure of a mobile station 100 in the same embodiment.

Fig. 4 is a diagram showing a memory map containing the memory contents of the SRAM 135 in the same embodiment.

Fig. 5 is a flow chart of a main routine performed by the CPU 110 in the same embodiment.

Fig. 6 is a flow chart of a menu display routine performed by the CPU 110 in the same embodiment.

Fig. 7 is a flow chart of a site access routine performed by the CPU 110 in the same embodiment.

Fig. 8 is a flow chart of a display screen registration routine performed by the CPU 110 in the same embodiment.

Fig. 9 is a flow chart of a standby screen setting routine performed by the CPU 110 in the same embodiment.

Figs. 10A-10K are respectively diagrams showing screens displayed on a liquid crystal display during the performance of each routine in the same embodiment.

Fig. 11A is a diagram showing a specific display example of a central display after setting the standby screen in the same embodiment.

Fig. 11B is a diagram showing a specific display example of a full-screen display after setting the standby screen in the same embodiment.

Fig. 12 is a block diagram showing the structure of a mobile station 101 and SIM card 190 in a different embodiment.

Fig. 13 is a diagram for explaining a mobile station 101 capable of storing and a mobile station 101 incapable of storing site screen data in the different embodiment.

Fig. 14 is a block diagram showing the overall structure of a mobile communication system including another terminal in a different embodiment.

Best Mode for Carrying Out the Invention

Preferred embodiments of the present invention shall be explained in detail herebelow with reference to the attached drawings.

Fig. 1 is a diagram showing the overall structure of a mobile communication system with a mobile station according to an embodiment of the present invention.

This mobile communication system comprises a mobile station 100 (mobile communication terminal), a mobile telephone network 20, a mobile packet communication network 30, the internet 40 and IP servers 50A, 50B. Herebelow, the mobile packet communication network 30 and mobile telephone network 20 shall be referred to collectively as mobile communication networks. Additionally, the IP servers 50A, 50B shall be referred to as IP servers 50 aside from cases where it is necessary to specify one from the other.

The mobile station 100 is, for example, a portable telephone device, capable of connecting to the mobile telephone network 20 and the mobile packet communication network 30. the structure of this mobile station 100 shall be described below.

The mobile telephone network 20 is a communication network for providing communication services to the mobile station 100, the mobile station 100 being capable of receiving calling services through this mobile telephone network 20, or this network 20 and a fixed telephone network which is not shown.

This mobile telephone network 20 comprises a plurality of base stations 31 installed at predetermined intervals inside the communication area, a switching station (not shown) for performing circuit switching services, a control station (not shown) for controlling the network and a communication line (not shown) connecting the respective stations.

The mobile packet communication network 30, aside from the above-mentioned

base stations 31, switching station, control station and the like, also comprises a packet subscriber processing device 33, a gateway server 34, a subscriber database 35 and a communication line (not shown) connecting these.

The packet subscriber processing device 33 is a computer system within a packet subscriber switching station (not shown) serving a plurality of base stations 31, for receiving packet switching requests from the mobile station 100 and relaying packet switching within the mobile packet communication network 30.

The gateway server 34 is a computer system within a mobile packet gateway switching station (not shown) interconnecting the mobile packet communication network 30 with another network such as the internet 40, for converting between the different protocols of a plurality of networks and intermediating data exchange between these networks. Specifically, the gateway server 34 intermediates data exchange between networks while converting between the transmission protocol of the mobile packet communication network 30 and TCP/IP which is the standard communication protocol of the internet 40.

The gateway server 34 also performs information distribution services such as intermediating the transmission and reception of electronic mail and various types of data between the mobile station 100 and IP servers 50. In order to perform this service, the gateway server 34 comprises a memory having a memory area as a mailbox for storing the sent electronic mail. Inside this mailbox, the addresses (hereinafter referred to as mailbox addresses) for storing electronic mail addressed to each subscriber to the mobile packet communication service are defined according to the subscriber.

The subscriber database 35 stores registered information relating to the subscribers of the mobile packet communication network 30. This registered information may, for example, include the "telephone number" of the mobile station 100, and the subscriber's "name", "sex", "date of birth" and "mailbox address".

The IP server 50 is a server system operated by the IP (information provider). This IP server 50 stores site screen data of homepages or the like in HTML (HyperText Markup Language) as information to be provided to users.

This IP server 50 is connected to the gateway server 34 through the internet 50 as shown in Fig. 1, and can be connected to the gateway server 34 through a dedicated line or provided inside the gateway server 34.

Next, the structure of the gateway server 34 shall be described in detail.

Fig. 2 is a block diagram showing the structure of the gateway server 34. As shown in the drawing, the gateway server 34 comprises a control portion 341, a subscriber information managing portion 342, a data distribution managing portion 343 and a bus 344

connecting these.

The control portion 341 controls the various parts of the gateway server 34, whereby it functions as an interface between networks such as by converting protocols between the mobile packet communication network 30 and other networks such as the internet 40.

The subscriber information managing portion 342 stores registered information obtained by referencing the subscriber database 35.

The data distribution managing portion 343 comprises a memory having a memory area for mailboxes as described above, as well as intermediating the transmission and reception of electronic mail and data between mobile stations 200, between the mobile station 100 and terminals (not shown) on the internet 40, and between the mobile station 100 and IP server 50.

The data distribution managing portion 343 also stores menu screen data for displaying menu items for each type of service to the user of the mobile station 100, and transmitting the data in response to a request from the mobile station 100. This menu screen data is data in HTML format, such that each menu item is correlated with the URL (Uniform Resource Locator) of the IP server 50 which performs the service corresponding to that item.

When the user requests a specific service using the mobile station 100, the mobile station 100 sends the gateway server 34 the URL correlated with the menu item corresponding to that service, and the gateway server 34 accesses the IP server 50 which performs that service based on the URL.

Next, the structure of the mobile station 100 shall be described.

Fig. 3 is a block diagram showing the structure of the mobile station 100. In this drawing, the mobile station 100 comprises a CPU 110 (display control portion, recording portion, recordability determining portion, selecting portion) for performing programs by controlling to entire mobile station 100, a RAM 120 used as a work area or the like for the CPU 110, a ROM 130 in which predetermined control programs or the like are stored, an SRAM 135 (non-volatile memory) for storing various types of screen data or the like upon receiving a supply of power from a backup power supply which is not shown, a transmission-reception device 140 (communication portion) for performing radio communications with a base station of the mobile communication network, a user interface 150 (display portion) including a liquid crystal display for displaying characters and images as well as a keypad for users to perform input operations and a bus 160 for interconnecting these.

Here, this mobile station 100 is capable of at least two types of mode settings including "calling mode" for making a call through the mobile telephone network 20, and "packet communication mode" for performing packet communications through the mobile packet communication network 30.

In the packet communication mode, the mobile station 100 is capable of transmitting and receiving electronic mail, and downloading data from the IP server 50.

The keypad of the user interface 150 comprises a key known as a "function button" (not shown). When a user pushes this function button, the mobile station 100 goes into packet communication mode by sending request signals to the mobile packet communication network 30, acquiring menu screen data by accessing the gateway server 34, and displaying this on the liquid crystal display.

The ROM 130 stores various control programs which are to be executed by the CPU 110, such as programs relating to the calling function.

These control programs include programs for executing various routines to the described later, in addition to document data viewing software, known as a browser.

By reading and executing the browser from the ROM 130, the CPU 110 accesses the IP server 50 to acquire data in the HTML format (hereinafter referred to as HTML data). Specifically, the CPU 110 of the mobile station 100 transmits a data acquisition request designating a URL through the transmission-reception device 140 to the IP server 50, and stores the HTML data sent from the IP server 50 in the RAM 120. Furthermore, the CPU 110 interprets the HTML data stored in the RAM 120 and displays it on the liquid crystal display.

Next, the structure of the above-mentioned SRAM 135 shall be described.

Fig. 4 is a diagram showing a memory map indicating the memory contents of the SRAM 135. In this drawing, prearranged default standby screen data are recorded as first screen data from the position of the address "A0001" of the SRAM 135. Then, the initial readout address is set so that when the CPU 110 is to display the standby screen on the liquid crystal display, it refers to this address "A0001" to read out the first screen data.

Furthermore, in the SRAM 135, the site screen data downloaded from the IP server 50 is recorded from the position of the address "X0001" as second screen data. This procedure of recording site screen data is executed by selecting the menu of the "Register display screen" to be explained later.

When the second screen data has been set as the standby screen by a request from the user, this address "X0001" is reset as the readout address instead of the previously mentioned address "A0001".

Here, data size information indicating the size of the site screen data and copyright information (e.g. a specific code indicating a copyright) indicating that the content is copyrighted and may not be copied without permission is appended to the site screen data provided from the IP server 50.

The CPU 110 determines whether or not to record the site screen data in the SRAM 135 by considering the data size information contained in the site screen data and the available capacity of the SRAM 135. That is, if the SRAM 135 does not have enough unused capacity to store data of the size indicated by the data size information, it is determined to be unrecordable.

Furthermore, the CPU 110 detects the presence or absence of copyright information in the site screen data, and determines whether or not to record the site screen data in the SRAM 135. That is, if copyright information is detected, it is determined to be unrecordable.

Herebelow, the operations of the embodiment according to the above structure shall be explained with reference to Figs. 5-10K.

Fig. 5 is a flow chart showing the main routine executed by the CPU 110, Fig. 6 is a flow chart showing a menu display routine executed by the CPU 110, Fig. 7 is a flow chart showing a site access routine executed by the CPU 110, Fig. 8 is a flow chart showing a display screen registering routine executed by the CPU 110 and Fig. 9 is a flow chart showing a standby screen setting routine executed by the CPU 110.

Figs. 10A-10K are diagrams which respectively show screens displayed on the liquid crystal display of the mobile station 100 during execution of the above routines.

First, when the power supply of the mobile station 100 is turned on, the CPU 110 reads the control program from the ROM 130, and activates the main routine shown in Fig. 5.

In step SP1, the CPU 110 reads first screen data from the address "A0001" of the SRAM 135 and displays it on the liquid crystal display as a standby screen. Fig. 10A is a diagram showing the standby screen displayed on the liquid crystal display at this time.

Then, in step SP2, the CPU 110 determines whether or not there has been an event such as a user input or call arrival.

If the result of the determination is NO (i.e. if there is no event), then the CPU 110 repeats the standby screen display procedure of step SP1.

If the result of the determination is YES (i.e. if there is an event), the procedure advances to step SP3 and the CPU 110 executes a procedure corresponding to that event. The procedure corresponding to an event in step SP3 may, for example, be processing in

the calling mode due to an outgoing call or incoming call, or processing in the packet communication mode due to pressing of the function button.

Then, when the procedure corresponding to an event in step SP3 is completed, the procedure returns to step SP1 and the CPU 110 once again displays a standby screen on the liquid crystal display.

If the function button is pressed after the power supply is turned on, the CPU 110 activates the menu display routine shown in Fig. 6 at the afore-mentioned step SP3.

First, in step SP11, the CPU 110 sends a packet communication request signal through the transmission-reception device 140 to the mobile packet communication network 30. As a result, the mobile station 100 goes into packet communication mode and menu screen data is sent from the gateway server 34.

In step SP12, the CPU 110 interprets the received menu screen data, and displays it on the liquid crystal display.

Fig. 10B is a diagram showing a menu screen displayed on the liquid crystal display at this time. As shown in the drawing, the menu items which are displayed include "(1) register display screen" for recording the screen data displayed on the liquid crystal display in the SRAM 135, "(2) mobile banking" for performing online transactions with a financial institution, "(3) electronic mail" for performing electronic mail services, "(4) internet" for access a site (such as the IP server 50) requested by the user by designating a URL, and "(5) set standby screen" for displaying the site screen data downloaded from the site such as the IP server 50 as the standby screen.

We return once again to Fig. 6 to explain the flow of operations.

In step SP13, the CPU 110 determines whether or not the user has selected a specific menu item from among the menu items displayed on the liquid crystal display. For example, the user may move a cursor on the liquid crystal display over a desired menu item by means of key operations, and perform a key operation for selecting that menu item.

Then, if the result of the determination is NO (i.e. if there is no menu selection), then the CPU 110 repeats the procedures of the menu screen display of step SP12.

If the result of the determination is YES (i.e. if there is a menu selection), the procedure advances to step SP14, and the CPU 110 performs a procedure corresponding to the selected menu item.

Once the procedure corresponding to the menu item is completed in step SP14, this menu display routine ends and the procedure returns to the above-mentioned main routine.

For example, if in the afore-mentioned menu display state, the user selects the menu item "(4) internet" and orders access to a desired site such as the IP server 50, the result of the determination in step SP13 becomes YES, and the procedure of the CPU 110 advances to step SP14.

Then, the CPU 110 activates the site access routine shown in Fig. 7.

First, in step SP21, the CPU 110 sends a URL designated by the user, thereby to access a site corresponding to that URL through the gateway server 34 for receiving site screen data.

In step SP22, the CPU 110 interprets the received site screen data and displays it on the liquid crystal display. Fig. 10C is a diagram of a site screen displayed on the liquid crystal display at this time.

In step SP23, the CPU 110 determines whether or not there has been an event such as an input operation by the user while the site screen is being displayed.

If the result of the determination is NO, then the CPU 110 repeats the procedure of the site screen display of step SP22.

If the result of the determination is YES, then the procedure advances to step SP24 and the CPU executes a procedure corresponding to that event.

When the procedure corresponding to the event of step SP24 is completed, the site access routine is ended and the procedure is returned to the menu display routine described above.

In the site screen display state of step SP22 in Fig. 7, when the function button is pressed by a user, the determination result of step SP23 becomes YES, and the procedure advances to step SP24. Then, the CPU 110 makes the site screen data wait in the temporary waiting area of the RAM 120, and displays the menu screen shown in Fig. 10D.

Here, if the user selects "(1) register display screen", the CPU 110 activates the display screen registration routine shown in Fig. 8.

In step SP31, the CPU 10 determines whether or not the waiting site screen data is recordable. Here, as mentioned above, the CPU 110 considers the data size information contained in the site screen data and the available space in the SRAM 135 to perform this determination. Furthermore, the CPU 110 also performs this process by detecting the presence or absence of copyright information in the site screen data.

If the result of this determination is YES (i.e. if recordable), then the procedure advances to step SP32, where the CPU 110 transfers the site screen data in the waiting area in the RAM 120 to the SRAM 135 and records from the address "X0001". Fig. 10E is a diagram showing a screen displayed during the recording of the site screen data.

When this recording process is completed, the procedure advances to step SP33, and the CPU 110 displays a registration completion notification indicating that registration of the display screen has been completed on the liquid crystal display. Fig. 10F is a diagram showing a registration completion notification displayed at this time.

If the result of the determination in step SP31 is NO (i.e. non-recordable), then the procedure advances to step SP34, and the CPU110 displays a non-recordability notification on the liquid crystal display. Fig. 10G is a diagram showing a non-recordability notification displayed at this time.

After performing these procedures, the procedures of the CPU 110 return to the main routine shown in Fig. 5.

If the function button is pressed in step SP2 of the main routine shown in Fig. 5, the menu display routing shown in Fig. 6 is executed, and the process returns once again to the menu screen display state shown in Fig. 10H. When "set standby screen" is selected by the user on this menu screen, the standby screen setting routine is activated in step SP14 of Fig. 6.

In step SP41 of the standby screen setting routine shown in Fig. 9, the CPU 110 performed the standby screen setting procedure described below. First, the CPU 110 displays on the liquid crystal display a screen for the user to select a display format for the standby screen.

Fig. 10I is a diagram showing a screen displayed on the liquid crystal display at this time.

As shown in the drawing, the display format for the standby screen includes "(1) central display" and "(2) full-screen display".

"(1) central display" refers to a condition where the site screen data recorded in the SRAM 135 is scaled according to the screen size of the liquid crystal display and displayed at the center of the display. Additionally, "(2) full-screen display" refers to a condition where a repeating pattern of the site screen image data recorded in the SRAM 135 is displayed over the entire screen of the liquid crystal display. Fig. 11A is a diagram showing a specific example of a central display, and Fig. 11B is a diagram showing a specific example of a full-screen display.

When the display format is set, the CPU 110 performs a procedure to reset the readout address of the standby screen data. That is, as described above, the readout address of the standby screen data is changed from the address "A0001" of the first screen data which is the initial setting to the address "X0001" of the second screen data.

When this procedure ends, the process advances to step SP42, where the CPU

110 displays a procedure completion notification indicating that the procedure for setting the standby screen has been completed on the liquid crystal display. Fig. 10J is a diagram showing a screen displayed on the liquid crystal display at this time.

Thereafter, the processing of the CPU 110 returns to the main routine shown in Fig. 5. Then, in step SP1 of that diagram, the newly set second screen data is read from the SRAM 135 as the standby screen, and displayed on the liquid crystal display as the standby screen. Fig. 10K is a diagram showing the standby screen displayed at this time.

According to the embodiment described above, the mobile station 100 is capable of receiving and storing site screen data from a site chosen by the user, and displaying this on the liquid crystal display as the standby screen.

However, in the GSM (Global System for Mobile Communications) format, mobile stations containing so-called SIM (Subscriber Identification Module) cards are used.

Fig. 12 is a block diagram showing the structure of a mobile station 101 and SIM card 190 (memory medium) according to the GSM format. In the drawing, the constituent elements which are common to those of the mobile station 100 shown in Fig. 3 are indicated by the same reference numbers and their explanation shall be omitted.

The mobile station 101 shown in Fig. 12 differs from that of Fig. 3 in comprising an SIM interface 180 (connection portion) for connecting with the SIM card 190.

On the other hand, the SIM card 190 comprises an IC chip (not shown) embedded in an insulating synthetic resin substrate and a connecting electrode (not shown) provided on the substrate surface. The flash memory provided in this IC chip contains communication setting information required for performing communications through the mobile communication network. In the case of GSM, this communication setting information includes an IMSI (International Mobile Subscription identity) for identifying the mobile communication company, a PLMN (Public Land Mobile Network) selector for determining a connection order if connection is possible to a plurality of mobile communication networks, an MSISDN (Mobile Station International ISDN Number) which is the telephone number of that mobile station and parameters necessary for performing a message service known as an SMS (Short Message Service). The CPU 110 (readout portion) of the mobile station 101 is capable of performing audio communications or data communications by reading out communication setting information on the SIM card 190 through the SIM interface 180.

Here, the site screen data provided by the IP server 50 can be stored in the SRAM 135 as a standby screen only if downloaded to the mobile station 101 through a mobile

communication network of a specific communication company.

An example shall be explained with reference to Fig. 13.

In this drawing, the site screen data provided by the IP server 50 can only be stored in the SRAM 135 if downloaded through the mobile communication network 30A of the communication company A. In this case, the above-mentioned site screen data contains an IMSI (e.g. "aaa") for specifying the communication company A.

On the other hand, an IMSI is also stored in the SIM card 190 of the mobile station 101 as mentioned above. That is, the SIM card 190 of a mobile station 101a served by the mobile communication network 30A of the communication company A stores the IMSI (aaa) of the communication company A, whereas the SIM card 190 of a mobile station 101b served by the mobile communication network 30B of the communication company B stores the IMSI (e.g. "bbb") of the communication company B. Each mobile station 101a, 101b collates the IMSI contained in the downloaded site screen data with the IMSI stored in its own SIM card 190, and stores the downloaded site screen data in the SRAM 135 if there is a match, but not if there is no match. That is, the mobile station 101a is capable of recording site screen data provided by the IP server 50 as a standby screen, but the mobile station 101b, although capable of browsing the site screen data, cannot record it as a standby screen.

Here, the criteria for determining whether or not to store site screen data are not restricted to the IMSI mentioned above. For example, one possible criterion for determination is an ICCID (ID Card Identification) which is specific to each IC card including the SIM card 190. That is, the site screen data may precontain ICCID's corresponding to SIM cards 190 for which permission to record the data has been granted, so that the mobile stations 101a, 101b would collate the ICCID's contained in the downloaded site screen data with the ICCID stored in its own SIM card 190, and store the site screen data in the SRAM 135 only when there is a match.

For example, if the site screen data is sent to the mobile station 101 encrypted with an encryption key corresponding to the communication company A, then a decryption key for decoding the encrypted data can be stored in the SIM cards 190 which are compliant with communication company A. Then, the mobile station 101 may make the decision of whether or not to record according to the presence or absence of a decryption key corresponding to the downloaded site screen data.

Additionally, it is possible to determine whether or not recording is possible not by referring to the presence or absence of a decryption key, but instead by not allowing the site screen data to be recorded in the SRAM 135 if the downloaded site screen data cannot be decoded by the decryption key stored in the SIM card 190.

An embodiment using a SIM card 190 can be employed not only to GSM, but also to such communication formats as IMT (International Mobile Telecommunications) 2000, DCS (Digital Communications Service) 1800 and PCS (Personal Communications Service) 1900.

In the above-mentioned embodiment, the structure is such as to record the site screen data by selecting the menu item "(1) register display screen", and setting the above-mentioned recorded site screen data as a standby screen by selecting the menu item "(5) set standby screen", but this invention is not restricted to such a menu structure.

Various embodiments can be conceived, such as to perform a site screen recording process and a standby screen setting process in response to the performance of a predetermined key operation by the user in a condition wherein the site screen is displayed, that is, wherein the site screen data is not recorded in the SRAM 135, but simply recorded temporarily in the RAM 120.

The "image data" in the present invention is not only restricted to still images, but is a concept including moving images and data which mixes moving images and still images. For example, it is possible to include moving images in the form of ordering a plurality of still images in a temporal sequence such as a GIF (Graphics Interchange Format) animation or in MPEG4 (Moving Picture Experts Group Phase 4) format.

In the above-described embodiment, the mobile station 100 displays the site screen data recorded in the SRAM 135 during the standby state, but embodiments may be conceived in which it is displayed during other states.

For example, the site screen data recorded in the SRAM 135 can be displayed as a screen indicating a download procedure when the mobile station 100 is in a state of downloading data from the IP server 50. Additionally, the site screen data recorded in the SRAM 135 may be displayed to indicate the mail is being received when the mobile station 100 is in a state of receiving electronic mail from another mobile station.

In the above-described embodiment, an example has been described of storing only one type of site screen data in the SRAM 135 aside from the default standby screen data. However, there is no restriction thereto, and it is possible to store a plurality of types of site screen data in the SRAM 135 in addition to the default standby screen data, so as to display site screen data chosen by the user from among these. Furthermore, different site screen data may be selectively displayed for each state from among the above-mentioned standby state, download state and electronic mail receiving state.

The subject who selects the data to be displayed from among the plurality of types

of site screen data need not be the user. For example, the mobile station 100 may display a plurality of types of site screen data in periodic rotation, or display randomly extracted data.

In the above-described embodiment, the standby screen data is site screen data acquired from the site of the IP server 50 or the like, but there is not restriction thereto.

For example, image data provided from another terminal (second terminal device) connected through the mobile communication network to the mobile station 100 by electronic mail may be used as the standby screen data. Here, the other terminal may be another mobile station 102 served by the mobile communication network as shown in Fig. 14, or may be a personal computer connected to the internet 40. In this case, the mobile station 100 treats the image data acquired by electronic mail from the other terminal as an object of a display screen registration procedure and standby screen setting procedure just as with the site screen data acquired from the above-described IP server 50. Additionally, the image data may be exchanged using a short message service known as an SMS instead of electronic mail.

When transmitting image data to a mobile station 101 containing a SIM card 190 as mentioned above, the other terminal on the data transmitting side should transmit the image data with an IMSI or decryption key appended.

The non-volatile memory provided in the mobile station 100 is not restricted to being an SRAM 135 as mentioned above, and may be a flash memory or EEPROM (Electrically Erasable Programmable Read-Only Memory).

The mobile communication terminal of the present invention is not restricted to being a mobile station 100 such as the above-mentioned portable telephone device or PHS (Personal Handyphone System). For example, it may be a mobile communication terminal which does not have a telephone function, such as a PDA (personal Digital Assistant) specialized for a data communication function or the like.



CLAIMS

1. A mobile communication terminal served by a mobile communication network, comprising:

a communication portion for accessing a server network-connected through said mobile communication network through a radio channel, and downloading site screen data provided by said server;

a display portion for displaying the downloaded site screen data;

a recording portion for recording said site screen data in a non-volatile memory; and

a display control portion for reading from said non-volatile memory said site screen data recorded by said recording portion and displaying it on said display portion.

2. A mobile communication terminal in accordance with claim 1, wherein said site screen data includes image data.

3. A mobile communication terminal in accordance with claim 1, wherein said display control portion displays said site screen data on said display portion as a reception standby screen when said mobile communication terminal is in a reception standby state.

4. A mobile communication terminal in accordance with claim 1, wherein said display control portion displays said site screen data on said display portion as a downloading screen when said mobile communication terminal downloads data from a server network-connected to said mobile communication network.

5. A mobile communication terminal in accordance with claim 1, wherein said display control portion displays said site screen data so as to fit the size of a display region of said display portion.

6. A mobile communication terminal in accordance with claim 1, wherein said display control portion generates a repeating pattern of said site screen data to display on said display portion.

7. A mobile communication terminal in accordance with claim 1, further comprising a recordability determining portion for determining whether or not said site screen data may be recorded by said recording portion.

8. A mobile communication terminal in accordance with claim 7, wherein said

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recordability determining portion performs the determination by referring to copyright information appended to said site screen data.

9. A mobile communication terminal in accordance with claim 7, wherein said recordability determining portion performs the determination by referring to data size information appended to said site screen data.

10. A mobile communication terminal in accordance with claim 7, further comprising:

a connecting portion for connecting a memory medium for storing communication setting information needed for communications through said mobile communication network; and

a readout portion for reading said communication setting information from said memory medium; wherein

said communication portion downloads predetermined information appended to said site screen data along with said data by accessing said server based on the read communication setting information; and

said recordability determining portion performs the determination by referring to said predetermined information appended to the downloaded site screen data, and said communication setting information.

11. A mobile communication terminal in accordance with claim 7, further comprising:

a connecting portion for connecting a memory medium storing communication setting information needed for communications through said mobile communication network, and a key for decrypting said site screen data which has been encrypted;and

a readout portion for reading said communication setting information and said key from said memory medium; wherein

said communication portion downloads said site screen data which has been encrypted, by accessing said server based on the read communication setting information; and

said recordability determining portion performs said determination according to whether or not a key to decrypt the downloaded site screen data is stored in said memory medium.

12. A mobile communication terminal in accordance with claim 1, wherein:

said recording portion records a plurality of types of said site screen data downloaded by said communication means to said non-volatile memory; and

comprises a selecting portion for selecting the site screen data to be displayed on

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said display portion from among the plurality of types of site screen data which are recorded; and wherein:

said display control portion reads the site screen data selected by said selecting portion from said non-volatile memory and displays it on said display portion.

13. A mobile communication terminal in accordance with claim 1, wherein said mobile communication terminal is a portable telephone device.

14. A mobile communication terminal served by a mobile communication network, comprising:

a communication portion for receiving through a radio channel image data sent from a second terminal device network-connected through said mobile communication network;

a recording portion for recording the received image data in a non-volatile memory;

a display portion for displaying a reception standby screen; and

a display control portion for reading from said non-volatile memory said image data recorded by said recording portion, and displaying it on said display portion as a reception standby screen.

15. A mobile communication terminal served by a mobile communication network, comprising:

a communication portion for receiving through a radio channel image data sent from a second terminal device network-connected through said mobile communication network;

a recording portion for recording the received image data in a non-volatile memory;

a display portion for displaying a data downloading screen; and

a display control portion for reading the image data recorded by said recording portion from said non-volatile memory and displaying it on said display portion as a downloading screen.

16. A mobile communication terminal in accordance with either claim 14 or 15, wherein said display control portion displays said image data so as to fit the size of a display region of said display portion.

17. A mobile communication terminal in accordance with either claim 14 or 15, wherein said display control portion generates a repeating pattern of said image data to display on said display portion.

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18. A mobile communication terminal in accordance with either claim 14 or 15, further comprising a recordability determining portion for determining whether or not said image data may be recorded by said recording portion.

19. A mobile communication terminal in accordance with claim 18, wherein said recordability determining portion performs the determination by referring to copyright information appended to said image data.

20. A mobile communication terminal in accordance with claim 18, wherein said recordability determining portion performs the determination by referring to data size information appended to said image data.

21. A mobile communication terminal in accordance with claim 18, comprising:

a connecting portion for connecting a memory medium for storing communication setting information needed for communications through said mobile communication network; and

a readout portion for reading said communication setting information from said memory medium; wherein

said communication portion receives predetermined information appended to said image data along with said data sent from said second communication terminal based on said communication setting information; and

said recordability determining portion performs the determination by referring to said predetermined information appended to the downloaded image data, and said communication setting information.

22. A mobile communication terminal in accordance with claim 18, comprising:

a connecting portion for connecting a memory medium storing communication setting information needed for communications through said mobile communication network, and a key for decrypting said image data which has been encrypted; and

a readout portion for reading said communication setting information and said key from said memory medium; wherein

said communication portion receives image data which has been encrypted and sent from said second communication terminal based on the read communication setting information; and

said recordability determining portion performs said determination according to whether or not a key to decrypt the downloaded image data is stored in said memory medium.

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23. A mobile communication terminal in accordance with claim either claim 14 or 15, wherein:

said recording portion records a plurality of types of said image data downloaded by said communication means to said non-volatile memory; and

comprises a selecting portion for selecting the image data to be displayed on said display portion from among the plurality of types of image data which are recorded; and wherein:

said display control portion reads the image data selected by said selecting portion from said non-volatile memory and displays it on said display portion.

24. A mobile communication terminal in accordance with either claim 14 or 15, wherein said mobile communication terminal is a portable telephone device.

