



PATENTS ACT 1977

APPLICANT Toshiba Research Limited

ISSUE Whether patent application
GB1119833.0 complies with section 1(2)

HEARING OFFICER H Jones

DECISION

Introduction

- 1 The application as filed relates to a linear semantic method, utilising a bag-of-wordpairs (BoWP) or wordgroups approach, which may, among other uses, be utilised in speech processing. The application was filed on 16 April 2009 and published as GB2482630 on 8 February 2012. The compliance date of the application was 22 August 2014.
- 2 The examiner argues that the invention is excluded from patentability under section 1(2) of the Act as a computer program as such. The applicant requested a hearing to decide the matter, which took place on 24 September 2014 and was attended by Mr Mark Kenrick and Dr Rhian Granleese of Marks & Clerk LLP representing the applicant. Skeleton arguments submitted before the hearing have proven useful in structuring this discussion.
- 3 Although not stated in the pre-hearing report of 18 August 2014, the examiner has deferred consideration of the outstanding requirements of the Act (novelty and inventive step, including a supplementary search under section 17(7)) pending resolution of the excluded matter issue.

The invention

- 4 The application relates to the field of data retrieval and indexing, and seeks to provide an improvement over the “bag-of-words” method used in natural language processing where independent items (words) taken from an object (a text document) are represented as an unordered collection thereby losing much of the semantic information present in the original document. The proposed method expresses the text as a group of word pairs, disregarding the order of the word pairs. This grouping in the described bag-of-wordpairs (or bag-of-wordgroups where more than 2 words are grouped) method thus allows more of the semantic information to be retained and modelled.
- 5 Following amendment of the claims on 22 January 2014, the claimed invention now specifically lies in the field of speech processing. In this context the method is used

to generate a language model indicating the probability of certain words following each other. This language model will change dependent on the subject matter used to train the system. This method allows selection, according to a search algorithm, of the training corpora used to train the language model and in so doing is intended to retain more of the semantic information than the bag-of-words method.

6 Mr Kenrick contended at the hearing that the amended claims (including independent claims 1, 12 and 15) stand or fall together, and I see no reason to disagree. As a result, I will only consider the later claims if I find that claim 1 is excluded from patentability under section 1(2).

7 Claim 1 as amended reads:

1. A method of speech processing, for processing speech relating to a specific subject matter, the method comprising:

using a processor to select training corpora relating to said specific subject matter by: determining a plurality of feature groups, wherein each feature group comprises n features and n is an integer of 2 or more;

providing a plurality of general training corpora as a plurality of data files;

expressing each of the plurality [of] data files of the general training corpora as a file vector with components of the vector indicating the frequency of a feature group within the data file, wherein the n features which constitute a feature group do not have to be located adjacent to one another;

providing a data file relating to the specific subject matter and expressing said data file using said feature groups as a file vector to produce a search query; and searching the general training corpora by comparing the search query expressed as a vector with said file vectors from the plurality of data files of the general training corpora to select training corpora relating to the specific subject matter,

the method of speech processing further comprising:

training a language model for speech processing using said selected corpora; and processing speech using said language model.

The law

8 The section of the Act concerning inventions that are excluded from patentability is section 1(2), which reads:

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) a discovery, scientific theory, or mathematical method;

(b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;

(c) a scheme, rule or method for performing a mental act, playing a game or doing business or a program for a computer;

(d) the presentation of information;

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 The starting point for determining whether an invention falls within the exclusions set out in section 1(2) is to use the structured approach set out by the Court of Appeal in its judgment in *Aerotel Limited v Telco Holdings Limited & Ors / Macrossan's Application* [2007] RPC 7. The structured approach comprises four steps:

- 1) *properly construe the claim;*
- 2) *identify the actual (or alleged) contribution;*
- 3) *ask whether it falls solely within the excluded subject matter;*
- 4) *check whether the actual or alleged contribution is actually technical in nature.*

10 In deciding whether the claims pass the third and fourth steps, I will also consider the guidance set out in the Court of Appeal's judgment in *Symbian Ltd v Comptroller-General of Patents* [2009] RPC 1 which confirmed that the structured approach is one means of answering the question of whether the invention reveals a technical contribution to the state of the art.

11 In *AT&T Knowledge Ventures v Comptroller General* [2009] FSR 19, Lewison J (as he then was) set out signposts which may help determine whether an invention provides a technical contribution. Both in the skeleton arguments and at the hearing, Mr Kenrick drew my attention to Lewison LJ's subsequent statement in *HTC Europe Co Ltd v Apple Inc (Rev 1)* [2013] RPC 30 that the fourth signpost had been expressed too restrictively and that he supported the test derived by Mann J in *Gemstar-TV Guide International Inc v Virgin Media Ltd* [2010] RPC 10. As a result, the signposts to a relevant technical effect (modified as per *HTC v Apple*) are:

- i) whether the claimed technical effect has a technical effect on a process which is carried on outside the computer;*
- ii) whether the claimed technical effect operates at the level of the architecture of the computer, that is to say whether the effect is produced irrespective of the data being processed or the applications being run;*
- iii) whether the claimed technical effect results in the computer being made to operate in a new way;*
- iv) whether the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer;*
- v) whether the perceived problem is overcome by the invention as opposed to merely being circumvented.*

12 Mr Kenrick also referred me to the comments of Birss HHJ at paragraphs 32, 34 and 38 in *Halliburton Energy Services Inc's Patent Application* [2012] RPC 12:

"The question [of patentability] is decided by considering what task it is that the program (or the programmed computer) actually performs. A computer programmed to perform a task which makes a contribution to the art which is technical in nature, is a patentable invention and may be claimed as such" ..

"The cases in which patents have been refused almost always involve the interplay between at least two exclusions..."

"when the task carried out by the computer program is not itself something within the excluded categories then it is likely that the technical contribution has been revealed and thus the invention is patentable."

- 13 Discussing the situation where the invention is confined to operation of a computer, Birss HHJ stated at paragraph 37:

“when the program solves a technical problem relating to the running of computers generally... Making computers work better is not excluded by s1(2)”.

Arguments and analysis

- 14 Applying the first of the *Aerotel* steps, I must first construe the claim. I find nothing in the claim that poses a problem with construction. Neither the examiner nor the applicant has presented me with any issues. It is clear that the claim is directed towards a method for speech processing that is conducted using a computer. In this context what is intended by speech processing is referred to at page 4 paragraph 5 of the application which states *“[t]he above speech processing may be applied to automatic speech recognition (ASR) where an input speech signal is output as a text data file or it may be applied to text-to-speech systems where input text is converted into an audio speech file”.*
- 15 The second step involves identification of the actual or alleged contribution. In her pre-hearing report of 18 August 2014, the examiner asserted that the contribution was “more efficiently searching and indexing of general training corpora in the form of data files in order to retrieve relevant information” and could be summed up as “a computer implemented method...for the searching, indexing and retrieval of data”. Therefore the method relates solely to excluded matter as a computer program.
- 16 Mr Kenrick argued that there are two ‘flavours’ of contribution. The first flavour concerns training a language model using selected material and then processing speech using the trained language model. The contribution is therefore “a better way of speech processing”. The second flavour was that a computer which operates using this search method (running the search algorithm) will be a better computer in the sense that it will be able to handle volumes of data more efficiently and effectively as a computer. He contends that the second flavour adds to the first to gain “further patentability”.
- 17 It is clear from case law that I must look at the claims as a whole when assessing the contribution made by the invention, e.g. the EPO Board of Appeal’s decision in *Vicom (T208/84)*, as approved by Court of Appeal in *Fujitsu Limited’s Application [1997] RPC 608* and in *Aerotel*, which says that “Decisive is what technical contribution the invention as defined in the claim when considered as a whole makes to the known art”. As a result, I believe that Mr Kenrick’s first flavour of contribution is the correct one: the contribution is a better way of speech processing. I shall however return to the second flavour of contribution identified by Mr Kenrick later.
- 18 I shall consider the third and fourth steps of the test together: does the alleged contribution fall solely within an excluded category and is that contribution technical in nature?
- 19 Mr Kenrick argued that the contribution, a better way of speech processing, accords with the first *AT&T* signpost. It is, he argued, a process going on outside the computer, i.e. a process which is not itself a computing process e.g. as in *Halliburton* or *Vicom*. This speech processing goes on outside of the computer and is not

excluded; it is more than a computer program. If image processing is patentable (as in *Vicom*) then speech processing is no more or less patentable.

- 20 I agree with Mr Kenrick. Although the method is run as a computer program on a computer, the method relates to speech processing (the training and use of a speech processing system) which is not excluded matter, and thus the contribution is both technical in nature and patentable.
- 21 For completeness I shall return to Mr Kenrick's second contribution. This contribution, that the computer running the search algorithm was a better computer, he argued fits with the fourth *AT&T* signpost. He asserted that a technical problem within the computer itself had been solved e.g. as in *Symbian*. The computer running this algorithm will be better able to perform a search and to come to the required result more quickly. I do not disagree that a computer running a program according to this method will be able to arrive at a result more quickly and efficiently than one using the prior art bag-of-words method, but I do not see that this amounts to a better computer, merely a better program. No change is being made to the underlying computer to make it work better. Thus I believe that this contribution is not technical in nature and not patentable on its own without being tied to speech processing.

Conclusion

- 22 I find that the application does include a patentable invention. Therefore the application will be remitted to the examiner for further substantive examination including completion of the supplementary search under section 17(7). The applicant will need to request extension of the compliance date in order to keep the application in force.

H Jones

Deputy Director, acting for the Comptroller