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Datasheet for the decision of 19 March 2021

Case Number: T 2825/19 - 3.5.07

Application Number: 02732949.9

Publication Number: 1397753

IPC: G06F17/27

Language of the proceedings: EN

Title of invention:
Computer system with natural language to machine language translator

Applicant:
Ravenflow, Inc.

Headword:
Natural language to machine language translator/RAVENFLOW

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:
G 0003/08, G 0001/19, G 0003/19, T 0236/91, T 0769/92, T 1173/97, T 1177/97, T 0641/00, T 0154/04, T 1539/09, T 0598/14

Catchword:
Assessment of technicality of programs for computers: "further technical considerations" in the sense of opinion G 3/08

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Case Number: T 2825/19 - 3.5.07

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 19 March 2021

Appellant: (Applicant)	Ravenflow, Inc. 918 Parker Street, Suite A-11 Berkeley, CA 94710 (US)
Representative:	Prock, Thomas Marks & Clerk LLP 15 Fetter Lane London EC4A 1BW (GB)
Decision under appeal:	**Decision of the examining division of the European Patent Office posted on 16 May 2019 refusing European patent application No 02732949.9 pursuant to Article 97(2) EPC**

Composition of the Board:

Chair	J. Geschwind
Members:	M. Jaedicke
	C. Barel-Faucheux

Summary of Facts and Submissions

I. The applicant (appellant) filed an appeal against the decision of the examining division refusing European patent application No. 02732949.9, filed as international application PCT/GB02/02742 published as WO 02/103555. The application claims a priority date of 18 June 2001.

II. The contested decision was issued according to the state of the file and reasoned by reference to a communication dated 3 May 2019. That communication referred to the examining division's annex to the summons for oral proceedings dated 13 November 2018 in which the examining division objected to claim 1 of the sole request on file under Article 56 EPC. The documents cited in the examining division's annex to the summons included:

D1: Richardson, S. D. et al., "MindNet: acquiring and structuring semantic information from text", ACL'98: 36th Annual Meeting of the Association for Computational Linguistics and 17th International Conference on Computational Linguistics, vol. 2, May 1998, pp. 1098-1102
D2: US 5 966 686, published on 12 October 1999
D3: US 6 246 977, published on 12 June 2001
D4: US 5 555 169, published on 10 September 1996

The examining division's annex to the summons stated in particular that the technical features of claim 1 of the sole request were disclosed in document D4 and that the claimed subject-matter was a straightforward implementation of non-technical features in the system of D4. It also stated that the dependent claims lacked

inventive step as they only specified further details of the non-technical linguistic model. In its communication dated 3 May 2019, the examining division rejected arguments submitted by the appellant in reply to the summons.

III. In its statement of grounds of appeal, the appellant requested that the decision be set aside and that a patent be granted on the basis of the sole claim request considered in the contested decision and resubmitted with the grounds of appeal.

Furthermore, the appellant requested accelerated processing of its appeal. It had a legitimate interest in the appeal being processed rapidly as the patent application was filed in June 2002, and fewer than three years of its term were remaining.

IV. In view of the appellant's request, the board decided to process the appeal with priority.

V. In a communication under Article 15(1) RPBA 2020 accompanying the summons to oral proceedings, the board expressed its provisional opinion that claims 1 and 5 were unclear and that the subject-matter of claims 1 and 5 of the sole request lacked inventive step.

VI. By letter of 27 April 2020, the appellant submitted a new main request, a first auxiliary request and further arguments. The claims of the first auxiliary request were identical to those of its prior sole request. The appellant stated that these claims were maintained as a first auxiliary request only as a precaution in case

the board decided not to admit the new main request and/or the new main request gave rise to any new objections.

VII. In a subsequent letter dated 4 December 2020, the appellant withdrew its request for oral proceedings and requested a decision on the state of the file.

VIII. Accordingly, the board cancelled the oral proceedings.

IX. Claim 5 of the new main request reads as follows:
"A computer-implemented method for translating natural language into a formal language executable on a programmable device, said method comprising the steps of:
a) receiving (3.1.1) natural language text;
characterised by:
b) parsing (3.1.2) said text into a sequence of sequences of pretokens;
c) recognizing (3.2.0) the pretokens as tokens in a lexicon of terms;
d) inserting new terms into the lexicon under specific control;
e) assigning syntactic types to pretokens by comparison to lexical terms in the lexicon for further syntactic processing;
f) generating a sequence of expressions by reassigning lexical types to tokens based on syntactic context based on the assigned types;
g) correlating terms occurring in the set of expressions in order to replace indirect references by direct references;
h) performing a process of term reduction, using a type reduction matrix, to establish syntactic dependencies between terms in an expression created by said correlating of terms, wherein the type reduction matrix

maps sequences of tokens into a relative reduction ordering that represents syntactic dependencies between tokens;
i) constructing in a process of term inversion chains of syntactic dependencies among lexical terms in an expression provided by the term reduction process and determining dependencies;
j) generating (3.2.3) syntactic trees which represent the syntactic structures of said processed expressions provided by the term reduction process;
k) representing said processed expressions as terms in a syntactic algebra on the basis of the syntactic trees, the syntactic algebra comprising syntactic terms formally representing processed expressions;
l) representing terms in the syntactic algebra as objects in a semantic algebra, the semantic object algebra comprising semantic objects as internal references of terms in the syntactic algebra;
m) combining objects in a semantic object algebra by means of a semantic product on pairs of semantic objects to form more complex semantic objects;
n) representing (3.3.1) correlated syntactic algebraic terms and semantic objects as terms in a semantic tensor algebra, the semantic tensor algebra comprising correlated syntactic terms and semantic objects;
o) representing terms in the semantic tensor algebra as internal formal models;
p) transforming terms in the syntactic algebra into equivalent expressions in an internal formal language;
q) associating external operation environments with internal formal models; and
r) translating expressions of the internal formal language into equivalent formal expressions executable in an external operational environment."

X. Claim 5 of the first auxiliary request differs from claim 5 of the new main request in that the expression "computer-implemented" has been omitted and its steps h, k, l, m and n read as follows:
"h) generating in a process of term reduction a sequence of reduction links by using a type reduction matrix to establish syntactic dependencies between terms in an expression created by said correlating of terms;"
"k) representing said processed expressions as terms in a syntactic algebra on the basis of the syntactic trees;"
"l) representing terms in the syntactic algebra as objects in the semantic algebra;"
"m) combining objects in the semantic algebra by means of a semantic product on pairs of semantic objects to form more complex semantic objects;"
"n) representing (3.3.1) correlated syntactic algebraic terms and semantic objects as terms in a semantic tensor algebra;"

XI. The appellant's arguments, where relevant to the decision, are discussed in detail below.

Reasons for the Decision

The invention

1. The application relates to a system and method which translates natural (human) language into an abstract formal language. This formal language is explicitly designed to serve as a universal template for further translations into a comprehensive variety of machine languages which are executable in specific operational environments (description as originally filed, page 1, first paragraph).

In essence, the invention translates natural language input into internal formal language expressions and then further translates these expressions into executable formal expressions in a formal language such as SQL (structured query language) or SMTPL (the language of the mail protocol SMTP) (see description as originally filed, page 34, last paragraph).

New main request

2. *Admissibility*

Independent claim 5 of the new main request differs from claim 5 of the sole request considered by the examining division and initially maintained on appeal only in containing clarifications and the limitation that the method is "computer-implemented". Claim 1 of the new main request contains similar amendments. These amendments were made at the appellant's first opportunity to address objections raised for the first time in the board's communication. The board therefore admits the new main request into the proceedings under Article 13(2) RPBA 2020.

Inventive step

3. The contested decision

In its decision, the examining division relied on document D4 as the starting point for assessing inventive step. The examining division first analysed the software system of claim 1 to identify technical and non-technical features when considering the features in isolation. It identified only a software system, a programmable device, a processing means,

input means, a lexicon and a text parser as a technical means. The non-technical features did not contribute to the technical character of the invention as their purpose was to translate natural language text input into a formal representation, which was a non-technical purpose. The underlying algorithm had to be provided by the non-technical linguist to the qualified skilled person in charge of its technical implementation.

According to the examining division (see communication of 13 November 2018, point 4), referring to decisions T 598/14 and T 1177/97, the translation of linguistic considerations into a mathematical model with the aim of enabling the linguistic analysis to be done automatically by a computer could be seen as involving, at least implicitly, technical considerations. However, according to opinion G 3/08 (OJ EPO 2011, 10), point 13.5 of the Reasons, this was not enough as the technical character would have to be established on the basis that those considerations constituted "further technical considerations". Moreover, machine-executable instructions per se were not technical as computer programs as such were explicitly excluded from patentability (Article 52(2)(c) EPC).

The examining division argued that, when starting from document D4, the only identifiable technical contribution consisted in the claimed implementation of the non-technical features in the system disclosed in document D4. However, this implementation would have been straightforward for the skilled person. Hence, the subject-matter of claim 1 and the corresponding subject-matter of claim 5 lacked inventive step (Article 56 EPC).

4. The appellant's arguments

The appellant argued that the amended claims of the new main request did not change the appellant's case with respect to inventive step. The crux of the examining division's reasoning was that most features of claim 1 were non-technical linguistic features that did not contribute to the technical character of the invention. The appellant disagreed with the examining division stating that the claimed invention had the same ultimate purpose as the invention in T 236/91, i.e. inputting a command executable by a computer. It was true that the decision T 236/91 preceded opinion G 3/08, which did not, however, redraw the boundary between "technical" and "non-technical" subject-matter. Indeed, the Enlarged Board of Appeal avoided defining the term "technical", and thus deliberately refrained from re-drawing the boundary between "technical" and "non-technical" subject-matter (see G 3/08, Reasons 9.2).

Moreover, the appellant cited decision T 1177/97, arguing that nothing in the wording of claim 1 could fairly be said to "reflect only peculiarities of the field of linguistics". Hence, the cited decision supported the appellant's position that all features of claim 1 had a technical character and could support the presence of an inventive step.

The objective technical problem was to provide an alternative implementation to that described by D4. This alternative implementation involved so many technical differences that the skilled person could not have arrived at the claimed subject-matter in an obvious manner.

Furthermore, the appellant argued that linguistics was not concerned with translating expressions in an internal formal language into equivalent formal expressions executable in an external operational environment. Rather, steps b) to r) of the claimed method defined a technically advantageous method of translating natural language to executable formal expressions via an abstract formal language. This abstract formal language was explicitly designed to serve as a universal template for further translations into a comprehensive variety of machine languages which were executable in specific operational environments. This was evidence that the steps involved further technical considerations. The method of claim 5 did not use the computer merely as a tool for implementation but focused on improving the computer functionality itself.

5. *The board's assessment of inventive step*

5.1 The board agrees with the examining division that most features of independent claim 5 do not contribute to the technical character of the invention.

The steps of the method of claim 5 can be grouped with respect to their functionality as follows:

- Step a) specifies that natural language text is received.
- Steps b) to p) specify how the received natural language text is transformed into equivalent expressions in an internal formal language.
- Steps q) and r) specify that expressions of the internal formal language are translated into equivalent formal expressions executable in an external operational environment.

5.2 Step a) does not specify a particular manner of inputting text into a computer, such as audio (speech) or keyboard input. This step encompasses receiving a text file containing a requirement specification for a program, for example. Step a) is known from document D4 (abstract; claim 1; Figure 1: reference sign 1; column 4, lines 48 to 55), which is directed to converting an input natural language character string into a command language instruction for a computer program.

5.3 Steps b) to p) specify an algorithm for translating natural language text into expressions in an internal formal language.

5.3.1 Points 13.5 and 13.5.1 of the Reasons of opinion G 3/08 read as follows (emphasis added by the board):
"While the referral has not actually identified a divergence in the case law, there is at least the potential for confusion, arising from the assumption that **any technical considerations are sufficient to confer technical character on claimed subject-matter, a position which was apparently adopted in some cases (e.g. T 769/92, Sohei, Headnote 1). However T 1173/97, IBM sets the barrier higher in the case of computer programs.** It argues that all computer programs have technical effects, since for example when different programs are executed they cause different electrical currents to circulate in the computer they run on. However such technical effects are not sufficient to confer 'technical character' on the programs; they must cause further technical effects. In the same way, it seems to this Board, **although it may be said that all computer programming involves technical considerations since it is concerned with defining a method which can be carried out by a machine, that in itself is not**

enough to demonstrate that the program which results from the programming has technical character; the programmer must have had technical considerations beyond 'merely' finding a computer algorithm to carry out some procedure.

[...] It was apparently the intention of the writers of the EPC to take the negative view, i.e. **to consider the abstract formulation of algorithms as not belonging to a technical field** (see e.g. the reference to the travaux préparatoires in the referral on page 12). In T 1173/97 the Board concentrated on the effect of carrying out an algorithm on a computer, noting that there were always technical effects, which led the Board, since it recognised the position held by the framers of the Convention, to formulate its requirement for a 'further' technical effect. Only if a computer program, when run, produced further technical effects, was the program to be considered to have a technical character. In the same way, it would appear that the fact **that fundamentally the formulation of every computer program requires technical considerations in the sense that the programmer has to construct a procedure that a machine can carry out, is not enough to guarantee that the program has a technical character** (or that it constitutes 'technical means' as that expression is used in e.g. T 258/03, Hitachi). **By analogy one would say that this is only guaranteed if writing the program requires 'further technical considerations'."**

5.3.2 The Enlarged Board of Appeal defined the expression "further technical considerations" by analogy to the expression "further technical effect" introduced in decision T 1173/97 (Computer program product/IBM, OJ EPO 1999, 609). That decision pointed out two cases in

which the technical character of a computer program is supported. First, when a computer is used to solve a technical problem related to a technical field outside of computing such as control of industrial manufacturing processes. Second, when there is a "further technical effect" that solves a technical problem internal to the computer system (see Reasons, 6.4 and 6.5).

The view that the technical character of computer programs depends on the contribution to solve a technical problem appears to be confirmed by the following comment on the proposed amendment of Article 52(1) EPC in the Basic Proposal for the Revision of the EPC (document MR/2/00 e of the documentation on the EPC revision 2000, point 4, page 43), which expressly states that the same considerations as for inventions in general apply for computer programs (underlining added by the board):
"*[...] the point must be made that patent protection is reserved for creations in the technical field. This is now clearly expressed in the new wording of Article 52(1) EPC. In order to be patentable, the subject-matter claimed must therefore have a 'technical character' or to be more precise - involve a 'technical teaching', ie an instruction addressed to a skilled person as to how to solve a particular technical problem using particular technical means. It is on this understanding of the term 'invention' that the patent granting practice of the EPO and the jurisprudence of the Boards of Appeal are based. The same considerations apply to the assessment of computer programs.*"

5.3.3 In the current application, the claimed subject-matter does not relate to a technical application outside computing (the first case mentioned in decision

T 1173/97). Thus, the program-related features of the claimed subject-matter only have a technical character if they contribute to solve a technical problem internal to the computer system (the second case mentioned in T 1173/97).

5.3.4 The appellant correctly argued that no final definition of the term "technical" has been given by the boards (see also opinion G 3/08, Reasons 9.2; decision G 1/19, Reasons 75 and 76).

5.3.5 However, the appellant's argument that opinion G 3/08 did not redraw the border between technical and non-technical aspects of computer programs is not convincing.

In particular, the board considers that opinion G 3/08, when compared to decision T 1173/97, reframed the interpretation of technicality with respect to computer programs. Decision T 1173/97, Reasons 7.3, cites the subject of decision T 769/92 as an example of an invention which concerns the internal functioning of a computer caused by the programs running on it. T 769/92 considered that if technical considerations were required to arrive at the invention, sufficient technical character was lent to the invention as claimed (T 769/92, Reasons 3.3, 3.6 and 3.7). However, opinion G 3/08, Reasons 13.5 and 13.5.1, explicitly rejected the position adopted by decision T 769/92 that any technical considerations are sufficient to confer technical character on claimed subject-matter.

Such a narrower interpretation of the term "technical" with respect to computer programs is a normal development for the interpretation of a legal provision open to interpretation (see opinion G 3/19 of

14 May 2020, Reasons XX), and this is the case for "programs for computers" "as such" in Article 52(2)(c) and (3) EPC.

5.3.6 The board understands opinion G 3/08 as taking a negative view on the technical character of the activity of programming a computer as also expressed in the decision T 1539/09, Reasons 4.2 (in German): "Die Tätigkeit des Programmierens - im Sinne des Formulierens von Programmcode - ist ein mentaler Vorgang, wenigstens soweit sie nicht im Rahmen einer konkreten Anwendung oder Umgebung in kausaler Weise der Erzielung einer technischen Wirkung dient."(The activity of programming - in the sense of formulating program code - is a mental act, at least in so far as it does not serve to achieve a technical effect in a causal way within the framework of a concrete application or environment [Translation by the board]).

Computer hardware is without any doubt a field of technology within the meaning of Article 52(1) EPC. Consequently, the board sees no reason why considerations that specifically exploit technical properties of the computer system hardware to solve a technical problem related to the internal operation of the computer system, such as storing data in main memory instead of on a hard disk to be able to read the stored data with less delay, should not be viewed as "further technical considerations" in accordance with opinion G 3/08. Such considerations (and associated "further" technical effects) are not present in all computer programs.

By contrast, the board sees no support for the appellant's view that the concept "further technical considerations" should be interpreted with a broader

meaning that would also cover considerations aiming to solve problems "merely" relating to programming such as maintainability, re-usability and understandability of program code, or, in this case, the use of a universal template for translating natural language into executable expressions in external operational environments. Such a broader view of the concept "further technical considerations" appears to be problematic with regard to the imperative to ensure legal certainty and judicial predictability requiring a uniform application of the law (see opinion G 3/08, Reasons 7.2.3) since no criteria are apparent which could then be used to establish a clear border between "technical" and "non-technical" aspects of computer programs.

5.3.7 In view of the above, the board agrees with the examining division that steps b) to p) do not contribute to the technical character of the claimed invention as these steps do not involve technical considerations going beyond "merely" finding an abstract computer algorithm to carry out the translation from natural language text into an internal formal language.

In particular, nothing in steps b) to p) reflects considerations that concern the internal technical operations of a computer system on which these steps are carried out. Rather, these steps are specified merely on an abstract level.

5.4 Steps q) and r) do not go beyond "merely" finding an algorithm, either. These steps concern translating expressions of an internal formal language into equivalent formal expressions executable in an external operational environment such as SQL. The board observes

that languages such as SQL have been designed specifically to be used by persons not trained in computer programming. Rather, it is well known that SQL is based on first-order predicate logic, i.e. mathematical logic. In view of the understanding of the case law of the boards explained above, no "further technical considerations" relating, for example, to the internal operation of a computer system are apparent in steps q) and r).

5.4.1 The appellant also argued that the claimed method steps contributed to the technical character in view of decision T 1177/97.

However, the cited decision T 1177/97 relies, *inter alia*, on decision T 769/92. In point 13.2 of its Reasons, the cited opinion G 3/08 states: "The referral asserts (on pages 11 and 12), correctly in our view, that T 1177/97, SYSTRAN, dated 9 July 2002, considers that programming always involves technical considerations, at least implicitly [...]". It follows that the cited decision T 1177/97 can no longer be followed in this respect. Hence, the appellant's arguments based on decision T 1177/97 are not persuasive.

5.4.2 The appellant also cited decision T 236/91. This decision concerned a dynamically generated menu system for inputting a sentence in natural language which then was translated into a computer command such as a database query. As this decision dealt with a specific graphical user interface for inputting natural language, the case is not comparable to the present one. In particular, as the claimed invention relates to translating natural language input into executable formal expressions, it can be regarded as having the

purpose of programming by means of natural language input. The claimed invention does not at all relate to a graphical user interface for inputting computer commands.

Moreover, the cited decision T 236/91 precedes opinion G 3/08 and consequently does not take into account this opinion with its narrower view of the technicality of computer programs. The appellant's argument that according to decision T 236/91 the purpose of enabling a command to be executed by a computer was technical is not persuasive in light of opinion G 3/08.

Hence, the board considers that the appellant's arguments based on the cited decision T 236/91 are not convincing.

5.4.3 As to the appellant's argument that linguistics were not concerned with translating expressions in an internal formal language into equivalent formal expressions executable in an external operational environment, the board has made it clear that according to opinion G 3/08 the issue of technicality is not only relevant for linguistic aspects but also for the abstract formulation of algorithms. Hence, the appellant's argument does not lead to a different assessment by the board.

5.5 In view of the above, steps b) to r) do not contribute to the technical character of the method of claim 5.

5.6 According to the established case law of the boards, when assessing inventive step in accordance with the problem/solution approach, an aim to be achieved in a non-technical field may legitimately be added to the problem as a constraint to be met (see decisions

T 641/00, OJ EPO 2003, 352; T 154/04, OJ EPO 2008, 46, Reasons 16).

Consequently, the objective technical problem may be formulated as how to implement a non-technical algorithm comprising steps b) to r) in the computer system disclosed in document D4.

5.7 The board judges that the method of claim 5 does not contain any implementation details going beyond a mere automation of the underlying non-technical algorithm using computing means known from document D4.

5.8 In view of the above, the board concludes that the method of claim 5 lacks inventive step and is therefore not allowable (Article 52 EPC in combination with Article 56 EPC).

Auxiliary request

6. The auxiliary request is identical to the appellant's sole request considered in the contested decision and maintained in the statement of grounds of appeal. However, the appellant maintained this request only conditionally as a precaution. As the appellant's new main request was admitted into the procedure and as the objections for the new main request were the same as for the former main request (i.e. the current auxiliary request), the board concludes that the conditions for maintenance of the auxiliary request are no longer met and considers that the auxiliary request is no longer pending according to appellant's statement about the purpose of the auxiliary request. Consequently, there is no need for the board to decide on the auxiliary request. Nevertheless, the board observes that the board's inventive-step objection for the new main

request would *mutatis mutandis* apply to the auxiliary request.

Conclusion

7. As the appellant's sole maintained request is not allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

S. Lichtenvort J. Geschwind

Decision electronically authenticated