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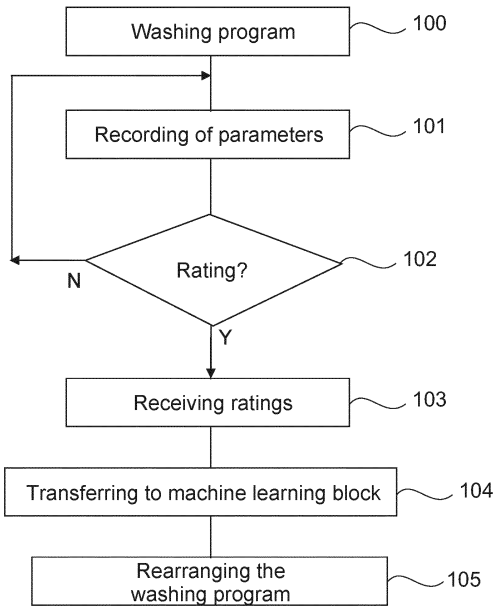
(54) A WASHING MACHINE CONTROL METHOD

(57) The present invention relates to a washing machine control method, which is used in a washing machine comprising a user interface for enabling the user to rate the washing parameters and a control unit which controls the operation of the washing machine, the control method comprising the steps of presenting the parameters of the washing program obtained as a result of the washing program to the evaluation of the user via the user interface during the washing program and/or after the washing program ends, updating the parameters of the washing program rated by the user with the ratings of the user, and running the next washing program in accordance with the updated parameters.

Figure 1



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Description

[0001] The present invention relates to a washing machine control method wherein washing program parameters are optimized according to user feedback and washing program parameters are created as per user preference without using any Internet connection or a cloud service.

[0002] Today, conventional washing machines have washing programs defined according to algorithms and parameters determined by certain standards and laboratory studies. In said washing programs, detergent type differences, laundry type selection, the hardness of the mains water used, changes in such parameters and similar parameters sometimes affect the washing programs, and therefore the washing machine cannot fully fulfill the performance expectations of the users. As a result, users become dissatisfied with the performance of the product.

[0003] In the state of the art smart washing machines, in order to prevent user dissatisfaction caused by the above-mentioned exemplary parameters, the users are enabled to select additional auxiliary functions defined on the washing programs via mobile applications by means of cloud services and/or Internet of Things (IoT), thus customizing washing programs in a limited manner. However, it is not possible to customize and optimize any washing program in conventional type washing machines without any access to Internet.

[0004] In the state of the art United States Patent Application No. US20160312396, a washing machine with access to Internet is disclosed. According to this document, one or more washing program results for any washing program are rated by the user via the mobile application. Washing parameters ratings (stain removal, odor, residue, whiteness, wrinkles, humidity, fading, energy and water consumption, etc.) performed by the user according to the washing program outputs are processed together with the washing program parameters in the database. The results obtained with the Rule Based Algorithm and the outputs of the washing program are presented to the user and the user is asked if he/she wants to make any changes on the optimized parameters. If the user does not want to make any changes on the optimized parameters, user approval is requested to transfer said parameters to the washing program. If the user wants to make changes on the optimized parameters, a new parameter option is offered to the user through the Rule Based Algorithm. As a result of the user approval, the relevant washing program parameters are updated in line with the user's choices and approvals.

[0005] The aim of the present invention is the realization of a washing machine control method wherein washing program parameters are optimized according to user ratings and washing program parameters are created as per user preference without using any Internet connection or a cloud service.

[0006] The washing machine control method realized in order to attain the aim of the present invention, explicated in the first claim and the respective claims thereof, is used in a washing machine comprising a user interface for enabling the user to select the washing parameters and a control unit which controls the operation of the washing machine, and the control method comprises the steps of presenting the parameters of the washing program obtained as a result of the relevant washing program to the evaluation of the user via the user interface at any time during the washing program and/or after the washing program ends, updating the parameters of the washing program rated by the user with the ratings of the user, and running the next washing program in accordance with the updated parameters.

[0007] By means of the present invention, the user can make changes in the washing program parameters while not connected to the Internet, without the need for access to Internet, a cloud service and/or Internet of Things (IoT) application. Thus, predefined washing program parameters are customized with the ratings offered by the user via the user interface on the control panel on the washing machine, thus improving the performance of the washing machine in accordance with the user satisfaction.

[0008] The user evaluates, in terms of satisfaction, the most recently performed washing program in the washing machine and the parameters thereof via the user interface on the washing machine control panel, at the end of the washing programs predetermined as optimizable and/or at any time during the normal operating time. Thus, in addition to the evaluation of general washing performance, working performance satisfaction, the user rates the parameters such as odor, wrinkles, humidity of the laundry, washing time, sound, noise level, detergent residue and shrinking of the laundry via the user interface on the control panel.

[0009] The parameters obtained at the end of the optimized washing program are matched with the user ratings and transmitted to the machine learning block in the control unit. In this block, new washing program parameters are calculated in accordance with the parameters obtained at the end of the washing program and the ratings by the user. This calculation is preferably carried out by using the edge computing method. At the end of the calculation, the machine learning block contains information about which parameters are to be changed with which values in the washing program. According to the information in the machine learning block, the relevant washing program parameters are updated on the control unit, and the washing program is carried out as per the ratings by the user.

[0010] By means of the present invention, if the user is not satisfied with the performance of the washing program and/or wants to optimize the washing program as per his/her needs, the most suitable washing program parameters for the user are recreated and the relevant washing program is updated by means of the machine learning block as per user satisfaction ratings.

[0011] By means of the present invention, even if the washing machine does not have access to Internet, cloud

services or IoT connection, the parameter optimizations of the washing program deemed necessary by the user are carried out via a user interface through the edge computing and machine learning blocks on the SoC (system on chip).

[0012] In the embodiment of the present invention, the user stays within the safety limits determined for the washing program and updates the washing program parameters as per his/her preference, thus obtaining a washing program according to these parameters.

[0013] In an embodiment of the present invention, in case the user cannot reach the targeted washing performance as a result of the ratings or is not satisfied with the resulting washing program performance, he/she can continue to optimize the related washing program performance continuously by rating the last washing program again.

[0014] In another embodiment of the present invention, if the user wants to return to the predefined washing program parameters, he/she is enabled to cancel the changes updated over time and to return to the factory default parameters. In this embodiment of the present invention, the 'reset' operation can be performed via the user interface by means of certain key combinations.

[0015] By means of the present invention, the user is enabled to eliminate the performance losses/differences caused by detergent type differences, laundry type differences, water hardness level differences and similar effects, and to obtain a washing machine with a washing performance which satisfies the user.

[0016] A washing machine control method realized in order to attain the aim of the present invention is illustrated in the attached figure, where:

Figure 1 - is the view of the flow chart of the control method.

[0017] The washing machine control method is used in a washing machine comprising a user interface for enabling the user to select the washing parameters and a control unit which controls the operation of the washing machine, and the control method comprises the steps of presenting the parameters of the washing program obtained as a result of the washing program to the evaluation of the user via the user interface during the washing program and/or after the washing program ends, updating the parameters of the washing program rated by the user with the ratings of the user, and running the next washing program in accordance with the updated parameters (Figure 1).

[0018] By means of the present invention, the user can make changes in the washing program parameters while not connected to the Internet, without the need for access to Internet, a cloud service and/or Internet of Things (IoT) application. Thus, predefined washing program parameters are customized with the ratings offered by the user via the user interface on the control panel on the washing machine, thus improving the performance of the washing machine in accordance with the user satisfaction.

[0019] The user evaluates, in terms of satisfaction, the most recently performed washing program in the washing machine and the parameters thereof via the user interface on the washing machine control panel, at the end of the washing programs predetermined as optimizable and/or at any time during the normal operating time, for example, at a standby state following the end of the washing program or before the activation of the next washing program. Thus, in addition to the evaluation of general washing performance, working performance satisfaction, the user rates the parameters such as odor, wrinkles, humidity of the laundry, washing time, sound, noise level, detergent residue and shrinking of the laundry via the user interface on the control panel.

[0020] The parameters obtained at the end of the optimized washing program are matched with the user ratings and transmitted to the machine learning block in the control unit. In this block, new washing program parameters are calculated in accordance with the parameters obtained at the end of the washing program and the ratings by the user. This calculation is preferably carried out by using the edge computing method. At the end of the calculation, the machine learning block contains information about which parameters are to be changed with which values in the washing program. According to the information in the machine learning block, the relevant washing program parameters are updated on the control unit, and the washing program is carried out as per the ratings by the user.

[0021] By means of the present invention, if the user is not satisfied with the performance of the washing program and/or wants to optimize the washing program as per his/her needs, the most suitable washing program parameters for the user are recreated and the relevant washing program is updated by means of the machine learning block as per user satisfaction ratings.

[0022] By means of the present invention, even if the washing machine does not have access to Internet, cloud services or IoT connection, the parameter optimizations of the washing program deemed necessary by the user are carried out via a user interface through the edge computing and machine learning blocks on the SoC (system on chip).

[0023] In the embodiment of the present invention, the user stays within the safety limits and updates the washing program parameters as per his/her preference, thus obtaining a washing program according to these parameters.

[0024] In an embodiment of the present invention, according to the information in the machine learning block, the relevant washing program parameters are updated on the control unit and offered to the approval of the user, and if approved by the user, the washing program is carried out as per the ratings by the user. If the user does not approve, the current washing program and parameters are continued.

[0025] In an embodiment of the present invention, in case the user cannot reach the targeted washing performance as a result of the ratings or is not satisfied with

the resulting washing program performance, he/she can continue to optimize the washing program performance continuously by rating the last washing program again.

[0026] In the embodiment of the present invention, the parameters obtained at the end of the washing program (100) are recorded (101) and these parameters are enabled to be rated as per user satisfaction (102). If the user rates the same as per his/her satisfaction, the ratings are received (103) and transferred to the machine learning block after being matched with the parameters (104). In the machine learning block, new washing program parameters are formed with the recalculated parameters as a result of ratings (105). If there is no rating in terms of satisfaction, the current washing program continues.

[0027] In another embodiment of the present invention, if the user wants to return to the predefined washing program parameters, he/she is enabled to cancel the changes updated over time and to return to the factory default parameters. In this embodiment of the present invention, the 'reset' operation can be performed via the user interface by means of certain key combinations.

[0028] By means of the present invention, the user is enabled to eliminate the performance losses/differences caused by detergent type differences, laundry type differences, water hardness level differences and similar effects, and to obtain a washing machine with a washing performance which satisfies the user.

Claims

1. A washing machine control method, which is used in a washing machine comprising a user interface for enabling the user to select the washing parameters and a control unit which controls the operation of the washing machine, **characterized by** the steps of presenting the parameters of the washing program obtained as a result of the washing program to the evaluation of the user via the user interface during the washing program and/or after the washing program ends, updating the parameters of the washing program rated by the user with the ratings of the user, and running the next washing program in accordance with the updated parameters.

2. A washing machine control method as in Claim 1, **characterized in that** the most recently performed washing program in the washing machine and the parameters thereof are evaluated in terms of satisfaction via the user interface on the washing machine control panel, at the end of the washing programs predetermined as optimizable and/or at any time during the normal operating time.

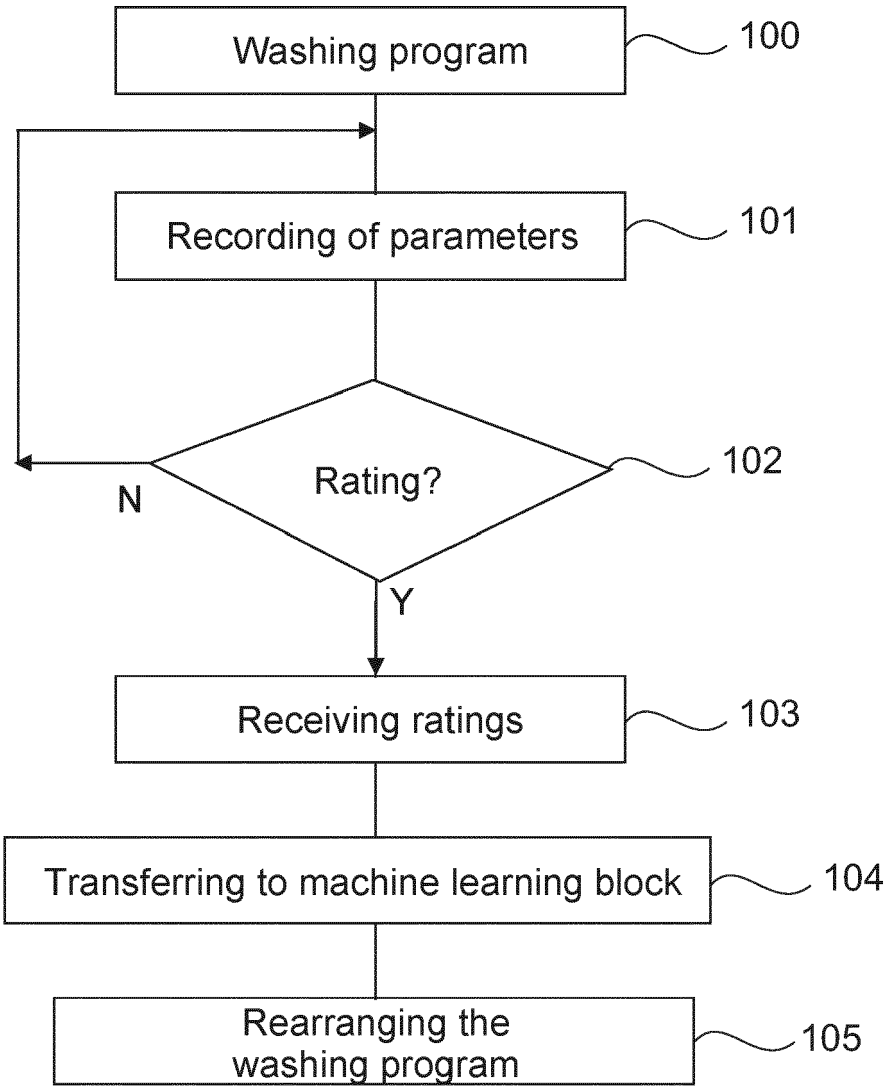
3. A washing machine control method as in Claim 1 or 2, **characterized in that** in addition to the evaluation of general washing performance, working performance satisfaction, the parameters such as odor, wrinkles, humidity of the laundry, washing time, sound, noise level, detergent residue and shrinking of the laundry are rated via the user interface on the control panel.

4. A washing machine control method as in any one of the above claims, **characterized in that** the parameters obtained at the end of the optimized washing program are matched with the user ratings and transmitted to the machine learning block in the control unit.

5. A washing machine control method as in any one of the above claims, **characterized in that** new washing program parameters are calculated in accordance with the parameters obtained at the end of the washing program and the ratings by the user.

6. A washing machine control method as in any one of the above claims, **characterized in that** the parameters obtained at the end of the washing program (100) are recorded (101) and these parameters are enabled to be rated as per user satisfaction (102), that if the user rates the same as per his/her satisfaction, the ratings are received (103) and transferred to the machine learning block after being matched with the parameters (104), and that in the machine learning block, new washing program parameters are formed with the recalculated parameters as a result of ratings (105).

Figure 1


Washing program
100
Recording of parameters
101
Rating?
102
N
Y
Receiving ratings
103
Transferring to machine learning block
104
Rearranging the washing program
105

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EUROPEAN SEARCH REPORT

Application Number
EP 22 21 0522

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 May 2023	Weidner, Maximilian

CATEGORY OF CITED DOCUMENTS

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