Intellectual Property Office

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PATENTS ACT 1977

APPLICANT	Shenzhen Audaque Data Technology Ltd
ISSUE	Whether patent application number GB 1511187.5 complies with section 1(2)
HEARING OFFICER	J Pullen

DECISION

Introduction

1 Patent application GB 1511187.5 entitled "*Data Quality Measurement Method Based on a Scatter Plot"* was filed in the name of Shenzhen Audaque Data Technology Ltd on 18 August 2014, claiming an earliest priority date of 26 September 2013. It was published as GB 2523514A on 26 August 2015.

2 Following several rounds of substantive examination and amendment the examiner, Mr Stephen Procter, remains of the view that the claimed invention is excluded from patentability under section 1(2) and has deferred further consideration of the application pending resolution of this matter. With the position unresolved the applicant (via their attorneys Manitz, Finsterwald & Partner) requested that the matter be referred to a hearing officer for a decision on the papers.

3 I confirm in reaching my decision that I have considered all the correspondence on file.

The application

4 The application relates to a method of measuring data quality in a set of abstract data and a system on which the method is operated. More specifically the method concerns a method of measuring data quality in a scatter plot comprising an enormous number of data points.

5 In general terms the invention seeks to reduce the number of data points that are analysed when applying data quality rules, and consequently measuring data quality to improve the accuracy of the data quality measurement. Fundamentally, the number of data points processed during the measuring phase are reduced by mapping a plurality of effective data points from a first data set to a single data point on a second

data set. Non effective data points are corrected so as to avoid unnecessarily mapping across of null/erroneous data points.

6 An advantage of the present invention concerns reducing the number of data points by correction and mapping data points from a first data set to a second data set allowing more efficient manipulation of the second data set either by hand or by a computer. In both instances manipulating the second data set would take less processing steps than the manipulation of the first data set to achieve a similar data quality measurement.

7 The current claims were filed with the attorneys' letter dated 27 January 2016. There are two independent claims, these are directed to a data quality measurement method (claim 1) and data quality measurement system (claim 7). The claim 7 carries out a similar, although not identical, method to that defined in the claim 1.

8 Claim 1 reads as follows:

> *A data quality measurement method based on a scatter plot, wherein the method comprises the following steps:*
>
> > *defining a data grid (Gxy) and fitting a plurality of trend lines;*
> >
> > *using a scatter plot to display data and according to actual trends of the data, selecting a trend line and displaying same;*
> >
> > *generating data quality rules according to the determined trend line type and parameters;*
> >
> > *selecting appropriate data quality rules and measuring data quality according to a threshold;*
>
> *wherein said defining a data grid (Gxy) and fitting a plurality of trend lines comprises:*
>
> > *defining a data grid (Gxy) and scanning a data source;*
> >
> > *reading the data source, analyzing the stored data, and correcting the display scale of the X axis;*
> >
> > *for every effective data grid (Gxy) of every effective display scale, according to the total record numbers of X and Y as well as the sums of X and Y, calculating the average values of X and Y;*
> >
> > *for every Gx of every effective display scale, calculating the general average value of X and the general average value of Y and fitting every type of trend line based on the general average values,*
>
> *wherein said generating data quality rules comprises:*
>
> > *providing that the trend line is y=f(x), i.e., for a value x, the target value y can be calculated according to the trend line;*
> >
> > *setting a threshold for the target value to generate data quality rules,*
>
> *wherein said measuring data quality comprises:*

selecting data quality rules based on the actual situation of displaying data in the scatter plot, for each input data (x,y), calculating the target value y' corresponding to x according to the trend line technique of the rules;

configuring the threshold to be a value or a percentage, calculating the reasonable interval of the target value to judge the data quality of the actual value y.

9 Claim 7 reads as follows:

A data quality measurement system based on a scatter plot, the system comprising:

A trend line fitting unit configured for defining a data grid (Gxy) and obtaining the information of fitting a plurality of trend lines;

A data display unit configured for using a scatter plot to display data and according to actual trends of the data, selecting a trend line and displaying same;

A data quality rules generating unit configured for generating data quality rules according to the determined trend line type and parameters and obtaining information of the data quality rules;

A data quality measuring unit configured for selecting appropriate data quality rules, measuring the data quality according to a threshold, and obtaining the result of data quality measurement,

wherein the data quality rules generating unit generating data quality rules comprises

providing that the trend line is y=f(x), i.e., for a value x, the target value y can be calculated according to the trend line;

setting a threshold for the target value to generate data quality rules,

wherein the data quality measuring unit measuring data quality comprises:

selecting data quality rules based on the actual situation of displaying data in the scatter plot, for each input data (x,y), calculating the target value y' corresponding to x according to the trend line technique of the rules;

configuring the threshold to be a value or a percentage, calculating the reasonable interval of the target value to judge the data quality of the actual value y.

10 Claims 1 and 7 would appear to relate to the same invention, however claim 7 omits key features that contribute to defining the data grid (Gxy) of the method claim 1 relying only on the broad statement "*A trend line fitting unit configured for defining a data grid (Gxy) and obtaining the information of fitting a plurality of trend lines*".

The law

11 Section 1(2) declares that certain things are not inventions for the purposes of the Act, as follows:

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, a 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 purpose of this Act only to the extent that a patent or application for a patent relates to that thing as such.

12 These provisions are designated in Section 130(7) as being so framed as to have, as nearly as practicable, the same effect as Article 52 of the European Patent Convention, to which they correspond. I must therefore also have regard to the decisions of the European Patent Office Boards of Appeal that have been issued under this Article in deciding whether the present invention is patentable although I am not bound to follow them.

13 These provisions have been the subject of regular consideration by the UK courts. The assessment of patentability under section 1(2) is governed by the judgment of the Court of Appeal in *Aerotel* [1], as further interpreted by its judgment in *Symbian*[2] . In *Aerotel*, the court reviewed the case law on the interpretation of section 1(2) and approved a four-step test for the assessment of "excluded matter". Those steps are:

i. properly construe the claim:

ii. identify the actual/alleged contribution;

iii. ask whether the identified contribution falls solely within the excluded subject matter;

iv. check whether the actual or alleged contribution is actually technical in nature.

14 In its judgment in *Symbian* the Court made clear that the *Aerotel* test is not intended to provide a departure from the previous requirement set out in case law, namely that the invention must provide a "technical contribution" if it is not to fall within excluded matter. Thus in deciding whether the invention is excluded as a program for a computer as such I must ask whether it makes a technical contribution (though it does not matter whether I do that at step 3 or step 4).

15 The Courts have also provided additional guidance as to what constitutes a "technical contribution" in the form of the "AT&T signposts" which in their latest form[3] read as follows:

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;

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[1] Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application [2006] EWCA Civ 1371, [2007] RPC 7
[2] Symbian Ltd's Application [2008] EWCA Civ 1066, [2009] RPC 1
[3] As modified by the Court of Appeal in HTC Europe Co. Ltd. V Apple Inc. [2013] RPC 30

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

iv) whether a program makes a 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.

16 In assessing whether the current invention is excluded or not, I will follow the *Aerotel* approach as interpreted in *Symbian* and use the signposts to assist in identifying any technical contribution.

Arguments and analysis

17 The examiner maintains that the claimed invention is excluded from patentability under section 1(2) of the Act, and in particular that it relates to a mathematical method and a program for a computer under sections 1(2)(a) and 1(2)(c) respectively. His position is most recently set out in his pre-hearing report of 23 September 2016. Detailed arguments against the examiner's position are contained in the attorneys' letters of 27 October 2015 and 27 January 2016.

18 What I must do is determine whether the claimed invention relates solely to excluded matter under section 1(2).

19 The applicant has not provided a formal analysis of the invention following the *Aerotel* test or using the *AT&T* signposts. The attorneys' letters refer, in a more general manner, to the *AT&T* signposts and *Merrill Lynch*[4] but there is no analysis or argument that relates specifically to the present claim set. A number of more general arguments that the application should be allowed have been provided. I have read and considered these arguments. I do not intend to reproduce each argument in detail here but they may be summarised as follows:

i. The skilled person in the art is a software engineer, or maybe a group of software engineers that have received a substantial amount of training in order to be able to develop the claimed software. The software engineer is treated unfairly merely because their developments are not considered technical as they do not alter the hardware of a technical computing device. The Agent further argues that the patent system should follow technical trends to encourage technical improvements by way of software engineering.

ii. The present invention can decrease errors in data that can be output to various external devices such that the devices operate in a more efficient and accurate manner.

iii. A system including specific physical units is sufficient to introduce technical contributions outside of the data quality measurement method.

iv. In addition to point (iii) above, the specific physical units can only be realised by a special purpose computing device having specific physical structures

[4] Merrill Lynch's application [1989] RPC 561.

that are new in light of prior art computing devices. Insisting that the invention requires a change in hardware in order to function correctly.

20 I am sympathetic to the applicant and acknowledge that software engineering requires considerable expertise and investment. However, the IPO is bound by decisions on such matters from the higher tiers within the UK tribunal system – in this case, and in order of ascending importance, the Patent High Court, the Court of Appeal and the Supreme Court. These decisions are based on the legal provisions in place in the UK which concern intellectual property, for example, the Patents Act 1977. It is these decisions that will be used in deciding on the technical merits of the invention rather than any feelings to the contrary displayed by the applicant.

21 In determining the patentability of the current application the examiner was bound by current UK patent law, as established under the Act and as interpreted and expounded by UK courts. This is the correct approach and I am also bound to follow this approach. It is not at the discretion of the examiner or the hearing officer to change the approach set down by the UK courts.

22 I will now follow the four-step structured approach as laid down in *Aerotel*:

Properly construe the claim

23 I do not think this presents any real problems since there has been no discussion between the examiner and the applicant as to the meaning of the claims. I can see no difficulty in construing the claims.

24 I note at this point, and as mentioned in paragraph 10 above, that there are subtle differences in the scope of each of the independent claims, however I consider the claims to be sufficiently similar in substance that they stand or fall together.

Identify the actual or alleged contribution.

25 In the second step I must identify the actual or alleged contribution. In this case it is the alleged contribution as no search has been performed. At paragraph 43 of its judgement in *Aerotel*, the Court of Appeal rightly recognised this step as being more problematical as it involves an exercise of judgment *"probably involving the problem said to be solved, how the invention works, what its advantages are*." The Court also said that the formulation of the contribution involves looking at the substance of the invention and not the form.

26 From reading the specification it appears that the problem to be solved relates directly to analysing abnormal data and performing data correction within a scatter plot. A consequence of displaying such a scatter plot can be the very slow processing of the number of data points in very large data sets.

27 The invention as defined in claim 1 is a method providing an iterative process applied to develop a data set. It defines, in a data set, a data grid (Gxy) which is then used to develop a scatter plot in which the data points in said scatter plot no longer correspond to individual recorded points in the original data but to a set of all recorded points in the original data that satisfy specific conditions. Trend lines are fitted to the developed scatter plot and data quality rules are selected based on the trend lines. Data quality

can be measured using quality rules and a threshold. Furthermore, although not specifically defined in the claim, it is clear that the invention is most likely to be implemented by means of a computer programme. However, there is no reason why a skilled mathematician couldn't realise the method manually using paper and pen.

28 Claim 7 is a data quality measurement system comprising a trend line fitting unit, data display unit, data quality rules generating unit and data quality measuring unit configured to run a method substantially similar to that of claim 1.

29 The invention is advantageous as it reduces the number of data points in the second data set so that a computer requires less processing capacity to arrive at a quality measurement.

30 The attorneys' submissions state that the data produced by the method or system can be output to an external device such that the external device can operate in a more efficient manner. However, no external device is claimed or discussed in the application, thus I am unable to consider the efficiency impact on the external device caused by the present invention. As such an external device does not form part of the invention it cannot form part of the contribution.

31 The applicant additionally asserts that the invention cannot be simply realised by *any* ASIC (Application-specific Integrated circuit) or FPGA (Field Programmable Gate Array) but may only be realised by a very specific ASIC or FPGA.

32 An ASIC, as its name would suggest, is an integrated circuit customised for a specific use therefore an ASIC design is driven by its intended use and it is its intended use that would define its physical architecture. An FPGA is similar to an ASIC although it is programmed by the customer after manufacture, thus the physical architecture would already be present.

33 The applicant, in light of their discussions of ASIC's and FPGA's, argues that the provision of a plurality of named units, as in claim 7, is sufficient to meet the requirements of a technical contribution. However, no specific information about the system or specific details of the sub-units is given in the specification. It follows that the sub-units and their architecture and programming would be obvious to a skilled person reading the specification and therefore be conventional.

34 Conventional apparatus cannot be considered to form part of the contribution. At paragraph 44 of *Aerotel* Jacob LJ remarks:

> *"If an inventor claims a computer when programmed with his new program, it will not assist him if he alleges wrongly that he has invented the computer itself, even if he specifies all the detailed elements of a computer in his claim. In the end the test must be what contribution has actually been made, not what the inventor says he has made."*

35 The contribution of claim 7, even though it relates to a plurality of units suitable for carrying out a data quality measurement, lies in the computer program that performs a method that is substantially similar to claim 1.

The contribution of claim 1 is a mathematical method which transforms a first, larger, dataset into a workable second, smaller, dataset so that data quality rules can be applied and the data quality is measured.

Ask whether the identified contribution falls solely within the excluded matter

36 I have no doubt that contribution falls solely within the excluded subject matter for reasons analogous to those given by Birss J in paragraphs 32 and 33 of his judgement in *Halliburton*[5].

> *"The question (of whether an invention which is implemented in computer software is patentable) 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.*
>
> *If the task the system performs itself falls within the excluded matter and there is no more to it, then the invention is not patentable."*

37 Thus, in finding that the contribution is a mathematical method implemented as a program for a computer this is not the end of the matter.

38 The task performed by the invention as claimed in claims 1 and 7 is a method for developing a large data-set into a smaller data set by collocating similar data points and correcting other erroneous data points. Displaying the developed data set on a scatter graph and applying trend lines and thresholds in order to judge the quality of the data.

39 There is nothing in the identified contribution, the claimed subject matter, or in the description that anchors the identified contribution to any specific technical field. Furthermore there is nothing in the claimed subject matter, nor in the specification as a whole, that gives the reader any guidance as to what the undeveloped, or developed dataset represents. The invention essentially judges the quality of an abstract data set.

40 Therefore I conclude that the identified contribution falls solely within the excluded matter.

Check whether the contribution is actually technical in nature

41 In response to the assertions made in your attorneys' correspondence dated 27 January 2016, I shall also consider the technical merit of the alleged contribution of the main claims using the *AT&T* signposts.

42 Considering each signpost in turn:

> *i) whether the claimed technical effect has a technical effect on a process which is carried on outside the computer*

43 In your correspondence you assert that the invention "generates a technical effect outside the computer" but provide no further argument in support of this. In later

[5] *Halliburton Energy Services Inc [2011] EWHC 2508 (Pat)*

discussion you put forward that the invention decreases the errors in data that may be output to various kinds of external device. However, the invention requires no such external devices, and there is no discussion of such external devices anywhere in the application. I can find no 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*

44 Your attorneys' correspondence suggests that there is an interplay between hardware and software to realise the invention. I have considered the relevance of the hardware above in paragraphs 30 -34. The implied computer operating the method of claim 1, or the computer comprising a trend line fitting unit, data display unit, data quality rules generating unit and data quality measuring unit of claim 7 must be taken to be conventional. In the absence of any further detailed explanation I am unable to see any interplay between hardware and software which is akin to the "something further" as required by *Merrill Lynch*[6].

> *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*

45 Considering the third and fourth signposts, your attorneys' correspondence asserts that the present invention "necessitates a change in hardware to function correctly and in an improved manner", "to operate in a new way" and "increase the efficiency of the computer". In *AT&T* Kitchen LJ discusses *Gales Application*[7] stating that;

> *"So, for example, the invention in Gale related to a new way of calculating a square root of a number with the aid of a computer and Mr Gale sought to claim it as a ROM in which his program was stored. This was not permissible. The incorporation of the program in a ROM did not alter its nature: it was still a computer program (excluded matter) incorporating a mathematical method (also excluded matter)"*

46 The identified contribution does not necessitate a change in hardware to function correctly, nor does it operate the computer in any new way. Also, while there may be a reduction in the amount of data processing required, the effect of the invention does not improve the inherent speed or reliability of the functioning of the computer as required by *Symbian*. Where the computer processes data in the same way as it did before, where the program merely makes more efficient use of the hardware, it cannot be considered to be technical.

> *v) whether the perceived problem is overcome by the invention as opposed to merely being circumvented.*

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[6] Merrill Lynch's Application [1989] RPC 561

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

47 Finally, I do not consider this to be the sort of invention where considering signpost v) offers any assistance in reaching the correct decision. Furthermore, you do not appear to refute this in any of your correspondence.

48 I find that the identified contributions of claims 1 and 7 are not technical in nature.

Conclusion

49 I find that the invention as currently claimed is excluded under section 1(2) of the Act as it relates to a mathematical method and a program for a computer.

50 Having reviewed the specification I do not consider that any saving amendment is possible. I therefore refuse the application under section 18(3).

Appeal

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

J Pullen

Deputy Director, acting for the Comptroller