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Datasheet for the decision
of 2 February 2017

Case Number: T 1369/11 - 3.5.07

Application Number: 05105313.0

Publication Number: 1647896

IPC: G06F17/24

Language of the proceedings: EN

Title of invention:
System and method for automatic label placement on charts

Applicant:
Microsoft Technology Licensing, LLC

Headword:
Automatic label placement/MICROSOFT TECHNOLOGY LICENSING

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - all requests (no)

Decisions cited:

Catchword:

Case Number: T 1369/11 - 3.5.07

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 2 February 2017

Appellant: Microsoft Technology Licensing, LLC
(Applicant)   One Microsoft Way
                          Redmond, WA 98052 (US)

Representative: Grünecker Patent- und Rechtsanwälte
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Decision under appeal: **Decision of the Examining Division of the**
                          European Patent Office posted on 4 March 2011
                          refusing European patent application No.
                          05105313.0 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman   R. Moufang
Members: R. de Man
                    M. Jaedicke

Summary of Facts and Submissions

I.   The applicant (appellant), which at the time was
        Microsoft Corporation, appealed against the decision of
        the Examining Division refusing European patent
        application No. 05105313.0.

II.   With effect from 2 February 2015 the EPO registered a
        transfer of the application to Microsoft Technology
        Licensing, LLC, which thereby acquired the status of
        appellant.

III.   The decision under appeal cites the following
        documents:

        D1: Edmonson S. et al.: "A General Cartographic
            Labeling Algorithm", Cartographica, Vol. 33,
            No. 4, 1997; and
        D2: Asman P.: "Creating SVG Pie Charts through XSLT
            via a Web Service: An Experience Report", SVG Open
            2003, 2nd Annual Conference on Scalable Vector
            Graphics, July 2003.

        The Examining Division refused the then main request
        for lack of inventive step in the subject-matter of
        independent claims 1 and 13 in view of document D1 and
        for lack of inventive step in the subject-matter of
        independent claim 9 in view of a combination of
        documents D2 and D1.

        With respect to the then auxiliary request I, it
        decided that the subject-matter of independent claims 1
        and 11 was not new in view of document D1 and that the
        subject-matter of claim 8 lacked inventive step in view
        of a combination of documents D2 and D1. It reached the

same conclusion with respect to the then auxiliary request II.

IV.   With the notice of appeal and the statement of grounds of appeal, the appellant resubmitted the main request and auxiliary requests I and II considered in the contested decision.

V.   In a communication accompanying a summons to oral proceedings, the Board expressed the preliminary view that the subject-matter of claim 1 of each request lacked inventive step in view of document D1 and that claim 1 of auxiliary request I was unclear.

VI.   With a letter dated 2 January 2017, the appellant submitted an amended auxiliary request I.

VII.   In the course of oral proceedings held on 2 February 2017, the appellant filed an amended auxiliary request II. At the end of the oral proceedings, the chairman pronounced the Board's decision.

VIII.   The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request filed with the notice of appeal or, in the alternative, on the basis of one of auxiliary request I filed with the letter dated 2 February 2017 and auxiliary request II filed in the oral proceedings.

IX.   Independent claim 1 of the main request reads as follows:

         "A computer-implemented method for automatically positioning labels associated with a visual data object, comprising:

determining a first layout for the labels;

scoring the first layout to determine a first score;

determining a second layout for the labels;

scoring the second layout to determine a second score;

comparing the first score with the second score;

proceeding with one of the first layout and the second layout as a selected layout for rendering the visual data object depending on the comparison of the first score to the second score; and

repeating determining an additional layout for the labels and scoring the additional layout until a layout is achieved that approaches an optimal layout,

wherein labels that are manually positioned are exempt from consideration during the optimization process."

X.   Independent claim 1 of auxiliary request I differs from claim 1 of the main request in that the text following "proceeding with ...; and" has been replaced with

"repeating multiple iterations of determining an additional layout for the labels and scoring the additional layout until a layout is achieved that approaches an optimal layout;

wherein determining a second layout for the labels further comprises executing a perturb function, wherein the perturb function alters the first layout according to a set of constraints."

XI.   Independent claim of auxiliary request II differs from
         claim 1 of auxiliary request I in that the following
         text has been added at the end of the claim:

         "; and

         wherein the score that is acceptable for a layout to be
         used depends on a termination condition, wherein the
         termination condition varies according to time limits
         for achieving a usable layout."

XII.   The appellant's arguments as relevant to the decision
         are discussed in detail below.

Reasons for the Decision

1.   The appeal complies with the provisions referred to in
         Rule 101 EPC and is therefore admissible.

2.   *The invention*

         The invention relates to the automatic positioning of
         labels associated with a visual data object. A number
         of possible label layouts are generated, starting with
         a first and a second layout. The first and second
         layout are compared on the basis of a "score"
         calculated for each layout. The layout with the higher
         score is retained. Additional layouts are generated
         until a satisfactory layout is achieved (a layout "that
         approaches an optimal layout").

3.   *Main request – inventive step*

3.1   Document D1 discloses an algorithm for automatic label
        placement on maps (see abstract) and is therefore a
        suitable starting point for assessing inventive step
        for the subject-matter of claim 1. The algorithm can be
        used to label point, line and area features of a map
        (abstract and page 2, lines 7 to 11; page numbers refer
        to the copy of document D1 used by the Examining
        Division).

3.2   In a first step of the proposed algorithm, a number of
        candidate label positions are generated for each
        feature to be labelled (page 3, lines 4 to 6). A
        "labeling" is a set of label positions, one drawn from
        each feature's set of candidate positions. Such a
        "labeling" corresponds to a "layout" within the meaning
        of claim 1.

3.3   Given a layout or labeling, a score is computed "that
        indicates its quality with respect both to the position
        of labels relative to the tagged symbology, and to
        spatial contention between the label and other features
        and feature labels" (page 3, lines 7 to 9). These
        scores correspond to the scores of claim 1.

3.4   Document D1 proposes in section 3 an algorithm that,
        given a set of generated candidate positions for each
        label and an overall evaluation function, selects
        positions for all the labels so that the evaluation
        function is optimised.

        Step 1 of this algorithm selects for each feature a
        candidate position at random.

        Step 2 initialises a "temperature" T to a high value.

Step 3(a) decreases temperature T "according to an annealing schedule".

Step 3(b) randomly selects one of the features and changes the position of its label at random to one of the other candidate positions for the selected feature.

Step 3(c) computes ΔE, which is the change in the overall evaluation of the layout caused by repositioning the label.

If the new labeling is worse (i.e. ΔE is negative), then step 3(d) reverts the label repositioning with probability $P = 1.0 - \exp(-\Delta E/T)$.

Step 3 is repeated until the rate of improvement falls below a given threshold.

3.5   The Board observes that step 1 results in a "first layout" and step 3(b) in a "second layout".

In step 3(c), the ΔE value can obviously be computed by first calculating the overall evaluation of the first layout to determine a first score and of the second layout to determine a second score and then subtracting one score from the other.

Step 3(d) corresponds to proceeding with one of the first and the second layout depending on a comparison of the first score to the second score.

Repeating step 3 until the rate of improvement falls below a given threshold corresponds to the claimed step of "repeating determining an additional layout for the

labels and scoring the additional layout until a layout
is achieved that approaches an optimal layout".

3.6   The Board observes that both the application and
        document D1 in fact disclose the use of what is known
        as "simulated annealing" for optimising the layout (see
        Figure 6 and page 21, line 20, to page 22, line 10, of
        the application as filed and section 3 of document D1).

3.7   The only remaining feature of claim 1 is the feature
        specifying that labels that "are manually positioned"
        are "exempt from consideration" during the optimisation
        process.

        The appellant argued that the method of document D1 did
        not allow for the manual positioning of labels at all.
        Even if a user were to manually position labels, these
        labels would then be repositioned during the subsequent
        optimisation process. That was inconvenient for the
        user and could impair the readability and visibility of
        the labels. In addition, computational resources were
        saved by exempting the manually positioned labels from
        consideration during the optimisation process.

3.8   According to the Examining Division, the user's wish to
        exempt manually placed labels from further optimisation
        was, from a technical point of view, an arbitrary
        choice. In addition, it was generally known to give a
        user control over automatic processing, one example
        being the automatic processing of page breaks in text
        processing programs in combination with allowing the
        user to manually insert page breaks.

3.9   The Board agrees with the Examining Division that
        giving a user control over automatic processes is
        generally known. And uncontestedly it is known that

label placement can be performed both automatically and
manually. In the Board's view, there is no inventive
step in the idea of splitting this task: first let the
user manually place a subset of the labels, then let
the computer automatically place the remaining labels.
When placing the remaining labels, it is obviously
desirable that the manually positioned labels should
not be repositioned. Thus, the manually positioned
labels have to be "exempted from consideration" during
the optimisation process.

The appellant is correct in saying that applying the
automated optimisation process to fewer labels requires
fewer computational resources, but it is self-evident
that reducing the amount of work done also reduces the
amount of resources needed. In other words, the
reduction in computation achieved is not a surprising
technical effect.

3.10   Thus, the subject-matter of claim 1 of the main request
        lacks inventive step (Article 56 EPC).

4.   *Auxiliary request I – inventive step*

4.1   Apart from a minor rewording ("repeating multiple
        iterations of determining ..." instead of "repeating
        determining ..."), claim 1 of auxiliary request I
        differs from claim 1 of the main request only in that
        the feature related to manual positioning has been
        replaced with a feature specifying that determining a
        second layout involves executing a "perturb function"
        which "alters the first layout according to a set of
        constraints". In one embodiment, the perturb function
        "repositions a single label each time it is
        called" (page 2, lines 4 to 6, of the application as
        filed).

4.2   In document D1, the second layout is obtained from the
        first layout in step 3(b) by randomly selecting one of
        the features and moving its label to a new position
        randomly chosen from that feature's set of candidate
        positions. Thus, step 3(b) discloses a procedure that
        determines the second layout by "altering the first
        layout according to a set of constraints", the
        constraints corresponding to the restriction that each
        label's position is selected from that label's set of
        candidate positions.

4.3   The appellant argued that the procedure set out in
        step 3(b) is not a "function". A function was a
        mathematical object that mapped an input to an output.
        The perturb function of the invention did not require
        the initial generation of a set of candidate positions
        for each label.

        In the Board's view, the term "perturb function" as it
        is used in the claim is fully defined by the claim
        itself: it is a computer-implemented "function" or
        procedure that "alters the first layout according to a
        set of constraints" (to determine a second layout). The
        procedure of step 3(b) of document D1, which is also
        computer-implemented, does exactly that. Therefore, it
        anticipates the "perturb function" feature added to
        claim 1.

        As to the initial generation of sets of candidate
        positions in document D1, there is nothing in claim 1
        that excludes the presence of such a preparatory step.

4.4   Since the computation of ΔE disclosed in document D1
        does not necessarily - but may obviously - involve
        separate determinations of the scores of the first and

second layouts (see the discussion of step 3(c) in point 3.5 above), the subject-matter of claim 1 of auxiliary request I is new but lacks inventive step (Article 56 EPC).

5.   *Auxiliary request II - inventive step*

5.1   Claim 1 of auxiliary request II adds to claim 1 of auxiliary request I the feature "wherein the score that is acceptable for a layout to be used depends on a termination condition, wherein the termination condition varies according to time limits for achieving a usable layout".

        The Board understands this feature as meaning that the termination condition "until a layout is achieved that approaches an optimal layout" involves a time component. Instead of terminating when the rate of improvement falls below a given threshold, as in document D1, the optimisation process stops when a time limit expires.

5.2   It is well known that optimisation processes commonly involve a trade-off between optimisation time used and optimality of the solution. Thus, if the available time is limited, then it is obvious to stop the optimisation process early at the cost of a less optimal solution.

5.3   Hence, the subject-matter of claim 1 of auxiliary request II likewise does not involve an inventive step (Article 56 EPC).

6.   *Conclusion*

        Since none of the requests on file is allowable, the
        appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Nachtigall   R. Moufang

Decision electronically authenticated