(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
5 November 2009 (05.11.2009)

PCT

(10) International Publication Number
WO 2009/133987 A1

(51) International Patent Classification:
G06F 3/041 (2006.01)

(21) International Application Number:
PCT/KR2008/003793

(22) International Filing Date:
29 June 2008 (29.06.2008)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2008-0040887 30 April 2008 (30.04.2008) KR

(71) Applicant *(for all designated States except US)*: **THINKWARE SYSTEMS CORPORATION** [KR/KR]; Hanmi Tower 15 F., 45 Bangi-dong, Songpa-gu, Seoul 138-050 (KR).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **SEO, Jung Kak** [KR/KR]; c/o THINKWARE SYSTEMS CORPORATION, Hanmi Tower 15 F., 45 Bangi-dong Songpa-gu, Seoul 138-050 (KR).

(74) Agent: **MUHANN PATENT & LAW FIRM**; 2, 5, 6th Floor, Myeonglim Building, 51-8 Nonhyeon-dong, Gangnam-gu, Seoul 135-814 (KR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

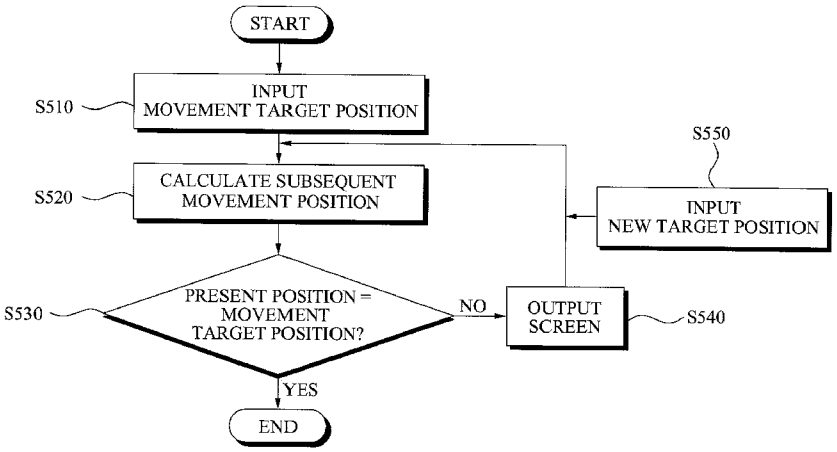
Published:

— *with international search report (Art. 21(3))*

WO 2009/133987 A1

(54) Title: SYSTEM AND METHOD FOR MOVING SCREEN IMAGE USING ACCELERATIVE ANIMATION

FIG. 5



(57) Abstract: Disclosed are a system and method for screen movement using an accelerative animation. The system includes a target position setting unit to set a movement target position of the screen, a movement position calculating unit to calculate a stepwise movement position of the screen, and a screen display controlling unit to display a movement of the screen based on the calculated stepwise movement position.

SYSTEM AND METHOD FOR MOVING SCREEN IMAGE USING ACCELERATIVE ANIMATION

Technical Field

The present invention relates to a method and system for screen movement using an accelerative animation, and more particularly, to a system and method for screen movement using an accelerative animation that may control a movement of a screen in a stepwise manner using a predetermined accelerative constant.

Background Art

In a screen movement scheme using a touch operation in a portable terminal, etc., it may not be easy to recognize a movement position because of performance or technology issues. Most screen movement schemes may compute a touched position on the screen, and output, on the screen, a map showing the touched position as a center of the screen. In above-mentioned schemes, since a continuity of a screen movement is not maintained, a user may become confused, and it may not be easy for the user to directly recognize the map on the screen.

Accordingly, there arises a need for a screen movement scheme of easily recognizing the screen movement while ensuring the continuity of the screen movement.

Disclosure of Invention

Technical Goals

An aspect of the present invention provides a method and system for screen movement using an accelerative animation that may express a movement of the screen in a stepwise manner, thereby increasing a screen recognition ratio while ensuring a continuity of screen movement.

An aspect of the present invention provides a method and system for screen movement using an accelerative animation that may express a movement of the screen in a stepwise manner using a predetermined accelerative constant to enable the screen to be progressively moved, thereby increasing user satisfaction.

An aspect of the present invention provides a method and system for screen movement using an accelerative animation that may enable directly moving to a new

target position even when the new target position is inputted while the screen is being moved, so that a user can move to the new target position even before terminating moving of the screen, thereby increasing user satisfaction of a performance of the system.

Technical solutions

According to an aspect of the present invention, there is provided a system for screen movement using an accelerative animation, the system including: a target position setting unit to set a movement target position of the screen; a movement position calculating unit to calculate a stepwise movement position of the screen; and a screen display controlling unit to display a movement of the screen based on the calculated stepwise movement position.

In this instance, when a new target position is inputted while the screen is being moved, the target position setting unit may re-set the inputted new target position as the movement target position.

Also, a subsequent movement position may be obtained by adding a present position and a product of a distance and the predetermined acceleration constant, the distance being obtained by deducting the present position from the movement target position.

According to an aspect of the present invention, there is provided a method for screen movement using an accelerative animation, the method including: setting a movement target position of a screen; calculating a stepwise movement position of the screen; and displaying a movement of the screen based on the calculated stepwise movement position.

Advantageous effects

According to example embodiments of the present invention, there is provided a method and system for screen movement using an accelerative animation that may express a movement of the screen in a stepwise manner, thereby increasing a screen recognition ratio while ensuring a continuity of screen movement.

According to example embodiments of the present invention, there is provided a method and system for screen movement using an accelerative animation that may

express a movement of the screen in a stepwise manner using a predetermined accelerative constant to enable the screen to be progressively moved, thereby increasing user satisfaction.

According to example embodiments of the present invention, there is provided a method and system for screen movement using an accelerative animation that may enable directly moving to a new target position even when the new target position is inputted while the screen is being moved, so that a user can move to the new target position even before terminating moving of the screen, thereby increasing user satisfaction of a performance of the system.

Brief Description of Drawings

FIG. 1 illustrates a conventional screen movement scheme;

FIG. 2 illustrates a method for screen movement using an accelerative animation according to example embodiments of the present invention;

FIG. 3 illustrates a method for screen movement using various schemes according to example embodiments of the present invention;

FIG. 4 illustrates a configuration of a system for screen movement using an accelerative animation according to other example embodiments of the present invention;

FIG. 5 is a flowchart illustrating a method for screen movement using an accelerative animation according to example embodiments of the present invention;

FIG. 6 is a flowchart illustrating a method for calculating a subsequent movement position according to example embodiments of the present invention.

Best Mode for Carrying Out the Invention

Reference will now be made in detail to embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below in order to explain the present invention by referring to the figures.

FIG. 1 illustrates a conventional screen movement scheme.

Referring to FIG. 1, when a user sets a movement target position using a touch operation, etc., the conventional screen movement scheme outputs a map showing

around a touched position on a screen. For example, in a navigation terminal, when a user inputs, through a touch on a present screen 110 displaying a specific area, a movement target position 111 where the user desires to move to, a changed screen showing around the touched position is outputted at once. Specifically, a movement termination screen 120 showing a movement target position 121 as a center of the screen may be directly outputted without outputting any continuous screens after the present screen 110.

The above described conventional screen movement scheme may not display a consecutive screen movement, and thus screen recognition may be deteriorated, and satisfaction of a user may be reduced due to a sudden screen change.

FIG. 2 illustrates a method for screen movement using an accelerative animation according to example embodiments of the present invention.

Referring to FIG. 2, when a user inputs a movement target position 211 through a touch on a present screen 210, a process of screen movement may be successively outputted to display a movement termination screen 240. For example, in a navigation terminal, the user may input the movement target position 211, where the user desires to move to, through the touch on the present position 210. In this case, to consecutively display the process of screen movement, the movement termination screen 240 may not be directly outputted, and subsequent movement positions 222 and 232, that is, positions where a center of the screen is moved, may be calculated to thereby output subsequent screens 220 and 230. More specifically, the subsequent movement position 222 may be calculated in a present position 212 of the present screen 210, and the subsequent screen 220 may show the calculated subsequent movement position 222 as a center of the screen. Next, the subsequent movement position 232 may be calculated in the subsequent movement position 222, and the subsequent screen 230 may show the calculated subsequent movement position 232 as a center of the screen. In this instance, a distance between the movement target position 211 and the subsequent movement positions 221 and 231 may be reduced as the process of screen movement proceeds, and a movement target position 241 may be displayed in a center of a movement termination screen.

As described above, the process of screen movement may be consecutively displayed to increase a screen recognition ratio and ensure the screen to be

progressively moved, thereby increasing user satisfaction.

FIG. 3 illustrates a method for screen movement using various schemes according to example embodiments of the present invention.

Referring to FIG. 3 (a), a conventional screen movement method may display a screen movement directly to a movement target position 320 from a present position 310. Accordingly, in this case, the screen movement may be not progressively displayed, thereby reducing user satisfaction.

Referring to FIG. 3 (b), intermediate screens may be provided to move to the movement target position 320 from the present position 310, and subsequent movement positions 311 to 314 for providing the intermediate screens may be calculated. In this instance, a distance between the present position 310 and the movement target position 320 may be divided and outputted for a predetermined time interval or for a predetermined distance, so that a screen movement is performed at a uniform speed.

Here, to consecutively display the screen movement, the subsequent movement positions 311 to 314 between the present position 310 and the movement target position may be required to be calculated. As an example, Equation 1 below may be used, which is represented as

[Equation 1]

$$P_t = S + t/0.7 \times (G - S),$$

wherein S represents a present position, G represents a movement target position, t represents a time required for reaching a subsequent movement position, and P_t represents a position at the time t. Also, a range of the time t may be calculated based on a time required for a screen movement. For example, when 0.7 seconds is determined to be most reasonable for the time required for the screen movement, $0 \leq t \leq 0.7$ may be satisfied.

However, in Equation 1, a feeling of tension due to the screen movement may be reduced due to the screen being moved at a uniform speed, thereby improving aesthetic effects.

Referring to FIG. 3 (c), intermediate screens may be provided to move to the movement target position 230 from the present position 310, and subsequent movement positions 315 to 319 for providing the intermediate screens may be calculated.

In this instance, a distance between the present position 310 and the movement

target position 320 may be outputted for a predetermined time interval, and may be outputted at a uniformly accelerated speed. Specifically, to display the screen movement at a uniformly accelerated speed, the subsequent movement positions 315 to 319 between the present position 310 and the movement target position may be required to be calculated. As an example, Equation 2 below may be used, which is represented as

[Equation 2]

$P_0 = S$, and

$P_t = P_{t-1} + \alpha \times (G - P_{t-1})$,

wherein S represents a present position, G represents a movement target position, t represents a time required for reaching a subsequent movement position, P_t represents a position at the time t, and P_{t-1} represents a position at a time t-1. Also, like Equation 1, $0 \leq t \leq 0.7$ may be satisfied.

Also, α represents an acceleration constant, and thereby the screen movement is performed at a uniform acceleration. Specifically, the screen movement may be viewed to be performed at a lower speed at first, and to be performed at a higher speed later, thereby increasing user satisfaction. In this instance, α may be determined by an experiment and the like, and as an example, may be within a range of 0.35 to 0.45.

As described above, by implementing an acceleration motion using the acceleration α, the screen movement may quickly changed while being viewed, thereby enabling a user to view consecutive screens and feel satisfaction of a speed of the screen movement when the screen movement is performed through a touch and the like.

FIG. 4 illustrates a configuration of a system 400 for screen movement using an accelerative animation according to other example embodiments of the present invention.

Referring to FIG. 4, the system 400 includes a target position setting unit 410, a movement position calculating unit 420, and a screen display controlling unit 430.

The target position setting unit 410 may set a movement target position of a screen. Specifically, when a user selects a desired position where the user desires to move to through a touch on the screen, the selected desired position may be set as the movement target position.

In this instance, when a new movement target position is inputted while a

screen movement is performed, the new movement target position may be re-set as the movement target position. Here, when a user touches a desired new position before the screen movement is terminated, the touched new position may be re-set as the movement target position.

Specifically, the user may perform the screen movement through a touch and the like to seek a specific position, and also perform the screen movement to another position when the user touches the other position even before the screen movement to the specific position is terminated. When the screen movement to a new movement target position may not be permitted before the screen movement is terminated, the user may feel uneasy. To overcome this, when a new movement target position is inputted even while a screen movement to a previously inputted target position is being performed, a screen movement to the new movement target position may be performed. For example, in a case of an animation screen movement, a time required until a screen movement to a movement position is terminated may be set as about 0.7 seconds through experimentation and the like. When an input of a new position may not be permitted for the time of 0.7 seconds, a user needs to input the new position in 0.7 seconds, and this may cause the user to feel uneasy. Particularly, since continuous screens reaching to a movement position may be consecutively displayed in the method for moving the screen using the accelerative animation, when a new movement position is inputted by the user further desiring to set another position before the screen movement is terminated, the screen movement from a presently moved position to the new movement position may be performed.

The movement position calculating unit 420 may calculate a stepwise movement position of the screen. Here, since the screen movement is required to be displayed at a predetermined time interval so as to consecutively display the screen movement, a subsequent movement position is calculated to display the stepwise movement position of the screen. Specifically, the subsequent movement position may be calculated at the predetermined time interval, and the screen movement may show the calculated subsequent movement position at the predetermined time interval, as a center of the screen. In this instance, the screen movement may be performed at a lower speed at first, and performed at a higher speed later using a predetermined acceleration constant to calculate the subsequent movement position.

As an example, the subsequent movement position may be obtained by adding a present position and a product of a distance and the predetermined acceleration constant. In this instance, the distance may be obtained by deducting the present position from the movement target position. Specifically, the screen movement may be performed by a product of a distance difference between the present position and the movement target position and the acceleration constant at a predetermined time interval. When the acceleration constant is 0.4, the screen movement is performed by a distance corresponding to 40% of the distance difference between the present position and the movement target position. Accordingly, an initial movement position may be moved by 40% of an entire distance reaching to the movement target position, a second movement position may be moved by 40% of a remaining distance of 60%, that is, by 24% of the entire distance, and a third movement position may be moved by 40% of a remaining distance of 36%. As a result, the screen movement is performed at a lower speed at first, and performed at a higher speed later.

Also, when the calculated subsequent movement position and the movement target position are within a predetermined distance, the movement target position may correspond to the subsequent movement position. Here, when the screen movement is performed by a certain ratio of a remaining movement distance using the acceleration constant, the screen movement may be repeatedly performed even by a significantly smaller distance, so that a simple error with an actual movement target position may occur. Accordingly, to overcome this, when the calculated subsequent movement position and the movement target position are within the predetermined distance, coordinates of the movement target position may be mapped on coordinates of the subsequent movement position, thereby preventing occurrence of the simple error.

The screen display controlling unit 430 may display a movement of the screen based on the calculated subsequent movement position. Specifically, the screen may be displayed with respect to coordinates of the calculated subsequent movement position for each predetermined time interval.

FIG. 5 is a flowchart illustrating a method for screen movement using an accelerative animation according to example embodiments of the present invention.

Referring to FIG. 5, in operation S510, a movement target position may be inputted. Specifically, when a user selects a movement position where the user desires

to move to through a touch and the like on a screen, the selected movement position may be set as the movement target position.

In operation S520, a subsequent movement position may be calculated at a predetermined time interval. Specifically, the subsequent movement position may be calculated to consecutively display a screen movement. Calculation of the subsequent movement position will be described in detail with reference to FIG. 6 later.

In operation S530, whether a present position is the movement target position may be determined. Specifically, when the present position is not the movement target position, the screen movement does not reach the movement target position, and when the present position is the movement target position, the screen movement reaches the movement target position.

In operation S540, the screen movement may be outputted when the present position is not the movement target position as a result of operation S530.

In operation S550, when a new movement target position is inputted, the new movement target position may be set as the movement target position. Specifically, when the new movement target position is inputted before the screen movement is terminated, the inputted new movement target position may be re-set as the movement target position, and a screen movement from a presently moved position to the new movement target position may be performed.

As described above, by implementing an accelerated motion while consecutively displaying the screen movement, user satisfaction of a speed in the screen movement may be increased. Also, when a new movement target position is inputted even while performing the screen movement, a direct screen movement to the inputted new movement target position may be performed, thereby enabling a quick search of the user with respect to a desired position.

FIG. 6 is a flowchart illustrating a method for calculating a subsequent movement position according to example embodiments of the present invention.

Referring to FIG. 6, in operation S521, a distance difference X between the movement target position and the present position may be calculated to obtain a subsequent movement position.

In operation S522, a product Y of X and a predetermined acceleration constant may be calculated. Here, the acceleration constant may be appropriately set by an

experiment and the like, and may vary depending on a system environment and the like.

In operation S523, a value obtained by adding Y and the present position may be set as the subsequent movement position. Specifically, the subsequent movement position may be obtained by adding a product of a remaining distance and the acceleration constant to the present position. Accordingly, the screen movement may be performed at a lower speed at first and at a higher speed later. Also, a degree of the accelerated motion may be adjusted using the acceleration constant.

The method for moving the screen using the accelerative animation according to the above-described example embodiments of the present invention may be recorded in computer-readable media including program instructions to implement various operations embodied by a computer. The media may also include, alone or in combination with the program instructions, data files, data structures, and the like. The media and program instructions may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well-known and available to those having skill in the computer software arts. Examples of computer-readable media include magnetic media such as hard disks, floppy disks, and magnetic tape; optical media such as CD ROM disks and DVDs; magneto-optical media such as optical disks; and hardware devices that are specially configured to store and perform program instructions, such as read-only memory (ROM), random access memory (RAM), flash memory, and the like. Examples of program instructions include both machine code, such as produced by a compiler, and files containing higher level code that may be executed by the computer using an interpreter. The described hardware devices may be configured to act as one or more software modules in order to perform the operations of the above-described exemplary embodiments of the present invention.

Although a few embodiments of the present invention have been shown and described, the present invention is not limited to the described embodiments. Instead, it would be appreciated by those skilled in the art that changes may be made to these embodiments without departing from the principles and spirit of the invention, the scope of which is defined by the claims and their equivalents.

CLAIMS

1. A system for screen movement using an accelerative animation, the system comprising:

a target position setting unit to set a movement target position of the screen;

a movement position calculating unit to calculate a stepwise movement position of the screen; and

a screen display controlling unit to display a movement of the screen based on the calculated stepwise movement position.

2. The system of claim 1, wherein when a new target position is inputted while the screen is being moved, the target position setting unit re-sets the inputted new target position as the movement target position.

3. The system of claim 1, wherein the movement position calculating unit calculates a subsequent movement position at each predetermined time interval.

4. The system of claim 3, wherein the subsequent movement position is calculated using a predetermined acceleration constant.

5. The system of claim 4, wherein the subsequent movement position is obtained by adding a present position and a product of a distance and the predetermined acceleration constant, the distance being obtained by deducting the present position from the movement target position.

6. The system of claim 4, wherein when the calculated subsequent movement position and the movement target position are within a predetermined distance range, the movement position calculating unit adjusts the movement target position to correspond to the subsequent movement position.

7. The system of claim 1, wherein the screen display controlling unit includes:

a determination unit to determine whether a present position corresponds to the

movement target position, and when the present position corresponds to the movement target position, the screen display controlling unit terminates the displaying of the movement of the screen.

8. A method for screen movement using an accelerative animation, the method comprising:

setting a movement target position of a screen;

calculating a stepwise movement position of the screen; and

displaying a movement of the screen based on the calculated stepwise movement position.

9. The method of claim 8, wherein when a new target position is inputted while the screen is being moved, the setting re-sets the inputted new target position as the movement target position.

10. The method of claim 8, wherein the calculating of the stepwise movement position includes:

calculating a subsequent movement position at each predetermined time interval.

11. The method of claim 10, wherein the calculating of the subsequent movement position calculates the subsequent movement position using a predetermined acceleration constant.

12. The method of claim 11, wherein the calculating of the subsequent movement position calculates the subsequent movement position by adding a present position and a product of a distance and the predetermined acceleration constant, the distance being obtained by deducting the present position from the movement target position.

13. The method of claim 11, wherein when the calculated subsequent movement position and the movement target position are within a predetermined distance range, the calculating of the subsequent movement position adjusts the movement target

position to correspond to the subsequent movement position.

14. The method of claim 8, wherein the displaying includes:

determining whether the present position corresponds to the movement target position, and

when the present position corresponds to the movement target position, the displaying terminates the displaying of the movement of the screen.

15. A computer-readable recording medium storing a program for implementing the method of any one of claim 8 to claim 14.

FIG. 1

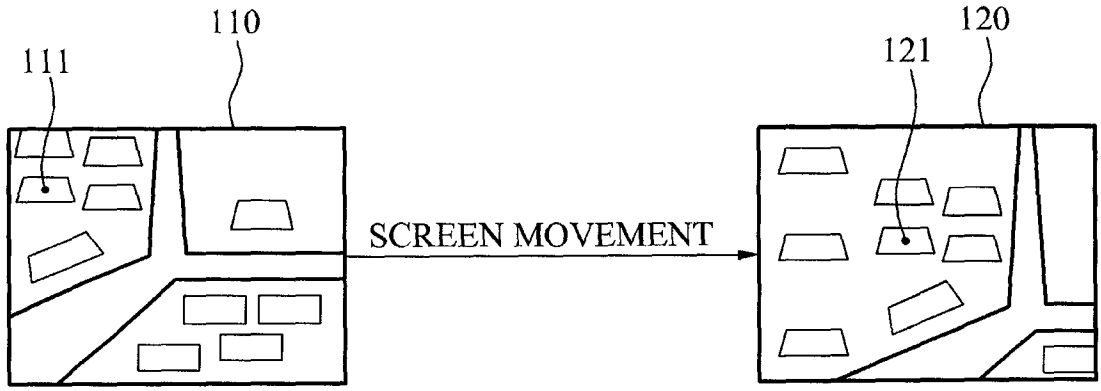


FIG. 2

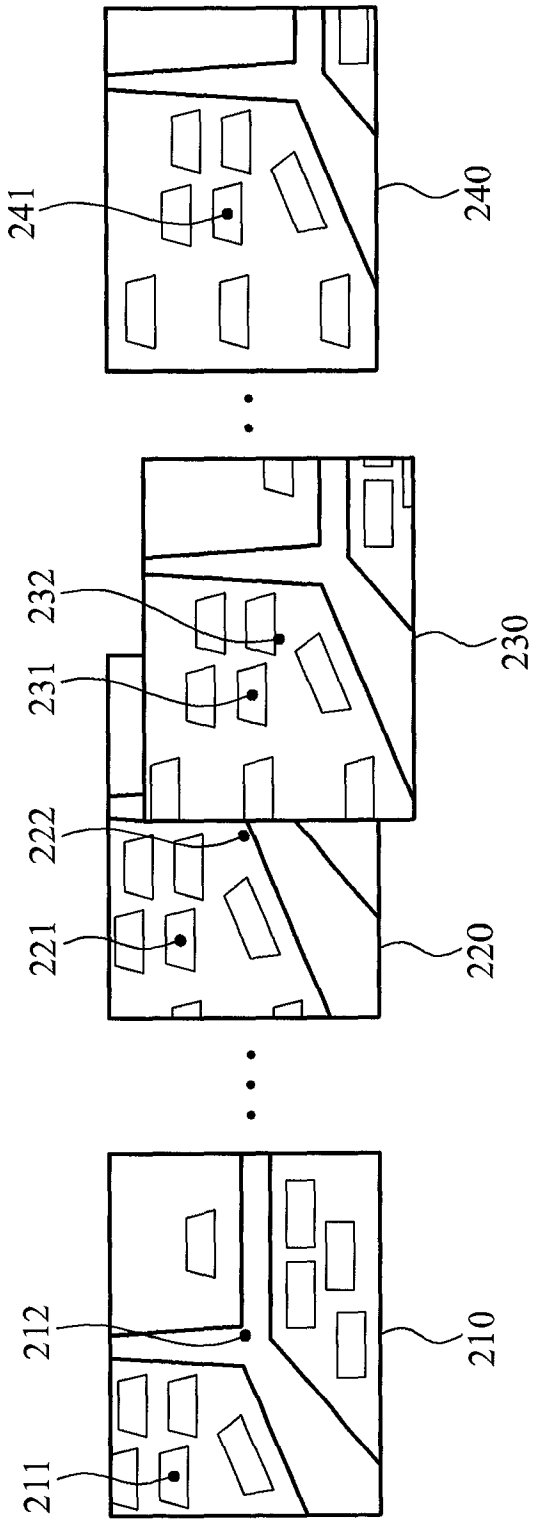


FIG. 3

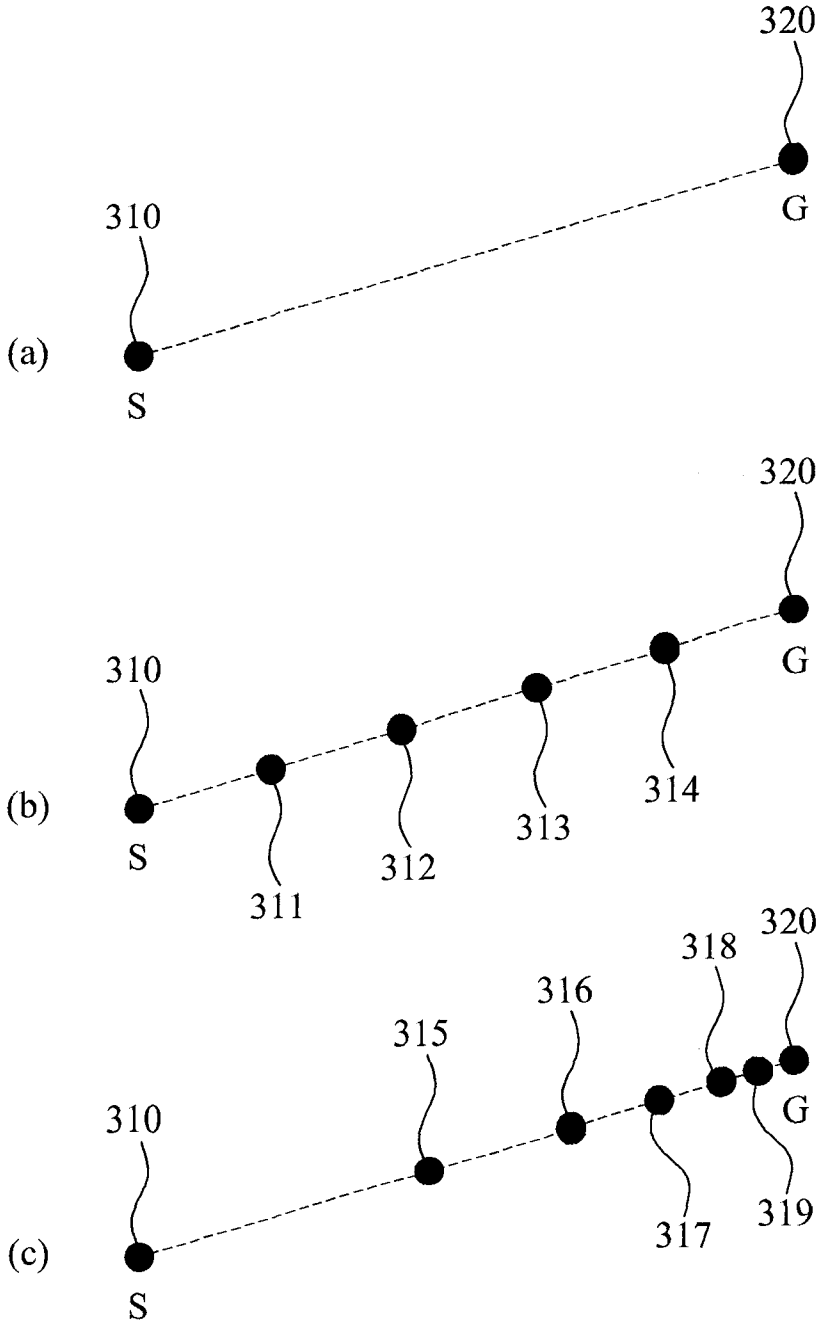

320
310
G
(a)
S
320
310
G
(b)
314
313
S
312
311
320
318
316
315
310
G
(c)
317
319
S

FIG. 4

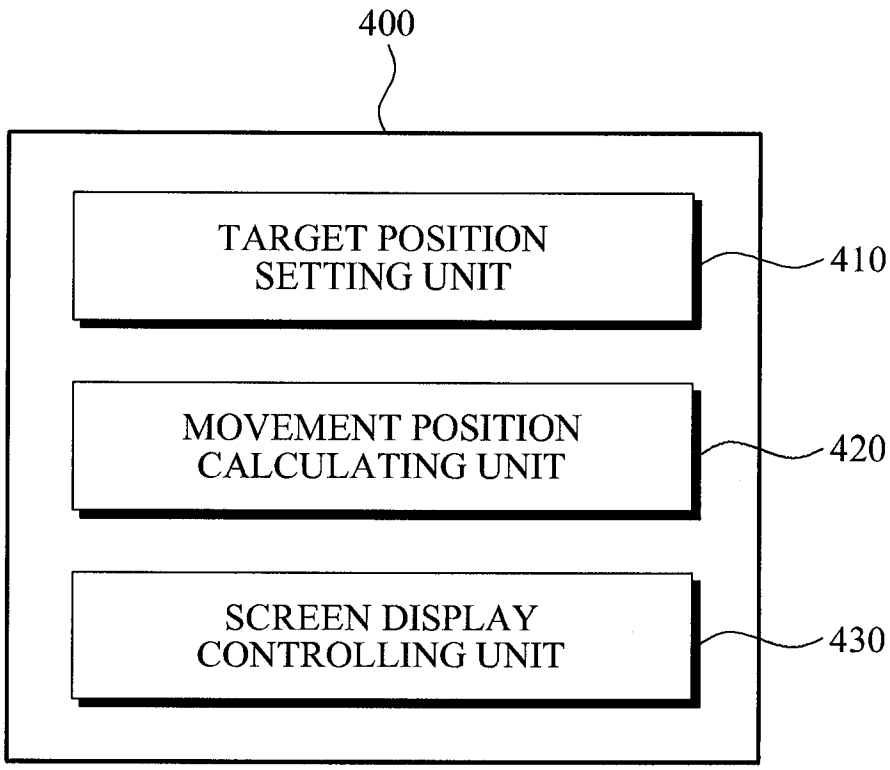

400
TARGET POSITION SETTING UNIT
410
MOVEMENT POSITION CALCULATING UNIT
420
SCREEN DISPLAY CONTROLLING UNIT
430

FIG. 5

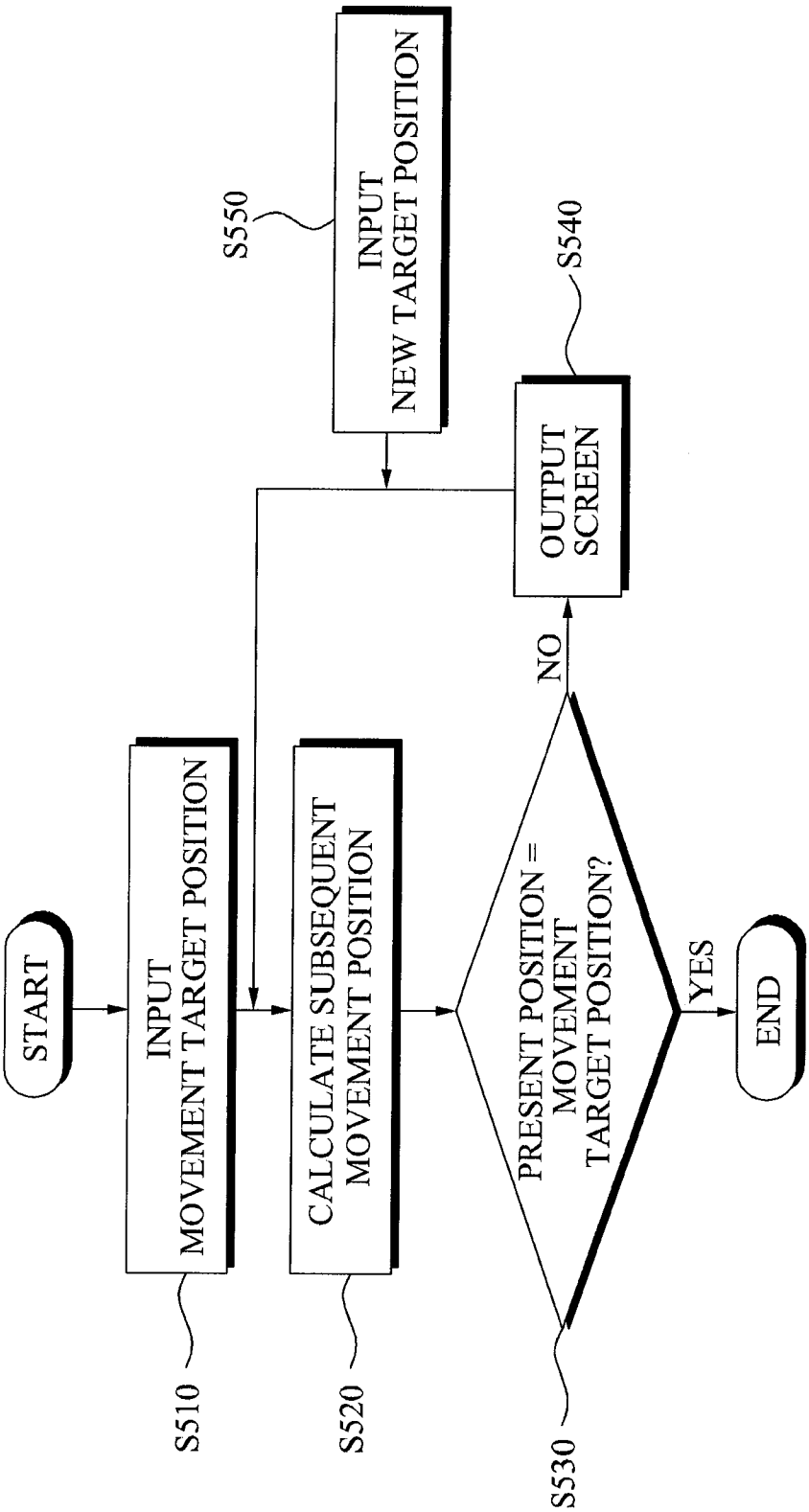
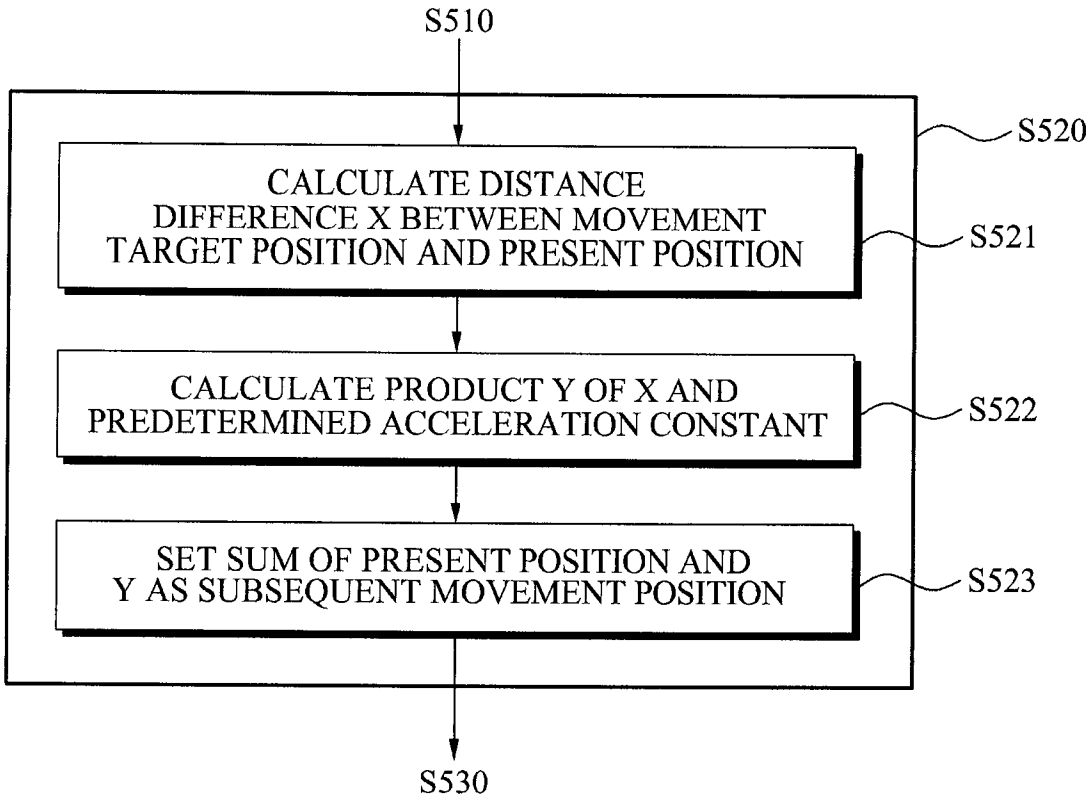

START
INPUT MOVEMENT TARGET POSITION
S510
CALCULATE SUBSEQUENT MOVEMENT POSITION
S520
PRESENT POSITION = MOVEMENT TARGET POSITION?
S530
NO
YES
OUTPUT SCREEN
S540
INPUT NEW TARGET POSITION
S550
END

FIG. 6


S510
S520
CALCULATE DISTANCE DIFFERENCE X BETWEEN MOVEMENT TARGET POSITION AND PRESENT POSITION
S521
CALCULATE PRODUCT Y OF X AND PREDETERMINED ACCELERATION CONSTANT
S522
SET SUM OF PRESENT POSITION AND Y AS SUBSEQUENT MOVEMENT POSITION
S523
S530

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/003793

A. CLASSIFICATION OF SUBJECT MATTER

G06F 3/041(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC : G06F G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO Internal) "MOVE", "IMAGE"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 6,957,389 B2 (FARADAY et al.) 18 October 2005 See abstract, claim 1, column 11 line 20 ~ column 11 line 38 and FIG.5	1, 7-8, 14-15 2-6, 9-13
A	EP 1837747 A1 (LG ELECTRONICS INC.) 26 September 2007 See abstract, claims 1, 4 and FIGS.2 and 5	1-15
A	US 2005/0223099 A1 (MORITA et al.) 6 October 2005 See abstract, claim 1 and FIGS.6-7	1-15
A	US 2003/0076301 A1 (TSUK et al.) 24 April 2003 See abstract, claim 1 and FIGS.10A and 10B	1-15

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 JANUARY 2009 (22.01.2009)	**22 JANUARY 2009 (22.01.2009)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

LEE, Cheol Soo

Telephone No. 82-42-481-8525

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/003793

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6,957,389 B2	18.10.2005	US 7165212 B2	16.01.2007
		US 7197710 B2	27.03.2007
		US 2002-0147740 A1	10.10.2002
EP 1837747 A1	26.09.2007	AU 2007-201241 A1	11.10.2007
		CA 2582738 A1	21.09.2007
		CN 101043685 A	26.09.2007
		JP 2007-257643 A	04.10.2007
		KR 10-2007-0096243 A	02.10.2007
US 2005-0223099 A1	06.10.2005	None	
US 2003-0076301 A1	24.04.2003	AU 2002-337950 A8	06.05.2003
		AU 2002-337950 A1	06.05.2003
		CN 101034328 A	12.09.2007
		CN 1668992 A	14.09.2005
		EP 1438651 A2	21.07.2004
		EP 1438719 A2	21.07.2004
		EP 1440430 A1	28.07.2004
		EP 1440430 A4	05.01.2005
		JP 2005-507112 A	10.03.2005
		JP 2007-141272 A	07.06.2007
		JP 2008-251053 A	16.10.2008
		JP 2008-262595 A	30.10.2008
		KR 10-2004-0048942 A	10.06.2004
		KR 10-2007-0061598 A	13.06.2007
		KR 10-2008-0018243 A	27.02.2008
		US 7312785 B2	25.12.2007
		US 2003-0076306 A1	24.04.2003
		US 2003-0095096 A1	22.05.2003
		US 2007-085841 A1	19.04.2007
		US 7046230 B2	16.05.2006
		WO 03-036457 A2	01.05.2003
		WO 03-036457 A3	27.11.2003
		WO 03-036611 A1	01.05.2003
		WO 03-036642 A2	01.05.2003
		WO 03-036642 A3	27.11.2003
		WO 03-036642 A9	10.07.2003