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Datasheet for the decision
of 9 November 2007

Case Number:	T 0922/04 - 3.5.01
Application Number:	96927260.8
Publication Number:	0842463
IPC:	G06F 3/023
Language of the proceedings:	EN

Title of invention:
Reduced keyboard disambiguating system

Patentee:
Tegic Communications, Inc.

Opponent:
Zi Corporation

Headword:
Disambiguating system/TEGIC COMMUNICATIONS

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 54, 56

Keyword:
"Novelty - no (main request, 2nd, 3rd, 4th, 6th and 7th
auxiliary requests)"
"Inventive step - no (1st, 5th and 8th auxiliary requests)"

Decisions cited:
-

Catchword:
-

Case Number: T 0922/04 - 3.5.01

D E C I S I O N
of the Technical Board of Appeal 3.5.01
of 9 November 2007

Appellant: (Patent Proprietor)	Tegic Communications, Inc. 2001 Western Avenue, Suite 250 Seattle, Washington 98121 (US)
Representative:	Tranter, Andrew David Barker Brettell 138 Hagley Road Edgbaston, Birmingham B16 9PW (GB)
Respondent: (Opponent)	Zi Corporation 300, 500 - 4 Avenue SW Calgary, Alberta T2P 2V6 (CA)
Representative:	Robson, Aidan John Reddie & Grose 16 Theobalds Road London WC1X 8PL (GB)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 11 May 2004 revoking European patent No. 0842463 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: S. Steinbrener
Members: R. R. K. Zimmermann
                 G. Weiss

Summary of Facts and Submissions

I.   European patent No. 0 842 463 concerns a reduced
        keyboard disambiguating system, the patent claiming
        priorities from patent applications filed in 1995 and
        1996. Claim 1 of the European patent reads as follows:

        "An input disambiguating system (50) for
        disambiguating ambiguous input sequences entered
        by a user, the disambiguating system comprising:
        (a) a user input device (54) having a plurality of
        inputs (56), each of the plurality of inputs being
        associated with a plurality of characters, an
        input sequence being generated each time an input
        is selected by manipulating the user input device
        and corresponding to the sequence of inputs that
        have been selected, the generated input sequence
        having a textual interpretation that is ambiguous
        due to the plurality of characters associated with
        each input;
        (b) a memory (104) containing a plurality of
        objects, including word objects comprising textual
        objects that are completed words and word stem
        objects comprising textual objects that comprise a
        string of characters corresponding to the initial
        characters of an uncompleted word, each of the
        plurality of objects being associated with an
        input sequence;
        (c) a display (53) to depict system output to the
        user; and
        (d) a processor (100) coupled to the user input
        device, memory, and display, the processor
        identifying from the plurality of objects in the
        memory at least one object associated with each

generated input sequence, and generating an output
signal causing the display to display at least one
of the identified objects associated with each
generated input sequence as a textual
interpretation of the generated input sequence."

II.   The patent was opposed and finally revoked on grounds
        of lack of novelty and inventive step by the opposition
        division in a decision posted on 11 May 2004. The
        revocation was based on prior art disclosing input
        devices for alphabetic writing systems. The opponent
        also cited prior art concerning logographic writing
        systems, in particular the document

        D16: US-A-5 109 352 (published on 28 April 1992)

        concerning a system for encoding the Chinese and
        Japanese scripts.

        This group of prior art documents was rejected as not
        relevant to the invention. According to the decision
        under appeal, Roman letters as used in the English
        language were not equivalent to the strokes making up a
        Chinese character, an argument suggested by the
        opponent. Whereas in the English language the sequence
        of letters defined a word, it was the two dimensional
        spatial relationship of strokes relative to each other
        which determined a Chinese character. The order in
        which the strokes of a Chinese character had been drawn
        was not visible and was thus not a characterising
        feature like the order of Roman letters displayed in an
        English word. Similarly, the decision also denied the
        equivalence between Chinese radicals and the word stem

objects defined in claim 1 as suggested by the opponent.

III. The patent proprietor filed an appeal against the revocation decision on 9 July 2004, paying the appeal fee on the same day, and filed a written statement of the grounds of appeal on 14 September 2004. Together with the statement of grounds as well as by a further letter dated 2 December 2005, the appellant filed requests for amended claims. The respective first independent claim of these requests was amended in respect of claim 1 as granted as follows (underlining added to indicate amendments; unamended passages are omitted as indicated by ellipses):

Main request and 2nd, 3rd, and 4th auxiliary requests:
"An input disambiguating system […]
(a) […]
(b) a memory (104) containing a plurality of objects including <u>completed</u> word objects [… ;] <u>and each object belonging to one of a plurality of object types</u>;
(c) […]
(d) [… .], <u>the system being arranged such that the display of word stem objects during entry provides feedback to the user confirming that the correct sequence of inputs has been entered to lead to the entry of the disambiguated input sequence intended by the user</u>."

1st and 5th auxiliary requests:
"An input disambiguating system […]
(a) […]
(b) […]

(c) […]

(d) [… .], <u>and wherein each of the plurality of</u> <u>objects in the memory is associated with a</u> <u>frequency of use, wherein the system changes the</u> <u>frequency of use to reflect a frequency with which</u> <u>a user uses certain objects within the memory.</u>"

6th auxiliary request:

"An input disambiguating system […]

(a) […]

(b) a memory (104) containing a plurality of objects including <u>completed</u> word objects [… ;] <u>and</u> <u>each object belonging to one of a plurality of</u> <u>object types;</u>

[…]

(d) [… .], <u>wherein the identified objects</u> <u>associated with the input sequence are displayed</u> <u>in a selection list on the display, and wherein if</u> <u>a plurality of objects comprising two or more</u> <u>object types are identified the selection list</u> <u>comprises identified objects of a plurality of</u> <u>object types.</u>"

7th auxiliary request:

"An input disambiguating system […]

(a) […]

(b) […] <u>and in which each of the plurality of</u> <u>objects in the memory belong to one of a plurality</u> <u>of object types, including a completed word type</u> <u>comprising textual objects that are completed</u> <u>words and a word stem type comprising textual</u> <u>objects that are the initial characters of an</u> <u>uncompleted word;</u>

(c) […]

(d) [… .], wherein the identified objects
associated with the input sequence are displayed
in a selection list on the display, and wherein if
a plurality of objects of both a word object type
and a word stem object type are identified the
output signal causes the display to display
objects of both those types."

8th auxiliary request:

"An input disambiguating system […]

(a) […]

(b) [… ;], wherein each of the plurality of
objects in memory belong to one of a plurality of
object types, including a completed word type
comprising textual objects that are completed
words and a word stem type comprising textual
objects that comprise a string of characters
corresponding to the initial characters of an
uncompleted word;

(c) a display (53) to depict system output to the
user in response to user manipulation of said user
input device; and

(d) [… .], wherein the identified objects
associated with the input sequence are displayed
in a selection list on the display, and wherein if
a plurality of objects of both a word object type
and a word stem object type are identified the
output signal causes the display to display
objects of both those types and further wherein
each of the plurality of objects in the memory is
further associated with a frequency of use,
wherein the system changes a frequency of use,
wherein the system changes a frequency of use to
reflect the frequency with which a user uses

certain objects within the memory, and wherein the
identified objects associated with the same input
sequence are presented to the user in order of
decreasing frequency of use."

IV.   The respondent (opponent) filed a written statement in
        response to appellant's requests, citing the following
        additional prior art:

        D29: GB-A-2 197 097 (published on 11 May 1988)

        D30: H.S. Venkatagiri: "Efficiency of Lexical
             Prediction as a Communication Acceleration
             Technique", AAC Augmentative and Alternative
             Communication, Volume 9, September 1993, pp. 161
             to 167

        D31: J.L. Arnott et al.: "Probabilistic Character
             Disambiguation for Reduced Keyboards Using Small
             Text Samples", AAC Augmentative and Alternative
             Communication, Volume 8, September 1992, pp. 215
             to 223

V.   In summons to oral proceedings, the Board indicated its
        intention to consider documents D29 to D31 and raised,
        as a provisional view, doubts regarding patentability
        of the claimed invention.

        Oral proceedings before the Board were held on
        9 November 2007. The matter in issue was discussed with
        the representatives of the parties on the basis of the
        requests presented to the Board.

VI.   According to the appellant, the claimed invention was
       clearly novel and inventive over the cited prior art.
       The storage of both types of objects, stem and word
       objects, and the display of stem objects during entry
       in order of decreasing frequency of use to give
       feedback to the user, was not known from the prior art.

       Document D16 and the further prior art concerning the
       Chinese and Japanese languages were not relevant to the
       invention since a logographic writing system was
       entirely different from an alphabetic writing system
       used, for example, in writing English, which was the
       field of the present invention. Except for some
       correspondence between Chinese characters and English
       words, there was no other relevant correspondence or
       equivalence between the basic writing components of the
       Chinese and English languages. Writing components like
       the strokes used in writing the Chinese characters and
       used in document D16 as a crucial element of the
       disambiguating algorithm had no function in the present
       invention. The strokes for composing a Chinese
       character did not correspond to any textual object used
       by the present invention; they were actually
       meaningless graphical units, comparable only, if at
       all, with the component lines of a written Roman
       letter.

       Document D29 disclosed an algorithm for ordering a list
       of words according to the recency of use. Maintaining
       absolute word frequency values, however, was indicated
       as being computationally not economic.

       Document D30, although addressing a system for ordering
       complete words according to their frequency of use and

changing the frequency as words were entered, did not
suggest to present word stems selected from stored word
stem objects in a memory. The document did not suggest
that there was any problem with presenting complete
words to the user.

Document D31 only disclosed the idea of associating a
frequency of use with objects in a memory and changing
that frequency. As with documents D29 and D30, however,
the skilled person would not combine the teaching of
this document with that of the remaining prior art to
arrive at a system having all of the features of the
claimed disambiguating system.

VII.   Accordingly, the appellant requested that the decision
       under appeal be set aside, and that a patent be granted
       on the basis of the main request or alternatively on
       the basis of the first, second, third, fourth, fifth,
       sixth, seventh and eighth auxiliary requests filed with
       letters dated 14 September 2004 and 2 December 2005.

VIII. The respondent requested that the appeal be dismissed.

IX.   The respondent raised various objections, including
       added subject matter and lack of clarity, and argued
       that the claims under consideration did not meet the
       requirements of novelty and inventive step,
       respectively.

       According to the respondent, the opposition division
       was wrong to disregard the input systems for Chinese or
       Japanese scripts. The claim wording, in particular if
       read in the context of paragraph [0131] of the present
       patent specification, did not limit the invention to

the English or any alphabetic writing system at all.
The opposition division had given undue emphasis to the
writing system as perceived by a human user. The
disambiguating system did not have any understanding of
the text it writes; it rather accepted a limited number
of defined inputs, performed some searching of its
memory and displayed an object which corresponded to
the input sequence. Such a system was not aware of
language and was immune to any preconceptions about
differences between written Chinese and written
English. It was only concerned with the order of entry,
and not at all with the final appearance of the
character or word. The only precondition which both the
present invention as well as the prior art required was
that the order in which the basic components of a word,
i.e. the strokes or letters, were drawn was fixed. This
was the case in the English as well as in the Chinese
writing system.

Document D16, in particular, taught that successively
more complete portions of a character might be
displayed each time a stroke was entered, causing the
display to render at least one of the identified
objects associated with each generated input sequence
as required by the present invention.

The new requests introduced the additional feature of
associating with the objects, a frequency of use, which
was previously not the subject of any claim and had
thus not been searched. This meant that prior art not
previously relevant, namely documents D29 to D31, now
had to be taken into account. Documents D29 and D30
showed the concepts of associating a changing frequency
of use with words in a dictionary. Document D31 taught

applying such a frequency of use to a reduced keyboard
entry system.

X.   The Board announced the decision at the end of the oral
         proceedings.

Reasons for the Decision

1.   The appeal complies with the requirements of
         Articles 106 to 108 and Rules 1(1) and 64 EPC and is
         thus admissible.

2.   The appeal, however, is not allowable since the
         respective first independent claim of the present
         requests seeks protection for subject matter which
         lacks either novelty or inventive step and does thus
         not comply with the requirements of Article 52(1) EPC.

3.   These claims are directed to embodiments of different
         aspects of the same invention and can thus be brought
         together under a single combined definition and
         considered in common without affecting the substance of
         the invention and the outcome of the examination. The
         following listing summarises the combined subject-
         matter of the claims (the claim features are renumbered
         for convenience):

         (1) A disambiguating system comprising a user input
         device, a display, a memory, and a processor coupled to
         the user input device, memory and display;

         (2) the user input device having

(21) a plurality of inputs, an input sequence being
generated each time an input is selected by
manipulating the user input device and corresponding to
the sequence of inputs that have been selected,
(22) each of the plurality of inputs being associated
with a plurality of characters, the generated input
sequence having a textual interpretation that is
ambiguous due to the plurality of characters associated
with each input;

(3) the display suitable to depict system output to the
user in response to user manipulation of said user
input device;

(4) the memory (104) containing a plurality of objects,
(41) each of the plurality of objects being associated
with an input sequence;
(42) wherein each of the plurality of objects in the
memory belong to one of a plurality of object types;
including
(421) a completed word type comprising textual objects
that are completed words and
(422) a word stem type comprising textual objects that
are (comprise a string of characters corresponding to)
the initial characters of an uncompleted word;
(43) wherein each of the plurality of objects in the
memory is further associated with a frequency of use,
(44) wherein the system changes a frequency of use to
reflect the frequency with which a user uses certain
objects within the memory,

(5) the processor identifying from the plurality of
objects in the memory at least one object associated
with each generated input sequence, and

(6) generating an output signal causing the display to
display at least one of the identified objects
associated with each generated input sequence as a
textual interpretation of the generated input sequence,
(61) such that the display of word stem objects during
entry provides feedback to the user confirming that the
correct sequence of inputs has been entered to lead to
the entry of the disambiguated input sequence intended
by the user,
(62) wherein the identified objects associated with the
input sequence are displayed in a selection list on the
display, and
(63) wherein if a plurality of objects of both a word
object type and a word stem object type are identified
the output signal causes the display to display objects
of both those types and further
(64) wherein the identified objects associated with the
same input sequence are presented to the user in order
of decreasing frequency of use.

The first independent claims of the main request and
the second, third and fourth auxiliary requests are
identical and comprise features (1) to (42) and (5) to
(61), to which - apart from minor reformulations - the
remaining auxiliary requests add the following
features, respectively:
- sixth auxiliary request: features (62) and (63),
- seventh auxiliary request: features (421), (422),
(62) and (63),
- first and fifth auxiliary requests: features (43) and
(44), and
- eighth auxiliary request: features (421), (422),
(43), (44), (62), (63) and (64).

4.   The main request as well as the second, third, fourth,
      sixth, and seventh auxiliary requests do not meet the
      requirement of novelty, Article 52(1) and 54 EPC, since
      all features of the respective first independent claim
      of these requests, i.e. the features (1) to (422) and
      (5) to (63) above, are anticipated by document D16.

4.1   In the terminology of the present claims, document D16
      discloses a disambiguating system (computer input
      system for Chinese and Japanese characters) comprising
      a user input device, a display, a memory, and a
      processor coupled to the user input device, memory, and
      display (see document D16, fig. 4: keyboard 22, monitor
      30, storages 26 and 28, and controller 24).

      The user input device has a plurality of inputs (keys,
      see D16, fig. 6), each of the plurality of inputs being
      associated with a plurality of characters (group of
      strokes, see D16, figures 1A,4, and 6 with
      specification, col. 8, lines 24 to 43, col. 9, lines 41
      to 54, and col. 10, lines 43 to 47) which can be
      selected by manipulating the user input device. This
      produces an input sequence (string of code numbers, see
      D16, col. 9, lines 44 to 50; data strings, see fig. 5
      and specification col. 10, lines 25 to 29) having a
      textual interpretation (partial character, root, and
      character, see col. 5, line 55 to col. 6, line 11,
      col. 12, lines 23 to 31) that is ambiguous due to the
      plurality of characters associated with each input (see
      D16, col. 10, lines 49 to 59, for example).

      The display depicts system output to the user in
      response to user manipulation of the user input device

(see D16, fig. 10 and specification, col. 11, lines 65 ff.).

4.2   Furthermore, document D16 anticipates features (4) to (422) (numbering, see above): The memory contains a plurality of objects (shapes of characters or partial characters, see D16, col. 9, lines 50 to 61, col. 12, lines 61 to 67, col. 21, line 17 f. and col. 24, claim 28) being associated with the input sequence (string of code numbers, D16, loc. cit.). Each of the plurality of objects belong to one of a plurality of object types (partial characters, i.e. roots or portions of roots -- see D16, col. 12, lines 24 to 31 -- as well as characters and compounds -- see D16, col. 5, line 65 to col. 6, line 11).

These object types comprise the completed words, i.e. in document D16 the Chinese (or Japanese) characters, as well as the word stems or uncompleted words, in document D16 the partial characters (roots or portions of roots) stored and displayed when the sequence of code numbers, if entered according to the traditional stroke order, uniquely identifies the string of the respective partial character.

The association of characters with completed words in terms of the present claims was unanimously accepted as appropriate by the appellant as well as by the examining division. However, it was strongly disputed (see point VI above) that a partial character formed by a sequence of strokes as disclosed in document D16 was a word stem in terms of the present claims.

This argument stands and falls on the definition of the term "word stem", which according to its ordinary meaning refers to the unchanged part of an inflected word. The present claims use this term differently by associating it with "a string of characters corresponding to the initial characters of an uncompleted word". The patent specification, paragraph [0034] is more precise on this point, indicating that word stems "are incomplete words" and "represent[ing] all possible valid sequences of letters that a user may be entering". This means that the term should not be construed according to its ordinary linguistic meaning, but in an operative sense simply as a sequence of key codes entered by the user in the intention to write a word.

As rightly pointed out by the respondent (see point IX above), the invention is not limited to the application to an alphabetic or any other specific writing system. Therefore, the term "character" in the present claims could and should be understood in a broad sense, including Roman letters but also more basic writing components like the strokes used for composing a Chinese character.

There is no justification for a more narrow construction of the claims. In fact, a straightforward implementation of the claimed invention is a digital data processing system which encodes any input into binary zeros and ones and retrieves the shapes of the basic writing components automatically from a database, e.g. from font files or otherwise. Beyond zeros and ones, therefore, the system has no idea of language or the difference between alphabetic and logographic

writing systems. It does not make any relevant
difference whether the disambiguating system operates
on digital data encoding Roman letters or on digital
data encoding strokes of the Chinese writing system for
composing the words the user intends to input. For
disambiguating an ambiguous input sequence, the
linguistic meaning of the input or the graphical
appearance of the data to be displayed is also
irrelevant provided that the system reproduces the
input sequence fundamental to possible meanings and
accesses the right databases. The same holds for
displaying and printing the data: the system retrieves
the graphical information e.g. from an appropriate font
file. It does not matter for the functioning of the
system whether the retrieved symbol is a Roman letter
or a Chinese stroke or character or which semantic
meaning the displayed symbol has. Such aspects of the
language and writing system used are not essential to
the present invention.

The Board concludes from these considerations that the
strokes in document D16 are included in the present
definition of character, and accordingly the partial
characters, roots and portion of roots referred to in
document D16 are also included in the present
definitions of word stem and uncompleted word.

4.3   Moreover, document D16 also anticipates features (5) to
        (63) (numbering, see above):

        The processor (controller 24) identifies at least one
        object in the memory and displays it as a textual
        interpretation of the generated input sequence (see D16,
        fig. 10, partial characters 58 to 68, and 56 and

pending character 52 and col. 12, lines 8 to 60). The
displayed object can be a word stem (partial character,
i.e. a root or a portion of root), which provides
feedback to the user confirming that the correct
sequence of inputs has been entered (see D16, for
example col. 12, line 17 f., col. 13, lines 19 to 27).

A plurality of identified objects associated with the
same input sequence (number of duplications) are
displayed in a selection list: "one or more and less
commonly used alternative characters are shown in
parenthesis alongside the most commonly used character
so that the operator can make a choice by a single
keystroke" (document D16, col. 16, lines 9 to 20). The
display shows completed words (characters) in pending
area 52, which can be moved to text line 54 by
actuating the space bar, and simultaneously a word stem
(56) to which further strokes may be added (D16,
col. 16, line 60 to col. 17, line 16).

It follows that document D16 fully anticipates the
subject matter of the first independent claims of the
main request as well as of the second, third, fourth,
sixth, and seventh auxiliary requests.

5.   The first, fifth, and eighth auxiliary requests do not
        meet the requirement of the inventive step, Article
        52(1) and 56 EPC, since the subject matter of the
        respective first independent claim is rendered obvious
        by document D16 and, for example, document D31.

        For these claims, document D16 is certainly an
        appropriate starting point for assessing inventive
        step. The only new features over this prior art,

features (43), (44), and (64) (numbering, see above), concern the presentation of identified objects according to their frequency of use.

However, already this prior art teaches to present the "most commonly used" of the identified characters to the user, which alludes to the above "frequency of use" features of the present claims at issue (see document D16, col. 16, lines 14 to 20). Documents D29, D30, and D31 share the same idea.

In particular, this last cited document brings out the "adaptive modelling of character sequences" as a means for increasing the efficiency of a disambiguation system for a reduced keyboard (see document D31, p. 222, second paragraph). According to this document, the occurrence of any word or portion of a word (n-gram) is to be counted, providing numbers which indicate the frequency of use of the words or word portions stored in the dictionary. The numbers are used as a measure of the probability of occurrence of the word or a portion of a word in predicting and presenting character sequences (see document D31, p. 217, right-hand column, last paragraph and p. 218, right-hand column, first paragraph).

Applying such an adaptive method to the disambiguating system of document D16, which directly leads to the implementation of features (43), (44), and (64), is straightforward and, in the light of document D31, an obvious measure to increase efficiency of the system. The claims at issue do thus not meet the requirement of inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

T. Buschek   S. Steinbrener