



PATENTS ACT 1977

APPLICANT International Business Machines Corporation

ISSUE Whether patent application GB2112654.5 complies with section 1(2) of the Patents Act 1977

HEARING OFFICER B Micklewright

DECISION

Introduction

- 1 This decision relates to whether patent application GB2112654.5 complies with section 1(2)(c) of the Patents Act 1977 (“the Act”).
- 2 The application is the national phase application of Patent Cooperation Treaty application PCT/IB2020/051547, filed on 24 Feb 2020 and with a declared priority date of 1 March 2019. The application was published as GB 2594901 A on 10 November 2021.
- 3 The examiner considered the invention claimed in the application to be a program for a computer and a method for doing business as such and therefore to be excluded from patentability. Despite several rounds of arguments, the applicant and the examiner did not reach an agreement. The matter was therefore referred to me for a decision on the papers.
- 4 I confirm that I have considered arguments made in all the correspondence on file, in particular the letters from the applicant dated 17 November 2021, 8 February 2022, and 9 May 2022.

The invention

- 5 The invention relates to a method for association rule mining. Association rule mining is a rule-based machine learning method for discovering relations between variables in large datasets.
- 6 The present invention identifies relations between items in transactions. Transactions can be online purchases of items, for instance. Local conditional frequency pattern trees are generated in processing nodes (such as server computers), wherein nodes of these trees represent items and their frequency

in the transactions. Each processing node generates a global conditional frequency pattern tree using the local conditional frequency pattern trees. The generated global conditional frequency pattern trees are then distributed such that each processing node has all the global conditional frequency pattern trees generated by the other processing nodes. Patterns are then generated. These patterns may indicate an order in which items are purchased, used, or otherwise manipulated, for example. A set of rules defining relationships between the items is then generated using the patterns and the global conditional frequency pattern trees. In one embodiment, the rules may be used to recommend items to a customer based on the current item that the user is viewing on a computer.

7 The claims have not been amended. The three independent claims – claims 1, 9, and 17 – are corresponding method, system, and computer program product claims. They are equivalent in scope so, for the purposes of this decision, it will be sufficient to consider only claim 1 which reads:

1. A method for identifying relations between items in transactions, the method comprising:
 - generating, by a computer system, local conditional frequency pattern trees in processing nodes in the computer system, wherein nodes in the local conditional frequency pattern trees represent items and a frequency of the items in the transactions;
 - generating, by the computer system, global conditional frequency pattern trees in the processing nodes, wherein each processing node in the processing nodes generates a global conditional frequency pattern tree using a set of local conditional frequency pattern trees in the processing node;
 - distributing, by the computer system, the global conditional frequency pattern trees generated by the processing nodes such that each processing node in the processing nodes has the global conditional frequency pattern trees generated by other processing nodes;
 - generating, by the computer system, patterns; and
 - generating, by the computer system, a set of rules using the patterns and the global conditional frequency pattern trees in the processing nodes, wherein the set of rules define the relations between the items.

The law

8 Section 1(2) of the Act states:

1(2) It is hereby declared that the following (amongst other things) are not inventions for the purpose of the Act, that is to say, anything which consists of-

- (a) a discovery, scientific theory or mathematical method;*
- (b) a literary, a 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 program for computer;*
- (d) the presentation of information;*

but the foregoing provisions shall prevent anything from being treated as an invention for the purposes of the Act only to the extent that a patent or application for a patent relates to that thing as such.

9 The provisions of Section 1(2) were considered by the Court of Appeal in *Aerotel*¹ where a four-step test was set out to decide whether a claimed invention was excluded from patent protection:

- (1) Properly construe the claim;*
- (2) Identify the actual 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 It was stated by Jacob LJ in *Aerotel* that the test is a re-formulation of and is consistent with the previous ‘technical effect approach with rider’ test established in previous UK case law. Kitchen LJ noted in *HTC v Apple*² that the *Aerotel* test is followed in order to address whether the invention makes a technical contribution to the art, with the rider that novel or inventive purely excluded matter does not count as a ‘technical contribution’.

11 Lewison J in *AT&T/CVON*³ set out five signposts that he considered to be helpful when considering whether a computer program makes a technical contribution. Lewison LJ reformulated the signposts in *HTC v Apple* in light of the decision in *Gemstar*⁴. The signposts 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 claimed invention as opposed to merely being circumvented.

Assessment

¹ *Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application* [2006] EWCA Civ 1371

² *HTC Europe Co Ltd v Apple Inc* [2013] EWCA Civ 451

³ *AT&T Knowledge Ventures/CVON Innovations v Comptroller General of Patents* [2009] EWHC 343 (Pat)

⁴ *Gemstar-TV Guide International Inc v Virgin Media Ltd* [2010] RPC 10

12 To determine whether the claimed invention can be considered more than a program for a computer and/or a method for doing business as such, I am required to follow the approach set out by the Courts in *Aerotel*.

(1) Properly construe the claim

13 It appears from the correspondence between the applicant and the examiner that there is a general agreement that the construction of the claim presents no particular challenges.

14 Claim 1 relates to “identifying relations between items in transactions”. Paragraph [0048] of the description states that “items” can be goods, services, amino acids, stocks, currency, nodes in a network, sensor data, positions determined using GPS devices in vehicles, or other suitable types of items. Paragraph [0048] further states that “transactions” can be online purchases of items, instore purchases of items, purchases of goods, purchases of services, placement of amino acids, purchases of stocks, purchases of currency, or other suitable types of transactions.

15 The claim requires “a computer system” comprising “processing nodes”. The description states that the processing nodes may be data processing systems such as computers or server computers. The computer system can therefore be seen to comprise a cluster of processing systems.

16 The claim requires “patterns” to be generated by the computer system. The description states that “patterns” are patterns of items which may indicate an order in which items are purchased, used, or otherwise manipulated.

(2) Identify the actual contribution

17 Identifying the contribution in the second step of this test is critical and I refer to the following paragraph in *Aerotel* for guidance:

“43. The second step – identifying the contribution – is said to be more problematical. How do you assess the contribution? Mr Birss submits the test is workable – it is an exercise in judgement probably involving the problem said to be solved, how the invention works, what its advantages are. What has the inventor really added to human knowledge perhaps best sums up the exercise. The formulation involves looking at the substance not form – which is surely what the legislator intended.”

18 The examiner, in their first examination report of 29 September 2021, identified the contribution to be the generation of a set of rules which define the relationships between items in transactions for the purposes that these rules may be used to identify items which may be recommended to the customer.

19 The applicant did not agree and identified the contribution, in their letter of 17 November 2021, to be the distribution of global conditional frequency patterns trees, which are generated based on the local conditional frequency pattern trees generated by each processing node, to the processing nodes. In this way,

each processing node receives a conditional frequency pattern tree contributed to by all of the other processing nodes of the system.

- 20 The examiner and applicant then appear to have agreed on the contribution to be:

“The identification of relations between items using distribution of global conditional frequency pattern trees, which are generated based on the local conditional frequency pattern trees. This allows for a set of rules for the relationships between items in transactions to be identified and thus more appropriate recommendations are made.”

- 21 However, I note the applicant raises doubts, in their letter of 9 May 2022, as to whether the “recommendations” should be considered part of the contribution. I share the doubts of the applicant on this point. Using the rules to make recommendations to the user is not defined by claim 1. While the main embodiment described in the description does make recommendations using the generated rules, it is not a requirement for all embodiments. For instance, paragraph [0075] explicitly states that the rules may be used for other purposes in place of recommendations. Furthermore, making “more appropriate recommendations” does not appear to be a stated advantage of the invention or argued to be such by the applicant.

- 22 Taking all this into account, I consider the contribution to be:

Generating a set of rules for identifying relations between items in transactions comprising distributing, to processing nodes of a computer system, global conditional frequency pattern trees which are generated by each processing node based on local conditional frequency pattern trees, such that each processing node has the global conditional frequency pattern trees generated by other processing nodes.

Steps (3) and (4): Ask whether it falls solely within the excluded subject matter; Check whether the actual or alleged contribution is actually technical in nature

- 23 The third and fourth steps of the *Aerotel* test involve considering whether the contribution falls solely within excluded categories, and then checking whether the contribution is technical in nature. It is appropriate to consider these two steps together because whether the contribution is technical in nature will have a direct impact on whether it falls solely within excluded matter.
- 24 I will first consider the computer program exclusion. Care must be taken here because an invention is not excluded merely because it is embodied as a program for a computer. What is important is whether the program makes a technical contribution. The *AT&T* signposts are a useful aid in determining this question.

Signpost i) Whether the claimed technical effect has a technical effect on a process which is carried on outside the computer

- 25 With respect to the first signpost, the applicant argues in their letter of 8 February 2022 that the present invention is similar to the process of manipulating images in the invention of *Vicom*⁵. That is, they consider the process of collating and processing local conditional frequency pattern trees in order to form a global conditional frequency pattern tree to be a technical process outside the computer, and thus to make a technical contribution.
- 26 I do not find this argument persuasive. The process carried out by the program of the invention relates to the generation and distribution of global conditional frequency pattern trees in order to identify relations between items, and as such relates simply to the mining and structuring of data. The mining and structuring of data is not a technical process carried on outside the computer so is not comparable to image processing. On the contrary, this takes place entirely within the computer system and there is no effect on a process outside of the computer.

Signpost 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;

Signpost iii) Whether the claimed technical effect results in the computer being made to operate in a new way

- 27 For convenience I will consider signposts ii) and iii) together. The applicant has not made any particular submissions in relation to these signposts, and this can be dealt with briefly.
- 28 In the present case it is evident that the invention does not operate at the level of the architecture of the computer. The effect of the invention is restricted to a specific process at the application level rather than being a general effect across all data being processed or applications being run. Furthermore, the computer itself does not operate in a new way. A computer program is potentially operating in a new or better way, but upon a computer that is operating in a normal and conventional fashion.

Signpost iv) Whether the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer

- 29 The applicant argues in their letter of 17 November 2021 that there is an improvement in the accuracy of the conditional frequency pattern trees of each processing node and as a result an improvement in the efficiency of the computer system as a result. I accept that the claimed method may be more efficient than other methods of identifying relationships between items being processed, but it is a better method of mining data, not a better computer in itself. The computer itself is operating in the way it normally does. The mere fact that a computer program uses less of the available hardware resources does not provide a technical contribution.

⁵ *Vicom Systems Inc.* T 0208/84 [1987]

Signpost v) Whether the perceived problem is overcome by the claimed invention as opposed to merely being circumvented

- 30 The applicant identifies the problem as one of structuring data more effectively in order to determine relations between items in a technically superior manner. The applicant argues the invention provides a solution to this problem as it identifies relations in a manner that decreases resource usage and processing time.
- 31 The invention may well relate to a more efficient way of determining relations between items, but I am not convinced that this problem is technical. As stated by the applicant, the problem relates to how the data is structured within a computer program. This problem is therefore a matter of program design, and as discussed above, one in which the solution provides no technical effect on any process outside the computer, nor any effect on the operation of the computer itself. The solution does not relate to improving the way the computer itself processes data, but instead a standard computer is simply running a different program. This signpost therefore does not point to a technical contribution.
- 32 I therefore conclude that none of the signposts point to the present invention making a technical contribution.
- 33 In their letter of 8 February 2022, the applicant refers to the decision of *Halliburton*⁶, emphasising paragraph 32 in particular, in which Judge Birss QC (as he then was) states that 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.”*
- 34 The applicant claims that the present invention clearly causes a computer to perform a task that makes a contribution to the art which is technical in nature. This provides me with a good opportunity to take a step back and consider the contribution more generally. The invention relates to the task of identifying relations between items in transactions. The invention works by distributing global conditional frequency pattern trees generated by each processing node to all the processing nodes of the computer system, such that relations can be determined more efficiently. The task relates to data mining and the method relates to a way of structuring the data for this specific task. In my view the contribution is therefore not technical, but instead relates entirely to data processing steps in relation to a non-technical task and lies in the excluded field of a program for a computer as such.
- 35 I will now also consider the business method exclusion. The main embodiment of the invention (as discussed in paragraphs [0002] and [0047] for instance) relates to the online purchases of items and the finding of relations between those items so that rules can be generated for recommending items to

⁶ *Halliburton Energy Services Inc* [2012] RPC 12

customers. This embodiment of the invention is clearly a business activity, as is acknowledged by the applicant in their letter of 9 May 2022. The applicant argues, however, that the claim is not limited to this particular application and that many other applications are noted in paragraph [0076] such as synthesis of artificial proteins, malware detection and continuous production. The applicant argues that it is not correct that because the invention is capable of processing information relating to purchases that the invention should be excluded as a method of doing business.

- 36 I am not persuaded by this argument. As stated in the Manual of Patent Practice⁷ at section 1.15:

“As Floyd J observed in paragraph 23 of Kapur v Comptroller-General of Patents [2008] EWHC 649 (Pat), if there are embodiments of a claim that fall within excluded subject matter, the fact that the claim is wide enough to encompass embodiments that are not excluded under s. 1(2) will not be sufficient to save it. The exclusion “will still bite to the extent that excluded subject matter is claimed”.

- 37 The claimed invention clearly encompasses a business activity and is therefore excluded from patentability as a method for doing business as such. Although other embodiments are listed, I need not make any formal finding as to whether the contribution would be technical in those circumstances because the claim is not limited in any way to those aspects and encompasses excluded embodiments.

Conclusion

- 38 I have found that the claimed invention relates to a program for a computer as such and a method of doing business as such and so is excluded from patentability under section 1(2)(c) of the Act. I therefore refuse the application under section 18(3).

Appeal

- 39 Any appeal must be lodged within 28 days after the date of this decision.

B Micklewright

Deputy Director, acting for the Comptroller

⁷ The Manual of Patent Practice is available at <https://www.gov.uk/guidance/manual-of-patent-practice-mopp>