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Datasheet for the decision
of 16 January 2015

Case Number:	T 0058/11 - 3.5.07
Application Number:	03765738.4
Publication Number:	1540513
IPC:	G06F17/28, G06F17/21, G06F3/02, G06F15/00, G09G5/00
Language of the proceedings:	EN

Title of invention:
Dynamic database reordering system

Applicant:
America Online Incorporated

Headword:
Reordering system/AOL

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step (no) - mixture of technical and non-technical features

Decisions cited:

Catchword:

Case Number: **T 0058/11 - 3.5.07**

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 16 January 2015

Appellant: (Applicant)	America Online Incorporated 22000 AOL Way Dulles, VA 20166-9323 (US)
Representative:	Zimmermann, Tankred Klaus Schoppe, Zimmermann, Stöckeler Zinkler, Schenk & Partner mbB Patentanwälte Radlkoferstrasse 2 81373 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 6 August 2010 refusing European patent application No. 03765738.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Moufang
Members:	P. San-Bento Furtado
	R. de Man

Summary of Facts and Submissions

I.   The appeal lies from the decision of the Examining Division to refuse European patent application No. 03765738.4, which originated from the international application published as WO 2004/010326. The application concerns ordering displayed suggested words corresponding to user input from a keyboard.

II.   The Examining Division held that the single request on file did not comply with the requirements of Article 123(2) EPC. In an *obiter dictum* it further commented that the application did not fulfill the requirements of Article 84 EPC in combination with Rule 43(2) EPC, and that the subject-matter of the independent claims did not appear to involve an inventive step over prior art document D1:

D1: WO 00/74240, published on 7 December 2000.

The following document was also cited:

D2: US 5 818 437, published on 6 October 1998.

III.   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 new main request, including claims 1 to 5 submitted with the grounds.

IV.   In a communication accompanying a summons to oral proceedings, the Board gave its preliminary opinion that the claims were unclear and defined added subject-matter. As far as claim 1 could be understood in the light of the description, its subject-matter did not appear to involve an inventive step over the disclosure of document D2.

V.   With a letter dated 18 December 2014, the appellant
       filed a new set of claims 1 to 12.

VI.   Oral proceedings were held on 16 January 2015. At the
       end of the oral proceedings, the chairman pronounced
       the Board's decision.

VII.   The appellant's final request was that the decision
       under appeal be set aside and that a patent be granted
       on the basis of claims 1 to 12 filed with the letter
       dated 18 December 2014.

VIII. Claim 1 of the sole request reads as follows:
       "A process for reordering items retrieved from a
       database for display to a user, comprising the steps
       of:
           accepting user input from a keyboard (102);
           providing a linguistic database (401);
           dynamically retrieving words from said linguistic
       database (401) that comprise letters formed by the
       user's keyboard input; and
           displaying a list (105) of said retrieved words to
       the user;
           characterized in that
           the linguistic database (401) is pre-ordered before
       placement into a product, the words being ordered using
       a linguistic model that measures a commonality
       frequency value for each word in the database, the
       linguistic database (401) being assembled using the
       frequency ordering, and the commonality frequency
       values not being stored with the words in the database
       once it is compiled;
           a user database (403) is provided which contains
       user defined words and a reorder database which is a
       region of the user database (403) that tracks the words

that the user selects from said list (105) and their
frequency values;

once a word not ordered first by the linguistics
model in the linguistic database (401) has been
selected from the list (105), a frequency value is
applied to the selected word and the word ordered first
by the linguistics model in the linguistic database
(401), wherein a first time a word is selected by the
user, the frequency value of the selected word is lower
than the frequency value of the first ordered word in
said list (105), wherein the frequency values are
adjusted every time a word is selected, and wherein the
next time the selected word is selected again, the
frequency value of the selected word is increased
relative to the frequency value of the first ordered
word;

words in said list (105) are ordered using the
linguistic database ordering and the frequency values
in the reorder database, wherein the order identified
by the frequency values in the reorder database takes
priority over the order of words in the linguistics
database."

Reasons for the Decision

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

        Since the current set of claims was a response to the
        preliminary opinion of the Board and could be treated
        without adjournment of the oral proceedings, the Board
        admitted it into the appeal proceedings.

2.   *The invention*

2.1   The present invention as described in the application
         relates to ordering displayed words associated with key
         presses in an electronic device. In order to better
         assist the user in entering text into the device, while
         the user is pressing keys the invention predicts the
         words that the user is trying to enter and displays
         them in a list. The words are displayed in an order
         which is influenced by the user's actual use of the
         words (page 2, lines 12 to 33, of the application as
         published). The invention may be applied both to
         devices with a full keyboard and to small-format
         personal electronic devices with reduced keyboard sizes
         where a single key may represent more than one
         character (page 1, lines 21 to 28, page 4, line 33, to
         page 5, line 3).

2.2   The invention uses a linguistic database and a user
         database. The linguistic database (LDB) is a fixed pre-
         compiled database containing words ordered by their
         frequency of use as measured by a linguistic model. The
         user database contains user defined words and a
         reordering database (RDB), referred to as a "reorder
         database" in claim 1, with information about the words
         selected by the user and the frequencies of use, or
         usage count, of each word (page 8, lines 7 to 11 and
         lines 17 to 23). The usage counts determine the
         relative position of a word in the displayed selection
         list and are also used for garbage collection and for
         ageing (page 9, lines 12 to 16).

2.3   When a user selects a word, the system determines which
         words to add to the RDB according to specific rules,
         including the so-called "non-aggressive learning
         principle" (page 9, line 21 to page 10, line 37). Those

rules also determine how frequencies of use of words in
the RDB are updated upon selection of a word on the
basis of the type of the selected word, for example
from which database it was read or how it was ordered
in the displayed list (page 8, line 25 to page 9, line
10; page 10, line 28 to page 11, line 21). In order to
limit the individual frequency values, they are
occasionally decreased by an ageing process (page 11,
line 23 to page 12, line 2).

Interpretation of claim 1

3.   At the oral proceedings the Board discussed the
        interpretation of claim 1 with the appellant.

3.1   Claim 1 defines a process which provides three
        databases of words. The linguistic database or LDB
        organises words on the basis of their frequency of use
        according to a linguistic model. The user database
        stores user-defined words. The reorder database or RDB
        is a region of the user database that tracks the words
        input by the user and stores the corresponding
        frequency values.

3.2   According to claim 1, the LDB is pre-ordered before
        placement in the product. The words in the LDB are
        ordered using the linguistic model, which measures a
        "commonality frequency value" for each word in the
        database, and are stored in this order. This obviates
        the need to store the frequency values in the database.

3.3   The claimed process comprises the main steps of
        accepting user input from a keyboard, dynamically
        retrieving words from the LDB that comprise letters
        formed by the user's keyboard input, and displaying the
        list of said retrieved words to the user. The words in

the list are ordered using the LDB ordering and the
frequency values in the RDB, wherein the order
identified by the RDB takes priority over that by the
LDB.

3.4   The appellant stated at the oral proceedings that the
        "keyboard" feature of the claim covered both full-sized
        as well as reduced keyboards, so that the feature
        "words ... that comprise letters formed by the user's
        keyboard input" should be interpreted accordingly.

        The Board therefore interprets the "keyboard input" as
        comprising the set of keys pressed by the user, each
        key corresponding to either one letter in a full
        keyboard, or more than one letter in a reduced
        keyboard. The "letters formed by the user's keyboard
        input" comprise all the letters that correspond to each
        of the pressed keys.

3.5   The claim defines the user database and specifies that
        the reorder database tracks the words that the user
        selects from the displayed list and their frequency
        values.

        Since the steps of dynamically retrieving words and
        displaying the list to the user refer exclusively to
        the linguistic database, the claim does not define how
        the user database containing user-defined words is used
        for the purposes of the invention. However, it follows
        from original claim 3, or present claim 2, that the
        user database, which includes the RDB, is also
        consulted in the step of dynamically retrieving words
        in order to also take into account user words which are
        not found in the linguistic database.

Furthermore, according to the process defined by present claim 2, the user-defined words are stored in the reorder database once they are selected from the list.

3.6   The part of the claim describing the frequency values reads (underlining added):

> "once <u>a word not ordered first by the linguistics model in the linguistic database</u> (401) has been selected from the list (105), a frequency value is applied to the selected word and <u>the word ordered first by the linguistics model in the linguistic database</u> (401), wherein a first time a word is selected by the user, the frequency value of the selected word is lower than the frequency value of the first ordered word in said list (105), wherein the frequency values are adjusted every time a word is selected, and wherein the next time the selected word is selected again, the frequency value of the selected word is increased relative to the frequency value of <u>the first ordered word</u>".

The appellant cited page 6, lines 6 to 18 of the description as a basis for these features.

Regarding the first underlined feature, since the claim mentions that the "word not ordered first by the linguistics model" has been selected from the list, it can be understood from the claim that the word is not ordered first by the linguistics model among the LDB words in the list of retrieved words comprising letters formed by the user's keyboard input. The Board hereinafter refers to such a word as "non-first LDB ordered word in the list".

Interpreting "the word ordered first by the linguistics model in the linguistic database" literally as the first word in the ordered LDB does not make sense, since the first word in the LDB may be completely unrelated to the keyboard input. In view of the description in the cited passage of page 6, the feature should be interpreted as the word ordered first by the linguistics model in the LDB "for that key sequence" (page 6, lines 8 and 9). In the following such a word is designated "the first LDB ordered word in the list".

According to page 6, lines 14 to 18, the third underlined feature, "the first ordered word", should be interpreted as referring to the first ordered word "in the displayed list", and is referred to as "the first word in the list" in the following.

The Board notes that, since the list reflects not only the frequency information of the LDB, but also that of the RDB, the first LDB ordered word in the list is not necessarily the first word in the list.

3.7   The feature "once a word not ordered first by the linguistics model in the linguistic database (401) has been selected from the list (105), a frequency value is applied to the selected word and the word ordered first by the linguistics model in the linguistic database (401)" describes what happens when a non-first LDB ordered word in the list has been selected from the displayed list.

The Board interprets this feature as corresponding to the features described on page 6, lines 6 to 18, in original claims 4 and 5, and on page 10, lines 5 to 7, according to which if a non-first LDB ordered word in the list is selected and the first LDB ordered word in

the list does not yet exist in the RDB, the latter is
inserted into the RDB and assigned a frequency value.
In addition, if the selected word is selected for the
first time, it is assigned an initial frequency value
and added to the RDB. Otherwise, its frequency value is
updated. This interpretation was also endorsed by the
appellant in its letter dated 18 December 2014 (pages 4
and 6).

4.   *Inventive step*

4.1   The application mentions on page 5, lines 16 to 18,
        that the invention uses a "T9® linguistics database".
        The T9 technology, where T9 stands for "Text on
        9 keys", is a well-known predictive text technology for
        mobile phones having a reduced keyboard, in particular
        for 3x4 numeric keypads including 9 text keys. It was
        originally developed by Tegic Communications, Inc.

4.2   Document D2 is a US patent assigned to Tegic
        Communications, Inc. and describes a process for
        reduced keyboard disambiguation where for each
        keystroke sequence a list of words which match the
        sequence of keystrokes is presented to the user for
        selection. The words are taken from a dictionary and
        listed in order of decreasing frequency of use
        (column 1, lines 51 to 58). Even though the approach of
        document D2 is especially adapted to reduced keyboards,
        it is not limited to T9 keyboards (column 1, lines 42
        to 46). The suggested words are not restricted to words
        corresponding to the exact input key sequences in order
        to also take into account misspelling and typing errors
        (column 3, lines 15 to 19, column 7, lines 55 and 56).

4.3   The process of document D2 allows entry of words that
        are not in the dictionary. Such words are automatically

added to the dictionary and subsequently also displayed
in the list of suggested words corresponding to the
keys entered by the user (column 2, lines 35 to 56).

4.4   The process of document D2 can use both a standard
       dictionary, also referred to as "standard English
       vocabulary" or "standard vocabulary", and additional
       vocabularies. It displays the words retrieved from the
       additional vocabularies together with those of the
       standard dictionary in the list of words suggested to
       the user (column 3, lines 1 to 11; column 11, lines 23
       to 32 and figure 7a).

       Document D2 also discloses that the process may keep
       track of the frequency of usage of words by a user in
       order to present the words most frequently used first
       (column 3, lines 11 to 14; column 4, lines 50 to 55). A
       custom vocabulary reflects the frequency of use of
       words by the user. Each word is assigned a frequency
       value, also named priority of the word, a number which
       is increased by one every time the word is selected
       (column 8, lines 1 to 7).

4.5   Therefore, document D2 discloses a process for
       reordering items retrieved for display to a user
       similar to that of the invention and constitutes an
       adequate starting point for assessing inventive step.

4.6   The appellant argued at the oral proceedings that
       document D2 did not disclose that tracking frequency of
       usage was accomplished using more than one database.

       The Board disagrees since, as explained above,
       document D2 discloses that different vocabularies are
       used together to generate the selection list. The
       standard vocabulary of document D2 corresponds to the

linguistic database of the claim. The custom vocabulary
is described as storing information regarding frequency
of word usage by the user and can be seen as a reorder
database in the sense of the claim. It is clear from
the passage in column 8, first paragraph, that the
custom vocabulary includes words from the standard
vocabulary which have been entered by the user. The
same is true for the reorder database of the invention.
According to document D2 newly defined words are stored
in a "user's private vocabulary" (column 12, lines 10
to 21), similarly to the user database of the
invention.

4.7   Word entry in the process of document D2 is performed
        in the same way as in the invention (see point 2.1
        above) by means of accepting user input from a
        keyboard, retrieving matching words, displaying the
        list of matching words from the vocabularies including
        the standard and custom vocabularies, and enabling
        selection of a word by the user (column 7, line 46 to
        column 8, line 12; column 11, lines 23 to 32, and
        Figure 7a). The words are ordered for display on the
        basis of the frequency information stored in the
        vocabularies (column 7, line 46 to column 8, line 12).

4.8   As explained above, the selected words are added to the
        custom or user vocabulary, and assigned frequency
        values, in a similar way to that of the invention. In
        the custom vocabulary of D2, the frequency values are
        also adjusted every time a word is selected. In
        particular, the next time a word is selected again, the
        frequency value of the selected word is incremented by
        one, and hence "increased relative to the frequency
        value of the first ordered word" in the displayed list
        (column 8, lines 1 to 4). The Board also notes that
        since the frequency values stored in the custom

vocabulary of document D2 reflect the number of times
the word is used and the first word in the list has
been used previously, the skilled person also assumes
that in the process of document D2 the first time a
word is selected by the user, the frequency value of
the selected word is normally set to a value not higher
than that of the first word in the list.

4.9   The custom vocabulary is described in document D2 as
        reflecting frequency of use by the user (column 8,
        lines 1 to 4), and the user-defined words are evidently
        words used by the user. In the Board's view the skilled
        person would therefore assume from that passage of D2,
        as well as from column 3, lines 11 to 14, that the
        custom vocabulary also includes information regarding
        user-defined words.

4.10   Document D2 discloses that the user may opt to get
        suggested words ordered according to the user's own
        frequency of use (column 8, lines 41 to 43). According
        to D2, column 8, lines 1 to 9, if two words of the
        custom vocabulary have the same frequency value based
        on usage, the relative frequency values of the standard
        vocabulary are used. Since in that case the standard
        vocabulary is only consulted in case of conflict, it is
        encompassed by the feature "the order identified by the
        frequency values in the reorder database takes priority
        over the order of words in the linguistics database".

        It can also be concluded from that passage in column 8,
        as well as from the passages in column 7, line 65 to
        column 8, line 2, and column 8, lines 24 to 35, that
        the standard vocabulary also includes a frequency
        value, or "commonality frequency value", for each word.
        Document D2 discloses in column 3, lines 1 to 6 that
        the "computer includes a standard vocabulary" and that

additional vocabulary modules can be enabled within the
computer. The skilled person reading document D2 would
therefore interpret the standard vocabulary as a
standard feature, namely a pre-compiled vocabulary
placed in the product.

4.11   From the above, the Board concludes that the subject-
        matter of claim 1 differs from the process of
        document D2 in that
        (a) the words in the linguistic database are ordered
            according to the commonality frequency values, the
            linguistic database being assembled using the
            frequency ordering, the commonality frequency
            values not being stored with the words in the
            database once it is compiled;
        (b) the reorder database is a region of the user
            database;
        (c) when a word not ordered first by the linguistics
            model in the LDB is selected from the list, if the
            word ordered first by the linguistics model in the
            LDB does not already exist in the RDB, it is
            inserted into the RDB and assigned a frequency
            value; and
        (d) the first time a word is selected by the user, the
            frequency value of the selected word is set to a
            value lower than the frequency value of the first
            ordered word in said list.

4.12   In the opinion of the Board, feature (b) is an obvious
        implementation detail. It is common practice to store
        related databases together. The claim does not describe
        any particular interaction between this and the other
        features of the invention bringing an additional
        advantage beyond the well known trade-offs of the
        feature. In its reasoning the appellant neither relied
        on feature (b) in support of inventive step nor

contested the opinion of the Board with regard to that feature.

4.13   Regarding feature (a), the appellant argued in oral proceedings that the claimed invention solved the problem of efficiently storing the LDB and nevertheless allowing tracking of the frequency of usage of the words by the user and ordering of the words accordingly. The prior art provided no solution to this problem.

The Board, on the contrary, finds that feature (a) is disclosed in the further document D1 as being used in the same context of suggesting words corresponding to keyboard input to a user and for the same purpose of saving storage space as in the claimed process.

Since document D1 addresses the implementation of a text entry system with automatic word correction or disambiguation, the skilled person would take its teaching into consideration when looking for a solution to the above-mentioned problem.

In the system of document D1 a lexicon stores the words to be suggested to the user. Document D1 describes on page 34, line 29, to page 35, line 21, ways of promoting or demoting words in the lexicon when a word is selected by a user. The promotion or demotion consists of updating the frequency of a word. On page 34, lines 35 to 37, it states "For a lexicon in which relative frequency information is indicated by the sequential order in which words appear in a list, promotions are made by moving the selected word upward..." (emphasis added). On page 35, lines 5 to 7 and 10 to 12, document D1 reads "Conservation of the 'word list mass' is maintained, so that the information

regarding the relative frequency of the words in the
list is maintained and updated <u>without increasing the
storage required for the list</u>" and "For example, <u>in a
lexicon in which relative frequency information is
indicated by the sequential order in which words appear
in a list</u>, a selected word which appears at position
IDX in the list is moved to position (IDX/2)"
(underlining added).

In other words, D1 suggests ordering the words in the
database in accordance with their relative frequencies,
and using this ordering to derive frequency information
without storing the frequency values. In the opinion of
the Board the skilled person wishing to reduce the
storage size of the standard vocabulary of the process
of document D2 would consider storing that vocabulary
without frequency values as taught in document D1.

4.14   The appellant disputed that the skilled person would
        modify the process of document D2 by not storing the
        frequencies in the standard vocabulary. It was an
        essential part of the solution of document D2 that the
        frequencies were stored in each database. The appellant
        also argued that the skilled person would only learn
        from document D1 that the standard vocabulary should be
        reordered after word selection to reflect the frequency
        of use of words by the user.

        While it is true that document D1 teaches reordering
        the lexicon in order to adjust to the user's actual
        word use, the Board notes that document D2 already
        describes the use of different vocabularies, including
        the custom vocabulary separate from the standard
        vocabulary, where the custom vocabulary reflects the
        frequency of usage of the words by the user and the
        standard vocabulary is not modified. In the opinion of

the Board the skilled person would consider that the
storage of the standard database without frequencies
could also be adopted in the process of document D2 and
would hence arrive at feature (a) without inventive
skills.

The Board recognises that, in order to use the
linguistic database without frequencies in the process
of document D2, the skilled person would have to decide
how to compare frequencies of words from the standard
vocabulary and from the custom vocabulary, and how to
assign frequency values. However, the claim does not
define how the frequency values are calculated, but
merely gives some principles in features (c) and (d)
related to the assignment of frequency values.

4.15   Distinguishing feature (c) essentially states that the
first LDB ordered word in the list is also stored in
the RDB, even if it was not used. Feature (d) states
that the initial frequency value of a selected word in
the RDB should be lower than that of the first word in
the list.

As explained in the following, features (c) and (d) are
directed towards the implementation of the "non-
aggressive learning principle" described in the
application on page 10, lines 33 to 37. This concurs
with the appellant's submission in its letter dated
18 December 2014 (page 6).

According to the non-aggressive learning principle, "a
single usage of a non-first word should not beat the
first-word to the first position in the displayed
selection list". The first and non-first words are
described on page 9, lines 8 to 10 as being the first

LDB ordered word in the list and a non-first LDB ordered word in the list respectively.

When the user selects a non-first LDB ordered word in the list for the first time, it is stored in the RDB and assigned a frequency value in both the process of document D2 and that of the claim. The next time a displayed list is created in D2, the word selected in the previous step could appear in the first position of the displayed list (see above points 4.8 and 4.10). Compared to the approach of D2, features (c) and (d) contribute to avoiding this by including also the first LDB ordered word in the list in the RDB and by assigning a newly inserted selected word a lower frequency value than that of the first word in the list. In this respect the Board remarks that since the first word in the list is often the first LDB ordered word in the list, feature (d) can be considered to support the non-aggressive principle.

In the opinion of the Board the non-aggressive learning principle reflects non-technical considerations about how likely it is that specific words will be input later by the user on the basis of knowledge of linguistic aspects, and independently of the problem solved by feature (a).

Features (c) and (d) are hence directed to the problem of implementing the non-technical model of word usage described as the "non-aggressive learning principle" or, equivalently, of avoiding a single usage of a non-first LDB ordered word resulting in it beating the first LDB ordered word to the first position in the displayed list.

The custom vocabulary of D2 is used in the same way as
the RDB to build the displayed list, its order taking
priority over that of the standard vocabulary. The
skilled person would therefore immediately recognise
that a modification of the order of words in the
displayed list could be achieved by a corresponding
change in the entries in the RDB.

From the above it follows that the skilled person,
starting from document D2 and faced with the above-
stated problem, would consider storing in the custom
vocabulary not only the selected non-first LDB ordered
word in the list but also the first LDB ordered word in
the list (feature(c)), and assign them appropriate
frequency values so that the next time the latter would
appear in a higher position than the former in the
displayed list.

Regarding the assignment of frequency values, the
skilled person would consider, as one possible
solution, assigning to a word the first time it is
selected a lower frequency value than the frequency
value of the first word in the list (feature (d)). The
Board notes that feature (d) anyway constitutes a minor
change to the prior art of document D2, where the
initial frequency value is normally lower than or equal
to that of the first word in the list (see point 4.8
above).

In the opinion of the Board, the skilled person
starting from the prior art of document D2 would hence
not require inventive skills to arrive at features (c)
and (d).

4.16   The Board comes to the conclusion that the subject-
        matter of independent claim 1 does not involve an

inventive step within the meaning of Article 56 EPC and
that the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

I. Aperribay   R. Moufang

Decision electronically authenticated