United States Patent	12393297
Kind Code	B2
Date of Patent	August 19, 2025
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Information processing apparatus and non-transitory computer readable medium storing information processing program

Abstract

An information processing apparatus includes a processor configured to: display a screen including an operation icon on a display; detect an operation object that is brought close to the operation icon while facing the operation icon and is provided for performing a non-contact operation on the operation icon; in a case where the operation object that is brought close to the operation icon while facing the operation icon is continuously detected for an operation confirmation time from a detection start time point at which detection of the operation object that is brought close to the operation icon while facing the operation icon is started, execute a process associated with the operation icon; and change the operation confirmation time in response to a movement of the operation object that is brought close to the operation icon while facing the operation icon.

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Appl. No.:	**17/863386**
Filed:	**July 12, 2022**

Prior Publication Data

Document Identifier	Publication Date
US 20230305652 A1	Sep. 28, 2023

Foreign Application Priority Data

JP	2022-050107	Mar. 25, 2022

Publication Classification

Int. Cl.: **G06F3/041** (20060101); **G06F3/04817** (20220101); **G06F3/04886** (20220101)

U.S. Cl.:

CPC **G06F3/0416** (20130101); **G06F3/04817** (20130101); **G06F3/04886** (20130101); G06F2203/04101 (20130101)

Field of Classification Search

CPC: G06F (3/04842); G06F (3/04886); G06F (3/04817); G06F (3/0416); G06F (2203/04101); H04N (1/00408); H04N (1/00381); H04N (1/00411); H04N (1/00384)

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS
(1) This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2022-050107 filed Mar. 25, 2022.
BACKGROUND
(i) Technical Field
(2) The present invention relates to an information processing apparatus and a non-transitory computer readable medium storing an information processing program.
(ii) Related Art
(3) In the related art, there has been proposed an information processing apparatus capable of a non-contact operation in which an operation on a screen is performed by an operation object such as a finger or a stylus without directly touching the screen.
(4) For example, JP2015-148960A discloses an information processing apparatus that detects an operation object in a spatial region close to a screen for displaying information, specifies an input

operation based on a predetermined movement of the detected operation object, and executes a process corresponding to the specified input operation. JP2006-332889A discloses an information processing apparatus that confirms an operation content on a screen by a contact operation, but, prior to the contact operation, detects an operation object close to the screen, predicts an input operation from the movement of the operation object, and starts a process corresponding to the predicted input operation.

SUMMARY

(5) In a non-contact operation, it is not possible to confirm an operation of a user by a clear trigger such as touching of a predetermined position on the screen. Thus, considering a non-contact operation on an operation icon included in the screen, it is conceivable to adopt a method of, in a case where the user brings an operation object such as a finger or a stylus close to the operation icon for a predetermined operation confirmation time, while facing the operation icon, determining that the non-contact operation on the operation icon has been confirmed. An operation that the operation object is close to the operation icon while facing the operation icon means that the operation object is located in a region that faces the operation icon in a space close to the screen and in which a distance from the screen in a perpendicular direction of the screen is within a predetermined distance. In a case where the non-contact operation on the operation icon is confirmed, the information processing apparatus can execute a process associated with the operation icon.

(6) Here, it may be difficult to grasp an accurate operation confirmation time depending on a user who performs a non-contact operation on the operation icon. As a result, the operability of the non-contact operation of the user may deteriorate. For example, even though the user attempts to operate the operation icon with a non-contact operation, the user cancels the close facing to the operation icon of the operation object before the operation confirmation time elapses after the operation object is brought close to the operation icon while facing the operation icon. Thus, the non-contact operation may not be confirmed. Further, even though the user attempts to stop the non-contact operation on the operation icon during the non-contact operation, the operation confirmation time has elapsed before the user cancels the close facing of the operation object to the operation icon, and thus the non-contact operation may be confirmed.

(7) Aspects of non-limiting embodiments of the present disclosure relate to an information processing apparatus and a non-transitory computer readable medium storing a program that improve operability of a non-contact operation by a user in an information processing apparatus that confirms the non-contact operation on an operation icon, as compared to a case where an operation confirmation time is fixed, in a manner that a user brings an operation object close to the operation icon included in a screen for the operation confirmation time while facing the operation icon.

(8) Aspects of certain non-limiting embodiments of the present disclosure overcome the above disadvantages and/or other disadvantages not described above. However, aspects of the non-limiting embodiments are not required to overcome the disadvantages described above, and aspects of the non-limiting embodiments of the present disclosure may not overcome any of the disadvantages described above.

(9) According to an aspect of the present disclosure, there is provided an information processing apparatus including a processor configured to: display a screen including an operation icon on a display unit; detect an operation object that is brought close to the operation icon while facing the operation icon and is provided for performing a non-contact operation on the operation icon; in a case where the operation object that is brought close to JP operation icon while facing the operation icon is continuously detected for an operation confirmation time from a detection start time point at which detection of the operation object that is brought close to the operation icon while facing the operation icon is started, execute a process associated with the operation icon; and

change the operation confirmation time in response to a movement of the operation object that is brought close to the operation icon while facing the operation icon.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) Exemplary embodiment(s) of the present invention will be described in detail based on the following figures, wherein:

(2) FIG. **1** is a schematic configuration diagram illustrating an information processing apparatus according to a present exemplary embodiment;

(3) FIG. **2** is a diagram illustrating a first example of a non-contact operation screen;

(4) FIG. **3** is a diagram illustrating a close facing region of an operation object and an operation icon;

(5) FIG. **4** is a diagram illustrating a state in which the operation object is closer to the operation icon than a state illustrated in FIG. **3**;

(6) FIG. **5** is a diagram illustrating a state in which the operation object is farther away from the operation icon than the state illustrated in FIG. **3**;

(7) FIG. **6** is a diagram illustrating a second example of the non-contact operation screen;

(8) FIG. **7** is a first diagram illustrating a form in which the operation object is moved out from the close facing region;

(9) FIG. **8** is a second diagram illustrating the form in which the operation object is moved out from the close facing region;

(10) FIG. **9** is a diagram illustrating a third example of the non-contact operation screen;

(11) FIG. **10** is a first flowchart illustrating a flow of processing of the information processing apparatus according to the present exemplary embodiment; and

(12) FIG. **11** is a second flowchart illustrating the flow of the processing of the information processing apparatus according to the present exemplary embodiment.

DETAILED DESCRIPTION

(13) FIG. **1** is a schematic diagram illustrating a configuration of an information processing apparatus **10** according to a present exemplary embodiment. As will be described in detail later, the information processing apparatus **10** is an apparatus capable of a non-contact operation. The non-contact operation is to perform an operation on a screen by an operation object without causing the operation object to directly touch an operation panel (the screen displayed on a display in the present exemplary embodiment). The operation object is provided for performing a non-contact operation, for example, a finger of a user or a stylus. The non-contact operation is also called a hover operation.

(14) In the present exemplary embodiment, the information processing apparatus **10** has a print function, a copy function, a scan function, and the like. The information processing apparatus is a multifunction device that executes a print process, a copy process, a scan process, or the like in response to a processing command (job) from the user, but the information processing apparatus **10** is not limited to this. Any apparatus may be used as long as the non-contact operation is possible.

(15) As illustrated in FIG. **1**, the information processing apparatus **10** is configured to include a display **12** as a display unit, an operation object sensor **14**, a memory **16**, and a processor **18**. In addition, although not illustrated in FIG. **1**, the information processing apparatus **10** may include a communication interface (for example, network interface card (NIC)) that communicates with other devices via a communication line such as a local area network (LAN) and a wide area network (WAN), a contact operation interface (for example, button and touch panel) that receives an instruction from a user by a contact operation, and a processing device (for example, printer and scanner) that executes a printing process and a scanning process.

(16) The display **12** includes, for example, a liquid crystal panel and an organic electro luminescence (EL) panel. Various screens are displayed on the display **12** by the processor **18** (particularly, a display processing unit **20** described later). In particular, the display **12** displays a non-contact operation screen including an operation icon that is a target of the non-contact operation.

(17) The operation object sensor **14** is a sensor that detects an operation object approaching the display **12** (more specifically, a display surface of the display **12**). Specifically, the operation object sensor **14** detects the presence or absence of the operation object approaching the display **12** and the position of the operation object which is not in contact with the display **12**. The position of the operation object includes a position in a direction of a plane parallel to the display **12** and a position in the perpendicular direction of the display **12**.

(18) As a method for detecting the operation object, various known methods can be adopted. For example, the operation object sensor **14** may be an electrostatic capacitance sensor that detects a change in electrostatic capacitance between the display **12** and an operation object. In this case, the processor **18** can detect the presence or absence and the position of the operation object in accordance with the change in electrostatic capacitance between the display **12** and the operation object, which is detected by the operation object sensor **14**. Alternatively, the operation object sensor **14** may be an optical sensor that detects light. In this case, infrared rays or laser light is emitted from a light source (not illustrated) in a display surface direction of the display **12**, and the operation object sensor **14** detects the reflected light, particularly, the reflected light from the operation object. The processor **18** can detect the presence or absence and the position of the operation object based on the reflected light detected by the operation object sensor **14**. In the present specification, the position of the operation object means the position of a portion of the operation object, which is closest to the display **12** (for example, the fingertip or the tip of a stylus).

(19) The detection signal indicating that the operation object has been detected and indicating the position of the detected operation object is transmitted from the operation object sensor **14** to the processor **18**.

(20) The memory **16** is configured to include a hard disk drive (HDD), a solid state drive (SSD), an embedded multimedia card (eMMC), a read only memory (ROM), a random access memory (RAM), and the like. The memory **16** stores an information processing program for operating each unit art of the information processing apparatus **10**. The information processing program can also be stored in a non-transitory computer readable storage medium such as a universal serial bus (USB) memory or a CD-ROM. The information processing apparatus **10** can read and execute the information processing program from such a storage medium.

(21) In the embodiments above, the term "processor" refers to hardware in a broad sense. Examples of the processor include general processors (e.g., CPU: Central Processing Unit) and dedicated processors (e.g., GPU: Graphics Processing Unit, ASIC: Application Specific Integrated Circuit, FPGA: Field Programmable Gate Array, and programmable logic device). In the embodiments above, the term "processor" is broad enough to encompass one processor or plural processors in collaboration which are located physically apart from each other but may work cooperatively. The order of operations of the processor is not limited to one described in the embodiments above, and may be changed.

(22) As illustrated in FIG. **1**, the processor **18** exhibits functions as a display processing unit **20**, an operation determination unit **22**, a process execution unit **24**, an operation confirmation time setting unit **26**, and a notification processing unit **28**, in accordance with an information processing program stored in the memory **16**.

(23) The display processing unit **20** executes a process of displaying various screens on the display **12**. In particular, the display processing unit **20** displays a non-contact operation screen including an operation icon that is a target of the non-contact operation, on the display **12**.

(24) FIG. **2** is a diagram illustrating a non-contact operation screen **30** displayed on the display **12**.

The non-contact operation screen **30** includes a plurality of operation icons **32** associated with various processes. Specifically, the non-contact operation screen **30** includes operation icons **32***a* to **32***d* for selecting various settings (color mode, double-sided/single-sided selection, N-up, the number of copies) related to a copying function, and an operation icon **32***e* for starting a copying process.

(25) The operation determination unit **22** determines whether or not a non-contact operation has been performed on the operation icon **32** displayed on the display **12**. Specifically, the operation determination unit **22** detects an operation object that is brought close to the operation icon **32** while facing the operation icon **32**, based on the detection signal of the operation object sensor **14**. In a case where the operation determination unit **22** detects the operation object that is brought close to the operation icon **32** while facing the operation icon **32**, continuously for an operation confirmation time from a detection start time point at which the detection of the operation object is started, the operation determination unit **22** determines that the non-contact operation has been performed on the operation icon **32**, that is, that the non-contact operation has been confirmed.

(26) The initial value of the operation confirmation time may be defined in advance by the administrator of the information processing apparatus **10** or the like. As will be described later, the operation confirmation time can be changed by the operation confirmation time setting unit **26**.

(27) A process of the operation determination unit **22** will be specifically described with reference to FIG. **3**. FIG. **3** is a diagram illustrating an operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**. In FIG. **3** (the same applies to FIGS. **4**, **5**, and **7**), a direction parallel to the display **12** (transverse direction of the display **12**) is set as an x-axis, a direction that is parallel to the display **12** and is perpendicular to the x-axis (longitudinal direction of the display **12**) is set as a y-axis, and the perpendicular direction of the display **12** is set as a z-axis.

(28) The phrase that the operation object **40** is brought close to the operation icon **32** while facing the operation icon **32** means that at least a portion of the operation object **40** is located in a close facing region **34** of the operation icon **32**. The close facing region **34** of the operation icon **32** is a region facing the operation icon **32**, that is, a region through which the operation icon **32** passes in a case where the operation icon **32** is moved in parallel in a z-axis direction. Such a close facing region **34** is a region in which a distance from the operation icon **32** in the z-axis direction is within a predetermined distance. The predetermined distance, that is, the length of the close facing region **34** in the z-axis direction may be determined in accordance with the detectable range of the operation object sensor **14**. That is, such a predetermined distance may be a detectable distance of the operation object **40** by the operation object sensor **14**.

(29) First, in a case where a user brings the operation object **40** close to the display **12**, the operation object sensor **14** detects the operation object **40** and transmits a detection signal to the processor **18**. The operation determination unit **22** determines whether the operation object **40** is brought close to any operation icon **32** displayed on the display **12** while facing the operation icon **32**, based on the position of the operation object **40** indicated by the detection signal from the operation object sensor **14**. In a case where the operation object **40** is brought close to the operation icon while facing the operation icon, the operation icon **32** to which the operation object **40** is brought close while facing is specified. Further, the operation determination unit **22** starts measuring the time from a detection start time point at which the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32** is detected.

(30) After the detection of the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32** is started, the operation determination unit **22** confirms the position of the detected operation object **40** based on the detection signal from the operation object sensor **14** at unit time intervals. Here, the unit time interval is a minute time interval such as a millisecond order interval. In a case where the detected operation object **40** is continuously brought close to the specified operation icon **32** for an operation confirmation time from the detection start

time point while facing the operation icon **32**, in other words, in a case where the position of the operation object **40** is within the close facing region **34** of the specified operation icon **32**, the operation determination unit **22** determines that a non-contact operation has been performed on such an operation icon **32**.

(31) In a case where the detected operation object **40** is no longer brought close to the operation icon **32** while facing the operation icon **32**, before the operation confirmation time elapses from the detection start time point, in other words, in a case where the position of the operation object **40** is moved out from the close facing region **34** of the specified operation icon **32**, the operation determination unit **22** does not determine that the non-contact operation on the operation icon **32** has been performed, but determines that the non-contact operation has been cancelled. In this case, the time (which has been measured so far) during which the operation object **40** has been brought close to the operation icon **32** while facing the operation icon **32** is reset.

(32) The case where the detected operation object **40** is no longer brought close to the operation icon **32** while facing the operation icon **32** includes a case where the operation object **40** moves in the z-axis direction and moves away from the operation icon **32** to move out from the close facing region **34** and a case where the operation object **40** moves in an xy plane direction to move out from the close facing region **34**.

(33) In a case where the operation determination unit **22** starts detecting the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**, the display processing unit **20** may display, for example, the operation icon **32** to which the operation object **40** is brought close while facing, and the elapsed time to the operation confirmation time on the display **12**. Thus, it is possible for the user to grasp that it is possible to bring the operation object **40** close to the target operation icon **32** while facing the target operation icon **32** and to grasp how long the operation confirmation time is to be waited for.

(34) For example, with reference to FIG. **2**, in a case where the operation determination unit **22** starts detecting the operation object **40** that is brought close to the operation icon **32***e* while facing the operation icon **32***e*, the display processing unit **20** may display, for example, a progress bar **42** that gradually extends from one end (left end in the example of FIG. **2**) of the operation icon **32***e* to the other end (right end in the example of FIG. **2**). The extension speed of the progress bar **42** may be, for example, a speed at which the progress bar **42** reaches the other end of the operation icon **32***e* at during the elapse of the operation confirmation time. The operation icon **32** to which the operation object **40** is brought close while facing and a display form of the elapse of the time to the operation confirmation time are not limited to the above description.

(35) In a case where the operation determination unit **22** determines that the non-contact operation on the operation icon **32** has been performed, the process execution unit **24** executes the process associated with the operation icon **32**.

(36) As described above, the initial value of the operation confirmation time for the operation determination unit **22** to determine whether or not the non-contact operation has been performed on the operation icon **32** may be defined to a predetermined time in advance. The operation confirmation time setting unit **26** executes a process of changing the operation confirmation time. In particular, the operation confirmation time setting unit **26** changes the operation confirmation time in response to the movement of the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32**.

(37) Specifically, the operation confirmation time setting unit **26** changes the operation confirmation time in response to a change in distance between the operation icon **32** and the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32**, in the perpendicular direction (z-axis direction) of the display **12** within the operation confirmation time from the detection start time point at which the detection of the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32** is started.

(38) Specifically, in a case where the operation confirmation time setting unit **26** detects that the

operation object **40** approaches the operation icon **32**, within the operation confirmation time from the detection start time point, the operation confirmation time setting unit **26** shortens the operation confirmation time. A situation in which the operation object **40** approaches the operation icon **32** means that the user attempts to perform a non-contact operation on the operation icon **32** in many cases. Thus, in a case where the operation object **40** approaches the operation icon **32**, the operation confirmation time setting unit **26** shortens the operation confirmation time so that the user can confirm the non-contact operation at an early stage.

(39) For example, as illustrated in FIG. **3**, a state in which the distance between the operation icon **32** and the operation object **40** (the portion of the operation object **40** closest to the operation icon **32**, simply referred to as the operation object **40** below) in the z-axis direction is L**1** is considered as a reference. As illustrated in FIG. **4**, in a case where the operation object **40** approaches the operation icon **32** and then the distance between the operation object **40** and the operation icon **32** in the z-axis direction becomes L**2** (L**2**<L**1**) from this state, the operation confirmation time setting unit **26** shortens the operation confirmation time. Specifically, the operation confirmation time setting unit **26** compares the position (L**1**) of the operation object **40** in the z-axis direction, which has been detected at a first time point (here, time point at which the position of the operation object **40** is the position illustrated in FIG. **3**) with the position (L**2**) of the operation object **40** in the z-axis direction, which has been detected at a second time point (here, time point at which the position of the operation object **40** is the position illustrated in FIG. **4**) being a time point after a predetermined movement determination time has elapsed from the first time point. In a case where L**2**<L**1** is established, the operation confirmation time setting unit **26** shortens the operation confirmation time. As described above, in a case where the operation determination unit **22** confirms the position of the operation object **40** at unit time intervals, the movement determination time may be a unit time, but is not necessarily required to be the unit time. For example, the movement determination time may be a time for a plurality of unit times, and the second time point may be a time point after the elapse of a plurality of unit times from the first time point.

(40) Further, in a case where the operation object **40** continues to approach the operation icon **32**, the distance between the operation object **40** and the operation icon **32** in the z-axis direction may continuously become shorter than the distance at the previous acquisition time point every time the distance is acquired at the movement determination time intervals. In this case, the operation confirmation time setting unit **26** may gradually shorten the operation confirmation time over a plurality of times. Alternatively, the operation confirmation time setting unit **26** may calculate a difference (L**1**−L**2**) between the distance L**1** between the operation object **40** and the operation icon **32** at the first time point in the z-axis direction and the distance L**2** between the operation object **40** and the operation icon **32** at the second time point in the z-axis direction. Then, in a case where such a difference is more than a threshold distance defined in advance, the operation confirmation time setting unit **26** may shorten the operation confirmation time only once.

(41) Further, in a case where the movement determination time is a considerably short time, for example, in a case where the movement determination time is set as a unit time, it is conceivable that the operation confirmation time is shortened due to the blurring of the operation object **40**. In order to suppress an occurrence of a situation in which the operation confirmation time is shortened due to such blurring of the operation object **40**, the operation confirmation time setting unit **26** acquires the distance between the operation object **40** and the operation icon **32** in the z-axis direction at least three time points or more at the movement determination time intervals. Then, in a case where such a distance becomes continuously less than the distance at the previous acquisition time point at least two times or more, the operation confirmation time setting unit **26** may shorten the operation confirmation time.

(42) On the contrary, in a case where the operation confirmation time setting unit **26** detects that the operation object **40** becomes farther away from the operation icon **32** within the operation confirmation time from the detection start time point, the operation confirmation time setting unit

26 lengthens the operation confirmation time. A situation in which the operation object **40** becomes farther away from the operation icon **32** means that the user attempts to stop a non-contact operation on this operation icon **32** in many cases. Thus, in a case where the operation object **40** becomes farther away from the operation icon **32**, the operation confirmation time setting unit **26** lengthens the operation confirmation time so that it is possible to suppress an occurrence of a situation in which the non-contact operation on the operation icon **32** is confirmed.

(43) Based on the state (see FIG. **3**) where the distance between the operation object **40** and the operation icon **32** in the z-axis direction is L**1**, in a case where, from this state, the operation object **40** becomes farther away from the operation icon **32**, and thus the distance between the operation object **40** and the operation icon **32** in the z-axis direction becomes L**2** (L**1**<L**2**) as illustrated in FIG. **5**, the operation confirmation time setting unit **26** lengthens the operation confirmation time. Specifically, the operation confirmation time setting unit **26** compares the position (L**1**) of the operation object **40** in the z-axis direction, which has been detected at a first time point (here, time point at which the position of the operation object **40** is the position illustrated in FIG. **3**) with the position (L**2**) of the operation object **40** in the z-axis direction, which has been detected at a second time point (here, time point at which the position of the operation object **40** is the position illustrated in FIG. **5**) being a time point after a predetermined movement determination time has elapsed from the first time point. In a case where L**1**<L**2** is established, the operation confirmation time setting unit **26** lengthens the operation confirmation time.

(44) Further, in a case where the operation object **40** continuously becomes farther away from the operation icon **32**, the distance between the operation object **40** and the operation icon **32** in the z-axis direction may continuously become longer than the distance at the previous acquisition time point every time the distance is acquired at the movement determination time intervals. In this case, the operation confirmation time setting unit **26** may gradually lengthen the operation confirmation time over a plurality of times. Alternatively, the operation confirmation time setting unit **26** may calculate a difference (L**2**−L**1**) between the distance L**2** between the operation object **40** and the operation icon **32** at the second time point in the z-axis direction and the distance L**1** between the operation object **40** and the operation icon **32** at the first time point in the z-axis direction. Then, in a case where such a difference is more than a threshold distance defined in advance, the operation confirmation time setting unit **26** may lengthen the operation confirmation time only once.

(45) Further, in order to suppress the occurrence of a situation in which the operation confirmation time is lengthened due to the blurring of the operation object **40**, the operation confirmation time setting unit **26** acquires the distance between the operation object **40** and the operation icon **32** in the z-axis direction at least three time points or more at the movement determination time intervals. Then, in a case where such a distance becomes continuously longer than the distance at the previous acquisition time point at least two times or more, the operation confirmation time setting unit **26** may lengthen the operation confirmation time.

(46) The non-contact operation screen displayed on the display **12** by the display processing unit **20** may include an operation icon associated with a screen transition process for transitioning the screen. For example, a non-contact operation screen **50** as the first screen illustrated in FIG. **6** includes an operation icon **32** associated with the screen transition process. For example, the non-contact operation screen **50** includes an operation icon **32**f as a first operation icon. In a case where a non-contact operation on the operation icon **32**f is confirmed, the display processing unit **20** executes the screen transition process of displaying a non-contact operation screen **30** as the second screen illustrated in FIG. **2** on the display **12** instead of the non-contact operation screen **50**.

(47) Here, as can be understood by comparing the non-contact operation screen **30** and the non-contact operation screen **50**, the display positions of the operation icons **32**a and **32**b as the second operation icon included in the non-contact operation screen **30** overlap the display position of the operation icon **32**f on the non-contact operation screen **50** (displayed at the identical position). In order to perform the non-contact operation on the operation icon **32**f on the non-contact operation

screen **50**, the user brings the operation object **40** close to the operation icon **32f** while facing the operation icon **32f**, and holds the operation confirmation time. Then, the non-contact operation on the operation icon **32f** is confirmed, and the display processing unit **20** displays the non-contact operation screen **30** on the display **12**. At this time, since the operation object **40** is in a state of being brought close to a region in which the operation icon **32f** has been originally displayed, while facing this region, the operation object **40** is in a state of being already brought close to the operation icon **32a** or **32b** while facing the operation icon **32a** or **32b**, at a display start time point of the non-contact operation screen **30**.

(48) In such a case, the user may perform an operation of temporarily separating the operation object **40** from the display **12**, for example, in order to check the entirety of the newly displayed non-contact operation screen **30**. In a case where such an operation is performed, the operation determination unit **22** detects that the operation object **40** becomes farther away from the operation icon **32a** or **32b**. Thus, the operation confirmation time setting unit **26** lengthens the operation confirmation time. In this case, since the user not necessarily attempts to stop the non-contact operation on the operation icon **32a** or **32b**, it may not be appropriate to lengthen the operation confirmation time.

(49) In view of this, the operation confirmation time setting unit **26** performs a non-contact operation on the operation icon **32f** included in the first screen (non-contact operation screen **50** in the above example) displayed on the display **12** before the screen transition process. In a case where the second screen (non-contact operation screen **30** in the above example) is newly displayed as a result, the operation confirmation time setting unit **26** may, for example, not change (not lengthen) the operation confirmation time even in a case where the operation object **40** is already brought close to the operation icon (operation icon **32a** or **32b** in the above example) included in the second screen while facing the operation icon, at the display start time point of the second screen, and the operation determination unit **22** detects that the operation object **40** becomes farther away from the operation icon.

(50) As illustrated in FIG. **7**, a case where the user temporarily moves away the operation object **40**, which is brought close to an operation icon **32** while facing the operation icon **32**, within the operation confirmation time and then the operation object **40** is brought close to the operation icon **32** again while facing the operation icon **32** is considered. In this case, the user wonders whether to perform the non-contact operation on the operation icon **32**, but it is highly possible that the non-contact operation is repeated. In this case, the operation determination unit **22** detects the operation object **40** (the operation object **40** having a portion that has entered into the close facing region **34** of the operation icon **32**) that has been brought close to the operation icon **32** while facing the operation icon **32**. Then, it is not possible to detect the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32** (the entirety of the operation object **40** is moved away from the close facing region **34**) within the operation confirmation time. Then, the operation determination unit **22** detects again the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32**.

(51) As described above, after the operation determination unit **22** detects the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32**, it is not possible to detect the close facing of the operation object **40** to the operation icon **32** within the operation confirmation time. Then, in a case where the operation determination unit **22** detects that the operation object **40** has been brought close to the operation icon **32** while facing the operation icon **32** again, the operation confirmation time setting unit **26** may shorten the operation confirmation time, for example, so that it is possible to confirm the non-contact operation to be performed at an early stage. For example, it is desirable that the operation confirmation time setting unit **26** may shorten the operation confirmation time in a case where it is not possible to detect the close facing of the operation object **40**, and then the operation determination unit **22** detects that the operation object **40** has been brought close to the operation icon **32** again while facing the

operation icon **32**, within a predetermined time. The predetermined time here may be set in advance by the administrator of the information processing apparatus **10** or the like.

(52) A case where the user repeats to move away the operation object **40** that has been brought close to an operation icon **32** while facing the operation icon **32**, within the operation confirmation time. In this case, the user may feel that the operation confirmation time is shorter than the actual operation confirmation time, and the operation object **40** may stop close facing to the operation icon **32** without waiting until the actual operation confirmation time in many cases. The user can grasp the elapse of the time until the operation confirmation time by checking the progress bar **42** (see FIG. **2**) described above, but the user may not look at the progress bar **42**, and the progress bar **42** may not be displayed.

(53) In particular, as illustrated in FIG. **8**, in a case where the user repeats to move away the operation object **40** that has been brought close to a plurality of operation icons **32** while facing the operation icons **32**, within the operation confirmation time, more clearly, a tendency that the user feels that the operation confirmation time is shorter than the actual operation confirmation time is strong. In the example of FIG. **8**, the operation determination unit **22** detects the operation object **40** which has been brought close to the operation icon **32***b* while facing the operation icon **32***b*, and then it does not become possible for the operation determination unit **22** to detect the operation object **40**, that is brought close to the operation icon **32***b* while facing the operation icon **32***b*, within the operation confirmation time. On the other hand, the operation determination unit **22** detects the operation object **40** which has been brought close to the operation icon **32***c* while facing the operation icon **32***c*, and then it does not become possible for the operation determination unit **22** to detect the operation object **40**, that is brought close to the operation icon **32***c* while facing the operation icon **32***c*, within the operation confirmation time.

(54) Thus, in a case where an occurrence of a situation in which the operation determination unit **22** detects the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**, and then it is not possible for the operation determination unit **22** to detect the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**, within the operation confirmation time, repeats a predetermined of number of times, the operation confirmation time setting unit **26** may shorten the operation confirmation time for the user. In particular, in a case where the occurrence of a situation in which, for a plurality of operation icons **32**, the operation determination unit **22** detects the operation object **40** which is brought close to the operation icon **32** while facing the operation icon **32**, and then it is not possible for the operation determination unit **22** to detect the operation object **40**, which is brought close to the operation icon **32** while facing the operation icon **32**, within the operation confirmation time repeats, the operation confirmation time setting unit **26** may shorten the operation confirmation time for the user, for example. The predetermined number of times here may be set in advance by the administrator of the information processing apparatus **10** or the like.

(55) As will be described in detail later, the operation confirmation time setting unit **26** associates the user ID for uniquely identifying the user with the operation confirmation time set in response to the non-contact operation (movement of the operation object **40**) by the user, and stores this association in the memory **16**. In this manner, it is possible to set the operation confirmation time for each user. The operation confirmation time for the user, which is set in this case, may be applied to all the operation icons **32**, for example.

(56) A case where, after the user performs a non-contact operation on the operation icon and the display processing unit **20** or the process execution unit **24** executes the processing associated with the operation icon, the information processing apparatus **10** gives an instruction for the user to cancel the process is considered. For example, the user performs a non-contact operation on the operation icon **32***f* that is included in the non-contact operation screen **50** illustrated in FIG. **6**, and is associated with the screen transition process, and the display processing unit **20** displays the non-contact operation screen **30** illustrated in FIG. **2**. Then, the user inputs an instruction to display

again the non-contact operation screen **50**. Alternatively, the user performs a non-contact operation on any of the operation icons **32***a* to **32***d* on the non-contact operation screen **30** illustrated in FIG. **2**, and the process execution unit **24** changes the setting related to the copy function. Then, the user inputs an instruction to return to the original setting. In this case, the user attempts to stop the non-contact operation on the operation icon **32**, but there is a probability that the non-contact operation is confirmed before the operation object **40** is moved out of the close facing region of the operation icon **32**. The operation of canceling the process by the user is not limited to the non-contact operation.

(57) Therefore, in a case where the user performs a non-contact operation on the operation icon **32**, the display processing unit **20** or the process execution unit **24** executes the processing associated with the operation icon **32**, and then reception of an instruction to cancel this process repeats a predetermined number of cancellations, the operation confirmation time setting unit **26** may lengthen the operation confirmation time, for example. As a result, an erroneous non-contact operation on the operation icon **32** by the user is suppressed. In particular, in this case, the user may feel that the operation confirmation time is longer than the actual operation confirmation time. Thus, the operation confirmation time setting unit **26** may lengthen the operation confirmation time for the user. The predetermined number of cancellations here may also be set in advance by the administrator of the information processing apparatus **10** or the like.

(58) The operation confirmation time setting unit **26** may be capable of setting the operation confirmation time for each user who performs a non-contact operation on the operation icon **32**, for example. Specifically, the operation confirmation time setting unit **26** associates the user ID for uniquely identifying the user with the operation confirmation time that is set (changed) in response to the non-contact operation (movement of the operation object **40**) by the user. Such association is registered in a user DB constructed in the memory **16**. The user ID may be obtained by the processor **18** authenticating the user prior to the non-contact operation on the display **12**. By referring to the user DB, the operation determination unit **22** is capable of determining whether or not a non-contact operation has been performed on the operation icon **32**, based on the operation confirmation time set in accordance with the previous non-contact operation in a case where the next user performs the non-contact operation in the information processing apparatus **10**. The user may be able to reset (return to the initial value) the operation confirmation time set at a desired timing. The operation confirmation time setting unit **26** may set the operation confirmation time to be common to all users, not to each user.

(59) In a case where there are a plurality of operation icons **32**, the operation confirmation time setting unit **26** can set the operation confirmation time for each operation icon **32**. For example, with reference to FIG. **2**, the operation confirmation time setting unit **26** can separately set the operation confirmation time for each of the operation icons **32***a*, **32***b*, **32***c*, **32***d*, and **32***e* for one user. The operation confirmation time setting unit **26** sets the operation confirmation time for the operation icon **32***a* according to the movement of the operation object **40** facing and close to the operation icon **32***a*. The operation confirmation time for each operation icon **32** may be different from each other.

(60) In this case, the operation confirmation time setting unit **26** registers each operation confirmation time for each operation icon **32** for the user ID in the above user DB. In a case where the operation determination unit **22** detects the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**, the operation determination unit **22** specifies the operation confirmation time set for the user and the operation icon **32** from the user DB, based on the user ID obtained by user authentication and the operation icon **32** facing the operation object **40**. Then, the operation determination unit **22** determines whether or not a non-contact operation has been performed on the operation icon **32** based on the specified operation confirmation time. The operation confirmation time setting unit **26** may set a common operation confirmation time for the plurality of operation icons **32**.

(61) In a case where the operation confirmation time is set for each operation icon **32**, for example, the operation confirmation time for the operation icon **32** associated with a specific process may not be shorter than the predetermined time. The operation icon **32** associated with a specific process is an operation icon **32** for which it is intended to prevent an erroneous operation by the user. For example, as such an operation icon **32**, there is an operation icon **32** (for example, the operation icon **32***e* in FIG. **2**) associated with an instruction to start a process of, for example, copying, printing, and scanning, an operation icon **32** associated with a reset instruction to reset settings and the like, an operation icon **32** associated with a logout instruction, or the like. By setting the predetermined time as the initial value of the operation confirmation time, it is possible to prevent the operation confirmation time of the operation icon **32** associated with the specific process from being shortened at all.

(62) The operation confirmation time setting unit **26** may temporarily apply the set operation confirmation time. For example, in a case where the operation confirmation time setting unit **26** changes the operation confirmation time for a certain operation icon **32** by a non-contact operation related to a job input to the information processing apparatus **10** by the user, the operation confirmation time setting unit **26** may save the changed operation confirmation time in the memory **16** until the execution of the job is completed. In a case where the execution of the job has been completed, the operation confirmation time setting unit **26** may delete the saved operation confirmation time from the memory **16**. As a result, the operation determination unit **22** determines whether or not a non-contact operation has been performed on the operation icon **32** based on the changed operation confirmation time while the job is being executed. After the job has been completed, the operation determination unit **22** determines whether or not the non-contact operation has been performed on the operation icon **32** based on the operation confirmation time having an initial value. Further, the operation confirmation time setting unit **26** may save the operation confirmation time in the memory **16** until the power of the information processing apparatus **10** is turned off.

(63) In a case where the operation confirmation time is changed by the operation confirmation time setting unit **26**, the notification processing unit **28** notifies the user who performs the non-contact operation on the operation icon **32** that the operation confirmation time has been changed. By the notification processing unit **28** performing the notification, it is possible for the user to easily grasp that the operation confirmation time has been changed.

(64) For example, as illustrated in FIG. **9**, the notification processing unit **28** displays a message **60** indicating that the operation confirmation time has been changed on the non-contact operation screen **30**. Further, the notification processing unit **28** may display the operation icon **32** to which the operation object **40** is brought close while facing, in a form different from a case where the operation confirmation time is not changed, instead of or in addition to the message **60**. For example, in the example of FIG. **9**, the notification processing unit **28** displays the color of the operation icon **32***e* to which the operation object **40** is brought close while facing, with a color different from a color in a case where the operation confirmation time is not changed. The form of notification of the notification processing unit **28** is not limited to the above description. The notification may be given by outputting voice instead of or in addition to the display on the display **12**.

(65) In a case where the notification processing unit **28** outputs notifications one by one in a case where the operation confirmation time is changed even a little, this may be troublesome for the user. Therefore, the notification processing unit **28** may notify the user, for example, that the operation confirmation time has been changed, in a case where the operation confirmation time setting unit **26** shortens the operation confirmation time and the changed operation confirmation time is shorter than a first threshold time. Further, the notification processing unit **28** may notify the user, for example, that the operation confirmation time has been changed, in a case where the operation confirmation time setting unit **26** lengthens the operation confirmation time and the

changed operation confirmation time is longer than a second threshold time. The first threshold time and the second threshold time here may be set in advance by the administrator of the information processing apparatus **10** or the like.

(66) The configuration of the information processing apparatus **10** according to the present exemplary embodiment is as described above. The flow of processing of the information processing apparatus **10** according to the present exemplary embodiment will be described below with reference to the flowchart illustrated in FIGS. **10** and **11**.

(67) FIG. **10** is a flowchart illustrating the flow of processing of changing the operation confirmation time in accordance with the change in the distance between the operation icon **32** and the operation object **40**, which has been brought close to the operation icon **32** while facing the operation **32**, in the perpendicular direction (z-axis direction) of the display **12**.

(68) In Step S**10**, the operation determination unit **22** determines whether or not the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32** displayed on the display **12** is detected based on the detection signal from the operation object sensor **14**. The operation determination unit **22** waits until the operation determination unit detects the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**. In a case where the operation determination unit **22** detects the operation object **40**, measurement of a time from the detection start time point is started, and the process proceeds to Step S**12**.

(69) In Step S**12**, the operation determination unit **22** waits for the above-described movement determination time.

(70) In Step S**14**, the operation determination unit **22** determines whether or not the operation object **40** detected in Step S**10** is still brought close to the operation icon **32** while facing the operation icon **32**. In a case where it is not possible to detect that the operation object **40** is brought close to the operation icon **32** while facing the operation icon **32**, the process returns to Step S**10**. In a case where the operation object **40** is still brought close to the operation icon **32** while facing the operation icon **32**, the process proceeds to Step S**16**.

(71) In Step S**16**, the operation confirmation time setting unit **26** compares the distance L**1** between the operation object **40** detected in Step S**10** and the display **12** (that is, operation icon **32**) in the z-axis direction with the distance L**2** between the operation object **40** detected in Step S**14** and the display **12** in the z-axis direction. In a case where L**2**<L**1** is established, that is, in a case where the operation object **40** approaches the display **12**, the process proceeds to Step S**18**.

(72) In Step S**18**, the operation determination unit **22** waits for the movement determination time again.

(73) In Step S**20**, the operation determination unit **22** again determines whether or not the operation object **40** detected in Steps S**10** and S**14** is still brought close to the operation icon **32** while facing the operation icon **32**. In a case where it is not possible to detect that the operation object **40** is brought close to the operation icon **32** while facing operation icon **32**, the process returns to Step S**10**. In a case where the operation object **40** is still brought close to the operation icon **32** while facing the operation icon **32**, the process proceeds to Step S**22**.

(74) In Step S**22**, the operation confirmation time setting unit **26** compares the distance L**2** between the operation object **40** detected in Step S**14** and the display **12** in the z-axis direction with the distance (here, set as L**3**) between the operation object **40** detected in Step S**20** and the display **12** in the z-axis direction. In a case where L**3**<L**2** is established, that is, in a case where the operation object **40** approaches the display **12**, the process proceeds to Step S**24**. In a case where L**2**<L**3** is established, that is, in a case where the operation object **40** becomes farther away from the display, Step S**24** is bypassed, and the process proceeds to Step S**34**.

(75) In Step S**24**, the operation confirmation time setting unit **26** shortens the operation confirmation time. As described above, in this flowchart, the operation confirmation time setting unit **26** shortens the operation confirmation time in a case where the position of the operation object **40** is acquired three times at the movement determination time intervals, and the operation object

40 approaches the display **12** continuously twice.

(76) In Step S**16**, in a case where L**1**<L**2** is established, that is, in a case where the operation object **40** becomes farther away from the display **12**, the process proceeds to Step S**26**.

(77) In Step S**26**, the operation determination unit **22** waits for the movement determination time again.

(78) In Step S**28**, the operation determination unit **22** again determines whether or not the operation object **40** detected in steps S**10** and S**14** is still brought close to the operation icon **32** while facing the operation icon **32**. In a case where it is not possible to detect that the operation object **40** is brought close to the operation icon **32** while facing the operation icon **32**, the process returns to Step S**10**. In a case where the operation object **40** is still brought close to the operation icon **32** while facing the operation icon **32**, the process proceeds to Step S**30**.

(79) In Step S**30**, the operation confirmation time setting unit **26** compares the distance L**2** between the operation object **40** detected in Step S**14** and the display **12** in the z-axis direction with the distance (here, also set as L**3**) between the operation object **40** detected in Step S**28** and the display **12** in the z-axis direction. In a case where L**2**<L**3** is established, that is, in a case where the operation object **40** becomes farther away from the display **12**, the process proceeds to Step S**32**. In a case where L**3**<L**2** is established, that is, in a case where the operation object **40** has approached the display, Step S**32** is bypassed, and the process proceeds to Step S**34**.

(80) In Step S**32**, the operation confirmation time setting unit **26** lengthens the operation confirmation time. As described above, in this flowchart, the operation confirmation time setting unit **26** lengthens the operation confirmation time in a case where the position of the operation object **40** is acquired three times at the movement determination time intervals, and the operation object **40** becomes farther away from the display **12** continuously twice.

(81) In Step S**16**, in a case where L**1**=L**2** is established, that is, in a case where there is no change in the position of the operation object **40** in the z-axis direction, the process proceeds to Step S**34**.

(82) In Step S**34**, the operation determination unit **22** determines whether or not the operation confirmation time has elapsed from the detection start time point at which the operation object **40** that is brought close to the operation icon while facing the operation icon is first detected in Step S**10**. In a case where the operation confirmation time has not elapsed, the process returns to Step S**10**. In a case where the operation confirmation time has elapsed, the process proceeds to Step S**36**.

(83) In Step S**36**, the process execution unit **24** executes the process associated with the operation icon **32**.

(84) FIG. **11** is a flowchart illustrating the flow of processing of shortening the operation confirmation time in a case where the operation determination unit **22** detects the operation object **40** which has been brought close to the operation icon **32** while facing the operation icon **32**, and then a situation in which it is not possible to detect the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32**, within the operation confirmation time repeats to occur a predetermined of number of times.

(85) In Step S**40**, the operation determination unit **22** determines whether or not the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32** displayed on the display **12** is detected based on the detection signal from the operation object sensor **14**. The operation determination unit **22** waits until the operation determination unit detects the operation object **40** that is brought close to the operation icon **32** while facing the operation icon **32**. In a case where the operation determination unit **22** detects the operation object **40**, measurement of a time from the detection start time point is started, and the process proceeds to Step S**42**.

(86) In Step S**42**, the operation determination unit **22** determines whether or not the operation confirmation time has elapsed from the detection start time point. In a case where the operation confirmation time has elapsed, the process proceeds to Step S**44**, and in Step S**44**, the process execution unit **24** executes the process associated with the operation icon **32** and ends the process. In a case where the operation confirmation time has not elapsed, the process proceeds to Step S**46**.

(87) In Step S**46**, the operation determination unit **22** determines whether or not the operation object **40** detected in Step S**40** is still brought close to the operation icon **32** while facing the operation icon **32**. In a case where the operation object **40** is still brought close to the operation icon **32** while facing the operation icon **32**, the process returns to Step S**42**. In a case where it is not possible to detect that the operation object **40** is brought close to the operation icon **32** while facing the operation icon **32**, the process proceeds to Step S**48**.

(88) In Step S**48**, the operation confirmation time setting unit **26** increments the count. The count is reset at the start of the flowchart. The count has a value indicating the number of occurrences of a situation in which it is not possible to detect the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32**, within the operation confirmation time after the operation object **40** that has been close to the operation icon **32** while facing the operation icon **32** is detected.

(89) In Step S**50**, the operation confirmation time setting unit **26** determines whether or not the count has reached a predetermined value. That is, the operation confirmation time setting unit **26** determines whether or not the number of occurrences of a situation in which it is not possible to detect the operation object **40** that has been brought close to the operation icon **32** while facing the operation icon **32** within the operation confirmation time after the operation object **40** that has been close to the operation icon **32** while facing the operation icon **32** is detected has reached a predetermined number of times. In a case where the count has not reached the predetermined value, the process returns to Step S**40**. In a case where the count reaches a predetermined value, the process proceeds to Step S**52**.

(90) In Step S**52**, the operation confirmation time setting unit **26** shortens the operation confirmation time.

(91) Hitherto, the exemplary embodiment of the present invention has been described, but the exemplary embodiment of the present invention is not limited to the above exemplary embodiment, and various modifications may be made without departing from the spirit of the present invention.

(92) The foregoing description of the exemplary embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

Claims

1. An information processing apparatus comprising: a processor configured to: display a screen including an operation icon on a display unit; detect an operation object that is brought close to the operation icon while facing the operation icon and is provided for performing a non-contact operation on the operation icon; in a case where the operation object that is brought close to the operation icon while facing the operation icon is continuously detected for an operation confirmation time from a detection start time point at which detection of the operation object that is brought close to the operation icon while facing the operation icon is started, execute a process associated with the operation icon; and change the operation confirmation time in response to a movement of the operation object that is brought close to the operation icon while facing the operation icon.

2. The information processing apparatus according to claim 1, wherein the processor is configured to: change the operation confirmation time in response to a change in a distance between the operation icon and the operation object that is brought close to the operation icon while facing the

operation icon, in a perpendicular direction of the screen, within the operation confirmation time from the detection start time point.

3. The information processing apparatus according to claim 2, wherein the processor is configured to: in a case where it is detected that the operation object approaches the operation icon, within the operation confirmation time from the detection start time point, shorten the operation confirmation time.

4. The information processing apparatus according to claim 2, wherein the processor is configured to: in a case where it is detected that the operation object becomes farther away from the operation icon, within the operation confirmation time from the detection start time point, lengthen the operation confirmation time.

5. The information processing apparatus according to claim 3, wherein the processor is configured to: in a case where it is detected that the operation object becomes farther away from the operation icon, within the operation confirmation time from the detection start time point, lengthen the operation confirmation time.

6. The information processing apparatus according to claim 4, wherein the processor is configured to: in a case where the operation object that is brought close to a first operation icon included in a first screen while facing the first operation icon is continuously detected for the operation confirmation time from the detection start time point, execute a screen transition process of displaying a second screen including a second operation icon located at an identical position to the first operation icon instead of the first screen, and in a case where the operation object has already been brought close to the second operation icon while facing the second operation icon, at a display start time point of the second screen, not change the operation confirmation time even in a case where it is detected that the operation object becomes farther away from the second operation icon.

7. The information processing apparatus according to claim 5, wherein the processor is configured to: in a case where the operation object that is brought close to a first operation icon included in a first screen while facing the first operation icon is continuously detected for the operation confirmation time from the detection start time point, execute a screen transition process of displaying a second screen including a second operation icon located at an identical position to the first operation icon instead of the first screen, and in a case where the operation object has already been brought close to the second operation icon while facing the second operation icon, at a display start time point of the second screen, not change the operation confirmation time even in a case where it is detected that the operation object becomes farther away from the second operation icon.

8. The information processing apparatus according to claim 1, wherein the processor is configured to: in a case where it is not possible to detect the close facing of the operation object to the operation icon within the operation confirmation time after the operation object that has been brought close to the operation icon while facing the operation icon is detected, and then it is detected again that the operation object is brought close to the operation icon while facing the operation icon, shorten the operation confirmation time.

9. The information processing apparatus according to claim 1, wherein the processor is configured to: set the operation confirmation time for each user who performs a non-contact operation on the operation icon, and in a case where a situation in which it is not possible to detect the operation object that is brought close to the operation icon while facing the operation icon, within the operation confirmation time from the detection start time point, repeats to occur a predetermined number of times, shorten the operation confirmation time for the user who has operated the operation object.

10. The information processing apparatus according to claim 1, wherein the processor is configured to: set the operation confirmation time for each operation icon, and not shorten the operation confirmation time for the operation icon associated with a specific process in comparison to a predetermined time.

11. The information processing apparatus according to claim 2, wherein the processor is configured

to: set the operation confirmation time for each operation icon, and not shorten the operation confirmation time for the operation icon associated with a specific process in comparison to a predetermined time.

12. The information processing apparatus according to claim 3, wherein the processor is configured to: set the operation confirmation time for each operation icon, and not shorten the operation confirmation time for the operation icon associated with a specific process in comparison to a predetermined time.

13. The information processing apparatus according to claim 8, wherein the processor is configured to: set the operation confirmation time for each operation icon, and not shorten the operation confirmation time for the operation icon associated with a specific process in comparison to a predetermined time.

14. The information processing apparatus according to claim 9, wherein the processor is configured to: set the operation confirmation time for each operation icon, and not shorten the operation confirmation time for the operation icon associated with a specific process in comparison to a predetermined time.

15. A non-transitory computer readable medium storing an information processing program causing a computer to execute a process comprising: displaying a screen including an operation icon on a display unit; detecting an operation object that is brought close to the operation icon while facing the operation icon and is provided for performing a non-contact operation on the operation icon; executing, in a case where the operation object that is brought close to the operation icon while facing the operation icon is continuously detected for an operation confirmation time from a detection start time point at which detection of the operation object that is brought close to the operation icon while facing the operation icon is started, a process associated with the operation icon; and changing the operation confirmation time in response to a movement of the operation object that is brought close to the operation icon while facing the operation icon.

16. An information processing apparatus comprising: means for displaying a screen including an operation icon on a display; means for detecting an operation object that is brought close to the operation icon while facing the operation icon and is provided for performing a non-contact operation on the operation icon; means for executing, in a case where the operation object that is brought close to the operation icon while facing the operation icon is continuously detected for an operation confirmation time from a detection start time point at which detection of the operation object that is brought close to the operation icon while facing the operation icon is started, a process associated with the operation icon; and means for changing the operation confirmation time in response to a movement of the operation object that is brought close to the operation icon while facing the operation icon.