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Case Number: T 0408/04 - 3.5.01

Application Number: 97920008.6

Publication Number: 0829043

IPC: G06F 3/033, G06K 11/16

Language of the proceedings: EN

Title of invention:
Object position detector with edge motion feature and gesture recognition

Applicant:
SYNAPTICS, INCORPORATED

Opponent:
-

Headword:
Edge motion/SYNAPTICS

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step - all requests (no)"

Decisions cited:
-

Catchword:
See points 8 to 10 of the Reasons

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Case Number: T 0408/04 **-** 3.5.01

D E C I S I O N
of the Technical Board of Appeal 3.5.01
of 21 September 2007

Appellant: SYNAPTICS, INCORPORATED
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 14 October 2003 refusing European application No. 97920008.6 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: S. Steinbrener
Members: W. Chandler
G. Weiss

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division to refuse the application on the ground that claim 1 of the main and auxiliary requests did not involve an inventive step (Article 56 EPC) over WO-A-96/07966 (D2) and PAJ of JP-A-07 072976 (D3).

II. In the statement of grounds of appeal, the appellant requested that the decision be set aside and that a patent be granted on the basis of a single amended main request.

III. In the communication accompanying the summons to oral proceedings, the Board summarised the issues to be discussed, namely the essential question of inventive step and, in particular, whether there was any motivation for the skilled person to combine the teachings of D2 and D3. In response, the appellant filed a slightly amended main request and first and second auxiliary requests as well as a translation of JP-A-07 072976 (referred to as D3'').

IV. At the oral proceedings, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main and first and second auxiliary requests, filed with the response to the communication, dated 7 August 2007, or alternatively on the basis of claims 1 to 9 of the third auxiliary request submitted at the oral proceedings. At the end of the oral proceedings, the Chairman announced the decision.

V. Claim 1 of the main request reads as follows:

"A method for providing electrical cursor motion signals for moving a cursor on a display screen associated with a computer in response to electrical signals representing the position an object (8) [sic] sensed on a sensing plane, said sensing plane being smaller than said display screen, the method including the steps of:

providing a sensing plane (10) including an inner region bounded by an outer region, and

sensing the presence of said object (8) on said sensing plane (10) and

generating present-position signals representing the present position of said object on said sensing plane;

sensing whether said object (8) is in said outer region (242) of said sensing plane (10);

generating first cursor motion signals for moving the cursor if said object is not in said outer region of said sensing plane, said first cursor motion signals being for moving said cursor in a direction on the display screen representing the difference between a previous position of said object and said present position of said object reported by said present-position signals;

generating second cursor motion signals different from said first cursor motion signals for moving said cursor if said object is in said outer region of said sensing plane, characterised in that:

said second cursor motion signals are for incrementally moving said cursor on the display screen a selected distance in a direction corresponding to a

direction perpendicular to the edge of said sensing plane (10) to which said object (8) is proximate."

Claim 1 of the first auxiliary request essentially qualifies that the directions involved are the X and Y directions, i.e. in a Cartesian co-ordinate system.

Claim 1 of the second auxiliary request adds to claim 1 of the main request the feature:

"wherein when said object (8) is proximate to two edges near a corner of said sensing plane said predetermined direction is a combination of the two directions respectively corresponding to the directions perpendicular to the two edges of said sensing plane to which said object is proximate."

Claim 1 of the third auxiliary request is the same as claim 1 of the first auxiliary request with the characterising feature replaced by:

"said second cursor motion signals comprise second X or Y cursor motion signals for incrementally moving said cursor on the display screen a selected distance in only one of the +X,-X,+Y and –Y directions representing the direction to the edge of said sensing plane (10) to which said object (8) is proximate, no second cursor motion signals being generated to move said cursor in a direction parallel to the edge to which said object (8) is proximate, except when said object (8) is proximate to two edges near a corner of said sensing plane in which case said second cursor motion signals comprise second X and Y cursor motion signals for incrementally moving said cursor on the display screen a selected

distance in a direction that is a combination of the two directions respectively perpendicular to the two edges of said sensing plane to which said object is proximate."

VI. The appellant argued essentially as follows:

D2 explained that the radial edge motion feature was provided to enable the user of a touch pad equipped computer to make large movements of the cursor on screen with a small touch pad more easily. Radial edge motion solved that problem - the user moved the sensor object (e.g. a finger) to the outer region of the touch pad. This caused the edge motion feature to be enabled and large movements became easy - the user simply held the object in the outer region and the cursor moved rapidly around the screen. The cursor could be steered by moving the object around the outer region of the sensing plane to change the direction of motion of the cursor. On the face of it, the problem of enabling the user to make large movements on screen easily was solved.

The inventors determined that in a number of actions in the use of modern software and operating systems, the radial edge motion scheme of D2 was inconvenient to the user and hard for the user to control. These actions included:

- dragging an icon to a recycle bin in graphical user interfaces (GUI) using windows, icons, mouse and pointer (WIMP);
- selecting a block of cells in a spreadsheet;
- navigating pull down menus.

That determination would not have been a simple observation for the skilled person - it required a detailed investigation of the behaviour of the edge motion feature in many different circumstances and situations to perform many different tasks.
In this art, it was generally not immediately apparent what behaviour of the cursor in response to user actions would be most comfortable and intuitive to the user. The purpose of the sensing plane and accompanying control logic was to translate the user's movements into screen actions that reflected the user's intentions and that was not an easy task. This was recognised in D2 at page 38, line 24 to page 39, line 2. The inventors there explained that a variation originally thought to be an improvement, variable glide speed, turned out in practice not to be practicable to the user.

The present inventors realised that the difficulties of radial edge motion (as disclosed in D2) in the above-mentioned actions arose from the fact that as the object moves from the inner zone of the sensing plane to the outer zone, the behaviour of the device effectively changed from being a relative position device to being an absolute position device. This could be explained with reference to Equations 9, 10, 12 and 13 of D2. In Equations 9 and 10, the inner cursor movement signals for the inner zone were defined. These signals were wholly dependent on the difference between a past and the current position of the object. The absolute positions did not matter. Thus, for example, if the user made a short horizontal movement in the upper left hand side of the sensing plane the cursor moved in exactly the same way as if the same movement

were made in the lower right hand side of the sensing plane. However, Equations 12 and 13, which defined the cursor motion signals when the object was in the outer zone, had a component dependent on the difference between the current object position and a focal point - the centre of the sensing plane. Thus, for example if the user made a horizontal movement ending in the upper part of the right hand side outer zone, the edge motion would be up and rightwards. The same movement carried out in the lower part of the screen would initially have the same effect but when the object entered the outer zone in its lower part, the edge motion would be down and right.
The cursor motion signals were incremental updates of the cursor position and were reported e.g. 40 times per second as stated at page 29, lines 4 to 5 of the application. This was ΔX and ΔY in Equations 12 and 13, but the co-ordinate system was not binding. The speed of movement in the edge region was not necessarily constant, and use of the term "selected distance" in claim 1 covered embodiments with different speed profiles, e.g. exponential.

Nowhere in D2 was the effect on the user of the change from relative to absolute position appreciated. Thus, formulation of the problem to be addressed by the present invention as "to solve the prior art problem of obtaining orthogonal cursor motion" (reasons for the decision, section 2-2, second paragraph, second sentence) incorporated elements of the solution in a way prohibited by T 229/85 as well as many other decisions.
Furthermore, the problem of the cursor drifting off the horizontal and vertical directions was only a problem

for novice users. The skilled person would not have considered this as a difficulty, but would have worked round it by more accurate finger positioning. The problem was thus concealed and required inventiveness to see it.

Even if the problem had been perceived, the skilled person would not have contemplated the possibility of a solution lying in D3 for the reasons given in full in the grounds of appeal.
It was not even clear that D3 disclosed the claimed solution to the problem because the description of the scrolling was ambiguous. In particular, paragraphs 4, 7 and 9 and claim 1 described that when the pen was pointed in the side areas, the cursor moved orthogonally as in the present invention, but Figure 3 stated only that the screen was scrolled in this direction. Moreover, paragraphs 7 and 9 of the specification were subsequently amended to state that the screen was scrolled. This seemed the more likely meaning given that the object of D3 was to provide a mouse-like function.

There were also many other possible solutions. It was not immediately obvious to discard the radial motion; the skilled person could play with other parameters such as the size of the edge region or the speed profile in the edge region. There were also other possible motions in the edge region that might be more advantageous in some situations, such as continuing motion in the direction it was prior to entry into the edge region, but with higher speed.

Thus, there were a number of hindrances, which, if not a roadblock, when taken in combination would have prevented a skilled person from arriving at the invention.

Reasons for the Decision

1. As explained by the appellant (see point VI, above), the application relates to a cursor control device to replace a mouse on a personal computer, in particular a touch sensor that is operated using finger strokes such as is found on many laptop computers. It concerns the general problem of moving the cursor over a large distance using only a small sized touch sensor. This is achieved by dividing the sensor area into an inner region and an outer region and using "orthogonal edge motion" when the user's finger is in the outer region, whereby the cursor moves left, right, up or down, depending on where the finger is in the outer region (see pages 35 to 41).

2. During the oral proceedings, the Board expressed doubts that the definition of the directions and motions in claim 1 of the main and second auxiliary requests was clear and that the deletion of the originally claimed qualification that the motion was in the X and Y direction (see e.g. original claims 6 and 9 relating to the orthogonal edge motion aspect) was an allowable amendment under Article 123(2) EPC. There was also some doubt about whether claim 1 without this qualification was distinguished over a prior art sensing plane of D2 that happened to be circular. The Board also had doubts whether the definition of the movement when the user's

finger was in the corner regions was not an essential feature missing from claim 1 of the main and first auxiliary requests. Although this was claimed in the second auxiliary request, the Board had doubts about the clarity of this feature.

3. The appellant therefore submitted a third auxiliary request to address all of these problems. The Board accepted this request since the amendments were a result of the discussion during the oral proceedings and were readily understandable and raised no new objections.

4. In view of the potential problems with the higher order requests, the Board prefers first to discuss claim 1 of the third auxiliary request, which is the clearest and most limited.

5. It is common ground that D2, by the same applicant, discloses the general idea of edge motion. In D2, the direction of cursor motion is the same as that of the finger from the centre of the pad (page 36, lines 21 to 22), so called "radial edge motion". This is also mentioned in the present application (page 38, lines 15 to 16).

6. It is also common ground that the edge motion of the invention differs from that in D2 in that the motion direction is only left, right, up or down, depending on where the finger is in the outer region (page 39, lines 8 to 10), so called "orthogonal edge motion". This is essentially the first part of the characterising part of claim 1. The remainder of this feature specifies that when the user's finger is in the

corner of the edge region, the motion is "a combination of the two directions respectively perpendicular to the two edges of said sensing plane to which said object is proximate". However in the Board's view, D2 implicitly discloses this feature at page 36, lines 1 to 9, from which it is apparent that if the user's finger is in any part of the outer zone the motion is given by Equations 12 and 13, namely always a combination of the X and Y directions. Thus, the Board considers that claim 1 differs from D2 only by the feature of the orthogonal edge motion.

7. The appellant considers that the division impermissibly incorporated elements of the solution when they posed the problem solved by the invention as "obtaining orthogonal cursor motion" at the end of point 2.2 of the reasons. However, the Board assumes that, despite this unfortunate phrasing, the division had a different problem in mind, namely that stated at the beginning of the last paragraph of point 2.1 of the decision, namely performing precise horizontal or vertical cursor movements over longer distances on the screen. This problem was derived from the application at page 39, lines 3 to 7. However, the Board judges that even this problem may be too specific in that it identifies the horizontal and vertical movements, and prefers a more general formulation of the problem as providing a more useful movement in the edge region.

8. The appellant argues that deriving this problem was "not a simple observation" and required a detailed investigation of the behavior of the edge motion feature in many different circumstances and situations to perform many different tasks. However, the Board

considers that in the commonly found situation of selecting cells in a spreadsheet, mentioned by the applicant, where horizontal and vertical movements of the cursor are generally required, it would in fact be a simple observation to notice that the cursor was drifting off the desired column or row when the finger was in the edge region. The Board considers that the skilled person would necessarily be aware of a problem such as the present one involving an inconvenience that comes to light in an everyday situation.

9. The appellant also goes into some detail as to the nature of the invention being the effect of a change from "relative to absolute position". However, as mentioned above, the Board considers that the skilled person would recognise the problem in everyday use and not via these theoretical considerations, which serve rather to explain it afterwards. Nevertheless having seen the problem, the Board considers that the skilled person would have no difficulty in understanding why it arose and would be in a position technically to implement other solutions.

10. The Board does not agree that only the user would see this problem and not the skilled person. The Board considers that the skilled person would be aware of problems experienced by users in the field of his expertise so that the problems recognisable by a novice are a subset of those recognised and evaluated by the skilled person. Notwithstanding this, the Board also disagrees that the skilled person would not consider modifying the radial motion, but would work around and instruct users to work around it. In the Board's view, the skilled person would generally always consider the

possibility of solving a problem of inconvenient use by finding a technical solution.

11. Faced with the problem that the cursor is not moving where it is supposed to move, the Board considers it to be an obvious solution to modify the system to move how it is supposed to be moving. The solution of course depends on the actual application with which the user is concerned. The appellant essentially suggested that there were many possibilities so that orthogonal motion was not suggested. However, the user generally wants horizontal and vertical movements in a large class of applications, including a spreadsheet as mentioned above. The Board considers that in these cases it would be obvious to modify the edge movement known from D2 to move in these directions, i.e. to provide orthogonal edge motion, as claimed.

12. The fact that the skilled person might also play with other parameters, e.g. the speed profile and size of the outer regions are less directly connected to the problem of the cursor drifting off horizontal and vertical directions, and thus do not change the above finding.

13. Accordingly, the subject-matter of claim 1 of the third auxiliary request lacks an inventive step (Article 56 EPC).

14. Since under any sensible interpretation, claim 1 of the main and first and second auxiliary requests is broader that that of claim 1 of the third auxiliary request, the claimed subject-matter must lack an inventive step for the same reasons (Article 56 EPC).

15. There being no further requests, it follows that the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

T. Buschek S. Steinbrener