

DESCRIPTION

WASHING SYSTEM, LAUNDRY WASHING MACHINE, AND PROGRAM

5 TECHNICAL FIELD

[0001]

The present disclosure relates to washing systems, washing machines, and programs.

BACKGROUND ART

10 [0002]

Conventionally, a washing system has been disclosed that is capable of setting, on a washing machine, a washing cycle selected on a terminal (for example, refer to Patent Literature (PTL) 1).

[0003]

15 The conventional washing system includes a washing machine and a terminal capable of communicating with the washing machine. The terminal displays, in a selectable format, a plurality of washing cycles stored in the washing machine in advance and transmits, to the washing machine, information about
20 the washing cycle selected on the terminal. The washing machine sets the washing cycle on the basis of the received information and displays the set washing cycle.

Citation List

Patent Literature

25 [0004]

PTL 1: Unexamined Japanese Patent Publication No. 2014-033765

SUMMARY OF THE INVENTION

[0005]

In the conventional washing system, a washing cycle is selected from among only the plurality of washing cycles stored in the washing machine in advance, and the washing machine is
5 operated accordingly. The present disclosure provides a washing system configured to be able to register a customized cycle not stored in a washing machine in advance, minimize data traffic between a terminal and the washing machine, and reduce the amount of data that is to be stored in the washing machine in
10 advance at the time of manufacture.

[0006]

A washing system according to the present disclosure includes: a washing machine; and a terminal communicable with the washing machine. The washing machine transmits, to the
15 terminal, information about a status of execution of a washing operation of the washing machine, and the terminal displays, based on the information about the status of execution of the washing operation, a washing operation indication that varies depending on whether a cycle preinstalled on the washing machine is to be
20 executed or a customized cycle is to be executed.

[0007]

The washing system according to the present disclosure is capable of registering a customized cycle, minimizing data traffic between the terminal and the washing machine, and reducing the
25 amount of data to be stored in the washing machine in advance at the time of manufacture.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is a block diagram illustrating the configuration of a control system of a washing system according to the first exemplary embodiment.

FIG. 2 is a diagram illustrating the configuration of a database in a washing system according to the first exemplary embodiment.

FIG. 3 is a sequence diagram for usage start registration of a washing system according to the first exemplary embodiment.

FIG. 4 is a sequence diagram for customized cycle setting information registration of a washing system according to the first exemplary embodiment.

FIG. 5 is a schematic diagram illustrating a cycle selection screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 6 is a schematic diagram illustrating a my-family favorite cycle selection screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 7 is a schematic diagram illustrating a customized cycle setting information input screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 8 is a schematic diagram illustrating a customized cycle setting information editing screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 9 is a timing chart illustrating washing machine control for a washing cycle stored in advance in a washing machine of a washing system according to the first exemplary embodiment.

FIG. 10 is a schematic diagram illustrating an operation start screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 11 is a diagram illustrating a washing machine operation display screen displayed on a washing machine of a washing system according to the first exemplary embodiment.

FIG. 12 is a diagram illustrating a terminal operation display screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 13 is a timing chart illustrating washing machine control for a customized cycle of a washing system according to the first exemplary embodiment.

FIG. 14 is a diagram illustrating an operation start screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 15 is a diagram illustrating a washing machine operation display screen displayed on a washing machine of a washing system according to the first exemplary embodiment.

FIG. 16 is a diagram illustrating a terminal operation display screen displayed on a terminal of a washing system according to the first exemplary embodiment.

FIG. 17 is a timing chart illustrating main unit registration of a customized cycle of a washing system according to the second exemplary embodiment.

FIG. 18 is a diagram illustrating a my-family favorite cycle selection screen displayed on a terminal of a washing system according to the second exemplary embodiment.

FIG. 19 is a diagram illustrating a registration destination selection screen displayed on a terminal of a washing system according to the second exemplary embodiment.

FIG. 20 is a diagram illustrating a my-family favorite cycle selection screen displayed on a washing machine of a washing system according to the second exemplary embodiment.

DESCRIPTION OF EMBODIMENT

5 [0009]

Hereinafter, exemplary embodiments will be described in detail with reference to the drawings. Note that the accompanying drawings and the following description are not intended to limit the present disclosure.

10 [0010]

FIRST EXEMPLARY EMBODIMENT

Hereinafter, the first exemplary embodiment will be described with reference to FIG. 1 to FIG. 16.

[0011]

15 BASIC CONFIGURATION

FIG. 1 is a block diagram illustrating the configuration of a control system of a washing system according the first exemplary embodiment. FIG. 2 is a diagram illustrating the configuration of a database in the washing system according to the first exemplary embodiment.

20

[0012]

Washing machine 1 includes washing machine function unit 4, washing machine control unit 3, washing machine storage unit 5, washing machine communication unit 2, and washing machine control display unit 6.

25

[0013]

Washing machine function unit 4 represents washing machine hardware. The washing machine hardware mainly includes: a tub elastically supported in a housing; a washing and

rinsing tub rotatably installed within the tub; a driving unit that drives and rotates the washing and rinsing tub; a water supply valve that can be opened and closed to supply water to the tub; a drain valve that blocks, in an openable and closable manner, a drainage path through which water for washing is drained; and a heating device that heats the water for washing, for example. Note that washing machine function unit 4 may include, other than the structural elements just listed, an automatic detergent dispensing device, a drying device, a mist-generating device, a disinfecting device, and the like. According to a control instruction from washing machine control unit 3, washing machine function unit 4 drives load devices such as the driving unit, the water supply valve, the drainage valve, and the heating device and performs a whole washing sequence.

[0014]

Washing machine control unit 3 controls a whole washing sequence for executing a washing operation. Generally, the washing sequence is configured by combining a washing step for washing clothes, a rinsing step for washing off a detergent, a spinning step for extracting moisture from the clothes, and a drying step for drying the clothes. Washing machine control unit 3 refers to the whole washing sequence stored in washing machine storage unit 5 and instructs washing machine function unit 4 to operate and drive the load devices.

[0015]

Washing machine storage unit 5 is configured to be able to store the whole washing sequence as a washing cycle. Furthermore, in washing machine storage unit 5 according to the present exemplary embodiment, image data showing the name

assigned to each washing cycle is stored. In the present exemplary embodiment, this image data is defined as a screen view related to the name of a cycle.

[0016]

5 Washing machine communication unit 2 is connected to communication network 20 via a relay unit (not illustrated in the drawings) and is connected to server communication unit 31, terminal communication unit 41, and the like via communication network 20. Washing machine communication unit 2 transmits, to
10 server communication unit 31, information about the status of washing machine 1 such as a power ON/OFF status and an operation status during a washing operation. Furthermore, washing machine communication unit 2 receives a control
15 instruction from server communication unit 31. Examples of the control instruction include an instruction to turn the power ON/OFF, a timer setting instruction to start the operation at a designated time, and an instruction to transmit the current status of washing machine 1.

[0017]

20 Washing machine control display unit 6, which includes a touch panel, is configured to display the image data stored in washing machine storage unit 5 and allow users to input selection results. Washing machine control display unit 6 is controlled by washing machine control unit 3 and displays the operation status
25 in the whole washing sequence performed by washing machine function unit 4.

[0018]

Server 30, which is built on the Internet, includes server communication unit 31, processing unit 32, control screen creation

unit 33, user information unit 34, setting information unit 35, and the like.

[0019]

Server communication unit 31, which is configured to be
5 able to communicate with washing machine 1, terminal 40, and the like via communication network 20, receives an operation instruction transmitted from terminal 40, and transmits a control signal to washing machine 1.

[0020]

10 Processing unit 32 performs a matching between the operation instruction received from terminal 40 and the current status of washing machine 1 received from washing machine 1, and determines whether or not the control instruction for washing machine 1 is appropriate. For example, when washing machine 1
15 is already in operation, washing machine 1 is disabled for timer setting entry. Therefore, by determining not to transmit the timer setting instruction to washing machine 1, processing unit 32 reduces unnecessary communication to minimize data traffic. Note that processing unit 32 may be provided on washing machine
20 1. The following description assumes that processing unit 32 is on server 30.

[0021]

Control screen creation unit 33 creates a control screen for terminal 40 according to the current status of washing machine 1.
25 For example, when the current status of washing machine 1 is the default standby status, a screen for selecting a cycle, detailed settings, and the like is created. The created control screen is transmitted to terminal 40 via server communication unit 31 and

communication network 20. Hereinafter, description of the creation of the control screen will be omitted.

[0022]

User information unit 34 stores information of washing machine 1 registered in washing machine usage start registration. The information stored in user information unit 34 includes: unit specific ID which is an identification number unique to washing machine 1; user ID for identifying a user; unit information which is information about the model of washing machine 1; and user information which is set by a user him or herself. Note that the user information may include the name, gender, age, etc., of the user.

[0023]

In setting information unit 35, after setting information registration of customized cycles to be described later, the unit specific ID and setting information set and input for each customized cycle are stored in association with each other. The setting information includes: a cycle name which is the name of a customized cycle; and parameter settings which are control information for washing machine function unit 4. The customized cycle will be described later.

[0024]

Terminal 40, which is a cell phone, a smartphone, a tablet device, etc., carried by the user, includes terminal communication unit 41, terminal control display unit 42, and the like.

[0025]

Terminal communication unit 41, which plays a role to transmit and receive information to and from server 30, receives the control screen, transmits the operation instruction to washing

machine 1, and transmits and receives the setting information, usage setting information, etc., for washing machine 1, for example.

[0026]

5 Terminal control display unit 42 displays the control screen transmitted from server 30. The display method is assumed to be a dedicated application that is installed on terminal 40 for washing machine 1, but software preinstalled on terminal 40 or an application usable on more than one device may also be applied.

10 Hereinafter, a washing machine application which is a dedicated application will be described as an example.

[0027]

 Note that the relationship between washing machine 1, server 30, and terminal 40 is not limited to one-to-one-to-one. For
15 example, two or more washing machines 1 may be connected to server 30; thus, server 30 can manage washing machines 1 installed in two or more homes. Furthermore, two or more terminals 40 may be connected to one washing machine 1; thus, two or more family members can use washing machine 1 installed in a
20 home. The following describes, as an example, a situation in which two or more washing machines 1 are connected to server 30 and furthermore, two or more terminals 40 are connected to one washing machine 1.

[0028]

25 Washing Machine Usage Start Registration

 The washing machine usage start registration will be described with reference to FIG. 3.

[0029]

FIG. 3 is a sequence diagram for usage start registration of the washing system according to the first exemplary embodiment.
[0030]

At the time of using a washing application for the first time,
5 a user needs to perform washing machine usage start registration. When the washing machine usage start registration is started, terminal 40 requests washing machine 1 via server 30 to provide the unit specific ID (Step S1). Washing machine 1 transmits the unit specific ID via server 30 (Step S2). Terminal 40 requests
10 server 30 to perform the washing machine usage start registration (Step S3) and transmits thereto the user ID input by the user, the unit specific ID, and the unit information of washing machine 1. Note that the unit information does not need to be transmitted to terminal 40 when server 30 performs the determination on the
15 basis of the unit specific ID. Server 30 associates the user ID, the unit specific ID, and the unit information with each other and adds the user ID, the unit specific ID, and the unit information to user information unit 34 as records (Step S4). When server 30 notifies terminal 40 of the result of the washing machine usage start
20 registration (Step S5), the washing machine usage start registration is completed. When the washing machine usage start registration is completed, operations such as setting information registration, washing machine control, and main unit registration become available.

25 [0031]

My-family Favorite Cycle

The setting information registration of customized cycles will be described with reference to FIG. 4 to FIG. 8.

[0032]

FIG. 4 is a sequence diagram for customized cycle setting information registration of the washing system according to the first exemplary embodiment. FIG. 5 is a schematic diagram illustrating cycle selection screen 101 displayed on the terminal of the washing system according to the first exemplary embodiment. FIG. 6 is a schematic diagram illustrating my-family favorite cycle selection screen 102 displayed on the terminal of the washing system according to the first exemplary embodiment.

[0033]

In the present exemplary embodiment, the “my-family favorite cycle” is defined as a washing sequence created by combining parameters that are changeable by user input to washing machine 1. The “my-family favorite cycle” includes a “subordinate cycle” and a “customized cycle”. In the present exemplary embodiment, the “subordinate cycle” is defined as a washing sequence stored in washing machine storage unit 5 in advance at the time of manufacture, and the “customized cycle” is defined as a washing sequence created using terminal 40.

[0034]

As illustrated in FIG. 4, when the washing application is started after the washing machine usage start registration is completed, terminal 40 requests server 30 to call up the user information and transmits the user ID thereto (Step T1). Server 30 obtains the unit specific ID and the unit information associated with the user ID from user information unit 34 (Step T2) and transmits the unit specific ID and the unit information to terminal 40 (Step T3). Note that in the case where the setting information associated with the unit specific ID has already been registered in

setting information unit 35, the setting information may also be transmitted.

[0035]

As illustrated in FIG. 5, cycle selection screen 101 displays, in a selectable format, operation modes such as “WASH” indicating a wash operation, “WASH TO DRY” indicating a wash operation to a dry operation, and “DRY” indicating a dry operation only. Furthermore, cycle selection screen 101 displays, in a selectable format, “OPTIMIZED”, which is a standard washing sequence, “MY-FAMILY FAVORITE”, “BLANKET CYCLE”, etc. Note that “OPTIMIZED” and “BLANKET CYCLE” are shown as examples of the washing sequence stored in washing machine storage unit 5 in advance at the time of manufacture. The washing sequence stored in advance at the time of manufacture to be displayed on cycle selection screen 101 is not limited to the standard washing sequence or the washing sequence aiming to wash blankets and may be a washing sequence for another purpose.

[0036]

When the user selects “OPTIMIZED” or “BLANKET CYCLE”, the screen view transitions to operation start screen 104A to be described later. When the user selects “MY-FAMILY FAVORITE CYCLE” on cycle selection screen 101, the screen view transitions to my-family favorite cycle selection screen 102.

[0037]

As illustrated in FIG. 6, my-family favorite cycle selection screen 102 displays, in a selectable format, “+ CYCLE CUSTOMIZATION”, the subordinate cycles such as “FAVORITE”, “QUIET”, and “SINGLE RINSE”, and the customized cycle already registered in setting information unit 35 such as “DAD ONLY”

(Step T4). When the user selects “+ CYCLE CUSTOMIZATION”, the screen view transitions to setting information input screen 103A to be described later (Step T5a).

[0038]

5 For the customized cycle that has already been registered, the cycle name input and registered by the user is displayed, as described later. Furthermore, “CHECK/EDIT” is displayed in a selectable format under the cycle name; when the user selects “CHECK/EDIT”, the screen view transitions to setting information
10 editing screen 103B (T5b).

[0039]

Operation in Setting Information Registration of Customized Cycle

FIG. 7 is a schematic diagram illustrating a customized cycle setting information input screen displayed on the terminal of
15 the washing system according to the first exemplary embodiment. FIG. 8 is a schematic diagram illustrating a customized cycle setting information editing screen displayed on the terminal of the washing system according to the first exemplary embodiment.

[0040]

20 As illustrated in FIG. 7, setting information input screen 103A is configured to be able to input the cycle name and parameter settings that are changeable by user input to washing machine 1 (Step T6). Note that the wash time, the number of rinses, the spin time, and the dry level are shown as examples of
25 parameters that are changeable by user input to washing machine 1. The user creates a favorite washing sequence by entering the cycle name and combining the parameter settings. Assigning a cycle name to each customized cycle created makes it easier to identify two or more customized cycles created.

[0041]

When the user selects “OPERATE WITHOUT REGISTRATION” on setting information input screen 103A, terminal 40 requests server 30 to perform the washing machine control and transmits thereto the unit specific ID and the parameter settings. The operation subsequent to requesting for the washing machine control is executed in substantially the same manner as the operation in Steps C3, C4, C5, C6, and C7 to be described later. When the user selects “REGISTER” on setting information input screen 103A, terminal 40 requests server 30 to perform the setting information registration and transmits thereto the unit specific ID and the setting information (Step T6). Server 30 causes setting information unit 35 to add the record in which the unit specific ID and the setting information are associated (Step T7).

[0042]

As illustrated in FIG. 8, setting information editing screen 103B is configured to be able to edit the cycle name and the parameter settings, as with setting information input screen 103A, and displays, as default values, the cycle name and the parameter settings that have been entered at the time of creation. When the user selects “CHANGE” after changing the cycle name or the parameter settings, terminal 40 requests server 30 to perform the setting information registration and transmits thereto the unit specific ID and the setting information (Step T6). Server 30 causes setting information unit 35 to edit the records by associating the unit specific ID and the setting information (Step T7).

[0043]

Subsequently, server 30 transmits, to terminal 40, information indicating that the setting information registration has been added and edited (Step T8).

[0044]

5 The present exemplary embodiment assumes a situation in which two or more family members use washing machine 1, meaning that two or more terminals 40 are connected to one washing machine 1. Therefore, there is a possibility that without the user noticing, the parameter settings for the customized cycle
10 may be changed by another terminal 40. In view of this, setting information editing screen 103B displays the date and time of update in a lower screen area so that it can be easily checked whether or not the parameters have been changed by another terminal 40.

15 [0045]

Start of Washing Operation in Subordinate Cycle

With reference to FIG. 9 to FIG. 12, the processes related to the washing machine control in operating the washing sequence stored in washing machine storage unit 5 in advance at the time of
20 manufacture will be described.

[0046]

FIG. 9 is a timing chart illustrating the washing machine control for the washing cycle stored in advance in the washing machine of the washing system according to the first exemplary
25 embodiment. FIG. 10 is a schematic diagram illustrating the operation start screen displayed on the terminal of the washing system according to the first exemplary embodiment. FIG. 11 is a diagram illustrating a washing machine operation display screen displayed on the washing machine of the washing system according

to the first exemplary embodiment. FIG. 12 is a diagram illustrating a terminal operation display screen displayed on the terminal of the washing system according to the first exemplary embodiment.

5 [0047]

Operation start screen 104A illustrated in FIG. 10 is an example of the operation start screen appearing when the washing sequence stored in washing machine storage unit 5 in advance at the time of manufacture is selected. When the washing cycle is selected on cycle selection screen 101 (refer to FIG. 5) or when the subordinate cycle is selected on my-family favorite cycle selection screen 102 (refer to FIG. 6), the screen view transitions to operation start screen 104A. Note that the screen may be configured so that setting information such as timer setting can be input in addition at this time.

15 [0048]

Operation start screen 104A displays terminal cycle name display portion 43 showing the cycle name of the selected washing sequence, terminal operation start portion 44 for starting the operation, and setting information 43a including timer settings and the like. Therefore, the user can check the selected washing cycle before the start of the operation and then cause washing machine 1 to start the washing operation. When terminal operation start portion 44 is operated on operation start screen 104A, terminal 40 starts the processes related to the washing machine control.

25 [0049]

Terminal 40 requests server 30 to perform the washing machine control to start the washing operation and transmits

thereto the unit specific ID and the control information (Step U1).
The control information includes information about the selected
washing cycle. Server 30 requests washing machine 1 to perform
washing control and causes washing machine 1 to start the
5 washing operation (Step U2).
[0050]

When the washing operation is started (Step U3), washing
machine control display unit 6 displays that the washing operation
is to be started, and then the screen view transitions to washing
10 machine operation display screen 201A displaying the current
operation status. As illustrated in FIG. 11, washing machine
operation display screen 201A displays cycle name display portion
7 displaying the cycle name of the washing cycle in operation and
current step display portion 8 displaying the current operation
15 status in the whole washing sequence.
[0051]

The cycle name display portion in the present exemplary
embodiment shows “MY-FAMILY FAVORITE - QUIET -” as an
example. The subordinate cycle is a washing sequence stored in
20 washing machine 1 in advance at the time of manufacture, and
therefore an image showing the name of the subordinate cycle is
stored in washing machine storage unit 5 in advance. Therefore,
washing machine control unit 3 reads out a screen related to the
cycle name stored in washing machine storage unit 5 and displays
25 the screen as the cycle name in cycle name display portion 7 (refer
to FIG. 11).
[0052]

Washing machine 1 transmits the current control
information to server 30 at intervals of predetermined time (Step

U4), and server 30 informs terminal 40 of the operation status of washing machine 1 based on the current control information (Step U5).

[0053]

5 As illustrated in FIG. 12, terminal control display unit 42 displays terminal cycle name display portion 43 displaying the cycle name of the washing cycle in operation and terminal current step display portion 45 displaying the current operation status in the whole washing sequence. In FIG. 12, as one example of
10 terminal cycle name display portion 43, "MY-FAMILY FAVORITE - QUIET -" is shown, and as one example of terminal current step display portion 45, "REMAINING TIME: 30 MINUTES" and "CURRENT STEP: WASHING" are shown, but these are not limiting.

15 [0054]

Start of Washing Operation in Customized Cycle

With reference to FIG. 13 to FIG. 16, the processes related to the washing machine control in operating the customized cycle will be described.

20 [0055]

FIG. 13 is a timing chart illustrating the washing machine control for the customized cycle of the washing system according to the first exemplary embodiment. FIG. 14 is a diagram
illustrating the operation start screen displayed on the terminal of
25 the washing system according to the first exemplary embodiment. FIG. 15 is a diagram illustrating the washing machine operation display screen displayed on the washing machine of the washing system according to the first exemplary embodiment. FIG. 16 is a diagram illustrating a terminal operation display screen displayed

on the terminal of the washing system according to the first exemplary embodiment.

[0056]

When the customized cycle is selected on my-family favorite
5 cycle selection screen 102 (refer to FIG. 6), the screen view transitions to operation start screen 104B illustrated in FIG. 14. Similar to operation start screen 104A, operation start screen 104B displays terminal cycle name display portion 43, terminal operation start portion 44, and setting information 43a including
10 timer settings and the like. On operation start screen 104B, “MY-FAMILY FAVORITE - DAD ONLY -” is shown as one example of cycle name display portion 7. When terminal operation start portion 44 is operated on operation start screen 104B, terminal 40 starts the processes related to the washing machine control.

15 [0057]

Terminal 40 requests server 30 to perform the washing machine control to start the washing operation and transmits thereto the unit specific ID and the control information (Step C1). The control information used when the customized cycle is selected
20 includes setting information about the selection indicated by the cycle name or the like. On the basis of the received unit specific ID and the received control information, server 30 obtains the parameter settings stored in a washing machine setting content table (Step C2) and reflects the parameter settings in the control
25 information (Step C3).

[0058]

Server 30 requests washing machine 1 to start the washing operation and transmits thereto the control information in which the settings have already been reflected (Step C4). On the basis of

the control information in which the settings have already been reflected, washing machine 1 drives washing machine function unit 4 and thus starts the washing operation (Step C5).

[0059]

5 When the instruction to start the washing operation is provided by remote control or by direct input to washing machine 1, washing machine control unit 3 controls washing machine function unit 4 and causes washing machine function unit 4 to start execution of the whole washing sequence in the selected washing
10 cycle. As illustrated in FIG. 15, washing machine operation display screen 201B displays cycle name display portion 7 displaying the cycle name of the washing cycle in operation and current step display portion 8 displaying the current operation status in the whole washing sequence. Washing machine control
15 display unit 6 displays that the washing operation is to be started, and then displays the current operation status in the whole washing sequence.

[0060]

 Cycle name display portion 7 displays an image showing
20 “APPLICATION” stored in washing machine storage unit 5 in advance at the time of manufacture and displays that the customized cycle is to be executed. In order to display the unique cycle name registered for each customized cycle, a plurality of text data need to be displayed in combination, meaning that all the
25 usable Hiragana characters, Katakana characters, Chinese characters, alphabets, and the like need to be stored in washing machine storage unit 5. Therefore, in the present exemplary embodiment, the image views related to the customized cycles are integrated as “APPLICATION” so that the amount of data to be

stored in washing machine storage unit 5 is reduced. The image view indicating that the cycle to be executed is a customized cycle is not limited to “APPLICATION” and may be another text view such as “CUSTOMIZED” or may be a pictogram view such as an icon.

5 [0061]

Similar to the operation of the washing sequence stored in washing machine storage unit 5 in advance at the time of manufacture, washing machine 1 transmits the current control information to server 30 at intervals of predetermined time in the operation of the customized cycle as well (Step C6). Server 30 informs terminal 40 of the operation status of washing machine 1 based on the current control information (Step C7).

10 [0062]

As illustrated in FIG. 16, terminal operation display screen 105B displays terminal cycle name display portion 43 displaying the cycle name of the washing cycle in operation and terminal current step display portion 45 displaying the current operation status in the whole washing sequence.

15 [0063]

In FIG. 16, as one example of terminal cycle name display portion 43, “MY-FAMILY FAVORITE” is shown. As illustrated in FIG. 13, in the washing machine control request from server 30 to washing machine 1 (Step C4), the washing machine control response from washing machine 1 to server 30 (Step C6), and the washing machine control response from server 30 to terminal 40 (Step C7), the information about the cycle name is not transmitted or received. The information about the cycle name is text data, meaning that the data amount thereof is great; it is therefore

20 25

possible to minimize data traffic by not transmitting or receiving the information about the cycle name.

[0064]

Furthermore, terminal current step display portion 45
5 displays the current operation status in the whole washing sequence on the basis of the current control information received from washing machine 1 via server 30. Therefore, since the current control information received from washing machine 1 does not include the information about the cycle name, terminal current
10 step display portion 45 does not display the cycle name.

[0065]

Note that the information about the cycle name selected may be stored in server 30 or terminal 40 in Step C1 and terminal current step display portion 45 may display the cycle name on the
15 basis of the stored history. However, the configuration in which the current operation status is displayed on the basis of only the current control information received from washing machine 1 is more reliable.

[0066]

20 Working Effects, etc.

As described above, the washing system according to the present exemplary embodiment includes: washing machine 1; and terminal 40 configured to be able to mutually communicate with washing machine 1. Washing machine 1 transmits, to terminal 40,
25 information about a status of execution of a washing operation, and terminal 40 displays, based on the current control information which is the status of execution of the washing operation, a washing operation indication that is different between terminal operation display screen 105A appearing in the execution of a cycle

preinstalled on washing machine 1 and terminal operation display screen 105B appearing in the execution of a customized cycle created by user input to terminal 40.

[0067]

5 Thus, terminal operation display screen 105A and terminal operation display screen 105B are created on the basis of the control information received from washing machine 1 and not including the data related to the cycle name. Therefore, it is possible to check reliable current control information while
10 reducing the amount of data to be transmitted and received.

[0068]

 Furthermore, as in the present exemplary embodiment, terminal 40 may transmit to washing machine 1 the instruction to execute the customized cycle or the subordinate cycle, which is a
15 preinstalled operation cycle, and washing machine 1 may execute the washing operation on the basis of the instruction.

[0069]

 Washing machine 1 according to the present exemplary embodiment, which is configured to be able to communicate with
20 terminal 40, displays an indication that is different between washing machine operation display screen 201A appearing in the execution of the subordinate cycle, which is an operation cycle preinstalled on washing machine 1, and washing machine operation display screen 201B appearing in the execution of the
25 customized cycle created by user input to terminal 40.

[0070]

 Thus, washing machine operation display screen 201B does not need to display the cycle name by combining a plurality of text data in order to display that the customized cycle is to be executed.

Therefore, washing machine storage unit 5 does not need to store all the text data usable for the cycle name, meaning that the amount of data to be stored in washing machine storage unit 5 can be reduced.

5 [0071]

Furthermore, as in washing machine 1 according to the present exemplary embodiment, washing machine control display unit 6, which is configured to be able to display an image and displays the operation status of the washing operation, may be included, and washing machine control display unit 6 may be configured to, in execution of the subordinate cycle, display the cycle name, and in execution of the customized cycle, display that the customized cycle is to be executed.

[0072]

15 Furthermore, as in the present exemplary embodiment, terminal 40 may transmit to washing machine 1 the instruction to execute the subordinate cycle or the customized cycle, and washing machine 1 may execute the washing operation on the basis of the instruction. The washing system according to the present
20 exemplary embodiment includes: washing machine 1; server 30 capable of mutually communicating with washing machine 1; and terminal 40 configured to be able to mutually communicate with server 30 or washing machine 1. Terminal 40 is capable of creating the customized cycle by user input, and the customized
25 cycle is configured according to the setting information including: parameter settings created by combining control contents of the whole washing sequence; and information about the cycle name which is the name of the customized cycle. Terminal 40 transmits the setting information to server 30 (Step T6). When server 30

receives from terminal 40 the washing machine control request for causing washing machine 1 to start the washing operation (Step C1), server 30 transmits to washing machine 1 the control contents based on the parameter settings without transmitting the cycle name to washing machine 1 (Step C4), and washing machine 1 starts the washing operation on the basis of the parameter settings (Step C5).

[0073]

The washing system according to the present exemplary embodiment includes: washing machine 1; server 30 capable of mutually communicating with washing machine 1; and terminal 40 configured to be able to mutually communicate with server 30 or washing machine 1. Terminal 40 displays, in a selectable format, the subordinate cycle, which is an operation cycle preinstalled on washing machine 1, and the customized cycle stored in server 30, server 30 transmits to washing machine 1 the control information about the operation cycle selected by input to terminal 40, and washing machine 1 executes the operation on the basis of the control information. Cycle name display portion 7 of washing machine 1 displays the cycle name in execution of the subordinate cycle, and displays, in execution of the customized cycle, that the customized cycle is to be executed.

[0074]

The washing system according to the present exemplary embodiment includes: washing machine 1; server 30 capable of mutually communicating with washing machine 1; and terminal 40 configured to be able to mutually communicate with server 30. Terminal 40 transmits to server 30 the setting information about the customized cycle created by user input, and server 30 stores the

unit specific ID, which is used to identify washing machine 1, or user ID, which is used to identify a user, and the setting information in association into setting information unit 35.

Terminal 40 displays the cycle name of the customized cycle stored in setting information unit 35 before transmitting to washing machine 1 a washing operation instruction to perform the washing operation, and the screen on washing machine 1 that displays the operation status of the washing operation does not display the cycle name.

10 [0075]

The washing application according to the present exemplary embodiment is a program for a washing machine application installed on terminal 40. This program includes a display step for displaying, in a selectable format, an operation cycle including an operation cycle preinstalled on washing machine 1 and a customized cycle not installed on washing machine 1.

Furthermore, this program causes terminal 40 to perform: a transmission step (Step U1, Step C1) for transmitting, to the washing machine, cycle selection information about the operation cycle selected; and a display step for receiving information about the status of execution of the operation cycle that is being executed by washing machine 1 (Step U5, Step C7), and displaying an indication that varies depending on whether washing machine 1 is executing the subordinate cycle or washing machine 1 is executing the customized cycle.

[0076]

SECOND EXEMPLARY EMBODIMENT

A washing system according to the second exemplary embodiment is different from the washing system according to the

first exemplary embodiment in that the selected customized cycle can be stored in washing machine storage unit 5. In the present exemplary embodiment, the operation of storing the customized cycle into washing machine storage unit 5 is defined as main unit registration. Hereinafter, the features of the main unit registration that are substantially the same as those in the first exemplary embodiment will be described using substantially the same reference marks.

[0077]

10 Main Unit Registration

The main unit registration will be described with reference to FIG. 17 to FIG. 20.

[0078]

FIG. 17 is a timing chart illustrating main unit registration of the customized cycle of the washing system according to the second exemplary embodiment. FIG. 18 is a diagram illustrating a my-family favorite cycle selection screen displayed on the terminal of the washing system according to the second exemplary embodiment. FIG. 19 is a diagram illustrating a registration destination selection screen displayed on the terminal of the washing system according to the second exemplary embodiment. FIG. 20 is a diagram illustrating a my-family favorite cycle selection screen displayed on the washing machine of the washing system according to the second exemplary embodiment. Note that the same elements as those in the first exemplary embodiment are assigned the same reference marks and description thereof will be omitted.

[0079]

As illustrated in FIG. 18, my-family favorite cycle selection screen 106 in the present exemplary embodiment displays “APP (1, 2, 3, ...)” as an identifier for a customized cycle. The identifier is automatically given when each customized cycle is created and
5 registered. Since the identifier is given in order to identify the customized cycle, the identifier may be any of numbers, text, graphics, and color. Note that giving the identifier is not essential. In the preset exemplary embodiment, main unit registration of the customized cycle “DAD ONLY” assigned with
10 “APP1” will be described as an example.
[0080]

As illustrated in FIG. 17, when the cycle customization or the customized cycle on my-family favorite cycle selection screen 106 is selected (Step V1), registration destination selection screen
15 107 for selecting a registration destination in washing machine storage unit 5 is displayed (refer to FIG. 19). On registered destination selection screen 107, storage area options such as “FAVORITE 2” and “FAVORITE 3” are displayed in a selectable format. When “FAVORITE 2”, “FAVORITE 3”, or “TO
20 CHECKING/EDITING SCREEN WITHOUT SAVING” is selected on registered destination selection screen 107 (Step V2), the screen view transitions to setting information input screen 103A (refer to FIG. 7) (Step V3). In the present exemplary embodiment, using an example where “FAVORITE 2” is selected, the operation to be
25 performed after completion of input on setting information input screen 103A will be described.
[0081]

Terminal 40 requests server 30 to perform washing machine registration and transmits thereto the unit specific ID, the setting

information, and the information about the registration destination (Step V4). Server 30 requests washing machine 1 to perform the washing machine registration and transmits thereto the unit specific ID, the setting information, and the information
5 about the registration destination (Step V5). Washing machine 1 stores the identifier and the parameter settings into a predetermined area of washing machine storage unit 5, that is, the designated registration destination “FAVORITE 2” (Step V6), and transmits the unit specific ID, the setting information, and the
10 information about the registration destination to server 30. Server 30 determines that the main unit registration has been successful, and adds the setting information including the identifier, the cycle name, and the parameter settings to setting information unit 35 as records.

15 [0082]

Washing machine control display unit 6 displays two or more subordinate cycles, “FAVORITE 2”, and “FAVORITE 3” on my-family favorite cycle selection screen 202 (refer to FIG. 20) in a selectable format. In the present exemplary embodiment, since
20 the setting information is stored in “FAVORITE 2” in Step V6, the identifier “APP1” is displayed below “FAVORITE 2”.

[0083]

When the user selects “FAVORITE 2” by operating washing machine control display unit 6, washing machine 1 starts the
25 washing operation of the customized cycle on the basis of the setting information stored in “FAVORITE 2”.

[0084]

Note that the sequence of Step V2 and Step V3 may be reversed so that a storage area in washing machine 1 can be selected (Step V2) after the detail of each parameter is fixed in StepV3.

[0085]

5 Note that in server 30, the setting information may be saved into setting information unit 35 (Step V8) before Step V9. In this case, in Step V9, only transmission of the identifier and the parameter settings is needed. This reduces the amount of data to be transmitted and received between washing machine 1 and
10 server 30 and thus minimizes the data traffic.

[0086]

Working Effects, etc.

A washing system according to the present exemplary embodiment includes: washing machine 1; server 30 capable of
15 mutually communicating with washing machine 1; and terminal 40 configured to be able to mutually communicate with server 30 or washing machine 1. Server 30 includes setting information unit 35 capable of storing a plurality of customized cycles created by user input to terminal 40. Washing machine 1 includes washing
20 machine storage unit 5 capable of storing a customized cycle received from server 30. In the main unit registration step in which the customized cycle is stored into washing machine storage unit 5, terminal 40 transmits the customized cycle and an identifier corresponding to the customized cycle to washing
25 machine 1 via server 30. Washing machine storage unit 5 stores the correspondence relationship between the customized cycle and the identifier. Washing machine 1 displays the identifier on a cycle selection screen.

[0087]

With this, it is possible to store the customized cycle into washing machine storage unit 5 without providing the function of displaying the cycle name on washing machine 1. Thus, the amount of data to be transmitted and received between washing machine 1 and server 30 can be reduced.

[0088]

OTHER EXEMPLARY EMBODIMENTS

The first and second exemplary embodiments have been described above by way of example of techniques disclosed in the present application. The techniques according to the present disclosure, however, are not limited to the foregoing exemplary embodiments.

[0089]

In view of this, other exemplary embodiments will be given below as examples.

[0090]

The first and second exemplary embodiments have described a washing machine including a dry function as one example of the washing machine. The washing machine does not need to include the dry function because it is sufficient that the washing machine can perform the washing operation.

[0091]

In the first and second exemplary embodiments, the customized cycle created by input to terminal 40 has been described as one example of the customized cycle. The customized cycle is not limited to the operation cycle created by input to terminal 40 as long as the customized cycle is not preinstalled on the washing machine. For example, the customized cycle may be

an operation cycle created by a washing machine manufacturer and distributed via the server.

[0092]

In the first and second exemplary embodiments, the
5 customized cycle included in the my-family favorite cycle has been described as one example of the customized cycle. The customized cycle does not need to be a my-family favorite cycle created by combining parameters that are changeable by user input to washing machine 1. In other words, the customized cycle is not
10 limited to the combination of parameters that are changeable by user input to washing machine 1; it is sufficient that the customized cycle be created by combining parameters that are required to control washing machine function unit 4. For example, the customized cycle may be created using parameters such as a
15 water level, a water temperature, an agitating speed, an airflow rate in the drying step, a heating temperature in the drying step, and total time of operation.

[0093]

In the first and second exemplary embodiments, the touch
20 panel has been described as one example of the washing machine control display unit.

[0094]

A user interface (washing machine control display unit)
between a user and the device according to the present disclosure
25 can take various forms. The washing machine control display unit may be configured to include one or both of an input interface and an output interface. The input interface and the output interface may be provided separately. The input interface is used by a user to input information to the device according to the present

disclosure. The output interface is used by a user to output information from the device according to the present disclosure.

[0095]

The input interface can take various forms. For example, the input interface may be configured using a mechanical operation member and the like. The touch panel is not limited to a contact type touch panel and may be a non-contact type touch panel.

Furthermore, sound from a user received by the device according to the present disclosure may serve as the input interface. One

example of this input interface is a smart speaker or the like.

[0096]

The output interface can take various forms. For example, the output interface may be configured using a display. As the display, a display such as a liquid-crystal display and an organic electroluminescent display can be used. The user interface may be provided on the device according to the present disclosure or may be provided as a unit separate from the device according to the present disclosure. In the case where the user interface is provided as a unit separate from the device according to the present disclosure, the user interface and the device according to the present disclosure are configured to be able to communicate with each other via a wired or wireless connection.

[0097]

It is sufficient that the washing machine control unit according to the present disclosure be a controller capable of controlling the device according to the present disclosure. The controller can take various forms. For example, a processor may be used as a controller. When the processor is used as the controller, it is possible to perform various processes by the

processor reading a program on a storage medium with the program stored thereon and executing the program. Therefore, it is possible to change details of the processes by changing the program stored on the storage medium, leading to improved flexibility in changing details to be controlled. Examples of the processor include a central processing unit (CPU) and a micro-processing unit (MPU). Examples of the storage medium include a hard disk drive, flash memory, and an optical disc. Furthermore, a wired logic device which cannot rewrite the program may be used as the controller. The use of the wired logic device as the controller is effective in improving the processing speed. Examples of the wired logic device include an application specific integrated circuit (ASIC). Furthermore, the processor and the wired logic device may be combined as the controller. The use of the combination of the processor and the wired logic device as the controller allows for an improved processing speed while improving software design flexibility. Furthermore, the controller and a circuit having a function different from the functions of the controller may be configured of one semiconductor element. Examples of the circuit having the different function include A/D and D/A conversion circuits. Moreover, the controller may be one semiconductor element or may include two or more semiconductor elements. In the case where two or more semiconductor elements are included, the control processes recited in the claims may be provided by different semiconductor elements. Furthermore, the controller may be formed of elements including a semiconductor element and a passive component such as a resistor and a capacitor.

[0098]

It is sufficient that the washing machine communication unit according to the present disclosure be connected to a communication network via a relay unit. For example, the washing machine communication unit may be connected to the relay unit via a wired connection or may be connected to the relay unit via a wireless connection.

[0099]

Examples of the wired connection means include a wired connection using a wired local area network (LAN) based on the Ethernet (registered trademark) standard and a wired connection using an optical fiber cable. Examples of the wireless connection means include an IEEE802.11 wireless LAN which communicates with a WiFi (registered trademark) router via a wireless connection, the third generation mobile communication system (commonly called 3G), the fourth generation mobile communication system (commonly called 4G), the fifth generation mobile communication system (commonly called 5G), an IEEE802.16 WiMAX (registered trademark), and a low-power wide-area (LPWA). Examples of the short-range wireless communication include the communication via Bluetooth (registered trademark), the near-field wireless communication (NFC) via a loop antenna, and the infrared communication.

[0100]

The relay unit is expected to be the aforementioned WiFi router, a gateway, or an external terminal that supports 3G, 4G, etc.

INDUSTRIAL APPLICABILITY

[0101]

The present disclosure is applicable to a device that communicates with a terminal, a server, or the like. Specifically, the present disclosure can be applied to devices such as washing machines, air conditioners, refrigerators, and microwaves.

5 REFERENCE MARKS IN THE DRAWINGS

[0102]

	1	washing machine
	2	washing machine communication unit
	3	washing machine control unit
10	4	washing machine function unit
	5	washing machine storage unit
	6	washing machine control display unit
	7	cycle name display portion
	8	current step display portion
15	20	communication network
	30	server
	31	server communication unit
	32	processing unit
	33	control screen creation unit
20	34	user information unit
	35	setting information unit
	40	terminal
	41	terminal communication unit
	42	terminal control display unit
25	43	terminal cycle name display portion
	44	terminal operation start portion
	45	terminal current step display portion
	101	cycle selection screen
	102	my-family favorite cycle selection screen

	103A	setting information input screen
	103B	setting information editing screen
	104A	operation start screen
	104B	operation start screen
5	105A	terminal operation display screen
	105B	terminal operation display screen
	106	my-family favorite cycle selection screen
	107	registration destination selection screen
	201A	washing machine operation display screen
10	201B	washing machine operation display screen
	202	my-family favorite cycle selection screen

CLAIMS

1. A washing system, comprising:
a washing machine; and
5 a terminal communicable with the washing machine,
wherein
the washing machine transmits, to the terminal,
information about a status of execution of a washing operation of
the washing machine, and
10 the terminal displays, based on the information about the
status of execution of the washing operation, a washing operation
indication that varies depending on whether a cycle preinstalled on
the washing machine is to be executed or a customized cycle
created by user input to the terminal is to be executed.
15
2. The washing system according to claim 1, wherein
the washing machine receives, from the terminal an
instruction instructing the washing machine to execute one of the
cycle preinstalled and the customized cycle, and performs the
20 washing operation based on the instruction.
3. A washing machine communicable with a terminal,
the washing machine comprising:
a display unit that displays an operation status of a washing
25 operation of the washing machine, wherein
the display unit performs the displaying that varies
depending on whether a cycle preinstalled on the washing machine
is to be executed or a customized cycle created by user input to the
terminal is to be executed.

4. The washing machine according to claim 3, wherein
the display unit that displays an image and when the cycle
preinstalled is to be executed, displays a name of the cycle
5 preinstalled and when the customized cycle is to be executed,
displays that the customized cycle is to be executed.

5. The washing machine according to claim 3 or 4, wherein
the washing machine receives from the terminal an
10 instruction instructing the washing machine to execute one of the
cycle preinstalled and the customized cycle, and performs the
washing operation based on the instruction.

6. A washing system, comprising:
15 a washing machine;
a server communicable with the washing machine; and
a terminal communicable with the server or the washing
machine, wherein
the terminal is capable of creating a customized cycle of a
20 washing operation of the washing machine by user input,
the customized cycle is indicated by setting information
including: a parameter setting created by combining control
contents of a whole washing sequence; and information about a
cycle name which is a name of the customized cycle,
25 the terminal transmits the setting information to the server,
when the server receives a request from the terminal to
cause the washing machine to start a washing operation, the server
transmits a control content of the washing operation based on the

parameter setting to the washing machine without transmitting the cycle name to the washing machine, and

the washing machine starts the washing operation based on the parameter setting.

5

7. A washing system, comprising:

a washing machine;

a server communicable with the washing machine; and

a terminal communicable with the server or the washing

10 machine, wherein

the terminal displays, in a selectable format, a cycle preinstalled on the washing machine or a customized cycle stored in the server,

the server transmits, to the washing machine, control
15 information about one of the cycle preinstalled and customized cycle which is selected by input to the terminal, and the washing machine executes an operation based on the control information, and

the washing machine displays a cycle name in executing the
20 cycle preinstalled, and displays, in executing the customized cycle, that the customized cycle is to be executed.

8. A washing system, comprising:

a washing machine;

25 a server communicable with the washing machine; and

a terminal communicable with the server or the washing machine, wherein

the server or the terminal includes a storage unit capable of storing a plurality of customized cycles created by user input to the terminal,

the washing machine includes a washing machine storage
5 unit capable of storing the customized cycle received from the server, and

in a main unit registration step in which the customized cycle is stored into the washing machine storage unit,

the terminal transmits the customized cycle and an
10 identifier corresponding to the customized cycle to the washing machine via the server, and

the washing machine storage unit stores a correspondence relationship between the customized cycle and the identifier, and the washing machine displays the identifier on a cycle selection
15 screen.

9. A program for a washing machine application installed on a terminal, the program causing the terminal to execute:

displaying, in a selectable format, an operation cycle
20 including a cycle preinstalled on a washing machine and a customized cycle not installed on the washing machine;

transmitting, to the washing machine, information about the cycle preinstalled and the customized cycle which is selected; and

25 receiving information about a status of execution of the operation cycle that is being executed by the washing machine, and displaying an indication that varies depending on whether the washing machine is executing a cycle installed on the washing machine or the washing machine is executing the customized cycle.

10. The program according to claim 9, wherein
when the washing machine receives the information about
the status of execution of the operation cycle that is being executed
5 by the washing machine and the washing machine is executing the
customized cycle, information about a cycle name of the customized
cycle is not displayed.