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15 February 2012

PATENTS ACT 1977

APPLICANT The Nielsen Company (US), LLC

ISSUE Whether application GB 0904722.6 is excluded from patentability under section 1(2)

HEARING OFFICER Ben Micklewright

DECISION

Introduction

1 International patent application PCT/US2007/078401 was filed on 13 September 2007 with a declared priority date of 15 September 2006 in the name of Nielsen Media Research, Inc. It was published as WO 2008/034001 A1 and then entered the GB national phase as patent application GB 0904722.6, republished as GB2455025 A.

2 The examiner argued that the claimed invention was excluded from patentability as a program for a computer as such and a mental act as such, although the mental act objection was later withdrawn. The applicant disagreed and despite several rounds of correspondence, could not convince the examiner that the claims were allowable. The applicant therefore requested a hearing and the matter came before me at a hearing on 24 November 2011 at which the applicant was represented by Mr Barry Moore, a chartered patent attorney of the firm of patent attorneys Hanna, Moore & Curley.

The invention

3 The invention relates to a method of identifying images in printed media. An image feature vector is computed from the image, based on characteristics of the image such as, for example, aspect ratio or overall brightness or comprising a resized version of the image. This image feature vector is compared with stored reference images and, when there is a substantial match, information relating to the printed media in question is stored in a database record associated with the reference image. At the hearing Mr Moore explained the invention in greater detail. A dissimilarity metric is computed based on the image feature vectors under comparison in order to define an overall dissimilarity measure for each pair of images. This measure is used to select a subset of the reference images. A larger image feature vector (i.e. one which is more detailed and provides a more precise

representation of the image) is then computed for those images in the subset and for the image being compared with them in order to identify a reference image feature vector which substantially matches the larger image feature vector of a reference image. In this way smaller image feature vectors may be used on the full database and the larger image feature vectors need only be processed on a subset of images, providing a system which operates more efficiently than one which must use these larger image feature vectors for the entire database. These additional features are now however claimed in claim 1 as it stands at present. The latest form of the claims, filed on 12 April 2011, include two independent claims, a method claim with an equivalent system claim. These claims, claims 1 and 11, which I will refer to as the main request, read:

> *1. A method to automatically record placement of a first image in printed media comprising:*
>
> *obtaining printed-media information representing the printed media in which the first image appears, the information comprising at least one of source information, a publication name, a publication title, a publication date, a publisher name, or a page number;*
>
> *computing a first image feature vector for the first image;*
>
> *comparing the first image feature vector to a stored second image feature vector for a reference image; and*
>
> *when the first image feature vector substantially matches the second image feature vector, storing the obtained printed-media information in a database record associated with the reference image.*
>
> *11. An image identification system comprising:*
>
> *an image feature extraction engine to compute an image feature vector for an image;*
>
> *a database engine to compare the image with one or more additional images stored in a database based on the image feature vector, and when the image matches a first of the one or more additional images, to store printed-media information associated with the image in a database record associated with the first of the one or more additional images, wherein the printed-media information comprises at least one of source information, a publication name, a publication title, a publication date, a publisher name, or a page number.*

4 At the hearing Mr Moore proposed an amended set of claims for my consideration in the event that I did not find the claims above allowable. In this set of claims the independent claims include the computation of dissimilarity metrics based on the image feature vectors under comparison in order to define an overall dissimilarity measure for each pair of images. This measure is used to select a subset of the reference images. A larger image feature vector is then computed for those images in the reference set and for the image being compared with them in order to identify a reference image feature vector which substantially matches the larger image

feature vector of a reference image. The proposed amendment to claim 1, which I will refer to as the auxiliary request reads:

> *1. A method to automatically record placement of a first image in printed media comprising:*
>
> *obtaining printed-media information representing the printed media in which the first image appears, the information comprising at least one of source information, a publication name, a publication title, a publication date, a publisher name, or a page number;*
>
> *computing a first image feature vector for the first image;*
>
> *comparing the first image feature vector to a stored second image feature vector for a plurality of reference images by computing for each of the compared pairs of images two or more dissimilarity metrics based on the two image feature vectors associated with the two images [0041] and combining the two or more dissimilarity metrics [0043] to define an overall dissimilarity measure for each pair of images;*
>
> *using the overall dissimilarity measure to select a subset of the plurality of reference images [0045];*
>
> *generating a larger image feature vector for those images of the subset of reference images [0046] and the first image;*
>
> *comparing the larger image feature vectors; and*
>
> *when the larger first image feature vector substantially matches a larger ~~the~~ second imaqe feature vector of an identified reference image, storing the obtained printed-media information in a database record associated with that~~e~~ reference image.*

5 These additional features are supported by the disclosure of paragraphs 41-45 of the description. I will consider this amended claim in my analysis below.

The law

6 Section 1(1)(d) of the Patents Act 1977 ("the Act") states that a patent may be granted only for an invention in respect of which the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A. Section 1(2)(c) states that things which consist of "a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer" are not inventions for the purposes of the Act, but only to the extent that a patent or application for a patent relates to that thing as such.

7 There is a large amount of case law in relation to these provisions. The most significant recent judgments of the Court of Appeal on the matter are *Aerotel Ltd v Telco Holdings Ltd Ors Rev 1* [2007] RPC 7 and *Symbian Ltd's Application* [2009] RPC 1. In *Aerotel* the Court of Appeal reviewed all the previous case law and specified the following four-step test as a methodology of determining whether an invention was excluded from patentability under section 1(1)(d):

(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 of alleged contribution is actually technical in nature.

8 In *Symbian* the Court of Appeal confirmed that the above test is intended to be equivalent to the prior case law test of "technical contribution". In the present case I will therefore use the *Aerotel* test and ensure in my consideration of steps (3) and (4) that I determine whether the invention makes a technical contribution.

9 In *Halliburton Energy Services Inc* [2011] EWHC 2508 (Pat) the judge considered the mental act exclusion and considered its scope to be narrow, its purpose being to make sure that patent claims cannot be performed by purely mental means. Accordingly following this judgment the examiner dropped his objection relating to the mental act exclusion and I will not consider it further in this case.

Assessment

Main Request

(1) Properly construe the claim

10 No issues arise in relation to claim construction.

(2) Identify the actual contribution

11 The examiner identified the contribution as a computerised system for recording placement of images in printed media which uses a database engine to store details of the printed media of a presented image from printed media in the database record associated with a matching image whereby images are matched using feature vectors generated by an image feature extraction engine.

12 Mr Moore took issue with this identification and argued that the contribution should be considered in the light of the prior art and should include the problem to be solved and the advantages over the prior art. He quoted the following paragraph of *Aerotel*, which is relevant to the determination of the contribution:

> *43. The second step – identify 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 judgment 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 substance not form – which is surely what the legislator intended.*

13 Although I agree that the problem to be solved and the advantages of the invention are important in identifying the contribution, the features of the invention set out in the claim which relate the problem being solved and which deliver the advantages of

the invention are the key elements of the contribution. I have to identify what the inventor has really added to human knowledge.

14 Mr Moore drew my attention to WO99/67695, a document cited in the international search report for the application in suit. This document has not been cited by the examiner in any of his examination reports following an amendment made to the claims of the application in suit when the application entered the national phase. It discloses an image retrieval system where images are retrieved from a database which are similar to a query image entered by the user. The database is organised by grouping the images in clusters according to a similarity criterion. Image feature vectors for the query image and a database image (or for the "center" of a cluster) are calculated and are used to calculate a similarity measure. The system does not automatically record placement of the query image in printed media.

15 Mr Moore suggested that much of claim 1 was known. The examiner had however found claim 1 to be novel and inventive over the WO document referred to above, presumably because it does not disclose the use of image feature vectors in a method of automatically recording placement of images in printed media. Mr Moore argued that a key advantage of the present invention over that disclosed in WO99/67695 is that processing is required on a smaller subset of the overall database. He argued that this should be considered part of the contribution. The independent claims as they stand at present however do not include the features that would result in this advantage. The suggested amendment to claim1 does go further towards this and I will consider the contribution made by this amended form of claim 1 below.

16 In my view the examiner's assessment of the contribution made by the independent claims in their current form is a good one. It provides an accurate summary of what in substance the inventor has added to human knowledge. The contribution relates to a system for matching images which involves the comparison of feature vectors representing those images to a method of automatically recording placement of an image in printed media. This is in substance what the inventor has added to human knowledge. The features Mr Moore relied on which resulted in more efficient data processing are not currently present in claim 1. They will however be relevant to the auxiliary request, which I will consider below.

(3) Ask whether it falls solely within the excluded subject matter; (4) check whether the actual of alleged contribution is actually technical in nature

17 Many of Mr Moore's arguments as to why the invention is not excluded relate more to the invention claimed in the invention of the auxiliary request rather than to the invention in the claims which were before me at the hearing. I will deal with these matters when I consider the auxiliary request below. In relation the claim 1 as it presently stands, I note that the invention does not lie in a new way of generating image feature vectors but it a new application of them to automatically recording placement of images in printed media. It lies in the matching of an image to images in a database and using this to store printed-media information associated with that image. These features lie entirely in the field of data processing, particularly database querying. Neither the image feature vectors nor the images themselves are manipulated in any way which could be said to amount to a technical contribution. There is no technical effect made outside of the computer. Nor does the computer

operate at the level of the architecture or operate in a new way. The contribution made by the invention seems to me to lie entirely in the field of a program for a computer as such. I therefore conclude that the invention is excluded from patentability.

Auxiliary request

18 Having found that the independent claims as they currently stand are excluded from patentability, I will go on to consider the auxiliary request.

(1) Properly construe the claim

19 The term “larger image feature vector” requires some construction. The only definition of the term in the description appears in paragraph [0045], which states:

> *“[0045] When the example dissimilarity measure of EQN. 10 is compared to a threshold to identify potential matching images, non-matching images may be incorrectly identified as matching. To substantially eliminate such non-matching images, the example database engine 115 of FIG. 1 compares the new image with each of the images identified by the dissimilarity measure of EQN. 10 using a larger image feature vector (e.g., resized 100 pixel by 100 pixel versions of the images) than that used to compute the example dissimilarity measure of EQN. 10. The database engine 115 compares the images by computing a correlation of the larger image feature vectors. However, other methods of comparing the larger image feature vectors may be used. By using larger image feature vectors, the chances of falsely identifying matching images are substantially reduced. However, by using the dissimilarity measure of EQN. 10 to select the set of images to which the larger image feature vectors are compared, the overall speed and computational efficiency of the database engine 115 is improved.”*

20 It would seem from this paragraph that a “larger image feature vector” is a vector that contains more detail about the image than the original image feature vector used to compute the original dissimilarity measure so that it provides a more precise representation of the image. I will construe the term accordingly.

(2) Identify the actual contribution

21 The submissions made by Mr Moore at the hearing are much more relevant in relation to the auxiliary request, namely those concerning the advantages of the invention over the prior art. I do however have to look at the features of the claimed invention and determine what, as a matter of substance, has been added to human knowledge, bearing in mind the advantages to which Mr Moore drew my attention, namely a more efficient system.

22 It seems to me that the contribution made by claim 1 of the auxiliary request is as follows:

> A computerised method of recording placement of images in printed media which uses a database engine to store details of the printed media of a presented image from printed media in the database record associated with a

matching image whereby images are matched using feature vectors generated by an image feature extraction engine, the system calculating at least two dissimilarity metrics based on image feature vectors representing a first image in the printed media and a reference image and combining these dissimilarity metrics to define an overall dissimilarity measure for the first image and each reference image, whereby this dissimilarity measure is used to select a subset of reference images for which larger image feature vectors are generated and compared with a larger feature vector for the reference image so as to identify a match, this comparison only needing to be carried out on a subset of the reference images rather than on all the reference images, the method finally storing the obtained printed media information in a database record associated with the reference image.

23 The latter part of this identification captures Mr Moore's point about there being an improvement in the efficiency of the data processing in this system.

24 This contribution has a very different nature than that of the original version of claim 1. The invention now lies in the use of dissimilarity measures to select a subset of reference images for which the comparison can be repeated using larger image feature vectors, reducing the number of reference images for which this more data-intensive comparison needs to be carried out.

(3) Ask whether it falls solely within the excluded subject matter; (4) check whether the actual of alleged contribution is actually technical in nature

25 Mr Moore argued that the invention was patentable because it resulted in increased efficiency in the data processing. I do not agree that this in itself is enough to take an invention outside of the exclusions. The efficiency gain is not one that all programs running on the computer are able to take advantage of. It does not operate at the architecture level of the computer and therefore does not result in a better or faster computer in general, in a manner that is independent of the program being run on the computer. Rather it is a more efficient method for automatically recording placement of images in printed media. Thus the mere fact that the system is more efficient does not in itself imply that the invention makes a technical contribution. What I have to determine is whether the process itself is a technical process.

26 In my view the process in question is not a technical process. At its heart it is a process for searching a database to match images, so as to enable the recording of the placement of images in printed media using a particular way of identifying matches. The images themselves remain unchanged in the process, and the image feature vectors are mere representations of the images. Although the image feature vectors are recalculated as "larger" image feature vectors, all that is actually taking place is a more refined matching following an initial "rough" match. No technical process is carried out on the images themselves such as digital filtering or data compression. A new method of identifying matches in a databases of this nature, even if it is more efficient than prior art systems, does not impart a technical contribution. I therefore conclude that the contribution relates solely to a program for a computer as such and makes no technical contribution.

Conclusion

27 I have found that the invention claimed in both the claims as originally presented at the hearing and the claims as proposed to be amended relate to a program for a computer as such and therefore lie solely in the excluded fields. They are therefore excluded from patentability. I have read the application and have not been able to identify any amendment which would overcome this objection. I therefore refuse the application.

Appeal

28 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

BEN MICKLEWRIGHT

Deputy Director, acting for the Comptroller