PATENTS ACT 1977

IN THE MATTER OF
Patent Application Number
GB9719454.2 in the name of
International Business Machines
Corporation

DECISION

Background

1. The present application, entitled "System and method for natural language determination" was filed on 15 September 1997, claiming priority from an earlier application filed on 30 September 1996. It was published as GB2318659A on 29 April 1998. In examination under Section 18 of the Act, the examiner reported *inter alia* that the application did not comply with Section 1(2)(c) of the Act since the claims related to a rule or method for performing a mental act and/or a computer program. He argued that the invention was not patentable, likening the method of the present application to that in *Raytheon Co.'s Application* [1993] RPC 427. In that application the invention was concerned with shape recognition, in particular recognising ships by comparing aspects of the silhouette of an observed ship with those of known ships. He quoted the words of Deputy Judge Jeffs (p 442 at lines 31-33) where he said of the process being carried out in *Raytheon*: "What is being done is to carry out a comparison such as is done by the mind in recognising an object but doing it by electronic means".

2. In response, the Agent acting for the applicants submitted several amendments including a new set of claims, and also put forward arguments as to why, in his view, the claims did not fall foul of Section 1(2)(c). In particular, he argued that whilst language recognition may be a mental act, the invention was concerned with the technical aspects of effecting such recognition by computer. He also argued that the present case differed from *Raytheon* in that in the latter there was a clear and direct analogy between the steps carried out by the computer and those that would be carried out in the human mind. He also drew attention to the decision of the Technical Board of Appeal of the EPO in the case of *IBM/Word Processing* (T38/86, [1990] OJEPO 384), which was approved by the Patents Court in *Raytheon*. He pointed out that in that case, the EPO Board of Appeal, having found that detecting and replacing linguistic expressions on the basis of understandability was a mental act, went on to say that the exclusion of mental acts as such from patentability was tempered by "the intention of the EPC to permit patenting in those cases in which an invention involves some contribution to the art in a field not excluded from patentability".

3. In a further report the examiner maintained his objection, and the applicants responded with further arguments and some minor amendments to the claims, and also offered to discuss the matters with the examiner or take the opportunity to be heard. The examiner responded by maintaining his objections and suggesting that a hearing be appointed. Thus the matter came before me on 30 August 2001. At the hearing, the applicants were represented by the agent, Mr R D Moss, assisted by Mr Mulholland. The examiner, Mr N Hanley, also attended.

The application

4. The invention of the present application is concerned with the identification of the human language of a computerised document. With the globalisation of communications in present times electronic documents may be in any of a number of human languages. When such documents are sent from one location to another it may be desirable to identify the language of each document so that certain ones may be selected or deselected. The present invention provides a method and means to enable the language of a document to be identified without the need for any human intervention.

5. In order to identify the human language of an electronic document, individual words from the document are parsed and data relating to those words are compared with corresponding data obtained from predetermined lists of words selected from a plurality of languages. The data that are compared concern the identity of the various letter pairs that make up a given word. The pairs of letters are not only adjacent pairs but also remote pairs. Thus for example, a four-lettered word would have six letter pairs (numbering the letters 1,2,3,4, gives the following pairs: 1,2; 1,3; 1,4; 2,3; 2,4; 3,4). For each language being identified, tables are created for each letter pair, each row of the table representing the first letter of a pair, and each column representing the second letter of the pair. So for English, each table would have 26 rows and 26 columns (27 of each if 'blanks' or spaces are included so that one-letter words can be incorporated in the analysis). The predetermined list of words - the most commonly occurring words in the given language - is analysed using the tables, 'hits' being recorded at the points of intersection of the occurring letter pairs.

6. When a document is then being analysed, words are selected from the document and their appropriate letter pairs are identified and the pairs compared with the tables. Comparisons with the tables of several languages may take place simultaneously. Each match is counted and accumulated for each language and when all the selected words have been compared, the language with the highest count of matches is taken to be the language of the document. Alternatively, when a given level of matches has been reached for one language, that is taken to be the language of the document.

7. The two independent claims of the application, as they stood at the time of the hearing, read as follows:

    1. A computer system for identifying a natural language from a stream of character coded signals included in coded electronic documents being transmitted across a computer network, groups of said signals representing words in a natural language document, said system comprising:

        a plurality of sets of n x n tables, each set corresponding to a different language, each table of a set being associated with a different pair of character positions in a word, each row of a table representing a respective one of n possible characters at one of said pair of character positions and each column of a table representing a respective one of said n possible characters at the other of said pair of character positions such that each table stores a value at the intersection of each row and column indicating the presence or absence of the respective character pair at the associated pair of character positions in a plurality of the most frequently used words in the respective natural language;
        means for parsing said character coded signal stream into candidate words;

means for comparing the character pairs of each candidate word with the values stored in each set of tables and for indicating a match if at least some of the character pairs of a candidate word are found in the set of tables;
means for counting said match indications for each set of tables; and
means for identifying the language of the document as the respective language having the greatest number of matches.

9. A method for computer recognition of a natural language from a stream of character coded signals included in coded electronic documents being transmitted across a computer network, groups of said signals representing words in a natural language document, values derived from a plurality of the most frequently used words in a plurality of natural languages being stored in a respective plurality of sets of n x n tables, each set corresponding to a different one of said languages, each table of a set being associated with a different pair of character positions in a word, each row of a table representing a respective one of n possible characters at one of said pair of character positions and each column of a table representing a respective one of said n possible characters at the other of said pair of character positions such that each table stores a value at the intersection of each row and column indicating the presence or absence of the respective character pair at the associated pair of character positions in said plurality of most frequently used words; said method comprising the steps of:
parsing said character coded signal stream into candidate words;
comparing the character pairs of each candidate word with the values stored in each set of tables and indicating a match if at least some of the character pairs of a candidate word are found in the set of tables;
counting said match indications for each set of tables; and
identifying the language of the document as the respective language having the greatest number of matches.

The law

8. Objection has been raised that the invention relates to a mental act and/or a computer program contravening Section 1(2)(c) of the Patents Act 1977. The relevant parts of Section 1 of the Act read as follows:

> *1(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of -*
>
> *(a) ...*
>
> *(b) ...*
>
> *(c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;*
>
> *(d) ...*
>
> *but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.*

9. This particular section of the Act corresponds to articles 52(2) & (3) of the European Patent Convention. As section 130(7) of the Act confirms, these respective provisions are so framed as to have, as nearly as practicable, the same effect. It is also well established that whilst I am

bound by the decisions of courts in the UK, as prescribed by Section 91 of the Act, I must also have regard to the decisions of the European Patent Office Boards of Appeal, at least insofar as they relate to these particular articles of the Convention.

Argument

10. In reaching a decision in this case there are, I believe, two questions I have to answer. The first is: does the invention relate to a scheme, rule or method for performing a mental act, or to a computer program? Secondly, if the answer to the first question is yes, is there a technical contribution or technical effect? The presence of such a technical contribution or effect would allow me to find that the invention does not relate to a mental act or a computer program **as such**, in which case it would not contravene Section 1(2)(c) or the corresponding Article 52(2)(c) of the EPC.

11. Mr Moss firstly sought to persuade me that the invention was essentially technical, and thus was not a scheme or method for performing a mental act, nor did it relate to a computer program. He referred to a number of reported cases where it had been found that the inventions were held to contravene Section 1(2)(c), and argued that the present invention could be distinguished from all of these. He noted that in *Wang Laboratories Inc.'s Application* [1991] RPC 463, the invention related to an expert system, involving a computer programmed and operating so as to apply information in a given field. In *Raytheon Co.'s Application* [1993] RPC 427. the invention related to shape recognition, and it involved the recognition of objects by using electronic means to analyse a shape and compare it with known shapes. In *Fujitsu Limited's Application* [1997] RPC 610, the invention related to devising crystal molecular structures, and involved simple substitution by superposition. In all these cases, he said, the invention was intended to replace or assist a human operator. In addition, they all used similar process steps to those that would be used by a human. Although they were technical steps in the sense that they were carried out by a computer they were conventional in that they were the same as or similar to the steps that would be used by a human performing the same task and were merely those that were necessary for computer implementation. As such it was clear that they related to schemes or methods for performing a mental act or programs for computers.

12. In contrast to those precedent cases, Mr Moss contended, in the present application, the invention was not intended to assist a human. In fact, he said, the computer, if anything, has more difficulty than a human being in recognising natural languages. He also drew my attention to a passage in the application on page 10 at lines 20-28, which reads:

> "While it is convenient to describe the invention in terms of instructions, symbols, characters, or the like, the reader should remember that all of these and similar terms should be associated with the appropriate physical elements. Further, the invention is often described in terms of comparing or identifying, or other terms that could be associated with a human operator. No action by a human operator is desirable in any of the operations described herein which form part of the present invention; the operations are machine operations processing electrical signals to generate other technical signals."

13. Thus, argued Mr Moss, it was wrong to think of the present invention as effecting a process that could be carried out by a human operator. The processing of certain electrical signals to

generate other electrical signals with the purpose of identifying certain characteristics of the documents, (*eg* the language of the documents), in order to determine the routing of those documents in a computer system was, he suggested, a technical process and not concerned with the performance of a mental act. In any case, he maintained, the steps taken in the process were not the steps that a human operator would take in carrying out the task. Thus, he put it to me that the invention was not substituting for a human operator, so there was no mental act involved. On the contrary, he suggested, because the way in which the described system identified the language of a document differed from the way in which a human operator would do so, the invention relates to technical subject-matter and makes a distinct technical contribution.

14. Mr Moss referred me to the words of Aldous J in the *Wang* case where he said (on page 473):

> "The method may well be different when a computer is used, but to my mind it still remains a method for performing a mental act, whether or not the computer program adopts steps that would ordinarily be used by the human mind."

Mr Moss argued that this conclusion of Aldous J should be interpreted narrowly otherwise, in his view, most if not all data processing inventions would be excluded from patentability. However, I also note that in *Fujitsu* (at page 618), Aldous LJ, in rejecting a narrow interpretation of the words "a method for performing a mental act", said " ... a decision as to whether an invention is patentable as consisting of a method of performing a mental act as such should be capable of determination without recourse to evidence as to how the human mind works." This indicates to me that it is not necessary for the invention to replicate the human thought processes exactly in order to be regarded as performing a mental act.

15. Despite the arguments put by Mr Moss, I am not persuaded that the invention claimed in claim 1 and claim 9 relates to anything more than a method of performing a mental act. The central object of the invention is to identify the human language of an electronic document. I am not convinced by the argument that the method by which the language is identified is not the method that a human operator would use. The human envisaged by Mr Moss is one who has some knowledge of the languages being identified and is able to recognise individual words, or someone armed with dictionaries in all of the respective languages. I could imagine a human with significant mathematical ability but little or no linguistic knowledge using a method similar to that used in the invention to identify the relevant language. Such a human may well be a complete fiction, but I think that this is of little consequence. The analysis of words by breaking them down into various letter pairs, and the comparison of those pairs with pre-prepared tables of letter pairs is to my mind a clear and unequivocal mental act. I should add that I can see no way of interpreting the words of the learned judge in *Wang* and *Fujitsu* in the way that Mr Moss suggests to take the present invention outside the exclusion of Section 1(2)(c).

16. Although claim 1 as it currently stands defines the invention in terms of operating on a stream of character coded signals, I do not accept the argument of Mr Moss that as such it relates to a technical process and as such it is not a human mental act. What is happening is that words in an electronic document are being analysed and compared with words from several different languages to identify the language of the electronic document. In operating the present invention, a number of documents in electronic form are analysed by a computer following a set of rules, in order to identify the human language in which each document is written.

Clearly, the operations carried out by the computer are electronic but they are conventional computer operations and are not technical in the sense Mr Moss suggests. It should be noted that in carrying out the process nothing is done to the documents, and following the operation of the invention each document remains in exactly the same form as it was in at the commencement of the operation.

17. For the sake of completeness, I need also to decide whether the claims relate to a computer program. This I can deal with fairly quickly. Mr Moss acknowledged that the specification tells us that the invention may be embodied in software. He argued, nevertheless that the specification discloses an explicit hardware embodiment, and the claims relate to a computer system, not a computer program. He drew my attention to the portion of the description headed "Specialized Hardware" commencing on page 25, and suggested that this disclosed a novel computer hardware arrangement which gave benefits in terms of faster processing by using a technique known as pipe-line processing, which involved parallel processing of documents. I am not persuaded by this argument. In my view, what is described here is a commonly used technique in the computer field and no new hardware or hardware arrangements are involved. Thus I do not accept that the invention relates to novel computer hardware. Any novelty lies in the combination of conventional computer hardware and possibly novel software. I must therefore conclude that the invention does relate to a computer program.

18. I am aware that claim 1 is directed to a computer system and is not therefore directed to a method of performing a mental act nor to a computer program, but I regard this merely as a matter of form. I turn again to the words of Aldous LJ in *Fujitsu* and quote the following passage from page 618, to provide the basis for my decision in this regard:

> "Mr. Birss sought to rely upon the form of the claims. He submitted that claim 10, directed as it was to a computer apparatus having a number of features and claim 9 directed to a method of manufacturing a structure could not be said to relate to an invention consisting of a computer program as such.
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> That submission cannot be right having regard to the judgment of Nicholls LJ in *Gale* [1]. In that case, I held at first instance that the ROM claimed was not excluded as it was an article which had been altered during manufacture so as to perform the function of the method or program defined by the claim. The Court of Appeal decided that that was not correct and that the court should look at the claims as a matter of substance. It was both convenient and right to strip away, as a confusing irrelevance, the fact that the claim was for 'hardware'."

19. I now need to consider whether the invention, despite my finding that it is directed to a mental act and/or a computer program, provides a technical effect or makes a technical contribution. Following the decisions of the Technical Board of Appeal of the EPO in *IBM/Computer programs* (T935/97) now reported as *IBM's Application* [1999] RPC 861, and *IBM/Computer program product* (T1173/97) [1999] OJEPO 609, where it was held that a computer program product was not excluded from patentability under Article 52(2) and (3) if, when it is run on a computer, it produces, or is capable of producing, a further technical effect which goes beyond

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[1] *Gale's Application* [1991] RPC 305

the "normal" physical interactions between program (software) and computer (hardware), the Patent Office issued a Practice Notice [1999] RPC 563, declaring that it would adopt the same practice as the EPO and allow claims to computer programs where the running of the program involves a technical contribution.

20. In referring to *Fujitsu*, Mr Moss directed me to the comments of Aldous LJ where he said on page 614:

> "... it is and always has been a principle of patent law that mere discoveries or ideas are not patentable, but those discoveries and ideas which have a technical aspect or make a technical contribution are. Thus the concept that what is needed to make an excluded thing patentable is a technical contribution is not surprising. .... It has been accepted by this court and by the EPO and has been applied since 1987. It is a concept at the heart of patent law."

21. Also in this regard, Mr Moss referred me to the decision in *Vicom Systems Inc/Computer-related invention* (T208/84) [1987] OJEPO 14, another decision of the Technical Board of Appeal of the EPO. In that case the BoA held that a method of digitally processing images was a mathematical method used in a technical process carried out on a physical entity and as such was patentable. He drew my attention to paragraph 6 of the decision where the Board said:

> "The Board, therefore, is of the opinion that even if the idea underlying an invention may be considered to reside in a mathematical method a claim directed to a technical process in which the method is used does not seek protection for the mathematical method as such."

22. Mr Moss then referred me to several more decisions of the EPO Boards of Appeal. He explained that *IBM/Document abstracting and retrieving* (T22/85) [1990] OJEPO 12, *IBM/Semantically-related expressions* (T52/85), and *IBM/Text processing* (T38/86) [1990] OJEPO 384, all related to inventions concerning the use of computers to carry out certain tasks, and all were refused by the EPO BoA as mental acts. In T22/85, he drew my attention to one sentence in the decision - "A claim directed to an excluded activity but at the same time containing such technical features [eg a computer controlled by appropriate software] would not appear to be unallowable under all circumstances." In T52/85, in which the patent application concerned a computer system for finding synonyms or antonyms of an input word, he noted that the BoA refused the application on the grounds that it made "no contribution in a field outside linguistics nor outside the field of conventional computer performance". In T38/86 the invention related to a method by which a computer substitutes simpler words into a document in order to made the document easier to read. Mr Moss drew my attention to paragraph 12 of the decision where the BoA said:

> "The Board recognises that the use of technical means for carrying out a method, partly or entirely without human intervention, which method, if performed by a human being, would require him to perform mental acts, may, having regard to Article 52(3) EPC, render such a method a technical process or method and therefore an invention within the meaning of Article 52(1) EPC, i.e. one which is not excluded from patentability under Article 52(2)(c) EPC."

23. Mr Moss also referred me to the decision in *Sohei/General purpose management system* (T769/92) [1995] OJEPO 525, which related to a computer controlled management system. He suggested to me that in their decision the BoA had broadened the field of patentability by introducing the concept of "technical considerations" in place of the previously used terms "technical effect" or "technical contribution". Finally, Mr Moss referred me to the *IBM* decision T935/97 to which I have already referred above in connection with the Practice Notice.

24. All these cases lend support to the now-accepted principle that the exclusion under Section 1(2)(c) and the corresponding exclusion under the EPC only apply to mental acts and computer programs **as such**, and that where the performance of the program or mental act leads to a technical effect or makes a technical contribution, then a patent may be granted. To that extent, I do not take issue with Mr Moss with regard to the cases he has put before me or the conclusions he draws from them. The question I have to consider is whether there is any technical effect, contribution or even consideration in the invention of the present case.

25. In the present application, Mr Moss said, the technical contribution lies in the breaking down of words in an electronic document into all the constituent letter pairs, and comparing those letter pairs with corresponding letter pairs of preselected words from the chosen languages under consideration. Again, he emphasised that this was not the way in which a human would carry out a comparison to identify the language of a document, and thus suggested that the invention did not relate to the carrying out of a mental act as such. Mr Moss also suggested that the present invention provided a technically elegant solution to a technical problem and by analogy went beyond a mere mental act. He argued that there was a technical effect, that effect being the electronic recognition of the language of the document, but had to concede that his argument was weakened by the fact that the documents being handled in the method of the present application remained unchanged by the process described.

26. I think that Mr Moss has identified the fatal weakness in his argument. When one looks at what is happening when the system disclosed is operating, electronic documents are inputted to the system, they are being analysed by computer to identify the natural language of the document - a purely intellectual exercise in my view, regardless of the precise manner in which this is effected - and the documents are outputted by the computer in exactly the form that they were inputted. No matter how broad an interpretation is put on the terms technical contribution, technical effect, or technical consideration, I cannot find such a contribution, effect or consideration in the invention of the present application. Accordingly I must conclude that the claims relate to a method of performing a mental act as such and to a computer program as such, and consequently are excluded from patentability under Section 1(2)(c) of the Act.

27. At the hearing Mr Moss sought my opinion on the allowability of an amended claim 1. He did not have a claim prepared, but envisaged a claim to a system or method of processing coded electronic documents incorporating the system or method substantially as currently defined in claim 1 or 9 then adding a further means or step relating to what happened to the documents when they were outputted from the system, to reflect some action taken by the computer in response to the determination of the language of the respective coded documents. Mr Moss admitted that there was a difficulty in that there is marginal support in the specification for such a claim. I have to agree with him in this regard. The specification is directed to the system and method of identifying the language of documents and has little or

no disclosure of the context of that system and method. There is a general statement on the opening page of the problem of documents in different languages being sent across national boundaries, but there is nothing to say how the present invention would process these documents beyond the identification of the language. As regards support for the origin of the documents Mr Moss pointed me to a reference on page 11 at line 2 to the effect that the source may originate as coded characters transmitted on a network ... from some remote location. I have to conclude that on the basis of the form of claim put to me by Mr Moss that it would have to be rejected as lacking adequate support in the description.

28. Had I found that there was adequate support for an amended claim on the lines envisaged by Mr Moss, I would have had to consider whether such a claim met the requirements of Section 1(2)(c). My view is that it would not. The addition of a step to the process in which documents are processed in some way (eg by sorting or selecting), but remained in their original form, would still result in a claim that was a mental act or a computer program and would not involve a technical effect or contribution. Having read the specification as a whole, I can see no way in which the claims could be amended to retain adequate support from the description and meet the requirements of Section 1(2)(c).

29. Therefore, having found that the current claims do not meet the requirements of patentability set out in Section 1(2)(c) of the Act, and also that there is insufficient disclosure to support allowable claims, I refuse the application.

Appeal

30. This being a substantive matter, any appeal from this decision must be lodged within six weeks of the date of this decision.

Dated this 7th day of September 2001

G M ROGERS
Deputy Director, acting for the Comptroller

THE PATENT OFFICE