

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 April 2006 (27.04.2006)

PCT

(10) International Publication Number
WO 2006/042417 A1

- (51) International Patent Classification:
G06F 3/00 (2006.01) G06F 3/02 (2006.01)
G06F 3/14 (2006.01)
- (21) International Application Number:
PCT/CA2005/001622
- (22) International Filing Date: 20 October 2005 (20.10.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/619,956 20 October 2004 (20.10.2004) US

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

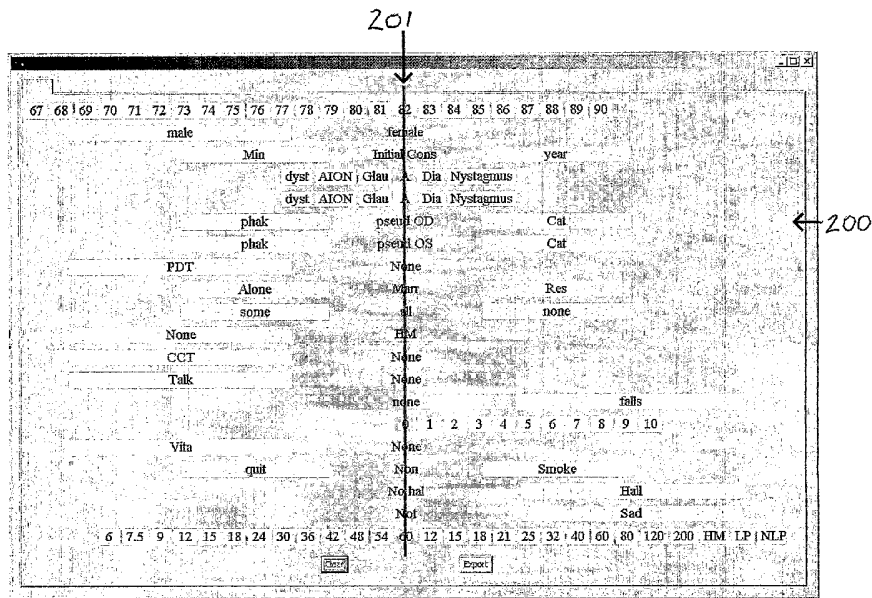
- (71) Applicants and
- (72) Inventors: JACKSON, Mary, Louise [CA/CA]; 408 Newport Avenue, Victoria, British Columbia V8S 5C5 (CA). WILLMS, Evan, Lee, Jackson [CA/CA]; 408 Newport Avenue, Victoria, British Columbia V8S 5C5 (CA).
- (74) Agent: GREEN, Bruce, M.; Oyen Wiggs Green & Muttala, 480-601 West Cordova Street, Vancouver, British Columbia V6B 1G1 (CA).

(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, HU, IE, IS, IT, LT, LU, LV, MC, NL, 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

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: GRAPHICAL INTERFACE FOR REPETITIVE DATA ENTRY AND DATA VISUALIZATION



(57) Abstract: A method, apparatus, and system for entering repetitive data pertaining to a domain are described. A graphical interface is provided through which the user is able to continuously move, passing over data elements to select them. Most common data elements are arranged on one axis and a secondary axis is created according to domain specific variables. When entering data one gains feedback according to each of these axes and also creates a graphical pattern which presents a visual summary. Previously entered data can be retrieved and displayed on an electronic display. Multiple entries viewed simultaneously provide visual summation of data and data associations.

WO 2006/042417 A1

GRAPHICAL INTERFACE FOR REPETITIVE DATA ENTRY AND
DATA VISUALIZATION

Cross-reference to Related Applications

5

This application claims priority from United States provisional application no. 60/619,956 filed October 20, 2004, which is pending.

Technical Field

10

This invention relates generally to data entry interfaces and methods for capturing and reviewing data. More specifically, the invention describes a graphical user interface on paper or displayed on or by an electronic device, which is appropriate for frequent, rapid entry of enumerated data and review of the data captured.

15

Background

The widespread adoption of electronic records has highlighted the bottleneck in data entry, especially in situations where time efficiency is a goal. Traditional data entry methods use drop down menus, default values and radio buttons for enumerated entry fields. Data entry remains tedious, time consuming and potentially error prone. Default fields may not be confirmed by users and data fields may be omitted, creating inaccurate and incomplete data sets. Users who are experienced and very familiar with the data elements in their domain can use more demanding interfaces in exchange for added value of feedback about the data which they have entered.

25

In domain specific applications, data entered often falls within a constrained set of observations from an event. Users are experienced and highly familiar with the process of entry and the data elements in the domain. What is required is a user interface that provides a tool for frequent, rapid entry of constrained, enumerated observations which avoids defaults and ensures that all data elements are entered and offers useful feedback about the event to the user.

35

- 2 -

The foregoing examples of the related art and limitations related thereto are intended to be illustrative and not exclusive. Other limitations of the related art will become apparent to those of skill in the art upon a reading of the specification and a study of the drawings.

5

Summary

The following embodiments and aspects thereof are described and illustrated in conjunction with systems, tools and methods which are meant to be exemplary and illustrative, not limiting in scope. In various embodiments, one or more of the above-described problems have been reduced or eliminated, while other embodiments are directed to other improvements.

The invention therefore provides a system and method for a user to enter data pertaining to a domain, comprising: a) providing a graphical interface comprising a plurality of discrete, linearly aligned rows of spatial elements, each spatial element marked to represent a data option, the data options within each linearly aligned row being mutually exclusive, wherein each row is aligned parallel to a first axis; b) the user selecting a set of data options by continuously passing over individual spatial elements in each successive row to thereby select the set of data options thereby moving over successive rows in a direction having a component perpendicular to the first axis; wherein selection of a data option results in a spatial element being visually indicated, the selection of data options thereby creating a graphical pattern on the interface. According to one aspect the rows are shifted such that the data option which is the statistical mode of each row is located on a common axis perpendicular to the first axis. The data options may be ordered qualitatively within each said row with respect to a domain-specific criterion. The first axis may horizontal. The graphical interface may be a sheet of paper or an electronic interface such as a computer screen.

30

The invention described herein pertains to a data entry process, which is efficient for the frequent entry of constrained observations and review of data by experienced users who are domain experts. In one embodiment a user interface with rows of horizontally arranged data elements is described. The flow of the

- 3 -

work process for the user is supported by enumerating all options for a data element in a horizontal row, with the set of horizontal data elements tiled vertically down a page. The data options are ordered qualitatively within the row with respect to a domain-specific criterion along the horizontal axis. Horizontal rows are shifted such that the option that is the statistical mode of each row is placed a
5 on a vertical axis common to all displayed rows.

A user can select options by continuously moving down the page, passing through a single option for each data element. Alternatively, individual options
10 may be selected independently, in an additive or exclusive manner as determined by element properties.

A leading cursor can be used to visually assist the user to read down the vertical expanse of the page.

15 In the graphical interface, a method is presented such that upon a continuous entry process, feedback is obtained as data is entered. The sequence of data elements selected creates a pattern. A selection of all the most common data options will according to one embodiment create a pattern that is a single
20 vertical line down the page. The selection pattern gives a visual overview of the qualitative property of the pattern as defined by the horizontal axis. The selection pattern also gives a visual indication of the commonality of the pattern by the deviation from the vertical axis. A data set may be retrieved from storage and have its pattern displayed on the interface. Multiple patterns may be overlaid on
25 a single interface to provide both quantitative and qualitative comparisons.

In addition to the exemplary aspects and embodiments described above, further aspects and embodiments will become apparent by reference to the drawings and by study of the following detailed descriptions.

30

Brief Description of Drawings

- 4 -

Exemplary embodiments are illustrated in referenced figures of the drawings. It is intended that the embodiments and figures disclosed herein are to be considered illustrative rather than restrictive

5 FIG. 1 shows an exemplary interface in the form of a sheet of paper for data entry in a vision rehabilitation domain.

FIG. 2 shows an illustration of the data entry process for selecting a sequence of data elements in accordance with an embodiment of the invention displayed on a
10 computer screen.

FIG. 3 and 4 are views of computer screens as shown in Fig. 2 illustrating different data sets each of which would provide feedback during data entry and summary after data has been entered.

15 FIG. 5 shows a summary of multiple data sets in accordance with the embodiment of the invention as shown in Fig. 2.

FIG. 6 shows a summary of many data sets using an intensity map.
20

Description

Reference will now be made in detail to a preferred embodiment of the invention. An example of the preferred embodiment is illustrated in the accompanying drawings. Well known elements may not have been shown or described in
25 detail to avoid unnecessarily obscuring the disclosure. Accordingly, the description and drawings are to be regarded in an illustrative, rather than a restrictive, sense. While the invention will be described in conjunction with a preferred embodiment, it will be understood that it is not intended to limit the
30 invention to one preferred embodiment. To the contrary, it is intended to cover alternatives, modifications, and equivalents as may be included within the scope of the invention as defined by the appended claims.

- 5 -

With the rapid advancement in the ability to capture data, domains such as healthcare have great advantage to be realized by holding accurate and complete data, which can be reviewed to assess and direct interventions. Obtaining feedback as data is being entered empowers the user to create new knowledge and this can direct subsequent formal data mining. Therefore the invention described herein is well suited for providing an efficient and value added user interface for entering repetitive data elements.

In one embodiment, shown in Fig. 1, a strategically ordered graphical user interface on a sheet of paper 100 is provided that facilitates a user data entry procedure. The user can group and organize data elements in two dimensions. In this embodiment, each data element is presented as a horizontal row of options, for example, the top line of Fig. 1 is a data string of patient age (101). Data elements are grouped such that each grouping is composed of mutually exclusive options, so that only one selection is made per group. The vertical axis is used for sequencing of entry and the horizontal axis is used to qualitatively indicate medical wellness, decreasing from left to right. In Fig. 1, for example, the visual acuity row (102) has 6/6 on the left, which is normal vision and NLP representing no-light-perception on the right, which is the poorest visual function. Furthermore, each horizontal row has the modally common element placed centrally. For example, A on the diagnosis row (103) represents age related macular degeneration which is the most common diagnosis and therefore, is centered in the diagnosis row. The most common data set that occurs on the interface is a series of selections straight down the center horizontal axis (see line 201 in Fig. 2).

25

In the embodiment shown in Fig. 1, the organized data elements are printed by the application onto a standard sheet of paper 100. The same data elements may be presented in the same layout as the computer screen application in Fig. 2, however positional calibration and identification marks 104 are added. Data options can now be selected by crossing the descriptor with a visible marking implement like a pencil which passes over the option such that the mark starts at the top and continues to the bottom of a data option 105. One can sequentially pass over several data choices, therefore the entire sheet can be completed (one selection per grouping) with a single drawn line. Should an incorrect option be

30

- 6 -

marked, the selection can be nullified by marking the option across the horizontal (106), and selecting another option in the grouping with a vertical mark (107). The marked sheet is then scanned and captured in digital form. The digital image is then automatically evaluated with the assistance of the printed calibration marks
5 (104) and the data set is exported to a database.

In a second embodiment the interface is presented electronically (Fig. 2) on an electronic screen 200 or touch screen and exported to a database as required. In this particular embodiment, a continuous movement selects data in all fields to
10 represent a portion of the work process such as one portion of the medical exam. A leading cursor 301 (Fig. 3), 'speed reading cursor' or other graphical prompt may be used to assist and encourage the user to continuously read down the center of the screen. The user input device is typically a mouse or a stylus. The path of the mouse or stylus leaves the image of a line, such as 201 or 403 (Fig. 4), on the
15 screen display. Data options which are not selected (401) are differentiated from those selected (402), for example, by highlighting the selected data option. Entering all data creates a graphical image which is a summary of the data set and apparent with visual appraisal of selected data elements and/or a line 403 drawn
20 through all of the selected data options.. This view of the graphical interface allows for both specific quantitative checks on single data options 402 as well as overall qualitative data impressions indicated by the path of the inclusive line 403. In the electronic embodiment of the invention, a subset only of the groupings may be displayed, based on the selection of the user.

25 Fig. 3 and 4 present contrasting data. Fig. 3 presents data from a patient with better visual functioning and the summary line 302 passing to the left side of the graphical interface, while Figure 4 presents a summary line passing to the right side representing poorer visual functioning. Furthermore, multiple data sets can be consecutively superimposed on a single interface, each with their respective
30 lines, or retrieved from memory in the electronic embodiment onto a single interface, allowing the user to gain knowledge from past data entries.

Various methods can be used by the user to display historical data to reflect the method by which the data was entered and preserve the visual advantages of

- 7 -

the described data entry method. Figure 5 illustrates display of two data sets on a single electronic interface. In this embodiment, two visits of the same patient are displayed, the initial consult displayed by a path 501 in a first color such as red, and the one year follow up by a path 502 in a second color such as blue. Options present in both paths are marked with a blending of path colors, in this case purple, at 503. The blue path 502 is generally to the right of the red path, visually indicating that this patient's medical well-being has decreased over time, as defined by the qualitative horizontal axis. In another embodiment, the interface could be used to filter the displayed data sets by selecting a particular option. Multiple selections from the same data option would be considered as Boolean OR filters whereas selections in separate options would be considered as Boolean AND filters. Thus, for example, a user may determine the number of times a particular data option has been selected in the course of multiple data entries.

While the display of multiple data sets as in Fig. 5 can be extended to more than two data sets, the information can become difficult to read if displayed in that way, in which case a further method of display using intensity mapping as illustrated in Fig. 6 may be used. Fig. 6 illustrates display of multiple data sets on a single electronic interface. In this embodiment, a large number of data sets are accessed, and display is filtered by selection of a single option, in this case whether the patient has fallen as marked by option 601, which could be colored purple for example. That is, the user can select only the data sets in which option 601 has been selected by selecting that option. Other data options are then color coded as to how many of the selected data sets also include them. Data options 602 that appear in many of the filtered data sets (e.g. >10) may be indicated by a color such as red. Data options 603 that appear in some of the filtered data sets (e.g. 5 -10) may be indicated in a color such as orange, and data options 604 that appear in a few of the filtered data sets (e.g. 1-4) may be indicated in a color such as green. Data options 605 that appear in none of the filtered data sets may be indicated in a default color such as cream.

Thus data is entered by selecting data options and data options may be selected or unselected by goal crossing. Multiple data options may be selected

continuously by crossing multiple goals. All the options selected in an interface compose a single data set.

5 Data entered electronically in this way may be displayed at a location to personnel other than the person who entered the data and may be displayed on a different user interface than the one on which the data was entered. The data is thus stored and retrieved to be reviewed on the interface described above, which thus allows the viewing party to select desired data composites and quickly interpret the data using to the visual clues described above.

10

Thus the data entry process provides feedback while entering, creates an image for review or summation, and then can either allow the data map to be scanned from the paper format or in the electronic format allow data options to be exported as desired. By tracing a path through selected options in an interface, the path creates a composite visual summary of the selected options in relation to the axial properties. Thus the graphical interface presents enumerated groupings of data options for interaction, wherein the organization of data options is by multiple axes. The axial distance of an option conveys additional information about the option.

20

According to either embodiment of the invention, a row of data options is not required to be labeled, or fully described in words. Single syllable data labels facilitate 'reading' quickly down the central vertical corridor as in speed reading techniques. Also, a data option may be represented by a user- recognized abbreviation or pictogram rather than a full textual description. The organization of the data elements on any axis can be altered, but the organization of the data elements on any axis is preferably determined by evaluating the property being measured on that axis. When required or desired, review of past data selections can be utilized to improve the arrangement of data elements.

25
30

The electronic interface described above can be displayed on a tablet computing device and data selection process can be conducted with a pen based selector, or on a computer with a pointing device such as a mouse. The same interface and data selection process can be conducted with a touch sensitive

display using a finger to make selections. The same interface and data selection process can be conducted with the interface printed to paper, marked with pen, and later captured by scanning technology. The same interface and data selection process can be conducted with a projected screen, in a heads-up or surface
5 projection format, with selection made by a remote pointing or gyroscopic gesturing device.

The electronic interface described above can also be used to retrieve from memory and passively display previously entered data on any suitable electronic
10 display, including computer screen, personal digital assistant, cell-phone, projector, or a heads-up display, to permit individuals to subsequently view stored data sets in the same advantageous way. For example, an emergency room physician can wear a heads-up display, and he is able to view a display of patients' data which has been previously entered on the interface as described above to
15 thereby quickly understand the significance of the previously-entered data, without any need to enter data himself.

While a number of exemplary aspects and embodiments have been discussed above, those of skill in the art will recognize certain modifications, permutations, additions and sub-combinations thereof. It is therefore intended that
20 the following appended claims and claims hereafter introduced are interpreted to include all such modifications, permutations, additions and sub-combinations as are within their scope.

WHAT IS CLAIMED IS:

1. A method for a user to enter data pertaining to a domain, comprising:
 - a) providing a graphical interface comprising a plurality of discrete, linearly aligned rows of spatial elements, each spatial element marked to represent a data option, said data options within each linearly aligned row being mutually exclusive, wherein each row is aligned parallel to a first axis;
 - b) said user selecting a set of data options by continuously passing over individual spatial elements in each successive row to thereby select said set of data options thereby moving over successive rows in a direction having a component perpendicular to said first axis;wherein selection of a data option results in a spatial element being visually indicated, said selection of data options thereby creating a graphical pattern on said interface.
2. The method of claim 1 wherein rows are shifted such that the data option which is the statistical mode of each row is located on a common axis perpendicular to said first axis.
3. The method of claim 1 wherein data options are ordered qualitatively within each said row with respect to a domain-specific criterion.
4. The method of claim 1 wherein said first axis is horizontal.
5. The method of claim 1 wherein said graphical interface is a sheet of paper.
6. The method of claim 1 wherein a spatial element is visually indicated by marking with a device for marking paper.
7. The method of claim 1 wherein said graphical interface is an electronic display.
8. The method of claim 7 wherein said data options are selected by movement of a cursor.

- 11 -

9. The method of claim 7 wherein said data options are selected by movement of a computer mouse.
- 5 10. The method of claim 7 wherein said electronic display is a heads-up display.
- 10 11. A system for a user to enter data pertaining to a domain comprising a display comprising a plurality of discrete, linearly aligned rows of spatial elements, each spatial element marked to represent a data option, said data options within each linearly aligned row being mutually exclusive, wherein each row is aligned parallel to a first axis;
whereby said user selects a set of data options by continuously passing over individual spatial elements in each successive row to thereby select said set of data options thereby moving over successive rows in a direction having
15 a component perpendicular to said first axis; and
wherein selection of a data option results in a spatial element being visually indicated, said selection of data options thereby creating a graphical pattern on said interface.
- 20 12. The system of claim 11 wherein rows are shifted such that the data option which is the statistical mode of each row is located on a common axis perpendicular to said first axis.
- 25 13. The system of claim 11 wherein data options are ordered qualitatively within each said row with respect to a domain-specific criterion.
14. The system of claim 11 wherein said first axis is horizontal.
15. The system of claim 11 wherein said graphical interface is a sheet of paper.
- 30 16. The system of claim 11 wherein a spatial element is visually indicated by marking with a device for marking paper.

- 12 -

17. The system of claim 11 wherein said graphical interface is an electronic display.
- 5 18. The system of claim 17 wherein said data options are selected by movement of a cursor.
19. The system of claim 17 wherein said data options are selected by movement of a computer mouse.
- 10 20. The system of claim 17 wherein said electronic display is a heads-up display.
- 15 21. An electronic display for displaying data pertaining to a domain comprising a plurality of discrete, linearly aligned rows of spatial elements, each spatial element marked to represent a data option, said data options within each linearly aligned row being mutually exclusive, wherein each row is aligned parallel to a first axis;
wherein selected data options are indicated by the associated spatial element being visually indicated, said selection of data options thereby creating a graphical pattern on said interface, and wherein rows are shifted such that the data option which is the statistical mode of each row is located on a common axis perpendicular to said first axis and data options are ordered qualitatively within each said row with respect to a domain-specific criterion.
- 20
- 25 22. The electronic display of claim 21 wherein said first axis is horizontal.
23. The electronic display of claim 21 wherein said electronic display is a heads-up display.

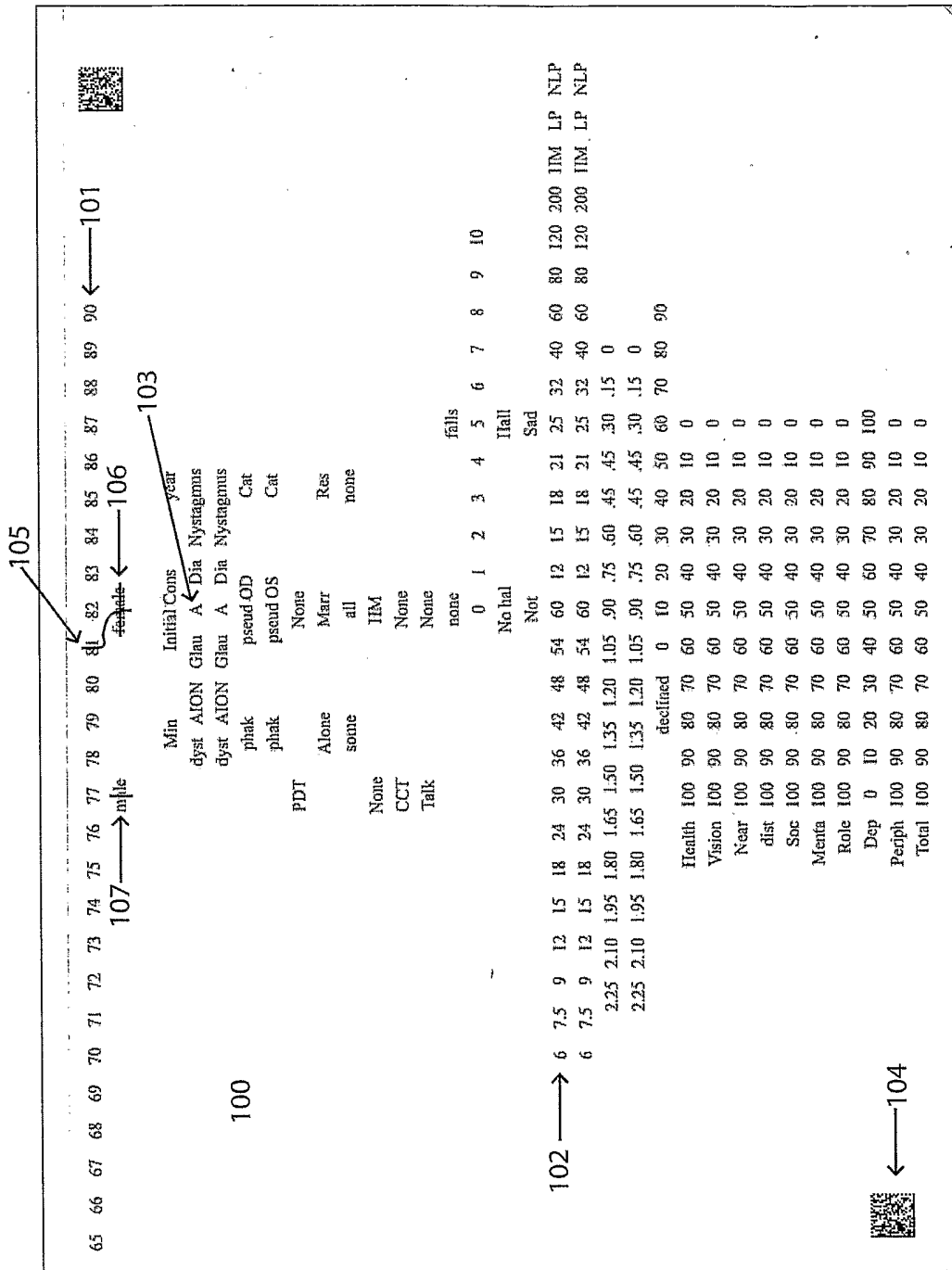


Figure 1

201 ←

← 200

| Year | Sex | Initial | Cons | Year | Sex | Initial | Cons | Year |
|------|------|---------|------|------|--------|---------|------|------|
| 67 | male | | | 80 | female | | | 90 |
| 68 | | | | 81 | | | | 88 |
| 69 | | | | 82 | | | | 89 |
| 70 | | | | 83 | | | | |
| 71 | | | | 84 | | | | |
| 72 | | | | 85 | | | | |
| 73 | | | | 86 | | | | |
| 74 | | | | 87 | | | | |
| 75 | | | | 88 | | | | |
| 76 | | | | 89 | | | | |
| 77 | | | | 90 | | | | |
| 78 | | | | | | | | |
| 79 | | | | | | | | |
| 80 | | | | | | | | |
| 81 | | | | | | | | |
| 82 | | | | | | | | |
| 83 | | | | | | | | |
| 84 | | | | | | | | |
| 85 | | | | | | | | |
| 86 | | | | | | | | |
| 87 | | | | | | | | |
| 88 | | | | | | | | |
| 89 | | | | | | | | |
| 90 | | | | | | | | |

male female

min Initial Cons Year

dyst AION Glau A Dia Nystagmus Cat

dyst AION Glau A Dia Nystagmus Cat

phak pseud OD Res

phak pseud OS none

PDT None Marr

None Alone all

CCT some HM

Talk None None

Vita None none

quit None none

0 1 2 3 4 5 6 7 8 9 10

Smoke falls

Hall

Sad

6 7.5 9 12 15 18 24 30 36 42 48 54 60 12 15 18 21 25 32 40 60 80 120 200 HM LP NLP

Export

Figure 2

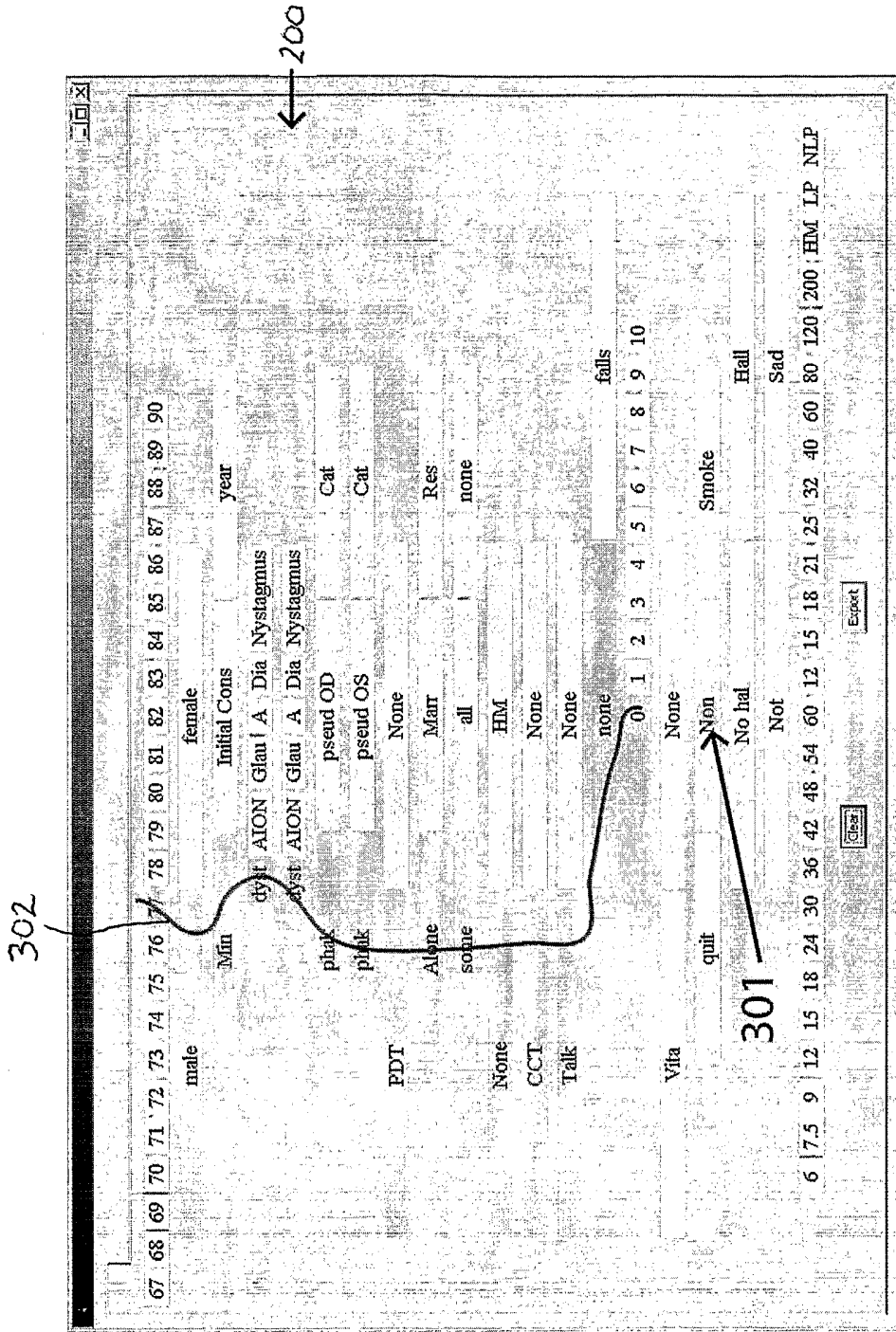


Figure 3

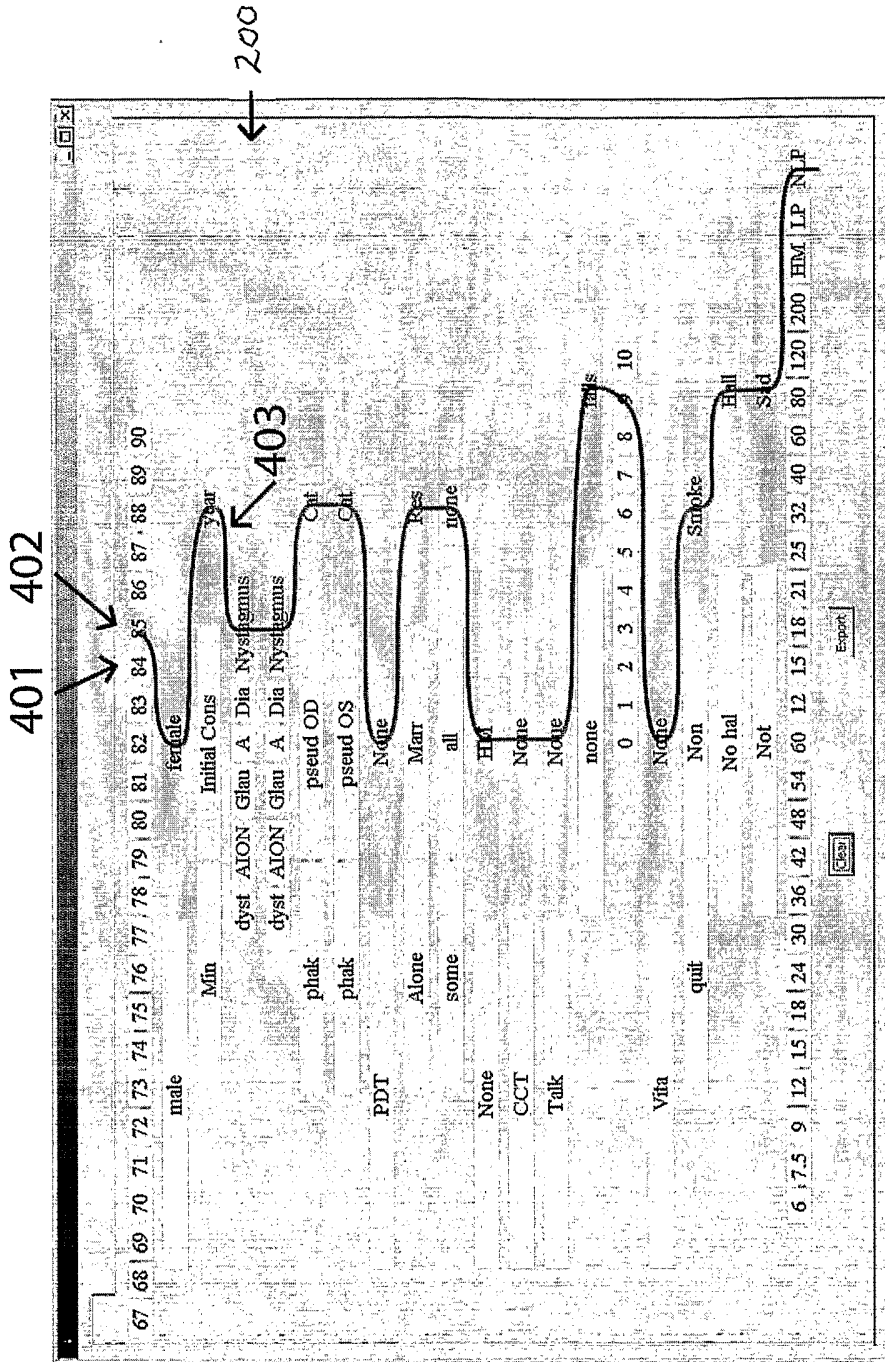


Figure 4

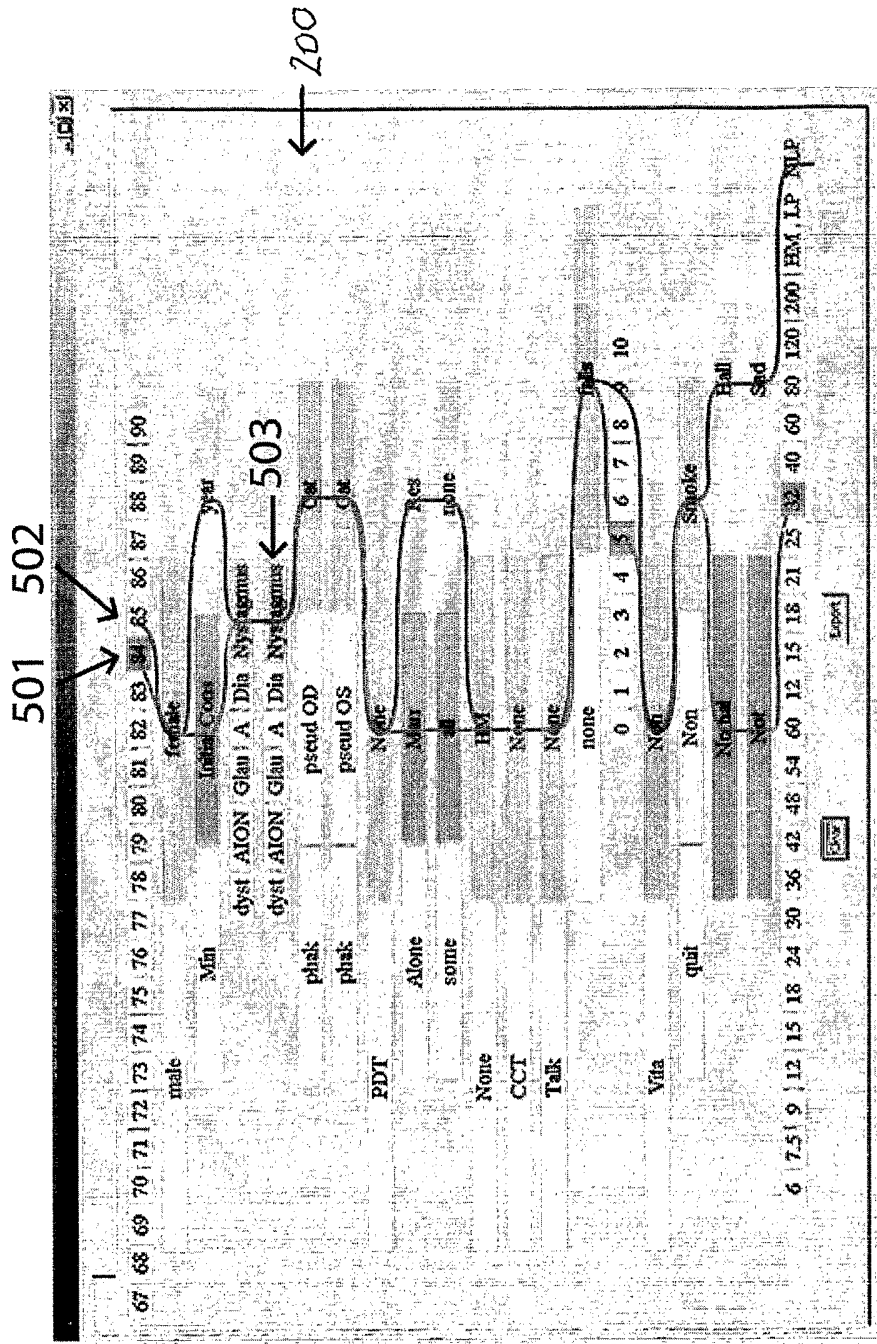


Figure 5

NoClick

66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

Min Initial Cons Year 602

dyst AION Glau A Dia Nystagmus
 dyst AION Glau A Dia Nystagmus

phak pseud OD Cat 601
 phak pseud OS Cat

PDT None
 None Mar Res
 some all none

None HM
 CCT None
 Talk None

Vita none falls 603

quit No:hal Smoke
 quit No:hal Hall
 quit No:hal Sad 604

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|----|----|----|----|-----|-----|----|----|----|----|----|----|----|-----|-----|----|----|-----|
| 6 | 7.5 | 9 | 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 12 | 15 | 18 | 21 | 25 | 32 | 40 | 60 | 80 | 120 | 200 | HM | LP | NLP |
| 6 | 7.5 | 9 | 12 | 15 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 12 | 15 | 18 | 21 | 25 | 32 | 40 | 60 | 80 | 120 | 200 | HM | LP | NLP |
| 2.25 | 2.10 | 1.95 | 1.80 | 1.65 | 1.50 | 1.35 | 1.20 | 1.05 | 90 | 75 | 60 | 45 | .30 | .15 | 0 | | | | | | | | | | | |
| 2.25 | 2.10 | 1.95 | 1.80 | 1.65 | 1.50 | 1.35 | 1.20 | 1.05 | 90 | 75 | 60 | 45 | .30 | .15 | 0 | | | | | | | | | | | |

Clear Export

200

Figure 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2005/001622

| <p>A. CLASSIFICATION OF SUBJECT MATTER IPC: G06F 3/00 (2006.01) , G06F 3/14 (2006.01) , G06F 3/02 (2006.01) According to International Patent Classification (IPC) or to both national classification and IPC</p> | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|--|--|---|--|---|--|--|---|--|------------|---|--|------------------|---|---|------------------|
| <p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC: G06F (2006.01)</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched</p> <p>Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used) Delphion, IEEE Xplore & keywords: graphic interface; graphical pattern/path; data entry/selection/option/input/capture/review/element; moving rows; enumerated/constrained observations; patient/healthcare data/info; navigate display/grid; heads-up.</p> | | | | | | | | | | | | | | | | | | | | |
| <p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X Y</td> <td>WO 01/77792 A2 (<i>Jules et al.</i>) 18 Oct. 2001 (18-10-2001) abstract; page 3 lines 8, 13; page 6 line 30 - page 7 line 8; page 9 line 13; page 10 line 15; page 11 lines 1-3; page 12 lines 16-20; page 13 lines 30, 31; claims 1, 7; Figs. 3-7</td> <td>1, 2, 4, 7-9, 11,12, 14, 17-19 3, 10, 13, 20-23</td> </tr> <tr> <td>Y</td> <td>US 2001/0054183 A1 (<i>Curreri</i>) 20 Dec. 2001(20-12-2001) [0031]</td> <td>3, 13, 21-23</td> </tr> <tr> <td>Y</td> <td>US 6,418,424 B1 (<i>Hoffberg et al.</i>) 9 July 2002 (09-07-2002) col. 112 lines 17-20, 51, 52</td> <td>10, 20, 23</td> </tr> <tr> <td>A</td> <td>WO 03/079137 A2 (<i>Modrovich</i>) 25 Sept. 2003 (25-09-2003) page 9 last par., page 10 third par. , claims 1-5, Fig. 3</td> <td>1-4, 7-14, 17-23</td> </tr> <tr> <td>A</td> <td>US 2004/0078236 A1 (<i>Stoodley et al.</i>) 22 Apr. 2004 (22-04-2004) [0134]</td> <td>1-4, 7-14, 17-23</td> </tr> </tbody> </table> | | | Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | X Y | WO 01/77792 A2 (<i>Jules et al.</i>) 18 Oct. 2001 (18-10-2001) abstract; page 3 lines 8, 13; page 6 line 30 - page 7 line 8; page 9 line 13; page 10 line 15; page 11 lines 1-3; page 12 lines 16-20; page 13 lines 30, 31; claims 1, 7; Figs. 3-7 | 1, 2, 4, 7-9, 11,12, 14, 17-19 3, 10, 13, 20-23 | Y | US 2001/0054183 A1 (<i>Curreri</i>) 20 Dec. 2001(20-12-2001) [0031] | 3, 13, 21-23 | Y | US 6,418,424 B1 (<i>Hoffberg et al.</i>) 9 July 2002 (09-07-2002) col. 112 lines 17-20, 51, 52 | 10, 20, 23 | A | WO 03/079137 A2 (<i>Modrovich</i>) 25 Sept. 2003 (25-09-2003) page 9 last par., page 10 third par. , claims 1-5, Fig. 3 | 1-4, 7-14, 17-23 | A | US 2004/0078236 A1 (<i>Stoodley et al.</i>) 22 Apr. 2004 (22-04-2004) [0134] | 1-4, 7-14, 17-23 |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | | | | | | | | | | | | | | | | | | |
| X Y | WO 01/77792 A2 (<i>Jules et al.</i>) 18 Oct. 2001 (18-10-2001) abstract; page 3 lines 8, 13; page 6 line 30 - page 7 line 8; page 9 line 13; page 10 line 15; page 11 lines 1-3; page 12 lines 16-20; page 13 lines 30, 31; claims 1, 7; Figs. 3-7 | 1, 2, 4, 7-9, 11,12, 14, 17-19 3, 10, 13, 20-23 | | | | | | | | | | | | | | | | | | |
| Y | US 2001/0054183 A1 (<i>Curreri</i>) 20 Dec. 2001(20-12-2001) [0031] | 3, 13, 21-23 | | | | | | | | | | | | | | | | | | |
| Y | US 6,418,424 B1 (<i>Hoffberg et al.</i>) 9 July 2002 (09-07-2002) col. 112 lines 17-20, 51, 52 | 10, 20, 23 | | | | | | | | | | | | | | | | | | |
| A | WO 03/079137 A2 (<i>Modrovich</i>) 25 Sept. 2003 (25-09-2003) page 9 last par., page 10 third par. , claims 1-5, Fig. 3 | 1-4, 7-14, 17-23 | | | | | | | | | | | | | | | | | | |
| A | US 2004/0078236 A1 (<i>Stoodley et al.</i>) 22 Apr. 2004 (22-04-2004) [0134] | 1-4, 7-14, 17-23 | | | | | | | | | | | | | | | | | | |
| <p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.</p> <table border="1"> <tr> <td>* Special categories of cited documents :</td> <td>"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</td> </tr> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"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</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"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</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td></td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table> | | | * Special categories of cited documents : | "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 | "A" document defining the general state of the art which is not considered to be of particular relevance | "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 | "E" earlier application or patent but published on or after the international filing date | "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 | "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family | "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 | | | | | | | |
| * Special categories of cited documents : | "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 | | | | | | | | | | | | | | | | | | | |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "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 | | | | | | | | | | | | | | | | | | | |
| "E" earlier application or patent but published on or after the international filing date | "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 | | | | | | | | | | | | | | | | | | | |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "&" document member of the same patent family | | | | | | | | | | | | | | | | | | | |
| "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 | | | | | | | | | | | | | | | | | | | | |
| <p>Date of the actual completion of the international search 3 February 2006 (03-02-2006)</p> | | <p>Date of mailing of the international search report 8 February 2006 (08-02-2006)</p> | | | | | | | | | | | | | | | | | | |
| <p>Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476</p> | | <p>Authorized officer Cristian S. Popa (819) 997-2299</p> | | | | | | | | | | | | | | | | | | |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2005/001622**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of the first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons :

1. Claim Nos. :
because they relate to subject matter not required to be searched by this Authority, namely :

2. Claim Nos. : 5, 6, 15, 16
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically :

 - in claims 5 and 15 the term "*graphical interface is a sheet of paper*" appears to be technically ungrounded because a sheet of paper can not fulfill the functions of a graphical interface as a program interface that takes advantage of the computer's graphics capabilities to make the program easier to use;
 - in claims 6 and 16 the feature "*spatial element is visually indicated by marking with a device for marking paper*" was not described; more specifically not only does the description make no reference to "a device for marking paper", but also it is not clear how the "device of marking paper" of claim 6 relates to the "graphical interface" of claim 1 and how the "device of marking paper" of claim 16 relates to the "display" of claim 11.

3. Claim Nos. :
because they are dependant claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows :

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claim Nos. :
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim Nos. :

Remark on Protest The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/CA2005/001622

| Patent Document Cited in Search Report | Publication Date | Patent Family Member(s) | Publication Date |
|--|------------------|-------------------------|------------------|
| WO0177792 | 18-10-2001 | AT255787T T | 15-12-2003 |
| | | AU3228600 A | 14-09-2000 |
| | | AU5120201 A | 23-10-2001 |
| | | CA2362882 A1 | 31-08-2000 |
| | | DE60006935D D1 | 15-01-2004 |
| | | DE60006935T T2 | 04-11-2004 |
| | | EP1149475 A1 | 31-10-2001 |
| | | JP2002538504 A | 12-11-2002 |
| | | US2002029341 A1 | 07-03-2002 |
| | | WO0051244 A1 | 31-08-2000 |
| US2001054183 | 20-12-2001 | CN1157941C C | 14-07-2004 |
| | | EP1143717 A2 | 10-10-2001 |
| | | JP3560558B2 B2 | 02-09-2004 |
| | | US6817027 B1 | 09-11-2004 |
| | | US6990679 B2 | 24-01-2006 |
| US6418424 | 09-07-2002 | US5774357 A | 30-06-1998 |
| | | US5867386 A | 02-02-1999 |
| | | US5875108 A | 23-02-1999 |
| | | US5901246 A | 04-05-1999 |
| | | US5903454 A | 11-05-1999 |
| | | US5920477 A | 06-07-1999 |
| | | US6081750 A | 27-06-2000 |
| WO03079137 | 25-09-2003 | CA2471595 A1 | 25-09-2003 |
| | | CN1622784 A | 01-06-2005 |
| | | EP1465525 A2 | 13-10-2004 |
| | | JP2005525158T T | 25-08-2005 |
| | | US2005033121 A1 | 10-02-2005 |
| US2004078236 | 22-04-2004 | US6611846 B1 | 26-08-2003 |