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**Datasheet for the decision  
of 3 June 2014**

**Case Number:** T 1656/08 - 3.5.07

**Application Number:** 00105009.5

**Publication Number:** 1037153

**IPC:** G06F17/28

**Language of the proceedings:** EN

**Title of invention:**

Method and device for language translation

**Applicant:**

Sharp Kabushiki Kaisha

**Headword:**

Translator/SHARP

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no) (all requests)

**Decisions cited:**

T 1177/97

**Catchword:**



**Beschwerdekammern  
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Case Number: T 1656/08 - 3.5.07

**D E C I S I O N  
of Technical Board of Appeal 3.5.07  
of 3 June 2014**

**Appellant:** Sharp Kabushiki Kaisha  
(Applicant) 22-22 Nagaike-cho  
Abeno-ku  
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**Representative:** Müller - Hoffmann & Partner  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted on 22 February  
2008 refusing European patent application No.  
00105009.5 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman** R. Moufang  
**Members:** M. Rognoni  
R. de Man

## **Summary of Facts and Submissions**

- I. The applicant (appellant) appealed against the decision of the Examining Division refusing European patent application no. 00105009.5.
- II. The contested decision was based on the following prior art document:

D1: US-A-5 490 061.

With respect to the reasons for the refusal, the Examining Division referred to its communications dated 25 October 2007, 3 August 2006 and 1 July 2005.

According to the communication of 25 October 2007, the features distinguishing the subject-matter of claim 1, filed with letter dated 10 January 2007, from document D1 only defined a particular linguistic rule and thus related to non-technical subject-matter. As a consequence, it was not possible to identify an objective technical problem beyond the problem of implementing an alternative linguistic rule in a known translator. This implementation was obvious and therefore the subject-matter of claim 1 did not involve an inventive step within the meaning of Article 56 EPC.

- III. With the statement of grounds of appeal dated 29 May 2008, the appellant filed new claims by way of a main request and an auxiliary request. In the light of the submissions made in the statement of grounds of appeal, the Board understands that the appellant intended to request that the decision under appeal be set aside and a patent be granted on the basis of the main request or, alternatively, of the auxiliary request.

IV. In a communication dated 20 December 2013, summoning the appellant to oral proceedings, the Board expressed the preliminary opinion that it was doubtful whether the features which appeared to distinguish the subject-matter of claim 1 according to the main request from the teaching of D1 contributed to the solution of a technical problem going beyond the mere implementation of a linguistic rule. Thus, the subject-matter of claim 1 seemed to lack an inventive step within the meaning of Article 56 EPC.

As to claim 1 of the auxiliary request, it did not appear to add, in the light of document D1, any novel feature to the subject-matter of claim 1 of the main request.

V. With letter dated 6 February 2014, the appellant's representative informed the Board that the appellant did not intend to attend the oral proceedings.

VI. On 3 June 2014 oral proceedings were held as scheduled in the absence of the appellant. At the end of these proceedings the chairman announced the Board's decision.

VII. Claim 1 according to the main request reads as follows:

"A translator comprising:  
a word dictionary (6a);  
an affix dictionary (6e);  
an input section (2) for inputting an original language to be a first language;  
a converting section (5a to 5d) for referring to the word dictionary (6a), thereby converting the input

original language into a translated word to be a second language;

a recognizing section (5e) for referring to the word dictionary (6a) and the affix dictionary (6e), thereby recognizing one or a plurality of derivatives each having a prefix, a word base and a suffix from the input original language which cannot be converted into the translated word by the converting section (5a to 5d);

an affix determining section (5f) adapted for determining the prefix and the suffix;

and a derivative translation generating section (5h) adapted for linking a translated word corresponding to the determined prefix and suffix to a translated word corresponding to a word base, thereby generating the translated word of the derivative having the prefix and the suffix,

characterized in that

the affix determining section (5f) is adapted for determining the prefix and the suffix of a word based on a comparison (S112) of the character length of the prefix with that of the suffix of the word;

wherein the affix determining section (5f) is adapted for executing

a suffix processing (S117) if the length of the suffix is greater or equal to the length of the prefix, and for carrying out a dictionary retrieval by using, as keys, the word base of a word of a word base buffer (7h) corresponding to the determined suffix of a match suffix buffer (7g), and for executing

a prefix processing (S113) if the prefix is longer than the suffix, and for carrying out a dictionary retrieval by using, as keys, the word base of a word of the word base buffer (7h) corresponding to the determined prefix of a match suffix [sic] buffer (7f)."

Claim 2 is dependent on claim 1. Independent claim 3 relates to a "translating method". Independent claim 4 is directed to a "storage medium (5,8) to be used for a translator". The features of independent claims 3 and 4 correspond essentially to the features recited in claim 1.

Claim 1 according to the auxiliary request differs from claim 1 of the main request in that it further comprises the following features recited in claim 2 of the main request:

"that the affix dictionary (6e) further includes an affix translation change information table in which an affix translation change information for changing a translated word of the prefix and the suffix corresponding to a part of speech of a word base and an inflection form thereof is stored, and that

the derivative translation generating section (5h) is adapted for changing a translated word of the prefix and the suffix corresponding to a translated word of a word base based on the affix translation change information."

Independent claim 2 relates to a "translating method". Independent claim 3 is directed to a "storage medium (5,8) to be used for a translator". The features of independent claims 2 and 3 correspond essentially to the features recited in claim 1.

VIII. The arguments submitted in writing by the appellant may be summarised as follows:

Document D1 did not show a translator, translating method or a storage medium to be used for a translator in which there was a comparison of the character lengths of the prefix and the suffix of a word derivative, so that based on this comparison either suffix processing or prefix processing was carried out. The technical effect arising from the distinguishing features of claim 1 enabled the generation of a more natural translation of a derivative.

The teaching of document D1 dealt with translating a first language into an intermediary language and from there into a target language. A person skilled in the art did not get any hint from document D1 to compare the lengths of the prefix and the suffix of a derivative and, depending on the result of the comparison, to carry out either suffix processing or prefix processing. In document D1 the suffixes were listed according to their lengths, but there was no indication in D1 that the length of a suffix was compared with the length of a prefix or that, depending on the result, different processing was carried out. In column 15, lines 31 to 45 of D1, the word "involved" was analysed, but there was no comparison between the prefix and suffix, and only the "ed" was removed. Thus, the subject-matter of the present invention was not only new, but also involved an inventive step in view of document D1.

Claim 1 of the auxiliary request differed from claim 1 of the main request by including the features of claim 3 as originally filed which corresponded to claim 2 of the main request. Apart from not disclosing a comparison between the length of a suffix and the length of a prefix of a derivative in order to determine whether prefix processing or suffix

processing should be carried out, document D1 did not disclose or suggest translating an affix on the basis of an affix translation change information table and a derivative translation generating section. As pointed out on page 49, lines 3 to 12 of the application as originally filed, it was possible to generate a more natural translated sentence by translating an affix portion according to the translation of the word base.

A person skilled in the art could not learn from document D1 to provide an affix dictionary and an affix translation change information table, and to adapt a derivative translation generating section for changing a translated word, as specified in claim 1 of the auxiliary request.

The subject-matter of the present invention related to technical subject-matter. The objective technical problem to be solved was providing a translator, translating method and a recording medium having a translating program thereon. Claim 1 of the main request as well as claim 1 of the auxiliary request comprised technical means, such as a word dictionary, an affix dictionary, an input section, recognizing section, an affix determining section and a derivative translation generating section. The function of the affix determining section was of a technical nature as it consisted in comparing the character lengths of a prefix and a suffix without addressing the content of these affixes. Depending on the comparison result, prefix processing or suffix processing was electronically performed by means of dictionary retrieval and matching without involving the meaning of the affixes. Furthermore, the features distinguishing the present invention from the prior art disclosed in document D1 performed technical functions, namely



comparing numbers of characters and matching words with stored words. Although these technical functions followed linguistic rules, they were performed by using only technical means. Thus, the subject-matter of claim 1 of the main request and of the auxiliary request was of a technical nature.

### **Reasons for the Decision**

1. The appeal is admissible.

#### The invention

2. The present application deals essentially with the problem of translating a word which is not listed in a particular word dictionary and which is considered to be a "derivative" in the sense that it is composed of a word base, listed in the dictionary, and a prefix and/or a suffix.

As pointed out in paragraphs [0090] and [0091] of the published application, it may not always be straightforward to determine the most appropriate combination of word base and prefix or suffix which make up a derivative. For instance, the word "exportable" may be regarded as the combination of the word base "portable" and the prefix "ex", or of the word base "export" and the suffix "able".

- 2.1 If the analysis of a derivative shows different possible combinations of a word base and a prefix/suffix, the present invention teaches to make a selection on the basis of a comparison between the lengths of the prefix and the suffix.

Main request

3. The translator according to claim 1 of the main request comprises the following features:

- a word dictionary;
- an affix dictionary;
- an input section for inputting an original language to be a first language;
- a converting section for referring to the word dictionary, thereby converting the input original language into a translated word to be a second language;
- a recognizing section for referring to the word dictionary and the affix dictionary, thereby recognizing one or a plurality of derivatives each having a prefix, a word base and a suffix from the input original language which cannot be converted into the translated word by the converting section;
- an affix determining section adapted for determining the prefix and the suffix; and
- a derivative translation generating section adapted for linking a translated word corresponding to the determined prefix and suffix to a translated word corresponding to a word base, thereby generating the translated word of the derivative having the prefix and the suffix.

The claimed translator is characterised in that:

- the affix determining section is adapted for determining the prefix and the suffix of a word based on a comparison of the character length of the prefix with that of the suffix of the word;

- wherein the affix determining section is adapted for executing
  - a suffix processing if the length of the suffix is greater (than) or equal to the length of the prefix, and for carrying out a dictionary retrieval by using, as keys, the word base of a word of a word base buffer corresponding to the determined suffix of a match suffix buffer,
- and for executing
  - a prefix processing if the prefix is longer than the suffix and for carrying out a dictionary retrieval by using, as keys, the word base of a word of the word base buffer corresponding to the determined prefix of a match prefix buffer.

As to the last feature, claim 1 reads actually "match suffix buffer". However, there can be no doubt that "match prefix buffer" is meant because the last feature of the claim relates to prefix processing.

3.1 As pointed out by the appellant in the statement of grounds of appeal (page 2), the two-part form of claim 1 is based on the translator known from document D1.

3.2 The operation of the known translator (see document D1 column 15: "General Algorithm for a Syntactical Translation") can be summarised as follows:

- each word in a sentence of the source language is looked up in the dictionary database in a preliminary search;
- if no match is found for an individual word, the dictionary returns an error code;

- the word then "goes to morphology" which strips successive endings or prefixes off the word and modifies it to see if the "root" is in the dictionary (for example the word "involved" is stripped of "ed" and looked up, if the stripped word is not found another lookup is tried with the modified word "involv(e)").

Thus, the translator according to document D1 analyses each word of the source language with the help of a dictionary and modules which perform syntactical and lexical analysis. One step of this analysis consists in stripping successive endings or prefixes of a word which is not found in a dictionary and in checking whether the "root" of the word can be found in the dictionary.

As specified in column 17, lines 48 to 52, each sentence of the source language is translated into an intermediate language with the Toltran indexes attached to each word awaiting the translation into the target language.

- 3.3 The essential steps of the morphological analysis of a word are set out in claim 1 of document D1 where it is specified that each word which is not found in the lexical database is subjected to morphological word stripping means which are directed to the affixes of the words and first to the stripping of suffixes. This is followed by the comparison of an individual stripped word with the data in the morpheme root database, whereby the comparison proceeds downward through character strings of decreasing length until a morpheme root match is found.

If the stripping of suffixes was not adequate, then the prefixes are stripped. Furthermore, tags are attached to the word roots to denote the affixes and the suffixes that have been stripped along with a syntactical analysis of the word (see claim 5 of D1).

3.4 As shown by the two-part form of claim 1, the appellant has not contested that all the features recited in the preamble of claim 1 are explicitly or implicitly disclosed in document D1.

3.5 As to the characterising part of claim 1, it contains essentially features relating to the "affix determining section" and, in particular, the following:

- (a) the "affix determining section" is adapted for determining the prefix and the suffix of a word based on a comparison of the character length of the prefix with that of the suffix;
- (b) a suffix processing is carried out if the length of the suffix is greater than or equal to the length of the prefix;
- (c) a prefix processing is carried out if the prefix is longer than the suffix;
- (d) furthermore once the prefix or the suffix has been selected, the word base corresponding to the prefix or the suffix is used as a key for translating the word.

3.6 Both document D1 and the present invention seek to decompose a word which is not stored in a translation dictionary into a base word and a prefix or suffix. They differ essentially in their approach to the

problem of quickly finding the correct component parts of a derivative.

- 3.7 Document D1 checks first whether it is possible to decompose the word into a word base and a suffix, starting with the longer suffixes. If no suitable combination is found, the prefixes are checked. As soon as a suitable combination is found, further processing of the word is started.
- 3.8 The present invention examines both suffixes and prefixes. If there are different possible combinations with a prefix and a suffix and the suffix is longer than or equal to the prefix, then suffix processing is given priority.
- 3.9 In the case of a derivative like "exportable", an implementation of the teaching of D1 should arrive at the correct solution (*i.e.* "export-able") faster than the translator of the present invention, because it would not examine another theoretically possible decomposition (*i.e.* "ex-portable") and compare the length of the suffix "able" with the length of the prefix "ex". However, the translator according to the present invention would more quickly identify the component parts of a derivative comprising a prefix longer than the suffix (cf. claims 1 and 2 of D1).
- 3.10 The application does not provide any explanation for preferring the approach of the present invention. However, it seems plausible to assume that there is some linguistic reason why the rule for selecting an affix specified in claim 1 would prove advantageous at least for some kinds of derivatives and source languages.

- 3.11 In case T 1177/97 of 9 July 2002 the Board came, *inter alia*, to the conclusion that information and methods related to linguistics might in principle assume technical character if they were used in a computer system and form part of a technical problem solution. In particular, a computerised translation process required technical considerations and thus provided a technical aspect to *per se* non-technical things such as dictionaries, word matching or to translating compound expressions into a corresponding meaning. However, the Board also observed that features or aspects of the method which reflected only peculiarities of the field of linguistics had to be ignored in assessing inventive step.
- 3.12 The translator known from document D1 and the claimed invention differ essentially in the rules they adopt for selecting the affix of a word derivative. Therefore, their differences pertain essentially to the realm of linguistics. As to possible technical differences, they appear to result from the implementation of the different rules for selecting the affix of a derivative.
- 3.13 In agreement with the Examining Division, the Board finds that the features which distinguish the claimed translator from the teaching of D1 do not contribute to the solution of a technical problem going beyond the mere implementation of some specific linguistic rules. Hence, in line with T 1177/97 the Board arrives at the conclusion that the subject-matter of claim 1 lacks an inventive step within the meaning of Article 56 EPC.
- 3.14 The same considerations apply, *mutatis mutandis*, to independent claims 3 and 4 of the main request.

Auxiliary request

4. Claim 1 of the auxiliary request differs from claim 1 of the main request in that it further comprises the following features:

(i) the affix dictionary further includes an affix translation change information table in which an affix translation change information for changing a translated word of the prefix and the suffix corresponding to a part of a speech of a word base and an inflection form thereof is stored and

(ii) the derivative translation generating section is adapted for changing a translated word of the prefix and the suffix corresponding to a translated word of a word base based on the affix translation change information.

4.2 The appellant has pointed out that the above features correspond to claim 3 of the original application. However, the Board notes that the term "an affix" used in claim 3 in the expression "translated word of an affix" has been replaced by "the prefix and the suffix", and that the expression "a conjugated form" has been replaced by "an inflection form".

4.3 Features i) and ii) appear to relate to the translation of a derivative which may be an inflected form of another derivative or of a word base. In particular, feature i) links changes in the translation of an affix to information regarding the grammatical function of the word base (*i.e.* its part of speech) and/or an inflected form, whereas feature ii) establishes the



link between the derivative translating generating section and the affix translation change information.

- 4.4 In other words, features i) and ii) imply that the translation rules for a prefix or a suffix take into account grammatical information relating to the word base (*i.e.* its part of speech and/or inflected form). The actual import of these feature can be better understood with reference to the description.
- 4.5 It is specified in paragraph [0024] to [0026] of the published application that the *"affix dictionary may further include an affix translation change information table in which an affix translation change information for changing a translated word of an affix corresponding to a part of speech of a word base and a conjugated form thereof is stored, the derivative translation generating section changing a translated word of an affix corresponding to a translated word of a word base based on the affix translation change information (underlining added)."*

*"With such a structure, the affix translation change information table may be constituted by a ROM"* (paragraph [0025]).

*"According to this structure, when the translated word of the derivative is to be generated, the translated word of the affix can be changed corresponding to the translated word of the word base. Therefore, it is possible to generate a more natural translated word as a derivative"* (paragraph [0026] - underlining added).

Furthermore, paragraph [0037] (from line 48 onwards) explains that the *"table memory 6 stores each of tables for functioning as a word dictionary table 6a which*

stores a second language corresponding to a first language, a grammar rule table 6b which stores a grammar rule given from a language characteristic information, a translation rule table 6c which stores a translation rule, a verb rule change form table 6d which stores the regular change form information about a verb given from the language characteristic information, and an affix table (a prefix table, a suffix table, a prefix processing pattern table, a suffix processing pattern table) 6e which stores an affix translation change information for changing the translated word of an affix corresponding to affix processing conditions given from the language characteristic information, the part of speech of a word base and a conjugated form thereof" (underlining added).

"Moreover, information about the length of an affix, information about the verb change form of a word base, information about a part of speech of a word base and information about a hyphen between an affix and a word base may be used as the affix processing conditions" (paragraph [38] - underlining added).

- 4.6 In summary, the translation of an affix (*i.e.* of a prefix or a suffix) is not univocal, but may depend on whether the affix is related to a "part of speech" of a word base, *i.e.* whether the affix serves the purpose of transforming a word base, such as a noun, into a different part of speech, such as an adjective, or whether the affix is part of an inflected form of the word base.

Tables 13 and 14 of the application show the processing patterns for the translation of the English prefix "non" and of the suffix "ness" into Japanese.

Furthermore, the different rendering of the prefix "non" in the translations of the derivatives "non-radioactive" and "non-remunerative" into Japanese (see paragraphs [0143] to [0157] of the application as published) exemplifies how the translation of an English prefix into Japanese may vary depending on the translation of the base word.

- 4.7 The teaching of document D1 implies that in translating a derivative, like a conjugated verb, grammatical information on the word to be translated is required (see for instance column 16, lines 33 to 60). Furthermore, document D1 takes also into account (see tables of columns 13 and 14) that the translation of suffixes from English into Spanish is not univocal.

Thus, it could be argued, in line with the view expressed by the Examining Division in the communication dated 25 October 2007, that features i) and ii) are at least partly anticipated by the teaching of D1.

- 4.8 In any case, features i) and ii) reflect the straightforward implementation in a translator of the finding that the correct translation of a prefix and a suffix requires information obtained from a structural analysis of the source language and of the target language. As these features merely express, in terms of obvious technical means, the contribution that a linguist's knowledge may give to the task of obtaining a "more natural translation" into the target language, they cannot contribute to the inventive step of the claimed translator (see item 3.11 to 3.14 above).

- 4.9 Hence, with respect to the translator known from D1, the subject-matter of claim 1 according to the

auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

The same objections apply, *mutatis mutandis*, to the subject-matter of independent claims 2 and 3.

5. In summary, the Board comes to the conclusion that none of the appellant's requests provides a basis for the grant of a patent. Hence, the application has to be refused.

## Order

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



I. Aperribay

R. Moufang

Decision electronically authenticated