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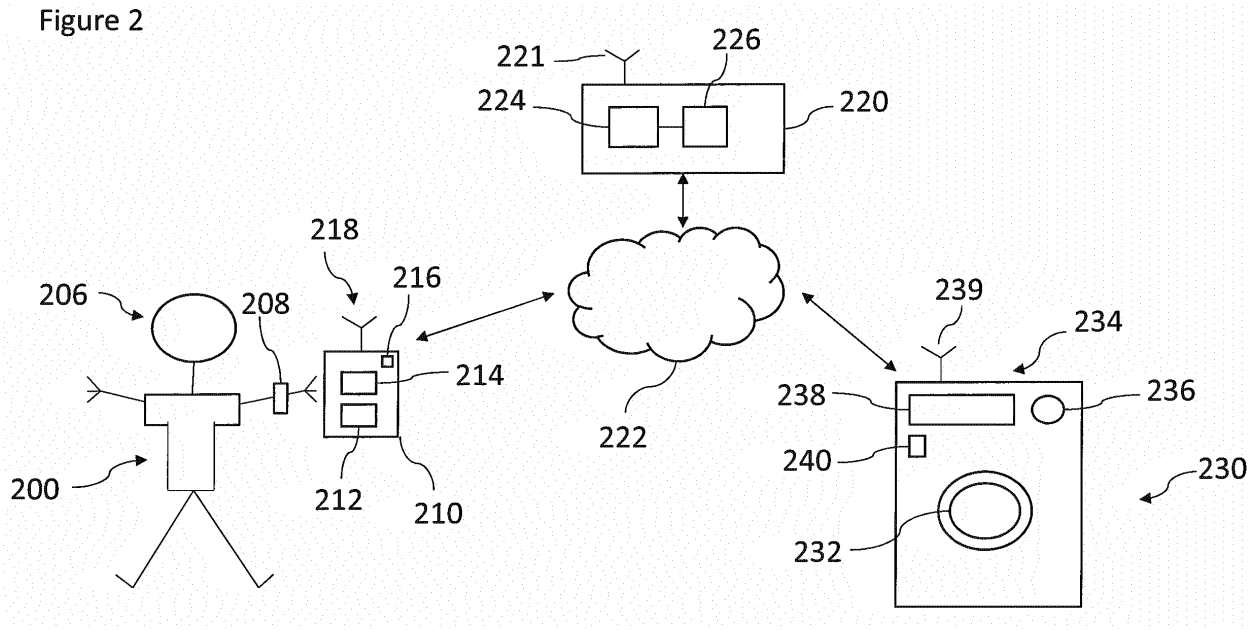
(54) APPARATUS AND METHOD FOR A WASHING MACHINE

(57) Apparatus for controlling a washing machine (230) comprising a controller configured to receive identification information of a garment (100) placed in a washing machine (230), the identification information being wirelessly readable from an identifier (102) on the garment (100), whereby the controller is configured to control the apparatus to retrieve stored washing instructions for the garment (100) from at least one memory (224) separate from said garment (100) and to operate said washing machine (230) according, at least in part, to the retrieved washing instructions.

Figure 2



EP 3 382 085 A1

Description

Technical Field

[0001] The present disclosure relates to an apparatus for controlling a washing machine, a server apparatus arranged to communicate with a washing machine, and related methods.

Background

[0002] Washing machines are used for washing garments such as clothes. Typically a user can select a suitable washing cycle via an interface on a front face of the washing machine. The interface usually includes a number of control knobs and/or buttons.

Summary

[0003] According to a first aspect disclosed herein, there is provided an apparatus for controlling a washing machine, the apparatus comprising a controller configured to control the apparatus to: receive identification information of a garment placed in a washing machine, the identification information having been read wirelessly from an identifier on the garment; in response to receiving the identification information of the garment, retrieve stored washing instructions for the garment from at least one memory in communication with the apparatus, the memory being separate from the garment; and cause a said washing machine to operate based at least in part on the retrieved washing instructions.

[0004] The at least one memory which stores the washing instructions for the garment may be in the washing machine or an external server, or memories storing the washing instructions for the garment may be provided in the washing machine and an external server.

[0005] The memory being separate from the garment may mean that the memory is remote from the garment. That is the memory is not physically attached to the garment.

[0006] In an example, in response to receiving the identification information of the garment, the controller is configured to retrieve, from the at least one memory, activity information of a user associated with the garment, and to cause a said washing machine to operate based at least in part on the activity information.

[0007] In an example, the apparatus is constructed and arranged to obtain washing instructions for the garment which are provided on the garment, the controller being configured to cause the washing instructions to be uploaded to the at least one memory.

[0008] In an example, the apparatus is configured to receive an image of washing instructions on the garment, the controller being configured to obtain the washing instructions from the image.

[0009] In an example, the apparatus comprises a reader in communication with the controller for wirelessly reading the identification information of the garment.

[0010] The wireless reading may use for example one or more of the following communication protocols: Bluetooth; RFID; ZigBee; Z-wave; NFC.]

[0011] In a second aspect there is provided a washing machine comprising apparatus according to the first aspect.

[0012] In a third aspect there is provided a method of operating a washing machine, the method comprising: wirelessly reading identification information of a garment placed in a washing machine, the identification information being read wirelessly from an identifier on the garment; in response to reading the identification information of the garment, retrieving stored washing instructions for the identified garment from at least one memory in communication with the apparatus, the memory being separate from the garment; and operating the washing machine based at least in part on the retrieved washing instructions.

[0013] In a fourth aspect there is provided a server apparatus for communicating with a washing machine, the server apparatus comprising: a memory configured to store identification information of one or more garments; the memory being configured to receive washing instructions associated with each of the one or more garments, and to cause an association to be made in the memory between the identification information of each garment and respective washing instructions of each garment; the server apparatus being configured to send, in response to receiving a request comprising identification information of at least one of the one or more garments, washing instructions associated with the one or more garments to a washing machine.

[0014] In an example, the server apparatus is configured to receive the washing instructions in the form of one or more images of respective washing labels on the one or more garments.

[0015] In an example, the server apparatus is configured to read data from the one or more images and to convert that data in to machine readable code for storing in the memory.

[0016] In an example, the server apparatus is configured to store activity information of a user received at the server apparatus, the server apparatus being configured to associate the activity information with one or more of the garments.

[0017] In an example, the server apparatus is configured to use the activity information to determine the washing instructions.

[0018] In an example, the server apparatus is configured to receive the activity information from an activity monitor being worn or associated with a wearer of at least one of the garments.

[0019] In an example the activity monitor comprises a smart watch.

[0020] In an example, the server apparatus is configured to receive the activity information from a user equipment associated with a wearer of at least one of the gar-

ments.

[0021] In an example the user equipment comprises a mobile phone.

[0022] In a fifth aspect there is provided a method of operating a server in communication with a washing machine, the method comprising: storing identification information of one or more garments in a memory; receiving washing instructions associated with each of the one or more garments; causing an association to be made in the memory between the identification information of each garment and respective washing instructions of each garment; and sending, in response to receiving a request comprising identification information of at least one of the one or more garments, washing instructions associated with the one or more garments to a washing machine.

Brief Description of the Drawings

[0023] To assist understanding of the present disclosure and to show how embodiments may be put into effect, reference is made by way of example to the accompanying drawings in which:

Figure 1 shows an example of a garment;

Figure 2 shows schematically an example system;

Figure 3 shows an example information table;

Figure 4 shows schematically an example washing system;

Figure 5 shows an example look up table; and

Figure 6 shows an example method flow chart;

Figure 7 shows an example method flow chart

Figure 8 shows an example method flow chart.

Detailed Description

[0024] The present disclosure has applicability to clothes washing machines.

[0025] When a user places a garment or garments in a washing machine the user has to select a washing cycle from a variety of available cycles. For delicate clothes a user may select a cold washing cycle. For heavily stained clothes a user may select a hot washing cycle, possibly with additional rinse and soak stages. This places the onus on the user to read and understand washing instructions associated with each garment to be washed. This is time and labour intensive and also prone to user error. Therefore a user may select an incorrect or non-optimal washing cycle for the type or number of garments placed in the washing machine. This can lead to wasted energy and/or damaged garments.

[0026] Figure 1 shows an example garment 100. In this example the garment is a T-shirt. Of course, the garment could be any other type such as trousers, pullover, socks, underpants, running shoes, etc. In this example the garment is a "smart" or "intelligent" garment, meaning that it has at least an identifier 102 attached to the garment 100. The identifier 102 may comprise any type of identifier that is machine-readable. For example the identifier 102 may comprise a tag capable of communicating by any one or more of: RFID, Bluetooth, Zigbee, Z-wave, near field communication (NFC), etc. The identifier may comprise a simple identifier of the garment, enabling it to be distinguished from other garments. The identifier may be a unique identifier.

[0027] The garment 100 also comprises a washing instructions label 104. The washing instructions label 104 comprises information for a wearer of how the garment should ideally be washed and/or dried, as well as giving information of the garment's material. For example it may include information indicating that the garment is cotton, and should be washed at 40°C. It may also contain other advice such as "wash dark colours separately" and/or "do not tumble dry" etc. The washing instructions may additionally or alternatively be stored in the identifier 102.

[0028] An example system is shown schematically in Figure 2. A user 206 is shown wearing a smart or intelligent garment 200, such as the garment described with respect to Figure 1. The user is also wearing an activity monitor 208, in this case a smart watch or fitness watch or some other fitness or activity monitor. The activity monitor 208 can track activity information of the user 206, for example a type of activity undertaken by the user such as jogging, cycling, playing football, etc., and the length of time for which the activity was undertaken. The activity monitor 208 can also record or have access to other information such as heart rate, temperature information, time of day, season, weather, etc. The activity monitor 208 also includes a memory, a processor, and a transceiver for sending and receiving information.

[0029] A user equipment operable by the user is shown at 210. The user equipment 210 is in this example a smart phone, although in other embodiments it may be a tablet, laptop, PC etc. The user equipment 210 comprises a memory 212, a processor 214, and a camera 216. The user equipment 210 also comprises a transceiver 218 for sending and receiving information. The user equipment 210 can also record and store activity information in the same or a similar manner as described with respect to activity monitor 208.

[0030] A server apparatus is shown at 220. The server 220 comprises a memory 224 and a processor 226. The user equipment 210 can communicate with the server apparatus 220 via a wireless connection 222. The wireless connection 222 may be for example an internet connection. To enable this communication the server 220 also comprises a transceiver 221.

[0031] In some embodiments the activity monitor 208 can communicate directly with the server 220 via the wire-

less connection 222. In other embodiments the activity monitor 208 communicates directly with user equipment 210, the user equipment then relaying that information to the server 220.

[0032] A washing machine is shown at 230. The washing machine 230 comprises a washing drum 232 into which garments to be washed can be placed. The washing machine also comprises a user interface 234, comprising one or more knobs/buttons/dials 236, as well as a display 238 for displaying information such as selected wash cycle, wash duration etc. The washing machine 230 also comprises a reader 240. The reader enables the washing machine to wirelessly read information of a smart garment placed therein. For example the washing machine 230 is operable to receive information from an identifier such as the identifier 102 shown in Figure 1. Therefore the washing machine 230 is capable of identifying a garment placed therein. The washing machine 230 is operable to communicate with server 220 and/or user equipment 210 via transceiver 239 and wireless interface 222.

[0033] The server memory 224 is operable to store information. The information may be stored in one or more databases. An example database 300 is shown schematically in Figure 3. The database 300 stores associations between garment IDs, default washing instructions associated with respective garments, and activity information associated with the respective garments.

[0034] The database 300 has a first column "Garment ID" 302, "Default washing instructions" column 304, and "Activity information" column 306. The garment I.D. may be obtained from an identifier on the garment, e.g. identifier 102 in Figure 1. The default washing instructions may have been obtained from a washing label such as label 104 in Figure 1. For this example the default washing instructions for garment A are cotton, 40°C.

[0035] The activity information comprises information of how active the garment wearer/user has been, and/or ambient conditions of the user. The activity information 306 may of course vary over time. In this example it has been recorded that a user has undertaken 30 minutes of jogging whilst wearing the garment A.

[0036] The information for the database can be sent to the server 220. In one example, a user uploads the garment ID information and default washing instructions information to the server 220 via their user equipment 210. In one example the user equipment 210 is operable to communicate with the identifier 102 of the garment to obtain the garment ID, so that the garment ID can be sent to server 220. In one example the washing instructions are obtained by a user taking a photograph image of the washing label of the garment, utilising for example camera 216 on user equipment 210. In another example the washing machine 230 includes a camera for taking a photograph of the washing instructions. In such examples the processor 226 of server 220 is operable to interpret the photograph of the washing instructions and to save the washing instructions in a machine-readable format. Alternatively the user may manually upload the garment ID and/or washing instructions e.g. via an online form.

[0037] Once the garment ID and washing instructions information is sent to the server, the server 220 then makes and stores an association between the garment ID and the default washing instructions for that garment.

[0038] Further information may be stored in database 300. For example the server may save information of whether the garment is top-wear e.g. T-shirt, shirt, pullover etc; or bottom wear e.g. shorts, trousers, underpants; colour information (e.g. dark or white) etc. The database may also store information of when the user starts and stops wearing the garment. The database may also store garment fabric information. The database may also store predetermined time-out information for garments. The time-out information may comprise a length of time after which a garment is deemed unclean (or requires some alteration from the default washing instructions), even if the user has undertaken no strenuous activity. The time-outs may be configurable. For example a user may configure a time-out value for a garment via a suitable application or app on their smartphone.

[0039] The garment 200 may communicate with activity monitor 208 and/or user equipment 210. This enables the activity monitor 208 and/or user equipment 210 to associate a garment with an activity. The activity monitor 208 and/or user equipment 210 can record information of activity, such as an amount of time a garment has been worn, and/or the type of activity undertaken whilst the garment is being worn. For example it can determine whether a user has undertaken relatively relaxed or relatively vigorous exercise. The activity monitor and/or user equipment can also record various ambient or environmental factors such as location, temperature, and weather conditions such as wind, rain etc.

[0040] As will be explained in more detail below, using this information an algorithm operable at the server can determine or predict a cleanliness of a garment and therefore determine an appropriate washing cycle, or appropriately modify the default washing cycle. The server can then cause the washing machine to wash the garment according to the determination. For example if a user has mostly undertaken non-strenuous activity such as watching television in a cool atmosphere, then the algorithm may determine that the garment is unlikely to require a particularly intensive wash, or require relatively little or no modification of the default washing instructions for that garment. On the other hand, the activity information may indicate that the user has undergone relatively strenuous activity, in which case it is likely that a user has sweated inside the garment. The algorithm may therefore determine that the garment requires a more intensive wash e.g. at a higher temperature and/or for longer and/or with additional pre-wash or soak stages or the like.

[0041] As mentioned above, this activity information is sent from activity monitor 208 and/or user equipment 210 to server 220. Of course the user may wear or have additional activity monitors capable of monitoring the user's

activity. The server can collect the activity information of a user from any number of these devices, the information being collected, arranged and stored as appropriate e.g. in a database as shown with respect to Figure 3.

[0042] In some examples the type of activity monitor from which activity information is received may inform the server, or be interpreted by the server, as indicative of the type of activity undertaken by a user. For example a smart phone is often carried in a user's trouser or shorts pocket. If the smart phone detects a lot of movement then the server (by means of the algorithm) may predict that lower garments e.g. underpants, trousers, socks may need a more intensive wash. If an activity monitor detects a lot of activity, then this is indicative that the user's upper body has undergone a lot of activity, and therefore the upper garments such as T-shirt, pullover etc. may need a more intensive wash.

[0043] Operation of an appropriate algorithm is explained in more detail with respect to Figure 4 which shows schematically a smart washing system 400. The smart washing system 400 is operable to perform operations on input data 402, so as to provide an output 404 to be sent to a washing machine. The input information 402 comprises information received from one or more activity monitors and/or user equipment, as discussed with respect to Figure 2. In this example the input comprises activity duration 405, activity type 406, and user input 408. The activity duration 405 may comprise a length of time e.g. 1 hour, 12 hours etc. The activity type may comprise information of a particular type of activity such as running, cycling, playing football etc. The activity type information may be determined by the activity monitor and/or user equipment. For example based upon the speed of travel of a user equipment it may be determined that a user is cycling. Based on gyroscope/accelerometer information an activity monitor may be able to determine that a user is running etc. User input 408 may comprise further input provided manually by a user. This information 404, 406, 408 is supplied to the server as shown at 410, where the information is processed so as to generate an activity coefficient k1 412. As part of this processing, information may be obtained from database 414 (which may be equivalent to database 300 described with respect to Figure 3). Once this activity coefficient 412 has been obtained, then a lookup table 416 is used so as to obtain an output in the form of suitable washing parameters k2 418 for the garment or garments in question.

[0044] Figure 5 shows an example lookup table 516, which may be equivalent to look up table 416 of Figure 4. First column 512 shows the "k1" activity coefficient, which as explained with respect to Figure 4 is determined based upon input information. The lookup table then contains washing parameters, in this example including "program", "duration", "rev" (i.e. spin speed), "temperature", "amount of detergent", "amount of softener", "amount of water". Each row of the lookup table 500 may be considered an output list of washing parameters (i.e. k2). For example row 550 (k1.1) is associated with washing parameters program P1 which has a washing temperature of 30° C. This may be associated with a low level of activity. Row 552 (k1.2) defines washing parameters program P2 which has a washing temperature of 40° C. This may be associated with a higher level of activity and therefore a higher level of sweat, dirt etc. is predicted which requires a higher temperature wash. Row 554 is associated with washing parameters program P3 (k1.3) and a wash temperature of 60°C. This may be associated with high intensity activity requiring a hot wash. Of course any of the other parameters e.g. duration, rev, amount of detergent, amount of softener, amount of water etc. may also vary based on the k1 value (e.g. k1.1, k1.2, k1.3 etc.).

[0045] The parameters "amount of detergent" and "amount of softener" may be particularly applicable to embodiments where the washing machine is configured to store and meter out amounts of these consumables.

[0046] Figure 6 is an example flowchart according to an example that makes use of a server for storing garment IDs and associated washing instructions.

[0047] At S 1 garment ID and washing instructions is sent to the server. As explained with respect to Figure 2, this garment data may be obtained from the garment, and then uploaded to the server where an association is made between the garment ID and default washing instructions.

[0048] At S2, which may be any time later, a user loads the garment into the washing machine. The washing machine identifies the garment by reading the ID tag on the garment, for example using reader 240 as described with respect to Figure 2.

[0049] At S3 the washing machine 230 sends a request to server 220 for washing instructions of how to wash the garment.

[0050] At S4 the server 220 determines the washing parameters for the garment. As described above this may take in to account the activity information of the user, as described with respect to Figure 5.

[0051] Then, as shown at S5 the server sends the washing instructions to the washing machine.

[0052] At S6 the washing machine determines if there are any issues with the given instructions. If the answer is "no", then the method proceeds to S7 where the wash is commenced in accordance with the provided washing parameters.

[0053] If the answer at S6 is "yes", then the method proceeds to S7 where an alert is provided to the user. The alert may for example indicate that the washing machine is unable to wash the garment in accordance with the provided washing instructions. For example the washing machine may have insufficient detergent, softener, etc. in which case the user is alerted to replenish these consumables. Alternatively conflicting garments (such as cottons and silk or synthetics) may have been placed in the washing machine, and an alert is provided to the user that the garments should not be washed to-

gether.

[0054] Then, the method proceeds to S9 where the user is asked to confirm whether they wish to proceed with the wash. For example the user may have replenished the consumables and wants to continue with the wash.

[0055] If "yes", the method proceeds to S7 where the wash continues with the recommended programme. The user can also confirm that they would like to proceed with the wash, even if it is non optimum for the combination of received garments.

[0056] If the user does not want to proceed with the wash having received the alert, then the method proceeds to S10 where the wash is not carried out.

[0057] Of course multiple garments may be placed in the washing machine at the same time. Some garments may be completely unsuitable for machine washing (e.g. dry clean only), in which case an alert is provided to the user. Some garments may be completely incompatible for washing together e.g. a first garment that needs to be washed at 30°C and a second garment that needs to be washed at 90°C. Again, an alert may be provided to the user.

[0058] Some garments can be washed together, but the algorithm may have determined different optimum washing cycles for two or more of the garments. Where this happens, in one example the algorithm selects the most intense of the recommended washes, to ensure that all of the garments are fully cleaned. In another example the algorithm selects the least intense program, to ensure that none of the garments are damaged. This may occur for example when it is detected that a delicate garment has been placed in the washing machine. In another example one or more average values may be taken. For example if a first garment ought to be washed at 30°C and a second garment ought to be washed at 40°C, then the washing machine may be caused to wash the garments together at 35°C. Averages can be similarly selected for other parameters such as wash duration, amount of detergent, amount of softener etc.

[0059] Although the server 220 is predominantly described as a separate entity, in another example the server 220 or its functionalities may be comprised in washing machine 230. In another example the server (or its functionalities) may be comprised in user equipment 210. Of course where the server is comprised in another entity (e.g. washing machine), then the server and that entity do not necessarily have to communicate via a wireless interface 222.

[0060] In another example the server 220, or at least some of its functionalities, may be distributed. For example an external server 220 may act predominantly as an information store, with the washing machine 230 or user equipment 210 carrying out the optimum washing cycle determinations. For example an external server 220 may store information of associations between garment IDs and default washing cycle information. When the washing machine 230 determines a garment has been placed in its washing drum it sends a request to the server 220 and obtains the default washing cycle information for that garment. Additionally, the washing machine may obtain the activity information for the garment from the user equipment 210 and/or activity monitor 208, and run an algorithm as described to determine an optimum washing cycle based at least in part upon the activity information.

[0061] A method of operating a washing machine is shown in Figure 7, according to an example.

[0062] At S1, identification information is wirelessly read from a garment. This information is wirelessly read from an identifier on the garment.

[0063] At S2, and in response to reading the identification information of the garment, stored washing instructions are retrieved for the identified garment from at least one memory. The at least one memory is separate from the garment.

[0064] At S3, the washing machine is operated based at least in part on the retrieved washing instructions.

[0065] A method of operating a server in communication with a washing machine is shown in Figure 8, according to an embodiment.

[0066] At S1, identification information of one or more garments is stored in a memory.

[0067] At S2, washing instructions associated with each of the one or more garments is received.

[0068] At S3, an association is caused to be made between the identification information of each garment and respective washing instructions of each garment.

[0069] At S4, in response to receiving a request comprising identification information of at least one of the one or more garments, washing instructions associated with the one or more garments are sent to a washing machine

[0070] It will be understood that the processor or processing system or circuitry referred to herein may in practice be provided by a single chip or integrated circuit or plural chips or integrated circuits, optionally provided as a chipset, an application-specific integrated circuit (ASIC), field-programmable gate array (FPGA), digital signal processor (DSP), graphics processing units (GPUs), etc. The chip or chips may comprise circuitry (as well as possibly firmware) for embodying at least one or more of a data processor or processors and a digital signal processor or processors, which are configurable so as to operate in accordance with the exemplary embodiments. In this regard, the exemplary embodiments may be implemented at least in part by computer software stored in (non-transitory) memory and executable by the processor, or by hardware, or by a combination of tangibly stored software and hardware (and tangibly stored firmware).

[0071] Reference is made herein to data storage for storing data. This may be provided by a single device or by plural devices. Suitable devices include for example a hard disk and non-volatile semiconductor memory.

[0072] Reference is made herein to transceivers. The term transceiver implies transmitting and/or receiving capability. Therefore the term encompasses a device that

can transmit and receive information; a device that can transmit information only; a device that can receive information only.

[0073] The examples described herein are to be understood as illustrative examples of embodiments of the invention. Further embodiments and examples are envisaged. Any feature described in relation to any one example or embodiment may be used alone or in combination with other features. In addition, any feature described in relation to any one example or embodiment may also be used in combination with one or more features of any other of the examples or embodiments, or any combination of any other of the examples or embodiments. Furthermore, equivalents and modifications not described herein may also be employed within the scope of the invention, which is defined in the claims.

Claims

1. An apparatus for controlling a washing machine, the apparatus comprising a controller configured to control the apparatus to:

   receive identification information of a garment placed in a washing machine, the identification information having been read wirelessly from an identifier on the garment;
   in response to receiving the identification information of the garment, retrieve stored washing instructions for the garment from at least one memory in communication with the apparatus, the memory being separate from the garment; and
   cause a said washing machine to operate based at least in part on the retrieved washing instructions.

2. An apparatus according to claim 1, wherein, in response to receiving the identification information of the garment, the controller is configured to retrieve, from the at least one memory, activity information of a user associated with the garment, and to cause a said washing machine to operate based at least in part on the activity information.

3. An apparatus according to claim 1 or claim 2, constructed and arranged to obtain washing instructions for the garment which are provided on the garment, the controller being configured to cause the washing instructions to be uploaded to the at least one memory.

4. An apparatus according to claim 3, the apparatus being configured to receive an image of washing instructions on the garment, the controller being configured to obtain the washing instructions from the image.

5. An apparatus according to any of claims 1 to 4, comprising a reader in communication with the controller for wirelessly reading the identification information of the garment.

6. A washing machine comprising apparatus according to any of claims 1 to 5.

7. A method of operating a washing machine, the method comprising:

   wirelessly reading identification information of a garment placed in a washing machine, the identification information being read wirelessly from an identifier on the garment;
   in response to reading the identification information of the garment, retrieving stored washing instructions for the identified garment from at least one memory in communication with the apparatus, the memory being separate from the garment; and
   operating the washing machine based at least in part on the retrieved washing instructions.

8. A server apparatus for communicating with a washing machine, the server apparatus comprising:

   a memory configured to store identification information of one or more garments;
   the memory being configured to receive washing instructions associated with each of the one or more garments, and to cause an association to be made in the memory between the identification information of each garment and respective washing instructions of each garment;
   the server apparatus being configured to send, in response to receiving a request comprising identification information of at least one of the one or more garments, washing instructions associated with the one or more garments to a washing machine.

9. A server apparatus according to claim 8, the server apparatus being configured to receive the washing instructions in the form of one or more images of respective washing labels on the one or more garments.

10. A server apparatus according to claim 9, the server apparatus being configured to read data from the one or more images and to convert that data in to machine readable code for storing in the memory.

11. A server apparatus according to any of claims 8 to 10, the server apparatus being configured to store activity information of a user received at the server apparatus, the server apparatus being configured to associate the activity information with one or more

of the garments.

12. A server apparatus according to claim 11, the server apparatus being configured to use the activity information to determine the washing instructions.

13. A server apparatus according to claim 11 or claim 12, the server apparatus being configured to receive the activity information from an activity monitor being worn or associated with a wearer of at least one of the garments.

14. A server apparatus according to any of claims 11 to 13, the server apparatus being configured to receive the activity information from a user equipment associated with a wearer of at least one of the garments.

15. A method of operating a server in communication with a washing machine, the method comprising:

storing identification information of one or more garments in a memory;
receiving washing instructions associated with each of the one or more garments;
causing an association to be made in the memory between the identification information of each garment and respective washing instructions of each garment; and
sending, in response to receiving a request comprising identification information of at least one of the one or more garments, washing instructions associated with the one or more garments to a washing machine.

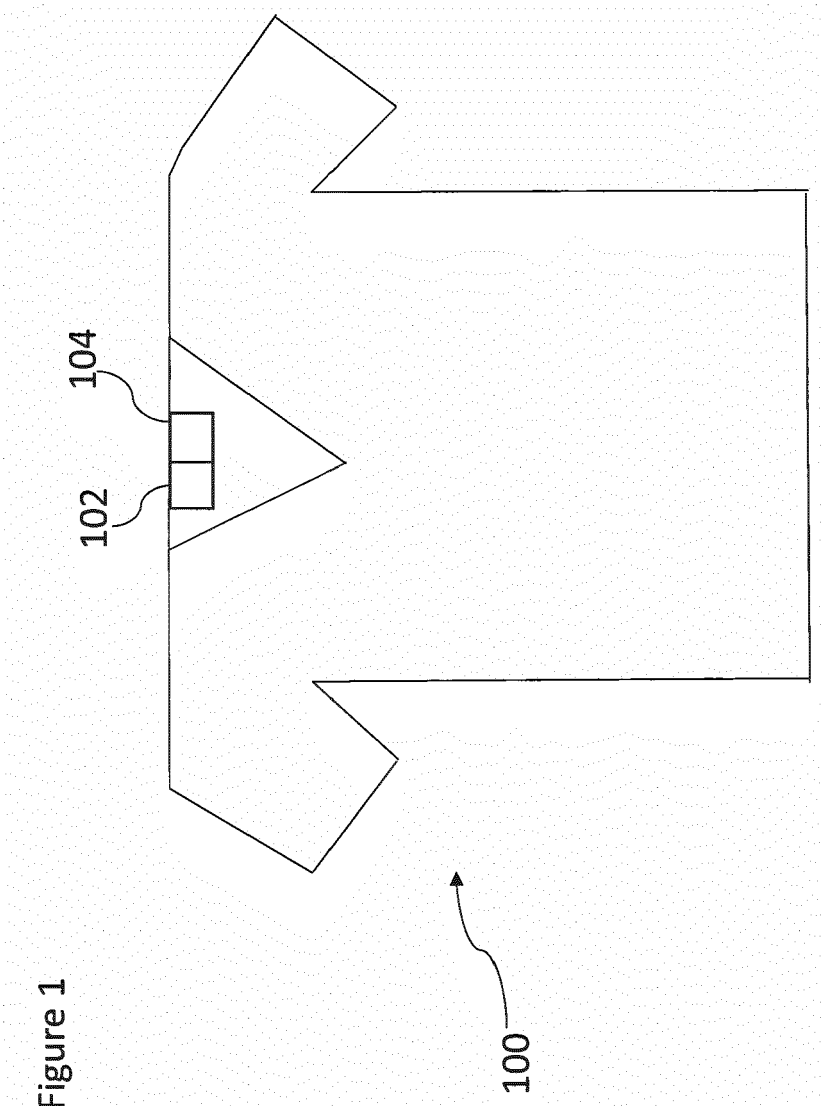


Figure 1

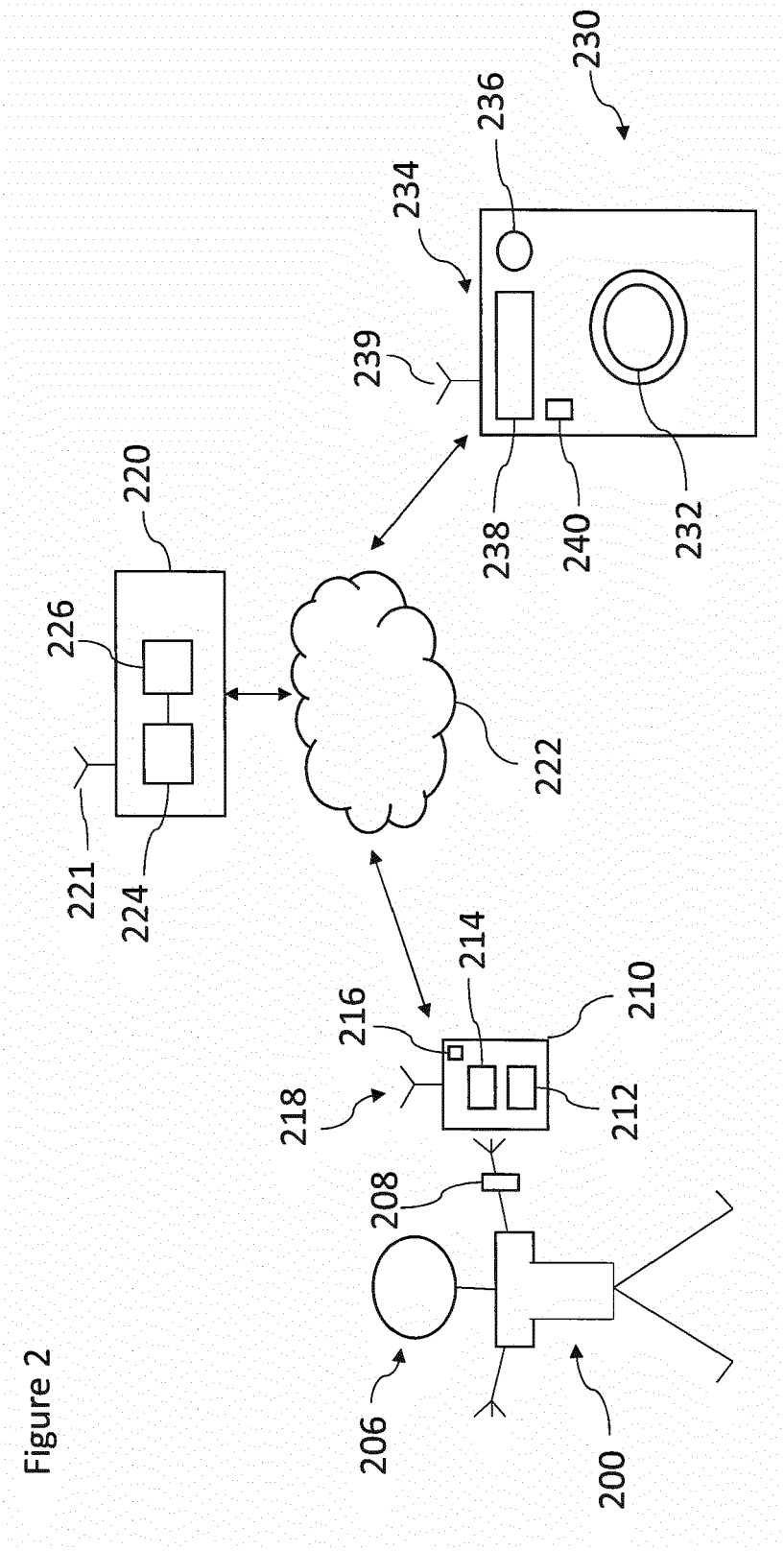

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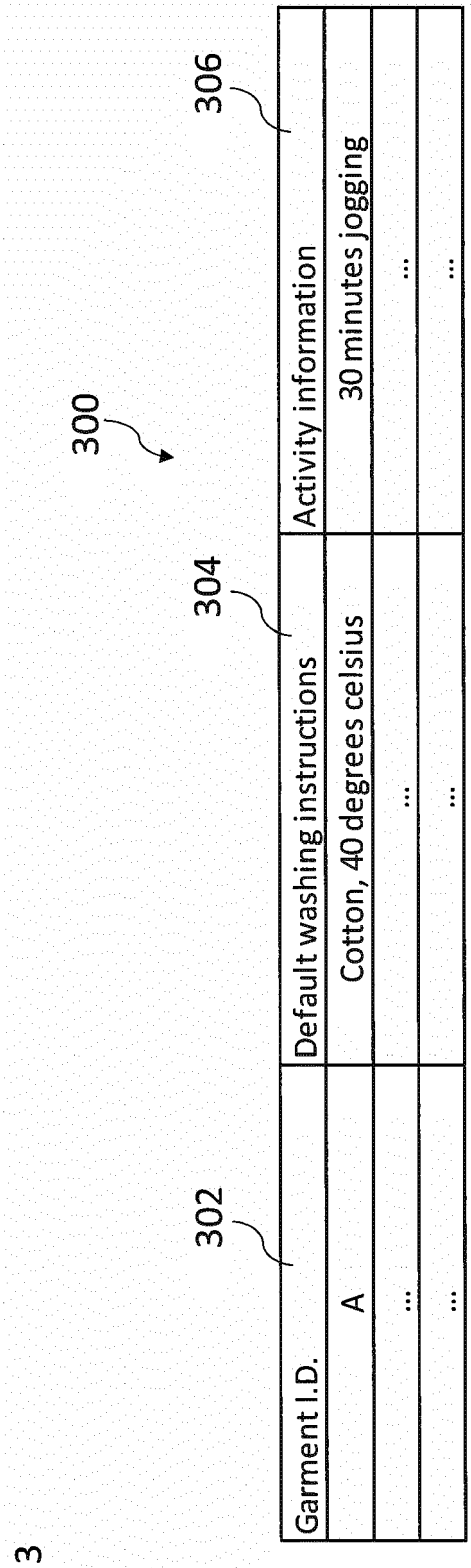
Figure 2


300
302
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306
Garment I.D.
Default washing instructions
Activity information
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Cotton, 40 degrees celsius
30 minutes jogging
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...

Figure 3

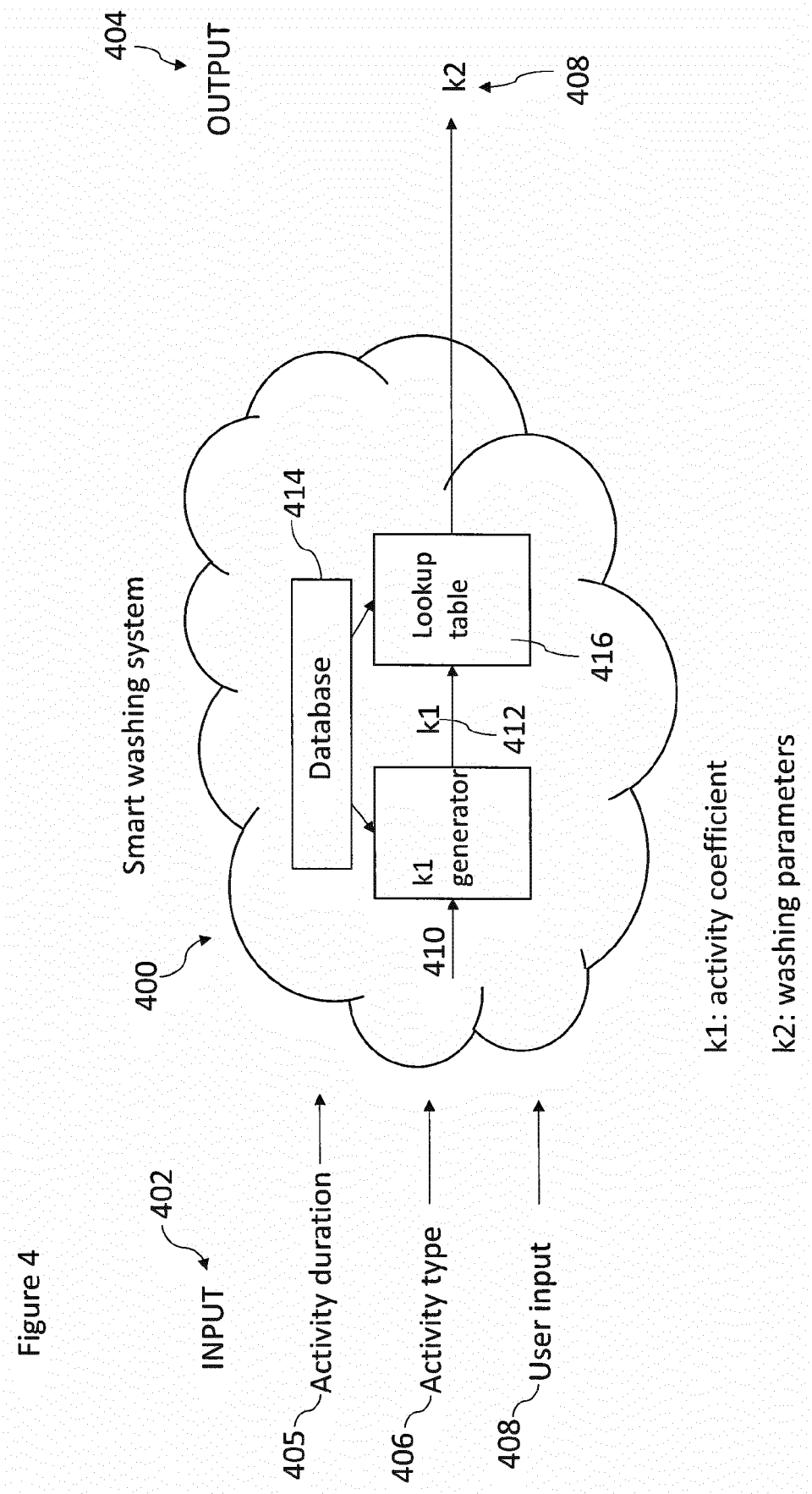
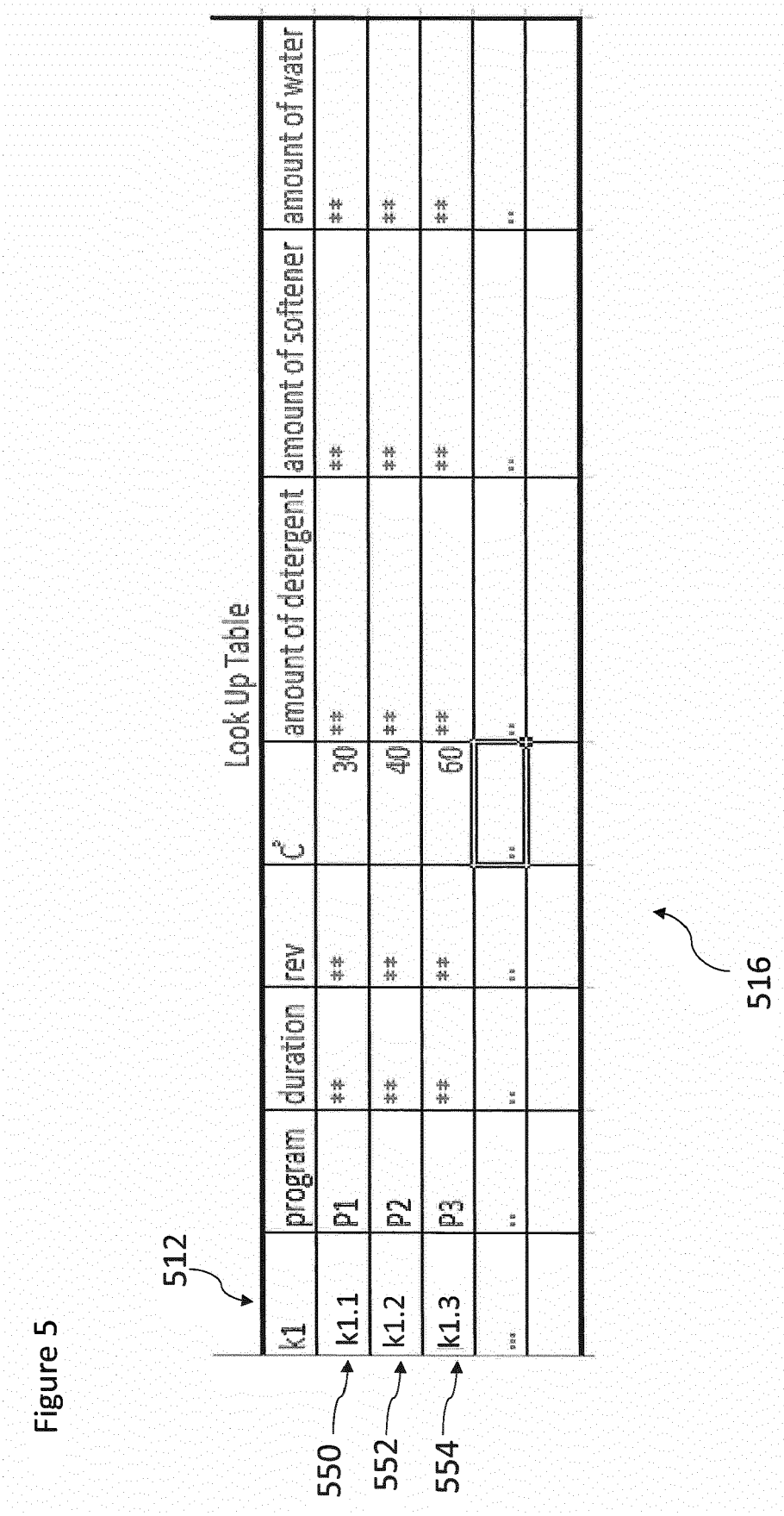

404
OUTPUT
k2
408
414
Smart washing system
Database
Lookup table
416
k1
412
k1 generator
410
400
402
INPUT
405
Activity duration
406
Activity type
408
User input
k1: activity coefficient
k2: washing parameters

Figure 4

Figure 5


512
Look Up Table
k1
program
duration
rev
C°
amount of detergent
amount of softener
amount of water
k1.1
P1
**
**
30
**
**
**
k1.2
P2
**
**
40
**
**
**
k1.3
P3
**
**
60
**
**
**
550
552
554
516

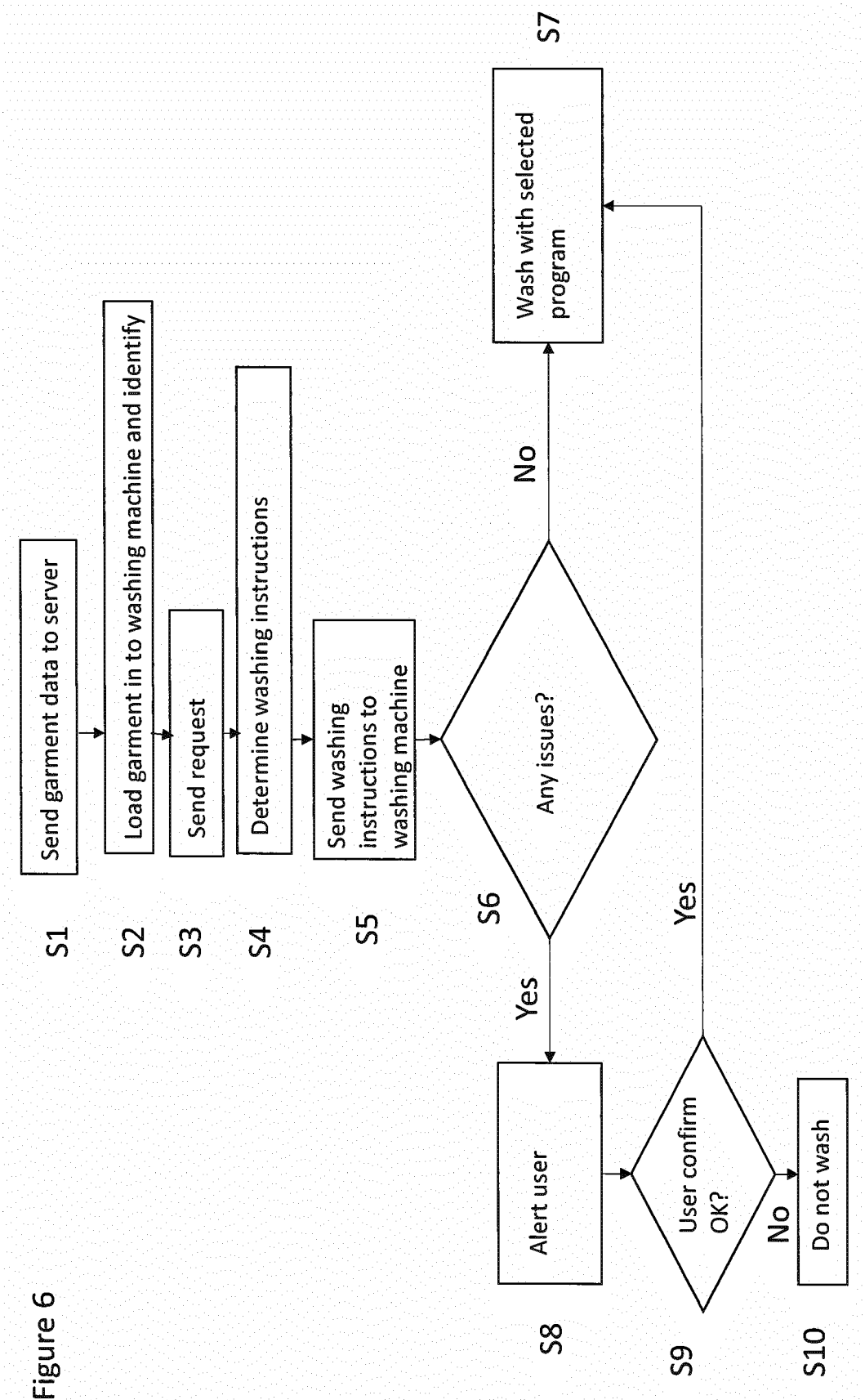

Send garment data to server
S1
Load garment in to washing machine and identify
S2
Send request
S3
Determine washing instructions
S4
Send washing instructions to washing machine
S5
Any issues?
S6
No
Wash with selected program
S7
Yes
Alert user
S8
User confirm OK?
S9
Yes
No
Do not wash
S10

Figure 6

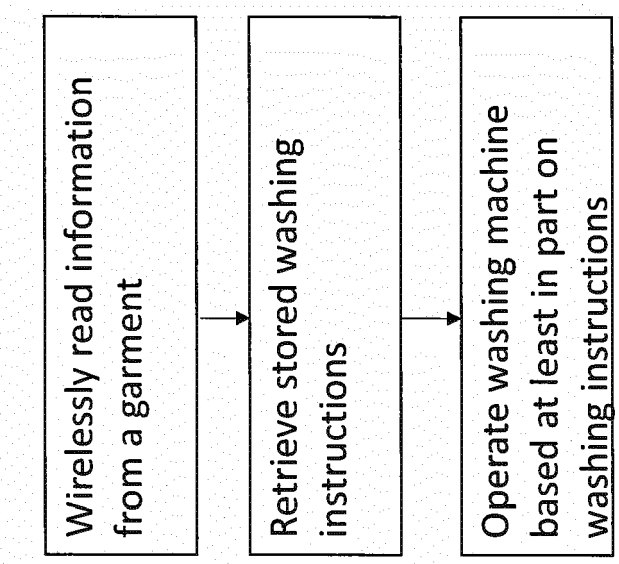

Wirelessly read information from a garment
Retrieve stored washing instructions
Operate washing machine based at least in part on washing instructions
S1
S2
S3

Figure 7

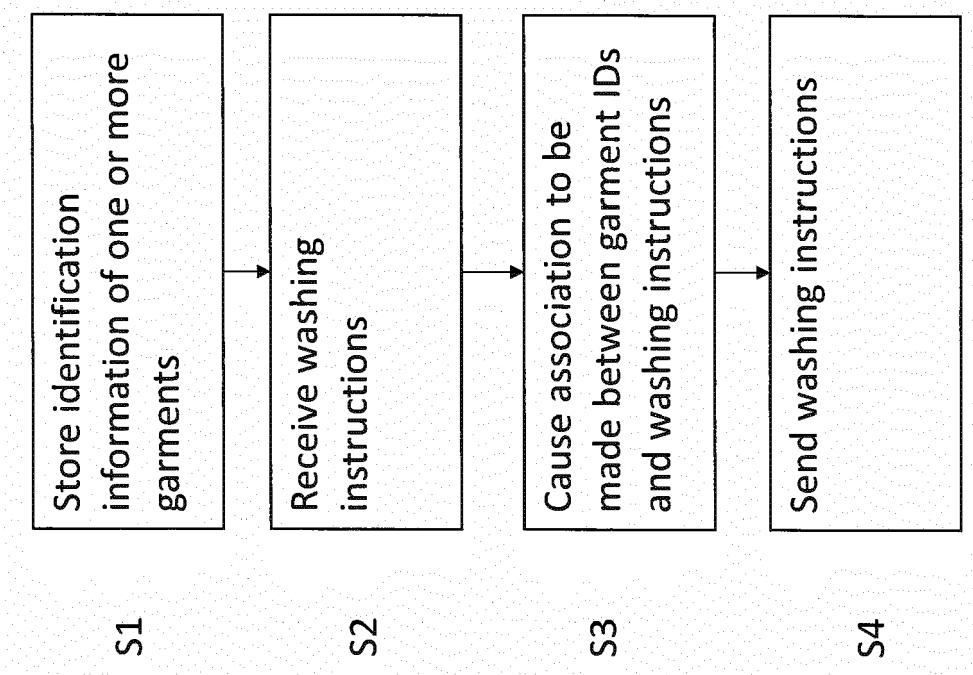

Store identification information of one or more garments
Receive washing instructions
Cause association to be made between garment IDs and washing instructions
Send washing instructions
S1
S2
S3
S4

Figure 8

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EUROPEAN SEARCH REPORT

Application Number
EP 17 16 3990

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D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	16 June 2017	Clivio, Eugenio

CATEGORY OF CITED DOCUMENTS

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