Intellectual Property Office

BL O/465/16

03 October 2016

PATENTS ACT 1977

APPLICANT Lim, Shio Hwi

ISSUE Whether patent application GB1502593.5 complies with the requirements of section 1(2)

HEARING OFFICER Phil Thorpe

DECISION

Introduction

1 This decision concerns whether the invention set out in patent application GB1502593.5 relates to excluded matter. The examiner has maintained throughout the examination of the application that the claimed invention is excluded from patentability under section 1(2)(c) of the Patents Act 1977 as a program for a computer and a method of doing business. The applicant Ms Shio Hwi Lim has not been able to overcome the objections, despite amendments to the application.

2 The matter came before me at a telephone hearing on 1st August 2016 where the applicant represented herself.

The Patent Application

3 The application is entitled "*System and method for multi party characteristics and requirements matching and timing synchronization*". It was filed under the provisions of the Patent Cooperation Treaty on 17th July 2013 with international application number PCT/SG2013/000295 claiming an earliest priority date of 17th July 2012 and was initially published as WO 2014/014417 A1 on 23rd January 2014. On entering the national phase in the UK, it was re-published as GB2519469 A on 22nd April 2016.

4 The application relates to a system for allocating users to particular service slots such as for example medical appointments, car-parking spaces, or dining places. The system takes account of not only the particular user who is making an appointment but also other users who could potentially make use of the same slot. The system operates in real time allowing for variability such as traffic delays so that best use is made of the appointment system for both the users and provider.

5 Ms Lim summarised the invention as a means of determining and displaying the real-time probability that users will utilise a particular time slot and allowing users to make

a decision as to whether or not they will utilise that time slot, indicated by placeholding the time slot, based on the displayed probabilities.

6 The invention works as follows. A user books a particular slot for example an appointment to see a doctor at 10am. At a time preceding the appointment the invention uses a statistical engine to calculate the probability that the user will actualise i.e. take the particular time slot. To do this the invention uses a series of equations (see in particular equation 1 on page 23 of the description). The sort of factors that may be considered include for example the location of the user as determined by a mobile phone, traffic and weather related information. The calculation involves not only estimating the probability that the user will arrive but also includes other characteristics of the system for example the probability that the doctor will be available for the appointment.

7 The probability further includes factors that represent the demand for the slot from other users. This then provides an overall probability that a user will actualise the time slot which as Ms Lim explains reflects the demand and supply of that slot as a whole. The invention calculates this value not only for the expected time of the appointment but also for various time instances around the time of the service slot. The probabilities are displayed to the user and also to other users in the system via a 'customised dashboard' using a 'placeholding' mechanism. The information provided by the dashboard is intended to encourage the user to interact with the dashboard to confirm their slot, abandon their slot, or move their appointment to an alternative slot. As a result of this interaction the allocation of slots amongst users should better match current supply and demand.

8 The result of including the effect of other potential users in the estimates is that it allows demand to be factored in. For example the invention allocates a low probability of actualisation for the user when it detects high demand; in this case if the probability is below a particular threshold then the slot may be taken by others if the user does not respond. Conversely when demand is low the invention devises a high probability of actualisation leading the user to actualise the slot unless they respond otherwise. For example the estimated probabilities may be 0.2, 0.4, 0.6, 0.8, 1.0 at time slots t0, t1, t2, t3, t4 where t4 is near to the intended service slot. In this case the user is predicted to arrive as planned with moderate demand from other users and therefore no intervention by the user is required. In another example the probabilities may be 0.2, 0.2, 0.2, 0.2, 0.2 for the same time slots. Here demand from other users is high and the user may need to respond otherwise their slot may be taken by other users in the system. The user is also able to change slots for example if they foresee they will arrive earlier or later than expected. They can view the probability of actualisation of other user's slots and choose one with low probability of actualisation to try to take instead (see for example Figures 11 and 12).

9 Amended claims were filed on entry to the national phase. Although further amendments to the claims were made at later dates, it was agreed that the claims on file at entry into the national phase should be considered for the purpose of this decision. There are 51 claims with five independent claims, 1, 15, 28, 40 and 51. These are directed to various aspects of the invention. For the purpose of this decision I consider all to relate to the same underlying concept and thus will stand or fall together. Therefore I need only consider claim 1 which reads as follows:

1 A self-adapting system for matching user requirements, characteristics and service actualization in real time by employing parameters of characteristics of one of a plurality of users and characteristics of other ones of the plurality of users to enable real time variability of the users' characteristics to decrease error rate of actualization of the service slots, maximise utilization of the service slots by the plurality of users, maximise utilization of time of the plurality of users, and minimize wait time of the plurality of users, the system comprising:

an estimator for generating an estimate of real time arrival characteristics for each of the plurality of users in response to ones of the service slots corresponding ones of the plurality of users, and static and dynamic characteristics of the plurality of users;

a recommender engine coupled to the estimator for generating time realizable service slots for ones of the plurality of users in response to the estimate of arrival characteristics for the plurality of users;

a server queue for maintaining one or more queues of the service slots assigned to one or more of the plurality of users;

a dynamic scheduler and placeholder mechanism coupled to the estimator and the server queue for placeholding one or more of the service slots within the queue of service slots in response to information associated with one of the queue of service slots corresponding to the service slots, wherein the information associated with each of the queue of service slots includes information indicating whether it is an assigned services slot and for which of the plurality of users it is an assigned service slot;

and an intervention and adaptation engine coupled to the server queue and the estimator to push or pull information to or from one or more of the plurality of users comprising at least one of the parameters indicating one or more of probability of arrival of one of the plurality of users within an assigned service slot associated with that one of the plurality of users, probability of wait time associated with assigned service slots, and available service slots, the pushed or pulled information generated in response to the real time arrival characteristics for the plurality of users, the information associated with the queue of service slots, and time information.

The Law

10 The examiner raised an objection under section 1(2) of the Patents Act 1977 that the invention is not patentable because it relates *inter-alia* to one or more categories of excluded matter. This is the only matter before me. The relevant provisions of this section of the Act, with highlighting relevant to this case, are shown below:

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, 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) *(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.

11 As explained in the notice published by the UK Intellectual Property Office on 8 December 2008[1], the starting point for determining whether an invention falls within the exclusions of section 1(2) is the judgment of the Court of Appeal in *Aerotel/Macrossan*[2].

12 The interpretation of section 1(2) has been considered by the Court of Appeal in *Symbian*[3]. *Symbian* arose under the computer program exclusion, but as with its previous decision in *Aerotel/Macrossan*, the Court gave general guidance on section 1(2). Although the Court approached the question of excluded matter primarily on the basis of whether there was a technical contribution, it nevertheless (at paragraph 59) considered its conclusion in the light of the *Aerotel/Macrossan* approach. The Court was quite clear (see paragraphs 8-15) that the structured four-step approach to the question in *Aerotel/Macrossan* was never intended to be a new departure in domestic law; that it remained bound by its previous decisions, particularly *Merrill Lynch*[4] which rested on whether the contribution was technical; and that any differences in the two approaches should affect neither the applicable principles nor the outcome in any particular case.

13 Subject to the clarification provided by *Symbian*, it is therefore appropriate to proceed on the basis of the four-step approach explained at paragraphs 40-48 of *Aerotel/Macrossan* namely:

(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.

Step (1): Properly construe the claims

14 The examiner has objected that claim 1 is unclear and also that it may not be fully supported by the application as filed. I agree that the claim is not particularly well-defined. However, as described above it appears to define a self-adapting system for matching users to particular service (usually time) slots. For simplicity I'll consider the system from a particular user's point of view who is attempting to meet a service slot although claim 1 allows for multiple such users in parallel.

15 The system of claim 1 essentially has the following components:

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[1] http://www.ipo.gov.uk/pro-types/pro-patent/p-law/p-pn/p-pn-computer.htm
[2] *Aerotel Ltd v Telco Holdings Ltd and Macrossan's Application* [2006] EWCA Civ 1371; [2007] RPC 7
[3] *Symbian Ltd v Comptroller-General of Patents*, [2009] RPC 1
[4] *Merrill Lynch's Appn*. [1989] RPC 561

(i) An estimator that estimates the real time arrival characteristics of all the potential users in the system in relation to a particular service slot corresponding to the particular user. From the description the estimator calculates a user's probability of actualisation that takes into account the supply and demand for the slot as a whole.

(ii) A recommender engine coupled to the estimator which generates potential service slots that are achievable by the user taking into account the arrival characteristics estimated earlier.

(iii) A server queue that maintains a queue of the potential service slots assigned to the particular user.

(iv) A dynamic scheduler and placeholder mechanism that is coupled to the recommender engine, the estimator and the server queue and allows the user to perform actions based on the estimator's probability of actualisation such as to change the service slot or to allow the slot to be taken up by another user.

(v) An intervention and adaptation engine coupled to the server queue and the estimator that appears to pass information to or from the users.

Step (2): Identify the actual contribution

16 From *Aerotel* paragraph 43 the identification of the contribution involves looking at the substance rather than the form of the claimed invention. Further, this step should essentially be a matter of determining what it is the inventor has really added to human knowledge and this involves (quoting from Jacob LJ) "*an exercise in judgment probably involving the problem said to be solved, how the invention works, what its advantages are".*

17 The description of the application notes that for example in the health care industry patients often have to wait upon arrival. Similarly the provider has to deal with sudden high numbers of patients, no-shows and periods of under-utilisation of the system. This variability depends on factors which for example may include factors such as traffic, weather, flu epidemics, time of day/year etc.

18 Computer-based appointment booking systems have been developed to manage this variable situation. One such system is described in WO 2006/057880 (D1) which was cited on the international search report and has been taken by Ms Lim and the examiner to be the closest prior art. D1 relates to a system for dynamically managing, scheduling and monitoring appointments between service providers and customers. A statistical engine is employed to determine a best appointment time based on geographic location of the customer or the service provider, weather, traffic conditions etc. The system monitors changes to the appointment initiated by the customer or service provider and notifies the other parties. Ms Lim explains that in D1 the processing is done 'in silo' such that any updates that occur such as delays must be continuously propagated to all the users affected in the appointment slots. This propagation may be done sequentially to the users and thus the changes may not match all the users' needs. If further changes are made by a user this must be propagated to all the users again. Uncertainty in users' actions requires large scale

data sets and computational resources to be employed and may still result in service slots not being filled satisfactorily. In the prior art location tracking may be employed to improve estimates but this then requires additional computational means to protect the user's privacy.

19 Therefore, the problem addressed by the invention is how to implement an appointment-booking system whereby real-time variability in the situation of both consumers and provider is taken into account to minimise loss time and maximise utilisation for all 'actors' in the system whilst at the same time not requiring excessive computing resources.

20 A description of how the invention works has been outlined above. Ms Lim has explained that the key features of the invention are the estimate of the user's probability of actualisation using in particular equation 1 which takes into account the overall picture of both supply and demand in a self-adapting manner. This is coupled with displaying these probabilities to all users on a real-time basis so they are encouraged to intervene to optimise the uptake of the service slots via the placeholder mechanism. Ms Lim has explained further that unlike in the prior art the estimate of the probability of actualisation of a particular slot by a user does not need to be precise. Similarly location tracking is not required. Therefore Ms Lim explains the advantages of the invention are a reduced load on the central computing system, smaller datasets, reduced communication bandwidth and reduced network traffic consumption whilst maintaining better utilisation of the service slots.

21 Ms Lim did try to suggest that the invention here contributes a new arrangement of hardware in much the same way that the invention in *Aerotel* was held, at least initially, to do. I am not persuaded. The description notes that the invention can be carried out via any form of computer, network, communication devices and service network. In other words the hardware components for implementing the invention are entirely conventional and there is nothing in the description to suggest that these components are arranged in a new way. I would add that an otherwise known arrangement of hardware does not become a new arrangement merely because the information communicated between the components is different or new.

22 Hence having regard to the application as a whole I regard the contribution to be a computer-based, self-adapting system for matching users to service slots which calculates estimates of a user's probability of actualisation taking into account the supply and demand for that slot, and displays the probabilities to users on a real-time basis so that users are encouraged to intervene to optimise the uptake of the service slots. I am also for the moment prepared to accept that the system operates with reduced computing and network requirements than comparable systems.

<u>Steps (3) & (4): Does the contribution fall solely within the excluded subject matter; Check if the contribution is actually technical.</u>

23 It is convenient when considering the computer program exclusion in particular to deal with steps (3) and (4) together.

24 Ms Lim has made a number of arguments at the hearing and in her earlier submissions that the invention has a technical effect and hence it is does not relate to excluded subject matter. These arguments rely for support in particular on the five

signposts set out by Lewison J in *AT&T/CVON*[5]. These he considered to be helpful when considering whether a computer program makes a technical contribution. Lewison LJ reconsidered the signposts in *HTC/Apple* in light of the decision in *Gemstar*[6]. 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.*

Whilst they can be useful, it is important to remember that these signposts are just guidelines to help decide if the invention makes a technical contribution.

25 Signpost (i) is concerned with whether there is an effect on a process outside the computer. Ms Lim argues that in the invention the probability of actualisation does not need to be determined precisely. In particular there is no need for location tracking. Instead the invention uses a series of equations to determine the probability of actualisation which involves the supply and demand of the system as a whole. Also, by employing the placeholding system described above, there is no need to continuously forward updates to the users of the system. However, I do not see that any of this provides any technical effect outside of the computer. It may reduce the processing requirements of the computing system and also may reduce the necessary communication load between the system and users. However all of the processes described take place within the computing system employed by the invention or between the system and the users using standard network connections. I am not persuaded that the optimisation of the allocation of the sort of time dependent slots described here is necessary a technical issue. In addition I would also note that the system itself does not necessarily control that allocation – rather it presents information to the users that is designed to influence their behaviour in rejecting or taking up slots. Therefore signpost (i) is not met.

26 Signpost (ii) is also not met since as Ms Lim appears to have accepted in the hearing, that there is no effect that operates at the level of the architecture of the computing system.

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

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

27 Signpost (iii) is concerned with whether the computer is being made to operate in a new way. Ms Lim argues that a user's probability of actualisation for a service slot is estimated in a new way as compared with the prior art to take into account the supply and demand characteristics as a whole. This, she argues, is achieved via a 'feed forward architecture that converge the estimate' to maximise utilisation of the slots. I agree that the invention appears to involve a new way of estimating these probabilities and this may have benefits with regard to both performance and computing resources. However, the system is using conventional computing systems which in the sense intended by this signpost will be operating as usual even if running new software. Therefore this signpost is not met.

28 Signpost (iv) asks whether the computer is a better computer running more efficiently and effectively *as a computer*. Ms Lim argues as above that the invention requires less precise estimates and removes the need for iterative updates to each individual user. Therefore she argues this results in a more efficient method than the prior art. This may be true but as I have discussed the computer and the associated network connections are entirely conventional. They will therefore run as normal; the computer will not be a better computer in the sense required by this signpost.

29 Signpost (v) is concerned with whether the perceived problem is overcome by the invention or merely circumvented. The problem addressed by the invention is how to implement an appointment-booking system whereby real-time variability in the situation of both consumers and provider is taken into account to minimise loss time and maximise utilisation for all 'actors' in the system, without requiring excessive computing resources. Ms Lim asserts in particular that the challenges in the prior art of computational complexity and high communication bandwidth resulting from the need to deal with users on an individual level has been overcome. I agree that the problem has been addressed (at least to some extent) by the invention with the combination of including a fuller picture of supply and demand in the calculation of the probability of actualisation coupled with the placeholder mechanism for allowing users to interact and intervene with the system. However, I do not consider the problem to have been overcome in any technical sense. The solution provided by the invention involves an improved analytical approach implemented by software on conventional computer and communication systems. The technical issues have not been overcome but instead have been circumvented. For example the invention may reduce the amount of communication between the system and users but it does not solve in a technical way any issues with the bandwidth. Therefore signpost (v) is also not met.

30 Hence having carefully considered all the arguments put forward by Ms Lim, I have not been able to identify anything that would meet any of the signposts in *AT&T* nor indeed anything that would provide a technical contribution. Rather I consider the contribution to fall solely within the excluded subject matter. In particular it relates to a computer program as such. Moreover, the invention is concerned with providing a more effective system for allocating users to particular service slots. This is a business objective. HHJ Birss QC in *Halliburton*[7] paragraph 35 explained the difficulties in analysing business method cases:

[7] *Halliburton Energy Services Inc's Applications* [2012] RPC 129

The business method cases can be tricky to analyse by just asking whether the invention has a technical effect or makes a technical contribution. The reason is that computers are self evidently technical in nature. Thus when a business method is implemented on a computer, the patentee has a rich vein of arguments to deploy in seeking to contend that his invention gives rise to a technical effect or makes a technical contribution. For example the computer is said to be a faster, more efficient computerized book keeper than before and surely, says the patentee, that is a technical effect or technical advance. And so it is, in a way, but the law has resolutely sought to hold the line at excluding such things from patents.

31 The system for booking service slots here may indeed be a more effective and efficient computerised service than the prior art. However, as discussed above I do not consider the invention to include any technical effect. In the absence of such an advance, I consider the contribution to also relate to a business method as such.

32 As noted above the other four independent claims, claims 15, 28, 40 and 51, have the same underlying inventive concept and I therefore consider these claims to relate to the same excluded categories.

Decision

33 Having carefully considered all the arguments put forward by the applicant I am satisfied that the invention does not provide any technical contribution. Rather I have found that the contribution made by the invention defined by the claims falls solely in matter excluded from patentability by virtue of section 1(2)(c) of the Act, namely a program for a computer and a scheme, rule or method for doing business.

34 I can see nothing in the specification as a whole that could be reasonably expected to form the basis of a valid claim. I therefore refuse this application under section 18(3).

Appeal

35 Any appeal must be lodged within 28 days

Phil Thorpe

Deputy Director, acting for the Comptroller