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# Operation control device, operation control method, and non-transitory storage medium


## Abstract

An operation control device includes: a brain information acquiring unit configured to acquire brain information of a user; a determining unit configured to determine whether or not the brain information acquired by the brain information acquiring unit represents brain information corresponding to a first command and a second command which are different from each other; an information presenting unit configured to present information which evokes the second command to the user; and an executing unit configured to execute operation specified in the first command when the determining unit determines that the brain information corresponding to the second command is acquired after acquiring the brain information corresponding to the first command.



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## Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a Continuation of PCT International Application No. PCT/JP2022/010732 filed on Mar. 10, 2022 which claims the benefit of priority from Japanese Patent Application No. 2021-119291 filed on Jul. 20, 2021, the entire contents of both of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

(1) The application concerned is related to an operation control device, an operation control method, and a non-transitory storage medium.

(2) In recent years, there has been advancement in a technology for measuring information about the brain, and a brain-machine-interface (BMI) is becoming more and more realistic as an interface for directly linking the brain and a machine. As an example of such a technology, a technology disclosed in Patent Literature 1 is known. According to Japanese Patent Application Laid-open No. 2013-117957, when a user receives any stimulus, a plurality of steady-state visual-evoked response potential signals is acquired from the user, and system command signals are provided.

(3) In a conventional BMI, at a time of execution of a brain wave command, if there is any irrelevant stimulus, then the stimulus may appear in the brain waves to implement some commands. For example, in a case of a forward movement command by which the robot moves forward when “forward movement” is wished for a robot, if any person present around merely says the term “forward movement”, the brain arbitrarily evokes the “forward movement” and the forward movement command gets issued. Moreover, if the robot is operated while an operator thereof is looking at its movement, when a situation in which the robot is moving forward is displayed on a monitor, the brain of the operator who is looking at the monitor arbitrarily keeps on evoking “forward movement”, and accordingly the forward movement commands get arbitrarily issued.

SUMMARY OF THE INVENTION

(4) An operation control device, an operation control method, and a non-transitory storage medium are disclosed.

(5) According to one aspect of the present application, there is provided an operation control device comprising: a brain information acquiring unit configured to acquire brain information of a user; a determining unit configured to determine whether or not the brain information acquired by the brain information acquiring unit represents brain information corresponding to a first command and a second command which are different from each other; an information presenting unit configured to present information which evokes the second command to the user; and an executing unit configured to execute operation specified in the first command when the determining unit determines that the brain information corresponding to the second command is acquired after acquiring the brain information corresponding to the first command.

(6) According to one aspect of the present application, there is provided an operation control method comprising: acquiring brain information of a user; determining whether or not the acquired brain information represents brain information corresponding to a first command and a second command which are different from each other; presenting information which evokes the second command to the user; and executing operation specified in the first command when it is determined that the brain information corresponding to the second command is acquired after acquiring the brain information corresponding to the first command.

(7) According to one aspect of the present application, there is provided a non-transitory storage medium that stores a program that causes a computer to execute: acquiring brain information of a user; determining whether or not the acquired brain information represents brain information corresponding to a first command and a second command which are different from each other; presenting information which evokes the second command to the user; and executing operation specified in the first command when it is determined that the brain information corresponding to the second command is acquired after acquiring the brain information corresponding to the first

command.
(8) The above and other objects, features, advantages and technical and industrial significance of this application will be better understood by reading the following detailed description of presently preferred embodiments of the application, when considered in connection with the accompanying drawings.

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## Description

BRIEF DESCRIPTION OF THE DRAWINGS
(1) FIG. **1** is a block diagram illustrating an exemplary configuration of an operation control device according to an embodiment;
(2) FIG. **2** is a flowchart for explaining a flow of overall processes executed in the operation control device according to the present embodiment;
(3) FIG. **3** is a flowchart for explaining a flow of indirect execution mode processes executed in the operation control device according to the present embodiment;
(4) FIG. **4** is a flowchart for explaining a flow of abstract image process executed in the operation control device according to the present embodiment; and
(5) FIG. **5** is a flowchart for explaining a flow of an abstract image updating processing executed in the operation control device according to the present embodiment.
DETAILED DESCRIPTION OF THE INVENTION
(6) An exemplary embodiment of an operation control device, an operation control method, and a program is described below in detail with reference to the accompanying drawings. However, the present application is not limited by the embodiment described below.
(7) <Operation Control Device>
(8) FIG. **1** is a block diagram illustrating an exemplary configuration of the operation control device according to the present embodiment.
(9) In the present embodiment, as illustrated in FIG. **1**, based on brain information of a user, an operation control device **10** executes operation control with respect to an operation target **50**. The operation control device **10** includes a brain wave acquiring unit (a brain information acquiring unit) **11**, a brain wave decoder **12**, a command buffer **13**, a password buffer **14**, a storage **15**, a processing unit **16**, a display controller **17**, a display **18**, and a communication unit **19**.
(10) An operation target **50** is, for example, a robot. However, the operation target **50** is not limited thereto, and, as long as a device that operates based on communication is used, it serves the purpose. Although not illustrated in FIG. **1**, the operation target **50** includes a driving device, a controller that controls the driving device, and a communication unit that is capable of receiving control signals. In the operation target **50**, when the communication unit receives a control signal, the control device drives the driving device and brings the robot into operation.
(11) The brain wave acquiring unit **11** can be attached to a head region of the user. As far as the brain wave decoder **12**, the processing unit **16**, the display controller **17**, the display **18**, and the communication unit **19** are concerned, either they can be attached to the user or they can be disposed at a predetermined position without being worn by the user. Moreover, the brain wave decoder **12**, the processing unit **16**, the display controller **17**, the display **18**, and the communication unit **19** either can be installed in an integrated manner or can be installed as separate units.
(12) The brain wave acquiring unit **11** acquires brain waves that represent brain information of the user. For example, the brain wave acquiring unit **11** includes an electrical sensor (for example, an electrode) that detects the brain waves deriving from a weak electrical current flowing in a neural network of the brain. The brain wave acquiring unit **11** detects an electrical potential (electrical signals) of the weak electrical current generated when the user receives an external stimulus or

generated on thoughts of the user such as contemplation. Meanwhile, the brain information acquiring unit is not limited to be the brain wave acquiring unit **11**. Alternatively, for example, the brain information acquiring unit can acquire a blood flow volume, which is attributed to a brain activity representing the brain information of the user, with a near-infrared light measurement, for example. The brain wave acquiring unit **11** is connected to the brain wave decoder **12** and sends, to the brain wave decoder **12**, the brain waves representing the brain information acquired from the user.

(13) The brain wave decoder **12** decodes the electrical signals of the brain waves of the user, which are acquired by the brain wave acquiring unit **11**, to contemplation information. In that case, multiple electrical signals of the brain waves of the user is associated in advance to the contemplation information of the user. For example, the electrical signals of the brain waves are associated to pieces of the contemplation information of the user using machine learning based on deep learning.

(14) The command buffer **13** is used to temporarily store first commands that are determined by a determining unit **21** based on the contemplation information of the user. The first command is a command for operating the operation target **50**, and examples thereof include “forward movement”, “backward movement”, “halting”, “acceleration”, “deceleration”, “clockwise turning”, and “counterclockwise turning”. In those cases, each first command is associated in advance to operation of the operation target **50**. Meanwhile, the command buffer **13** is capable of sending a variety of data to and receiving a variety of data from the processing unit **16**.

(15) The first command is not limited to a concept indicating operation to be instructed. Alternatively, a first command can have a numerical value added thereto for complementing to the concept indicating the operation to be instructed. For example, based on the electrical signals acquired by the brain wave acquiring unit **11**, the brain wave decoder **12** can decode the contemplation information of the user, detect an intensity of the brain waves in a form of a decimal between 0 and 1, and set a first command in which the intensity (numerical value) is added to the contemplation information. In that case, the numerical value of the first command represents a maximum torque output counted in the driving device installed in the operation target **50**.

(16) The password buffer **14** is used to temporarily store passwords representing second commands determined by the determining unit **21** based on the contemplation information of the user. A password representing a second command is used in deciding to execute a first command. A password is made of a combination of one or more symbols that are used in forming the password. Meanwhile, the password buffer **14** is capable of sending a variety of data to and receiving a variety of data from the processing unit **16**.

(17) The storage **15** is used to store multiple first commands and multiple second commands. Moreover, the storage **15** can be used to store learning data that is acquired as a result of executing machine learning of a relationship between the electrical signals of the brain waves of the user and the contemplation information of the user. Meanwhile, a second command is made of multiple symbols used in forming a password. The storage **15** is capable of sending a variety of data to and receiving a variety of data from the processing unit **16**. The processing unit **16** sets or updates a password by combining one or more symbols from among multiple symbols stored in the storage **15**. Meanwhile, as far as the passwords are concerned, either a common password can be set across different first commands, or an individual password can be set for each of the different first commands.

(18) The password as a second command is an abstract image. Since the password is made of a combination of one or more symbols, thus the symbol is an abstract image. An abstract image can be a symbol such as “Δ”, “□”, or “x”, or a color such as “red”, “blue”, or “black”, or a number such as “0”, “1”, or “2”, or an article or a scenery. Thus, for example, “Δ”+“red”+“9” can be set as a password as a second command.

(19) The command buffer **13** as well as the password buffer **14** is a semiconductor memory device

such as a RAM (Random Access Memory) or a flash memory. The storage **15** is configured using a memory card, an SSD (Solid State Drive), or an external memory device.
(20) The processing unit **16** is capable of switching between a direct execution mode and an indirect execution mode. In the direct execution mode, when a first command for causing the processing unit **16** to bring the operation target **50** into operation is input, the processing unit **16** executes the first command. On the other hand, in the indirect execution mode, when a first command as well as a second command is input for causing the processing unit **16** to bring the operation target **50** into operation, the processing unit **16** executes the first command.
(21) The processing unit **16** is, for example, an arithmetic processing device (a control device) configured using a CPU (Central Processing Unit). The processing unit **16** loads a stored program into a memory and executes the commands specified in the program. The processing unit **16** includes an internal memory (not illustrated) that is used to temporarily store data. The processing unit **16** is configured to function as the determining unit **21** and an executing unit **22**. The processing unit **16** sends the processing result to the display controller **17** and the communication unit **19**.
(22) The determining unit **21** determines whether or not the contemplation information of the user, which is acquired by the brain wave acquiring unit **11** and decoded by the brain wave decoder **12**, represents the brain waves corresponding to a first command and a second command (password) that are different from each other.
(23) More particularly, the determining unit **21** compares the contemplation information of the user, which is decoded by the brain wave decoder **12**, with a first command stored in the storage **15**. If the contemplation information of the user matches with a first command, then the determining unit **21** determines that the contemplation information of the user represents a first command. Thus, the determining unit **21** stores, in the command buffer **13**, the command determined to be a first command. On the other hand, if the contemplation information of the user does not match with any first command, then the determining unit **21** determines that the contemplation information of the user does not represent a first command. Thus, the determining unit **21** does not store, in the command buffer **13**, the command determined not to be a first command. Regarding the determination executed by the determining unit **21** about whether or not the contemplation information of the user, which is decoded by the brain wave decoder **12**, matches with a first command, it is determined to match with a first command even if it does not match therewith completely as long as it can be determined to imply a first command.
(24) Moreover, the determining unit **21** compares the contemplation information of the user, which is decoded by the brain wave decoder **12**, with the passwords stored in the storage **15**. If the contemplation information of the user matches either with a password or with symbols constituting a password, then the determining unit **21** determines that the contemplation information of the user represents either a password or symbols constituting the password. If the contemplation information of the user is determined to represent a password or symbols, then the determining unit **21** stores the password or the symbols in the password buffer **14**. On the other hand, if the contemplation information of the user does not match with any stored password or with the symbols constituting a password, then the determining unit **21** determines that the contemplation information of the user neither represents a password nor represents symbols constituting the password. When the contemplation information of the user is determined not to represent a password or symbols, no passwords or symbols are stored in the password buffer **14**.
(25) When the determining unit **21** determines that the brain wave corresponding to a first command and the brain wave corresponding to a password are acquired, the executing unit **22** executes the operation specified in the first command. More particularly, when the determining unit **21** determines that the initially-acquired contemplation information of the user represents a first command and determines that the subsequently-acquired contemplation information of the user represents a password, the executing unit **22** executes the operation specified in the first command.

(26) However, after the determining unit **21** determines that a first command is acquired, when a preset standby period such as three seconds elapses, then the executing unit **22** cancels the acquired first command. Moreover, after the determining unit **21** determines that a first command is acquired, when the processing unit **16** acquires a cancel command as the contemplation of the user, then the executing unit **22** cancels the acquired first command. Herein, a cancel command is a preset command, and the electrical signals of the brain waves of the user are associated to the contemplation information (cancel command) of the user and the associated information is stored in the storage **15**.
(27) Thus, when the direct execution mode is selected, if the determining unit **21** determines that the contemplation information of the user represents a first command, the executing unit **22** executes the first command without determining whether or not a second command is input. On the other hand, when the indirect execution mode is selected, if the determining unit **21** determines that the contemplation information of the user represents a first command, the executing unit **22** does not execute the first command right away. That is, after determining that the initial contemplation information of the user represents a first command, if the determining unit **21** determines that the subsequent contemplation information of the user represents a second command (password), then the executing unit **22** executes the first command.
(28) The display controller **17** and the display **18** function as an information providing unit that provides a variety of information. When the determining unit **21** determines that the brain waves corresponding to a first command are acquired, the display controller **17** and the display **18** present information evoking the password. In the present embodiment, the information presenting unit presents information which evokes a password to the user by visual information. However, that is not the only possible case. For example, the information presenting unit may present information which evokes a password by sound information. In that case, the information presenting unit is composed of, for example, a sound output controller and a speaker.
(29) The display controller **17** is connected to the display **18**. The display controller **17** sends the processing result, which is sent from the processing unit **16**, to the display **18** for displaying the processing result. Thus, the display controller **17** displays, in the display **18**, the processing result acquired by the processing unit **16**, such as the operating state of the operation control device **10** or a contemplation instruction with respect to the user.
(30) The processing unit **16** controls the display controller **17** and causes it to display necessary information in the display **18**. Thus, the processing unit **16** controls the display controller **17** and causes it to display, in the display **18**, an instruction to the user for evoking the symbol (the abstract image) of the password representing a second command. Since the symbol is an abstract image, the display **18** either can display the actual abstract image or can display an image or a word that evokes the abstract image.
(31) The display **18** is used to display the operating state of the operation control device **10** or a contemplation instruction for the user sent from the display controller **17**. Thus, the display **18** presents the necessary information to the user. The display **18** is, for example, a display such as a liquid crystal display (LCD) or an organic EL (Organic Electro-Luminescence) display.
(32) The communication unit **19** is capable of executing wireless communication with the operation target **50**. The communication unit **19** sends, to the operation target **50**, processed information that is acquired by the processing unit **16** as a result of executing processing. More particularly, when the determining unit **21** determines that the brain waves corresponding to a first command and the brain waves corresponding to a password are acquired, the executing unit **22** generates a control signal corresponding to operation specified in the first command and sends the control signal to the communication unit **19**. Then, the communication unit **19** sends, to the operation target **50**, the control signal corresponding to the operation specified in the first command. The operation target **50** receives the first command sent by the communication unit **19**, and operates according to the operation specified in the first command.

(33) <Operation Control Method>
(34) Given below is an explanation of an operation control method implemented in the operation control device **10**. FIG. **2** is a flowchart for explaining a flow of the overall processes executed in the operation control device according to the present embodiment.
(35) As illustrated in FIGS. **1** and **2**, at Step S**11**, the processing unit **16** determines whether or not the contemplation information of the user, which is acquired by the brain wave acquiring unit **11** and decoded by the brain wave decoder **12**, indicates a mode switching command. If it is determined that the contemplation information of the user indicates a mode switching command (Yes), then, at Step S**12**, the processing unit **16** switches the mode. That is, if the direct execution mode is currently set, then the processing unit **16** switches the mode to the indirect execution mode. On the other hand, if the indirect execution mode is currently set, then the processing unit **16** switches the mode to the direct execution mode. At that time, the processing unit **16** controls the display controller **17** and causes it to display, in the display **18**, the fact indicating to the user that the mode has been switched. For example, when the mode is switched to the direct execution mode, the display controller **17** displays the operation content indicating “the mode is switched to the direct execution mode” in the display **18**. On the other hand, when the mode is switched to the indirect execution mode, the display controller **17** displays the operation content indicating “the mode is switched to the indirect execution mode” in the display **18**. Thus, the display controller **17** notifies the user about the switch in the mode. Then, at Step S**13**, the command buffer **13** and the password buffer **14** are cleared, and the present routine is exited.
(36) Meanwhile, at Step S**11**, if it is determined that the contemplation information of the user does not indicate a mode switching command (No), then, at Step S**14**, the processing unit **16** determines whether or not the direct execution mode is currently selected. If the processing unit **16** determines that the direct execution mode is currently selected (Yes), then, at Step S**15**, the determining unit **21** determines whether or not the contemplation information of the user, which is acquired by the brain wave acquiring unit **11** and decoded by the brain wave decoder **12**, represents the brain waves corresponding to a first command. If the determining unit **21** determines that the contemplation information of the user does not represent a first command (No), then the present routine is exited.
(37) On the other hand, at Step S**15**, if the determining unit **21** determines that the contemplation information of the user represents a first command (Yes), then, at Step S**16**, the executing unit **22** executes the operation specified in the first command. That is, using the communication unit **19**, the executing unit **22** sends, to the operation target **50**, a control signal corresponding to the operation specified in the first command and brings the operation target **50** into operation. At that time, the processing unit **16** controls the display controller **17** and causes it to display, in the display **18**, the fact indicating to the user that the first command has been executed. For example, the display controller **17** displays, in the display **18**, a message such as “acceleration command was executed” indicating the fact that the first command was executed.
(38) Meanwhile, at Step S**14**, if it determined that the direct execution mode is not currently selected (No), then, at Step S**17**, the processing unit **16** executes the operations corresponding to the indirect execution mode. The operations illustrated in FIG. **2** are executed in a repeated manner during the period in which the operation of the operation target **50** is controlled by the operation control device **10**.
(39) Given below is an explanation of processes executed in the indirect execution mode. FIG. **3** is a flowchart for explaining a flow of the indirect execution mode processes executed in the operation control device according to the present embodiment.
(40) As illustrated in FIGS. **1** and **3**, at Step S**21**, the determining unit **21** determines whether or not the contemplation information of the user, which is acquired by the brain wave acquiring unit **11** and decoded by the brain wave decoder **12**, represents the brain waves corresponding to a first command. If it is determined that the contemplation information of the user represents a first command (Yes), then, at Step S**22**, the determining unit **21** stores the first command in the

command buffer **13**. At that time, the processing unit **16** can control the display controller **17** and cause it to display, in the display **18**, the fact indicating to the user that the first command has been stored. For example, the display controller **17** displays, in the display **18**, a message such as "acceleration command was stored" indicating the fact that the first command was stored. Then, at Step S**23**, the password buffer **14** is cleared.

(41) Meanwhile, at Step S**21**, if it is determined that the contemplation information of the user does not represent a first command (No), then, at Step S**24**, the determining unit **21** determines whether or not any first command is stored in the command buffer **13**. If it is determined that a first command is stored in the command buffer **13** (Yes), then, at Step S**25**, the determining unit **21** executes an abstract image processing.

(42) Given below is an explanation about an abstract image processing. FIG. **4** is a flowchart for explaining a flow of the abstract image processing executed in the operation control device according to the present embodiment.

(43) As illustrated in FIGS. **1** and **4**, at Step S**31**, the processing unit **16** controls the display controller **17** and causes it to display, in the display **18**, an instruction to the user for evoking a symbol (an abstract image) of the password representing a second command. For example, the display controller **17** displays an image equivalent to an abstract image in the display **18**.

(44) At Step S**32**, the determining unit **21** determines whether or not the contemplation information of the user, which is acquired by the brain wave acquiring unit **11** and decoded by the brain wave decoder **12**, represents the brain waves corresponding to a password (an abstract image). If the determining unit **21** determines that the contemplation information of the user does not represent a password (an abstract image) (No), then the present routine is exited.

(45) On the other hand, if it is determined that the contemplation information of the user represents a symbol of a password (Yes), then, at Step S**33**, the determining unit **21** stores the symbol as a single abstract image in the password buffer **14**. However, if the determining unit **21** determines that the contemplation information of the user does not represent a symbol of a password (No), then the present routine is exited.

(46) At Step S**34**, the determining unit **21** compares the abstract image stored in the password buffer **14** with a password composed of one or more abstract images stored in the storage **15**, and determines whether or not they are identical. If the determining unit **21** determines that the abstract image stored in the password buffer **14** is not identical to the password composed of the abstract image stored in the storage **15** (No), then, at Step S**39**, the processing unit **16** controls the display controller **17** and displays, in the display **18**, the fact indicating to the user that the abstract image stored in the password buffer **14** is not identical to the password stored in the storage **15**.

(47) On the other hand, at Step S**34**, if the determining unit **21** determines that the abstract image stored in the password buffer **14** is identical to the password composed of one or more abstract images stored in the storage **15** (Yes), then, at Step S**35**, the executing unit **22** executes the operation specified in the first command stored in the command buffer **13**. That is, using the communication unit **19**, the executing unit **22** sends, to the operation target **50**, a control signal corresponding to the operation specified in the first command and brings the operation target **50** into operation. At that time, the processing unit **16** controls the display controller **17** and causes it to display, in the display **18**, the fact indicating to the user that the first command has been executed. For example, the display controller **17** displays, in the display **18**, a message such as "acceleration command was executed" indicating the fact that the first command was executed.

(48) At Step S**36**, the processing unit **16** executes an abstract image updating processing for a purpose of updating the password. Regarding the abstract image updating processing, an explanation is given below. Subsequently, at Step S**37**, the command buffer **13** is cleared, and, at Step S**38**, the password buffer **14** is cleared.

(49) The following explanation is given about the abstract image updating processing. FIG. **5** is a flowchart for explaining a flow of the abstract image updating processing executed in the operation

control device according to the present embodiment.
(50) When operation for comparing the password (the abstract image) evoked by the user and the preset password (the abstract image) is executed many times, the user ends up remembering the preset password (the abstract image). Hence, it becomes less meaningful to input a password for expressing the intention of executing the operation content corresponding to the first command. That is, the user ends up executing the first command with ease. For that reason, when a predetermined condition is satisfied, the processing unit **16** executes the abstract image updating processing for updating and changing the password.
(51) As illustrated in FIGS. **1** and **5**, at Step S**41**, the processing unit **16** determines whether or not a predetermined condition for updating the password is satisfied. If the processing unit **16** determines that the predetermined condition is not satisfied (No), then the present routine is exited. On the other hand, if it is determined that the predetermined condition is satisfied (Yes), then, at Step S**42**, the processing unit **16** adds a symbol of a necessary abstract image to the current password to update the password.
(52) Examples of the predetermined condition for updating the password include a condition in which an execution count of the first command exceeds a predetermined count, a condition in which an intensity of the brain waves processed by the brain wave decoder **12** exceed a predetermined level, and a condition in which operation of adding the necessary abstract images is input by an input means such as the brain waves.
(53) Meanwhile, in the embodiment described above, a first command and a second command (password) are detected in chronological order. However, that is not the only possible configuration. For example, a first command as well as a second command (password) can be detected at the same time. That is, the processes from Step S**21** to Step S**23** illustrated in FIG. **3** can be executed in parallel to the processes from Step S**31** to Step S**34** illustrated in FIG. **4**.
(54) In the present embodiment, the operation control device includes: the brain wave acquiring unit (brain information acquiring unit) **11** that acquires the brain information of the user; the determining unit **21** that determines whether or not the brain information acquired by the brain wave acquiring unit **11** represents brain information corresponding to a first command and a second command that are different from each other; the display controller **17** and the display as an information presenting unit that presents information evoking the second command; and the executing unit **22** that, when the determining unit **21** determines that the brain information corresponding to the first command and the brain information corresponding to the second command is acquired, executes the operation specified in the first command.
(55) Thus, when the brain information corresponding to the first command and the brain information corresponding to the second command are acquired, the operation specified in the first command is executed and the operation target **50** is brought into operation. That is, even when the brain information corresponding to the first command representing the operation content is acquired, unless the brain information corresponding to the second command expressing the intention to execute the operation content is acquired, the operation specified in the first command is not executed. Hence, the content and the execution timing of the first command are implemented in a safer and more precise manner, thereby making it possible to execute an appropriate brain wave command without being impacted by any irrelevant stimulus.
(56) Moreover, in the present embodiment, the display controller **17** and the display **18** as the information presenting unit presents, to the user, the information evoking a second command. That enables the user to evoke the second command. Thus, the first command can be appropriately executed without the user remembering the second command.
(57) Furthermore, in the present embodiment, a first command represents the operation content for operating the operation target **50**, and a second command represents the intention of implementing the operation content with respect to the operation target **50**. Thus, when the brain information corresponding to a second command is acquired, it becomes possible to confirm the intention of the

user to implement the operation content with respect to the operation target **50**, and to execute an appropriate brain wave command.
(58) Furthermore, in the present embodiment, the determining unit **21** can set a second command to notify the user of the set second command by the display controller **17** and the display **18** as the information presenting unit, and can change the second command when a preset updating condition is satisfied. If the same second command is used over a long time period, the user ends up remembering the second command. That makes it less meaningful to confirm the intention of the user to execute the operation content corresponding to the first command. In that regard, by changing the second command, it becomes possible to appropriately confirm the intention of the user to execute the operation content.
(59) In the above, the explanation was given about the operation control device **10** according to the present application. However, the present application can be implemented in various other forms other than the embodiment described above.
(60) The constituent elements of the operation control device **10** illustrated in the drawings are merely conceptual, and need not be physically configured as illustrated. The constituent elements, as a whole or in part, can be separated or integrated either functionally or physically based on various types of loads or use conditions.
(61) The configuration of the operation control device **10** is implemented by, for example, a program that is loaded as software in a memory. In the embodiment described above, the configuration is explained with function blocks implemented by a combination of hardware and software. That is, such function blocks can be implemented in various ways, such as using only hardware, or using only software, or using a combination of hardware and software.
(62) According to the present application, it becomes possible to execute appropriate brain wave commands without being impacted by any irrelevant stimulus.
(63) Although the present application has been described with respect to a specific embodiment for a complete and clear disclosure, the appended claims are not to be thus limited but are to be construed as embodying all modifications and alternative constructions that may occur to one skilled in the art that fairly fall within the basic teaching herein set forth.
(64) The operation control device, the operation control method, and the program according to the present application can be implemented in, for example, a brain-machine-interface.

## Claims

1. An operation control device comprising: a display; a memory that is configured to store computer executable instructions; and a processor that is configured to execute the computer executable instructions to perform operations, the operations comprising: acquiring brain information of a user based on brain waves; determining whether the brain information comprises brain information corresponding to a first command and brain information corresponding to a second command that is different from the first command; presenting information that evokes the second command to the user by the display; and executing an operation specified in the first command in response to a determination that the brain information corresponding to the second command is acquired after acquiring the brain information corresponding to the first command, wherein the second command is an abstract image to decide to execute the operation specified by the first command and set by the processor, and the determining comprises: setting the second command; notifying the user of the second command by the display; and changing the second command in response to determining that a predetermined updating condition is satisfied, wherein the predetermined updating condition includes at least one of a condition in which an execution count of the first command exceeds a predetermined count, a condition in which an intensity of the brain waves exceeds a predetermined level, or a condition in which operation of adding a necessary abstract image that evokes the second command is input by the brainwaves.

2. The operation control device according to claim 1, wherein the first command represents operation content for operating an operation target, and the abstract image indicates intention of executing the operation content for the operation target.
3. The operation control device according to claim 1, the operations further comprising, in response to acquisition of the brain information corresponding to the first command, causing the display to display information that evokes the second command to the user.
4. An operation control method comprising: acquiring brain information of a user; determining whether the acquired brain information comprises brain information corresponding to a first command and brain information corresponding to a second command, wherein the second command is different from the first command; presenting information that evokes the second command to the user by a display; and executing an operation specified in the first command in response to a determination that the brain information corresponding to the second command is acquired after acquiring the brain information corresponding to the first command, wherein the second command is an abstract image to decide to execute the operation specified by the first command and set by a device in which the method is performed, and the determining comprises: setting the second command; notifying the user of the second command by the display; and changing the second command in response to determining that a predetermined updating condition is satisfied, wherein the predetermined updating condition includes at least one of a condition in which an execution count of the first command exceeds a predetermined count, a condition in which an intensity of the brain waves exceeds a predetermined level, or a condition in which operation of adding a necessary abstract image that evokes the second command is input by the brain waves.
5. A non-transitory storage medium that stores a program that causes a computer to execute: acquiring brain information of a user; determining whether the brain information comprises brain information representing a first command and brain information representing a second command that is different from the first command; presenting information that evokes the second command to the user by a display; and executing an operation specified in the first command in response to a determination that the brain information representing the second command is acquired after acquiring the brain information representing the first command, wherein the second command is an abstract image to decide to execute the operation specified by the first command and set by a device in which the method is performed, and the determining comprises: setting the second command; notifying the user of the second command by the display; and changing the second command in response to determining that a predetermined updating condition is satisfied, wherein the predetermined updating condition includes at least one of a condition in which an execution count of the first command exceeds a predetermined count, a condition in which an intensity of the brain waves exceeds a predetermined level, or a condition in which operation of adding a necessary abstract image that evokes the second command is input by the brain waves.