Appeal decision

Appeal No. 2018-16652

Appellant	Microchip Technology Germany GmbH
Patent Attorney	YAMAMOTO, Shusaku
Patent Attorney	MORISHITA, Natsuki
Patent Attorney	IIDA, Takatoshi
Patent Attorney	ISHIKAWA, Daisuke
Attorney	YAMAMOTO, Kensaku

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2015-526994, entitled "Automatic Gesture Recognition For a Sensor System" (publication on February 27, 2014, International Publication No. WO 2014/029691, National Publication of the Translated Version published on August 27, 2015, National Publication of International Patent Application No. 2015-52497) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The present application was filed on August 15, 2013 (priority claim under the Paris Convention received by the foreign receiving office on August 16, 2012, (United States), August 14, 2013 (United States)), as an International Patent Application. The history of the procedures is as follows.

August 10, 2016 : Submission of Written amendment

Dated May 23, 2017 : Notice of reasons for refusal

August 15, 2017 : Submission of Written opinion and Written amendment

Dated December 14, 2017 : Notice of reasons for refusal (the final reasons for refusal)

March 6, 2018 : Submission of Written opinion and Written amendment

Dated August 15, 2018 : Decision to Dismiss Amendment regarding the Written amendment submitted on March 6, 2018

Examiner's decision of refusal

December 13, 2018 : Submission of Written appeal and Written amendment

Dated April 28, 2020 : Decision to Dismiss Amendment regarding the Written amendment submitted on December 13, 2018

Notice of reasons for refusal (reasons for refusal by the body)

July 7, 2020 : Submission of Written opinion and Written amendment

No. 2 Decision to Dismiss Amendment regarding the written amendment submitted on July 7, 2020

[Conclusion of Decision to Dismiss Amendment]

The written amendment submitted on July 7, 2020 (hereinafter referred to as "the Amendment") shall be dismissed.

[Reason] (Judgment on propriety of amendment)

1 Regarding the Amendment (Details of Amendment)

(1) Claims after the Amendment

The recitation of Claim 1 of the scope of claims was amended by the Amendment as follows (amended portions are underlined).

"A method for touchless gesture recognition comprising:

detecting one or more gesture-related signals using an associated plurality of detection sensors; and

evaluating a touchless gesture detected from the one or more gesture-related signals using an automatic recognition technique to determine if the touchless gesture corresponds to one of a predetermined set of gestures, wherein

in determining a start of the gesture, a start is determined if the distance between a target object and at least one sensor decreases and the distance between the target

object and at least one different sensor increases, and a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold, and

the detected one or more gesture-related signals are low-pass filtered so as to have a maximum frequency of 15 to 20 Hz."

(2) Claims before the Amendment

The recitation of Claim 1 before the amendment of the scope of claims amended by the written amendment submitted on August 15, 2017 is as follows.

"A method for touchless gesture recognition comprising:

detecting one or more gesture-related signals using an associated plurality of detection sensors; and

evaluating a touchless gesture detected from the one or more gesture-related signals using an automatic recognition technique to determine if the touchless gesture corresponds to one of a predetermined set of gestures, wherein

in determining a start of the gesture, a start is determined if the distance between a target object and at least one sensor decreases and the distance between the target object and at least one different sensor increases, and a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold."

2. Propriety of amendment

The Amendment is to add a limitation regarding the "one or more gesture-related signals" which is a matter required for specifying the invention recited in Claim 1 before the Amendment, as above, and the invention recited in Claim 1 before the amendment and the invention recited in Claim 1 after the amendment belong to the same field of industrial application and aim to solve the same problems. Thus, the Amendment falls under restriction of the scope of claims stipulated in Article 17-2(5)(ii) of the Patent Act.

Then, we examine below as to whether the invention recited in Claim 1 after the Amendment (hereinafter referred to as "the Amended invention") falls under the provisions of Article 126(7) of the Patent Act which is applied mutatis mutandis in the provisions of Article 17-2(6) of the Patent Act (whether the invention could have been patented independently at the time of filing of the patent application).

(1) The Amended invention

The Amended invention is as described in 1 (1).

(2) Cited document and Cited invention

A Regarding Cited Document 1

(A) Described matters in Cited Document 1

International Publication No. 2011/098496 (published on August 18, 2011, hereinafter referred to as "Cited Document 1"), which is a document cited in the reasons for refusal by the body and distributed before the priority date of the present application, includes the following description with drawings.

In principle, National Publication of International Patent Application No. 2013-519933, which is a Japanese translation of Cited Document 1, is used as the translation by the body.

a "The invention relates to a system and a method for the contactless detection and recognition of gestures in a three-dimensional movement space, which are carried out by movements of at least one object in the three-dimensional movement space." (page 1, lines 8 to 10)

b "The object of the invention is therefore to provide a method and a system for contactless detection and recognition of gestures, which on the one hand allow detection and recognition of spatial gestures and on the other hand are also suitable for the use in mobile devices or systems." (page 2, lines 11 to 16)

c "In a first step 100, by means of an electrode system an electrical near-field is generated, which is formed preferably as a quasistatic alternating electrical field which defines a movement space relative to a reference surface, for example a screen or a tablet PC." (page 11, lines 24 to 27)

d "For the generation of the quasistatic alternating electrical field, which in the following will be called an electrical near-field, several electrodes distanced among each other may be provided, at which an alternating electrical field is emitted each time. An electrical alternating signal supplied to the respective electrodes, which is provided by one or several generators, is set in such a way that the electrical alternating fields emitted at the electrodes jointly may span the movement space around the electrodes relative to the reference surface.

In the movement space, in a next step 200, deformations of the lines of force of the electrical alternating field are recognized, which are produced, for example, by movements of at least one object in the movement space. For example, a deformation of the lines of force may be caused by movements of a finger or several fingers in the movement space. The deformations of the lines of force may be recognized at the electrodes, at which the electrical alternating fields are emitted, by determining a change of the load at the respective generators coupled with the electrodes. Deformations of the lines of force of the electrical alternating fields are called in the following deformations of the electrical near-field. Further embodiments for the generation of the electrical alternating fields and for recognizing deformations of the lines of force of the electrical near-field are indicated with reference to Fig. 2.
From the recognized deformations in a next step 300 a movement path is generated, which corresponds to the movement, for example, of a finger, in the movement space. Thus, according to the invention also several movement paths may be generated, if, for example, several fingers are moved in the movement space." (page 12, line 27 to page 13, line 21)

e "In the generation of the movement path, each point of the movement path is assigned a number of movement characteristics, so that from the movement accomplished in the movement space, one or more gestures may be reliably extracted. Such movement characteristic may be, for example, the position of the object, such as the fingertip of a forefinger relative to the reference surface, the orientation of the hand or the forefinger relative to the movement space, the speed of the fingertip, the acceleration of the fingertip, or a combination thereof. As is described in more detail in regard to Figs. 4 to 6, these movement characteristics may also be used for the determination of the beginning of a gesture and the end of a gesture of one or several gestures." (page 14, line 23 to page 15, line 2)

f "In step 400 one or more gestures are extracted from the generated movement path. According to the invention, discrete gestures and/or continuous gestures may be extracted.
A discrete gesture is characterized by a gesture start, a gesture end, and a movement between a gesture start and a gesture end. A continuous gesture is characterized by a gesture start and a movement following the gesture start, whereas a continuous gesture must not necessarily have a gesture end.
When extracting a gesture from the movement path, at first a gesture start is determined

in the movement path, both for a discrete gesture and for a continuous gesture. The gesture start is determined during the generation of the movement path. As soon as the gesture start has been determined, a gesture may be extracted, beginning with the gesture start. Concrete methods for recognizing the gesture start are described in more detail by reference to Figures 4 to 6." (page 15, lines 4 to 18)

g "With the help of a pattern recognition, the extracted gestures may be recognized. For the pattern recognition, for example, Hidden Markov models, a Viterbi algorithm, and/or Bayesian networks may be used. Another recognition method according to the invention is described in more detail with reference to Fig. 7." (page 15, lines 20 to 23)

h "For recognizing continuous and discrete gestures, reference gestures are provided, which are used for a pattern comparison with the movement path fed by the pattern recognition. Reference gestures may be gestures which, for example, are admissible in a certain user context of a device. If in a user context, for example, only the input of determined letters is admissible, the reference gestures include gestures which are representative for the allowed letters.
The pattern comparison may be carried out in such a way that single segments of the movement path are compared with corresponding partial gestures of the reference gestures. A partial gesture is a segment of a reference gesture. If the single segments of the movement path coincide each time with the partial gestures of a reference gesture, the movement path may be interpreted as a recognized gesture." (page 16, lines 6 to 17)

i "The context information assigned to the extraction step 400 may also include a set of reference gestures, which, for example, indicates which gestures are admissible in the context.
This is, for example, advantageous when a input device expects an input of numbers. The context information may include in this respect the digits '0' to '9' as reference gestures. A movement of the forefinger in the movement space which, for example, would correspond to the letter 'A' can then be recognized by the method according to the invention as a not allowed gesture. By using the reference gestures, which define the gestures allowed in a respective context, the probability of misinterpretations in the recognizing of gestures can be considerably decreased." (page 17, line 21 to page 18, line 2)

j "Fig. 2 shows the typical structure of a system according to the invention for the

contactless detection of movements in a movement space with four electrodes of an electric sensor system.
[0076] In the area of the four edges of a rectangular reference surface B, which may be, for example, a display device, each time one electrode is arranged, which is a component of an electric sensor system. The electrodes E extend over the total length of the respective edges of the reference surface B. At each of the electrodes E an alternating electrical field is irradiated, the four irradiated electric alternating fields jointly defining the movement space 10." (page 18, line 23 to page 19, line 3)

k "The movement space may be further subdivided. Inside the movement space 10, a detection space 20 is defined which is smaller than the movement space 10. The detection space 20 inside the movement space 10 is the space which is considered during the generation of the movement path; i.e., a movement path is generated only for movements inside the detection space 20. (page 20, line 27 to page 21, line 2)

l "In the following it is described in more detail with reference to Figs. 4 to 6, how a gesture start and a gesture end in the movement path may be determined according to the invention. In order to feed a movement detected in the movement space to a pattern recognition, it is at first necessary to detect at least a gesture start. Basically also movements which take place before the gesture start could lead to the pattern recognition, which, however, would have the disadvantage that movements before the gesture start could lead to a defective gesture recognition if the pattern recognition is not designed for leaving unconsidered movements not belonging to a gesture. For the case that a complete gesture of the pattern recognition is to be conducted, it is also necessary to detect the gesture end in the movement path.
During a movement of, for example, a fingertip in the movement space, one or several movement characteristics are detected with the help of the electric sensor electronics in predetermined time intervals, for example in time intervals of 5ms, and assigned to the corresponding point of the movement path. The time intervals may be also selected greater or smaller, depending on the concrete case of application. The movement characteristics may be, for example:
- position of the fingertip relative to the reference surface; for example of an input surface of a touch-sensitive display; the position may be indicated by the X, Y, and/or Z coordinate relative to the input surface;
- orientation of the finger or the hand relative to the movement space;
- speed of the movement of the finger;

- acceleration during the movement of the finger;
- and/or a combination thereof.

For determining either a gesture start or a gesture end, some of these movement characteristics or a combination thereof may be used." (page 23, line 16 to page 24, line 10)

m "Fig. 5 shows a second threshold value method according to the invention for determining a gesture start and a gesture end of a finger movement in a movement space. As a movement characteristic, the speed of the fingertip relative to the reference surface is used, with the time course of the speed of the finger movement in the X direction in Fig. 5.

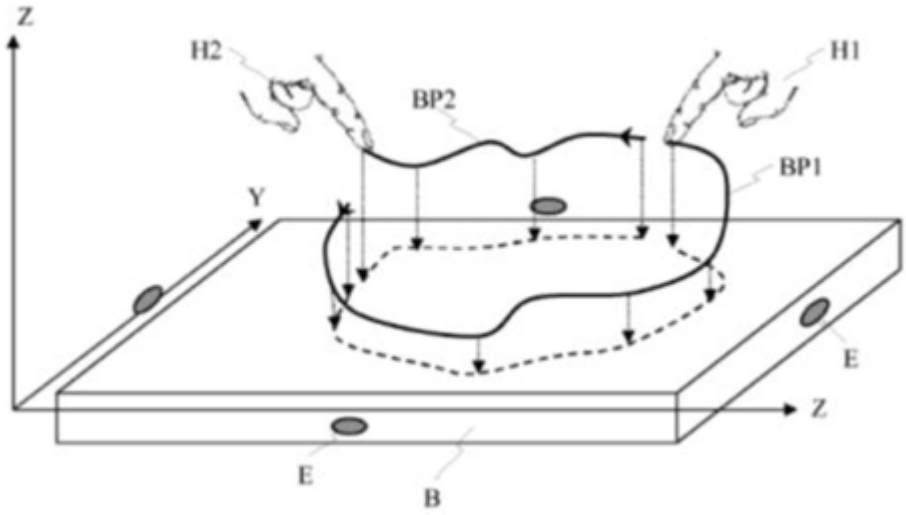
In the example shown in Fig. 5, the speed course of the fingertip in X direction is also evaluated as a feature for the gesture start or the gesture end, wherein exceeding a predetermined speed (threshold value) defines the gesture start and falling below the predetermined threshold value defines the gesture end. As with the threshold value method according to Fig. 4, also here the point 50a of the movement path 50 may be assigned a gesture start mark and the point 50b may be assigned a gesture end mark. The movement path between gesture end and gesture start may be fed again to pattern recognition." (page 26, lines 12 to 25)

n "Fig. 6 shows the temporal lapses of the distances between a sensor electrode and the fingertip of a moving finger in a sensor system with four sensor electrodes. For example, the course 60a corresponds to the time course of the distance of a fingertip relative to a first sensor electrode. Also here a threshold value is defined, and exceeding or falling below the threshold value determines the beginning of a gesture or the end of a gesture. According to the invention a gesture start appears when at least one of the four lapses shown in Fig. 6 falls below the preset threshold value. Therefore a gesture end may exist when all four lapses have again exceeded the corresponding threshold value." (page 28, lines 14 to 22)

o "Fig. 11 shows an example of a gesture which is extracted from two different movement paths (two finger gestures). In the movement space a first movement with the forefinger of the hand HI is carried out. With the forefinger of the second hand H2 a second movement is carried out in the movement space. From both movements, each time, a first movement path BP1 and another movement path BP2 are generated. From each of the two movement paths a gesture is then extracted, which may be

interpreted as partial gestures of a composed gesture. If in the extraction of the partial gestures or in the recognizing of the partial gestures the Z coordinate is not taken in consideration, each of both partial gestures represents a segment of a circle, as shown in Fig. 11. The total gestures resulting from the two partial gestures correspond thus to a circle. Whether or not two partial gestures are components of a composed gesture can be made dependent of the distance of the gesture start of a first gesture from the gesture end of the second gesture, for example. If the distance is below a predefined threshold, the partial gestures compose a total gesture. If the value does not fall below the threshold, the two partial gestures are interpreted as separated gestures." (page 38, line 23 to page 39, line 9)

p "



" (FIG. 11)

([Note by the body] The symbol "z" in the figure assigned to the right arrow along a long side of the rectangular display is considered as an error for "x".)

According to a to p in (A), it is recognized that Cited Document 1 describes the following technical matters.

(a) The technology described in the Cited Document relates to a method for contactless detection and recognition of gestures (A (a)); especially, it is intended to provide a method suitable for mobile devices (A (b)). Movement of a finger is presented as an example of the contactless gesture (A (d)).

(b) The method includes generating, by four sensor electrodes arranged at respective edges of a rectangular display, an alternating electrical field which defines a movement

space; detecting, by the sensor electrodes, a change of the lines of force generated by movements of a finger in the alternating electrical field, to detect movements of the finger; and detecting a movement path of the finger ((A) c, d, j).

The movement path of the finger is generated only for movements in a detection space in the movement space ((A) k). Thus, the movement path of the finger is considered to be detected only for movements in the detection space.

(c) The method includes interpreting a gesture out of a set of reference gestures coincident with the movement path of the finger as a recognized gesture by comparing the movement path of the finger with a set of reference gestures with the help of pattern recognition, such as Hidden Markov models ((A) g, h, i).

(d) A contactless gesture includes a gesture start. The gesture start is detected in the movement path of the finger so as not to consider movements not belonging to the contactless gesture, in order to reliably extract the contactless gesture ((A) e, f, l).

(e) Specifically, the method includes measuring movement characteristics for the movement of the finger by the sensor electrodes at time intervals of 5ms, and determining the time when the moving speed of a fingertip in X direction exceeds a predetermined threshold as a contactless gesture start ((A) l, m, n).

According to (A) o and p, the X direction is recognized as a direction along a long side of the rectangular display.

B Cited Invention

According to A, it is recognized that Cited Document 1 describes the following invention (hereinafter referred to as "Cited Invention").

"A method for detection and recognition of contactless gestures made by movement of a finger, comprising:

generating, by four sensor electrodes arranged at respective edges of a rectangular display, an alternating electrical field which defines a movement space, and detecting a change of the lines of force generated by movements of a finger in the alternating electrical field, to detect a movement path of the finger, wherein

the movement path of the finger is detected only for movements in a detection space in the movement space; and

interpreting a gesture among a set of reference gestures coincident with the movement path of the finger as a recognized gesture by comparing the movement path of the finger with a set of reference gestures with the help of pattern recognition, such as Hidden Markov models,

the method including measuring movement characteristics for the movement of the finger by the sensor electrodes at time intervals of 5ms, and determining the time when the moving speed of the finger in X direction exceeds a predetermined threshold as a contactless gesture start."

(3) Well-known art

A Described matters in Cited Document 2

Japanese Unexamined Patent Application Publication No. 2009-37582 (the application published on February 19, 2019, hereinafter referred to as "Cited Document 2"), which is a document distributed before the priority date of the application, includes the following description with drawings.

(The underlines were added by the body for emphasis.)

"[0001]

This invention relates to a technology of a game controller."

"[0013]

The controller 20 is driven by a battery (not shown) and includes a plurality of buttons and keys to be used for game input to play a game. When a user operates a button or a key of the controller 20, game operation date thereof is transmitted to a game device 10 periodically and wirelessly. The controller 20 includes a triaxial acceleration sensor for detecting acceleration in 3-axis directions of the controller 20, and an angular velocity sensor for detecting angular velocity around a predetermined axis. The triaxial acceleration sensor and the angular velocity sensor constitute a motion sensor which detects motion of the controller 20. In some game applications, values detected by the sensors are treated as game operation data, and are transmitted to the game device 10 periodically and wirelessly. For example, in a racing game using the controller 20 as a steering wheel of an automobile which is moved by a user like a steering wheel to move the automobile in the game, output values of the triaxial acceleration sensor and the angular velocity sensor are used as game operation data.

[0014]

... (Omitted) ... The controller 20 includes a vibrator. On receipt of a vibration start signal, the controller 20 drives the vibrator, and stops driving of the vibrator when receiving a vibration stop signal. The game device 10 may transmit a vibration control signal to specify whether to drive the vibrator, by transmission frame. In this case, the controller 20 operates in accordance with the vibration control signal."

"[0019]

FIG. 3 illustrates an internal structure of a controller. The controller 20 includes a processing unit 90, and also includes vibrators 80a, 80b formed of a motor and an eccentric member, and a wireless communication module 92. ... (Remainder omitted)

[0020]

The processing unit 90 includes a main control unit 50, an input receiving unit 52, a sensor unit 56, a filter unit 60, an analog-digital converter 64, an averaging unit 68, a memory 70, a read unit 72, a communication control unit 74, and a driving control unit 76.

... (Remainder omitted)

... (Omitted) ...

[0023]

The sensor unit 56 includes a plurality of acceleration sensors 54 and an angular velocity sensor 53. ... (Remainder omitted)

[0024]

The filter unit 60 includes a plurality of low-pass filters (LPF) 58, 57. The LPF 58 is arranged downstream of the acceleration sensors 54, to allow frequency components in outputs of the acceleration sensors 54 equal to or lower than a cutoff frequency to pass and to attenuate frequency components exceeding the cutoff frequency from the vicinity of the cutoff frequency. The LPF 57 is arranged downstream of the angular velocity sensor 53, to allow frequency components in outputs of the angular velocity sensor 53 equal to or lower than the cutoff frequency to pass and to attenuate frequency components exceeding the cutoff frequency from the vicinity of the cutoff frequency. ... (Remainder omitted)"

"[0032]

The controller 20in the embodiment has the vibrators 80 which vibrate by themselves, along with the acceleration sensors 54 and the angular velocity sensor 53. In motion sensors, such as the acceleration sensor 54, it is preferable to accurately detect motion of the controller 20 made by motion of a user, and it is not preferable to detect vibration components given to a housing due to vibration of the vibrators 80. The speed of a user to move the controller 20 is generally limited. By setting a cutoff frequency of a secondary passive filter 59 to a threshold frequency at which a person moves the controller 20 or lower, the acceleration sensor 54 can detect motion of the controller 20 made by motion of the user, and vibration components of the controller 20 caused by vibration of the vibrators 80 can be removed from outputs of the acceleration

sensor 54."
"[0039]

The number of vibrations to be applied to the controller 20 from motion of the user is usually smaller than the number of vibrations to be applied to the controller 20 from vibration of the vibrators 80. As described above, it is considered that the speed of a person to move the controller 20 is limited, and in general does not exceed 15 Hz. Therefore, by setting a cutoff frequency of the LPF 58 to a predetermined value equal to or less than 15 Hz, e.g., 15 Hz, the LPF 58 can properly output vibration components generated by motion of a user and effectively remove vibration components generated by vibration of the vibrators 80."

In light of the above, it is recognized that Cited Document 2 includes the following matters (hereinafter referred to as "Described matters in Cited Document 2").
"A controller for inputting game operation data from motion of a user,

configured to remove vibration components equal to or lower than 15 Hz, which is a limit of speed for a person to move the controller, from outputs of sensors equipped in the controller in order to accurately detect motion of the controller made by motion of the user."

B Described matters in Cited Document 3

Japanese Unexamined Patent Application Publication No. 2009-93641 (the application published on April 30, 2019, hereinafter referred to as "Cited Document 3"), which is a document distributed before the priority date of the application, includes the following description with drawings.
(The underlines were added by the body.)

"[Technical field]
[0001]

The present invention relates to a method and apparatus for stabilizing coordinates measured and output by a pointing device or digitizer tablet, a pointing device or digitizer tablet including the apparatus, and a computer readable medium and driver for performing the method. The present invention also relates to a height dependent filter usable to reduce jitter in a pointing device or digitizer tablet."
"[Problem to be solved by the invention]
[0005]

Since the detection of the signal strength at the electrodes of the touch tablet or at

the coils of the graphics tablet requires measuring the amplitude of an analog signal, the signal is susceptible to interference or noise from external sources. This noise manifests itself as instability in measured coordinate positions and is known as jitter. Jitter has a fairly random distribution, usually with Gaussian properties and a predictable range for any given environment, but is unpredictable from sample to sample.

[0006]

Jitter has a time scale that is the same as the time scale of the sampling, which is generally around 100-200 Hz. Since user movements are generally on a time scale of less than 20 Hz, a variety of low-pass filters can be used to separate the two signals; that is, the coordinate position signal from the noise or interference created by the external sources. However, significant effort must be taken to avoid introducing filtering artifacts. Filtering artifacts occur when the low pass filtering removes high frequency content from the position signal which actually represents valid user input data."

In light of the above, it is recognized that Cited Document 3 includes the following matters (hereinafter referred to as "Described matters in Cited Document 3").

"In a method for stabilizing coordinates measured and output by a pointing device or digitizer tablet, since user movements are generally on a time scale of less than 20 Hz, a variety of low-pass filters can be used to separate the two signals; that is, the coordinate position signal from the noise or interference created by the external sources."

C Well-known art

According to the Described matters in Cited Document 2 and the Described matters in Cited Document 3, it is recognized that the following matters were well-known matters before the priority date of the application.

"An apparatus or a method for performing input from motion of a user, configured to remove noise equal to or lower than 15 Hz or 20 Hz, which is an upper limit of user motion, by use of a low-pass filter, for accurate input."

(4) Comparison

The Amended invention and the Cited Invention are compared below.

(A) The Cited Invention is a technology relating to a method for contactless detection and recognition of gestures and it is identical with the Amended invention. The

inventions both determine (detect) a gesture start and they are to be solve the same problems.

(B) The "method for contactless detection and recognition of gestures made by movement of a finger" in the Cited Invention corresponds, excluding the configuration relating to the different feature described later, the "method for touchless gesture recognition" in the Amended Invention.

(C) The "four sensor electrodes" in the Cited Invention are arranged at respective edges of a rectangular display, and it is obvious that the "four sensor electrodes" associated for the respective arrangement positions detect a movement path of a finger in cooperation with each other. Thus, the "four sensor electrodes" are included in the "associated plurality of detection sensors" in the Amended Invention.

(D) The Cited Invention is configured to generate an alternating electrical field by using the "four sensor electrodes", to detect a change of the lines of force in the alternating electrical field, and to detect a movement path of the finger. The detected changes of the lines of force in the alternating electrical field are considered "signals", and the "signals" are for contactless detection and recognition of gestures.

Therefore, the signals detected by the sensor electrodes in the Cited Invention correspond to the "one or more gesture-related signals" in the Amended Invention.

(E) According to (C) and (D), the Cited Invention includes a configuration corresponding to the matter in the Amended Invention, "detecting one or more gesture-related signals using an associated plurality of detection sensors".

(F) The "pattern recognition, such as Hidden Markov models" in the Cited Invention is included in the "automatic recognition technique" in the Amended Invention.

(G) In the Cited Invention, the movement path of the finger is detected by signals detected by the sensor electrodes. Thus, the movement path of the finger corresponds to the "touchless gesture detected from the one or more gesture-related signals" in the Amended Invention.

(H) The matter in the Cited Invention, "comparing the movement path of the finger with a set of reference gestures", corresponds to the matter in the Amended Invention, "evaluating a touchless gesture". Accordingly, the matter in the Cited Invention, "interpreting a gesture out of a set of reference gestures coincident with the movement path of the finger as a recognized gesture", corresponds to the matter in the Amended Invention, "determine if the touchless gesture corresponds to one of a predetermined set of gestures".

(I) According to (F) to (H), the Cited Invention includes a configuration corresponding to the matter, "interpreting a gesture among a set of reference gestures coincident with

the movement path of the finger as a recognized gesture by comparing the movement path of the finger with a set of reference gestures with the help of pattern recognition, such as Hidden Markov models".

(J) The matter in the Cited Invention, "determining ... as a contactless gesture start", corresponds to the matter in the Amended Invention, "determining a start of the gesture".

(K) The "finger" in the Cited Invention is included in the "target object" in the Amended Invention.

(L) In the Cited Invention, the matter "measuring movement characteristics for the movement of the finger, and determining the time when the moving speed of the finger in the X direction (the direction along a long side of the rectangular display) exceeds a predetermined threshold as a contactless gesture start" is considered to specify the following two conditions:

. moving direction of the finger is X direction, and

. moving speed of the finger exceeds a predetermined threshold,

as movement characteristics for the movement of the finger for determining the "contactless gesture start" (corresponding to the matter in the Amended Invention, "determining a start of the gesture").

(M) In the Amended Invention, "in determining a start of the gesture, a start is determined if the distance between a target object and at least one sensor decreases and the distance between the target object and at least one different sensor increases, and a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold". According to the configuration, the conditions for movement of the target object for "determining a start of the gesture" are considered the following two conditions:

. "the distance between a target object and at least one sensor decreases and the distance between the target object and at least one different sensor increases", and

. "a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold".

(N) Regarding the condition in (L) that "the moving direction of the finger is the X direction", the matter in the Cited Invention that the finger is moved in the X direction (the direction along a long side of the rectangular display), or the condition that "the moving direction of the finger is the X direction", and the condition in the Amended Invention that "the distance between a target object and at least one sensor decreases and the distance between the target object and at least one different sensor increases" are, considering (K), "conditions on movement of a target object". The Amended Invention and the Cited Invention are common in satisfying the "conditions on

movement of a target object" as a condition for "determining a start of the gesture".
(O) Regarding the condition in (L) that "the moving speed of the finger exceeds a predetermined threshold",

in the Cited Invention, the "movement characteristics for the movement of the finger" are obtained by "measuring movement characteristics for the movement of the finger by the sensor electrodes at time intervals of 5ms".

The "measuring" the "movement characteristics for the movement of the finger" "at time intervals of 5ms" is equivalent to sampling a plurality of signals relating to the movement of the finger "at time intervals of 5ms". The obtained signals may be arbitrarily referred to as "a predetermined plurality of signal samples". The "time intervals of 5ms" are sufficiently short in the overall time in which the gesture is input, and a period of time for obtaining the "moving speed of the finger" can be a "short time" for determining a contactless gesture start. The "speed (of finger movement)" corresponds to the "term variance (of the distance of the moving finger). Accordingly, the matters as conditions for determining a start of the gesture in the Cited Invention, "measuring movement characteristics for the movement of the finger by the sensor electrodes in time intervals of 5ms", and "the time when the moving speed of the finger in the X direction (the direction along a long side of the rectangular display) exceeds a predetermined threshold", correspond to the matter in the Amended Invention, "a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold".
(P) According to (L) to (O), the Amended Invention and the Cited Invention include the following configuration: "in determining a start of the gesture, a start is determined when conditions on movement of a target object are satisfied and when a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold".

(5) Corresponding Feature and Different Feature

In light of the above, corresponding and different features between the Amended Invention and the Cited Invention are as follows.

[Corresponding Feature]
"A method for touchless gesture recognition comprising:

detecting one or more gesture-related signals using an associated plurality of detection sensors; and

evaluating a touchless gesture detected from the one or more gesture-related

signals using an automatic recognition technique to determine if the touchless gesture corresponds to one of a predetermined set of gestures, wherein

in determining a start of the gesture, a start is determined if conditions on movement of a target object are satisfied and a short-term variance or an equivalent measure over a predetermined plurality of signal samples is larger than a threshold."

[Different Features]

<Different Feature 1>

Regarding the matter that "conditions on movement of a target object is satisfied" in the corresponding feature, the conditions are satisfied if "the distance between a target object and at least one sensor decreases and the distance between the target object and at least one different sensor increases" in the Amended Invention, while they are satisfied when moving direction of the finger is the X direction (the direction along a long side of the rectangular display) in the Cited Invention.

<Different Feature 2>

Regarding the "one or more gesture-related signals", the Amended Invention includes a limitation that "the detected one or more gesture-related signals are low-pass filtered so as to have a maximum frequency of 15 to 20 Hz", while the Cited Invention does not specify the limitation.

(6) Judgment

A Regarding Different Feature 1

In the Cited Invention, the configuration that the finger moves in X direction (the direction along a long side of the rectangular display) in the Cited Invention is equivalent to the fact that the distance between a finger (target object) and one of two sensor electrodes out of "four sensor electrodes arranged at the respective edges of a rectangular display" arranged on each of facing short sides (sides in Y direction) of the rectangular display decreases and the distance between the finger (target object) and the other sensor electrode increases. Thus, the Cited Invention substantially includes, as conditions for determining a start of the gesture, the conditions in the Amended Invention that "the distance between a target object and at least one sensor decreases and the distance between the target object and at least one different sensor increases".

Therefore, Different Feature 1 is not a substantial difference, but only a difference in expression.

Even if the invention according to Claim 1 is configured so that one sensor detects that a distance between a target object and the sensor decreases and another

sensor detects that a distance between the target object and the sensor increases, Cited Document 1 discloses that each of the four sensor electrodes can detect time course of the distance between the target object and the finger, or increase and decrease in distance from the finger to each sensor electrode (see (2) A (A) n and o) (hereinafter referred to as "Disclosed matters in Cited Document 1). Thus, a person skilled in the art could have easily conceived of determining a finger moving in the X direction when detecting by one of two sensor electrodes arranged along the Y direction that a distance between a target object and the sensor electrode decreases and detecting by the other sensor electrode that a distance between the target object and the sensor electrode increases, in detecting that the moving direction of the movement characteristics of finger is the X direction, in the Cited Invention, by referring to the Disclosed matters in Cited Document 1.

B Regarding Different Feature 2

(A) Technical significance of Amended Invention relating to Different Feature 2

Regarding the configuration of the Amended Invention relating to the Different Feature 2, "the detected one or more gesture-related signals are low-pass filtered so as to have a maximum frequency of 15 to 20 Hz" (hereinafter referred to as "Configuration of Different Feature 2"), the following description is included in [0021] of the specification (the Specification) relating to the present application, "In some embodiments, the sensor system provides discrete time measurement values for each sensor electrode at a predetermined sampling rate f_s. Typically, in a pre-processing stage, the sensor signals are low-pass filtered in order to match the frequency range of hand gestures which are typically up to f_max=<15-20 Hz, depending on the application, wherein f_s>2*f_max. Given these signals for one or more electrodes, the goal is to provide reliable automatic recognition of hand gestures performed over the keyboard or the active area, respectively".

According to the description, the Configuration of Different Feature 2 has a technical significance in implementing "reliable automatic recognition of hand gestures" by removing the frequency equal to or lower than "15 Hz to 20 Hz," which is the maximum frequency value of signals to be detected from sensor signals in a pre-processing stage, through a "low-pass filter".

However, the Specification does not clearly describe a technical ground for specifying that the maximum frequency of sensor signals to be removed should be "15 Hz to 20 Hz". According to the descriptions in [0021] "depending on the application, typically" and "in order to match the frequency range of hand gestures", it is recognized

that there is an assumption that an upper limit value of frequency range of sensor signals detected from "hand gestures" in typical (general) applications is "15 Hz to 20 Hz".

The Amended Invention is an invention of a method. A stage of the Configuration of Different Feature 2 which constitutes the invention of a method is not explicitly described. However, considering the technical significance, it is recognized that it is performed on "one or more gesture signals" detected by the "detection sensors" before (in the pre-processing stage) "evaluating a contactless gesture detected from the one or more gesture-related signals using an automatic recognition technique to determine if the contactless gesture corresponds to one of a predetermined set of gestures".

(B) Examination based on well-known arts

Cited Document 1 also includes the following description. (The underlines were added by the body for emphasis.)

"[0074]

In order to ignore unintentional movements, for example by a finger in the movement space, in extracting gestures from the movement path, a compensation method is proposed, which during the generation of the movement path (step 300) eliminates those segments from the movement path which correspond to unintentional movements of the finger in the movement space. For this purpose, for example, the speed and/or the acceleration of the finger in the movement space may be used, wherein exceeding or falling below a preset speed or a preset acceleration may be indicative for an unintentional movement of the finger. By extracting such segments from the movement path also the recognition degree in the extraction of gestures from the movement path in step 400 is increased." (page 18, lines 12 to 21)

"[0077]

Instead of the four stripe-shaped electrodes E shown in Fig. 2, at the edges of the reference surface B each time one punctiform electrode may be arranged, which makes possible an improved recognition of the space coordinates, for example of a fingertip, in the movement space 10. Also at each edge of the reference surface there may be several punctiform electrodes in order to even further increase the recognition precision." (page 19, lines 5 to 10)

According to the above description, the Cited Invention is to improve

recognition of a finger or a fingertip, as a potential problem.

As indicated in (3) C, the "apparatus or a method for performing input from motion of a user, configured to remove noise equal to or lower than 15 Hz or 20 Hz, which is an upper limit of user motion, by use of a low-pass filter, for accurate input" had been well-known before the priority date of the present application.

The Cited Invention is a "method for contactless detection and recognition of gestures made by movement of a finger" or a method for performing input from motion of a user. Thus, a person skilled in the art could have easily conceived of a configuration to remove signals (noise) not based on "contactless gestures made by movement of a finger" by "low-pass filtering" a "change of the lines of force detected by four sensor electrodes" (corresponding to the "detected one or more gesture-related signals" in the Amended Invention) "so as to have a maximum frequency of 15 to 20 Hz", with reference to the well-known art relating to the apparatus or a method for performing input from motion of a user, as one method for solving the potential problem in the Cited Invention.

C Examination on working effect

Considering the above different features comprehensively, the working effect to be produced by the Amended Invention is merely within a range expected from the working effect of the Cited Invention and the well-known art, and thus cannot be regarded as a particularly distinguishing effect.

D Summary

The Amended Invention could be easily made by a person skilled in the art with reference to the Disclosed matters in Cited Document 1 and the well-known art, on the basis of the Cited Invention. Thus, the Appellant should not be granted a patent for the invention independently at the time of filing of the patent application under the provisions of Article 29(2) of the Patent Act.

3 Closing (Closing of the Decision to Dismiss Amendment)

The Amendment violates the provisions of Article 126(7) of the Patent Act which is applied mutatis mutandis in the provisions of Article 17-2(6) of the Patent Act, and should be dismissed under the provisions of Article 53(1) of the Patent Act which is applied mutatis mutandis pursuant to the provisions of Article 159(1) of the Patent Act.

Therefore, the decision is made in accordance to Conclusion of Decision to Dismiss Amendment.

No. 3 Regarding the Invention

1 The Invention

The written amendment submitted on July 7, 2020 was dismissed as above. The invention according to claims of the present application is as specified by the matters recited in Claim 1 of the scope of claims amended by the written amendment submitted on August 15, 2017. The invention according to Claim 1 (hereinafter referred to as "the Invention") is as descried in No. 2 [Reason] 1 (2), which is specified by the matters recited in Claim 1.

2 Reasons for refusal by the body

The reasons for refusal stated in the reasons for refusal by the body regarding the Invention are as follows: The Invention is an invention described in Cited Document 1 (International Publication No. 2011/098496) which was distributed before the priority date of the application or made available to the public through electric telecommunication lines, or an invention which could have been easily made by a person ordinarily skilled in the art of the invention before the filing date on the basis of the matters described in Cited Document 1. Thus, the Appellant should not be granted a patent for the invention under the provisions or Article 29(1)(iii) of the Patent Act or Article 29(2) of the Patent Act.

3 Cited document

The matters described in Cited Document 1 cited in the reasons for refusal stated in the reasons for refusal by the body are as described in No. 2 [Reason] 2 (2).

4 Comparison / Judgment

The Invention is to delete a limitation matter relating to the configuration that "the detected one or more gesture-related signals are low-pass filtered so as to have a maximum frequency of 15 to 20 Hz" (Configuration of Different Feature 2) from the Amended Invention examined in No. 2 [Reason] 2.

The Amended invention including all of the matters specifying the invention of the Invention and corresponding to inclusion of the Configuration of Different Feature 2 could have been easily made by a person skilled in the art, as described in No. 2 [Reason] 2 (4) to (6), with reference to the Disclosed matters in Cited Document 1 and the well-known art, on the basis of the Cited Invention. As indicated in No. 2 [Reason] 2 (6) A, the Disclosed matters in Cited Document 1 are referred subsidiarily

when Different Feature 1 between the Amended Invention and the Cited Invention is assumed to be a substantial different feature. The well-known art is referred for determining easily-conceived property relating Different Feature 2 between the Amended Invention and the Cited Invention.

Accordingly, the Invention could have been easily made by a person skilled in the art by referring to the Cited Invention or the Disclosed matters in Cited Document 1 based on the Cited Invention.

No. 4 Closing (Conclusion)

As above, the Appellant should not be granted a patent for the Invention under the provisions of Article 29(1)(iii) of the Patent Act or Article 29(2) of the Patent Act. Thus, the present application should be rejected without examining inventions according to other claims.

Therefore, the appeal decision shall be made as described in the conclusion.

August 24, 2020

Chief administrative judge: YOSHIDA, Koichi
Administrative judge: HAYASHI, Tsuyoshi
Administrative judge: ODA, Hiroshi