Intellectual Property Office

BL O/0773/23

14 August 2023

PATENTS ACT 1977

APPLICANT	Bytemark Inc
ISSUE	Whether patent application GB2016577.5 complies with the requirements of sections 1(1)(d) and 1(2)
HEARING OFFICER	B Micklewright

DECISION

Introduction

1 Patent application GB2016577.5, in the name of Bytemark Inc, is the national phase entry of international application PCT/US2018/056829 filed under the Patent Cooperation Treaty (PCT) on 22 October 2018 with a claimed priority date of 21 March 2017. It was published under the PCT on 26 September 2019 as WO 2019/182646 A1. The national phase application was allocated the GB publication number GB2586929 A.

2 The examiner held that the invention was excluded from patentability under sections 1(1)(d) and 1(2) of the Patents Act 1977 ("the Act") as a program for a computer as such and a method of doing business as such. Despite several rounds of correspondence between the examiner and the applicant's attorney no agreement was reached. The matter was therefore referred to me for a decision on the papers.

3 Other issues were also raised by the examiner in their examination reports, including novelty and inventive step. The pre-hearing letter of 22 May 2023 makes reference to inventive step in particular, arguing that the claimed invention does not involve an inventive step. I note however that the arguments are not fully fleshed out in the pre-hearing report and full consideration of novelty and inventive step has been deferred. The examiner also notes that further searching will be required. I will not therefore consider novelty and inventive step in this decision. The application will need to be referred back to the examiner should it be found that the invention is not excluded from patentability under section 1(2)(c).

The invention

4 The invention relates to a transit system for transporting passengers using autonomous vehicles. A user's mobile device has a pre-purchased transport ticket stored on it. Passenger data is received from the mobile device in response to

selection of a desired destination by the user. Passenger data including the geographical location of the user and an estimated time of arrival (ETA) of the user to a first transit station, which has been selected by a Fare Validation (FV) application (included on the mobile device) as a boarding station for the user, is received. Data relating to vehicle data is also received from a location tracker of a transit vehicle. This data includes a geographical location of the transit vehicle. Finally, data relating to the transit station including attributes of that station is received by the system. Based on data relating to the passenger, the vehicle and the station an autonomous transit vehicle is dynamically routed to the first transit station so as to be there by the ETA of the user.

5 The transit vehicle also includes a gateless entry system, whereby the pre-purchased ticket is validated using the FV application without any manual interaction by the user when the user enters a paid area defined by a perimeter of the transit vehicle, and the user is monitored until they exit this paid area.

6 The latest claims, filed on 16 March 2023, include independent claims 1,7 and 11 which relate to a method, control unit operating as a server device, and a transit system respectively. The claims are similar in scope and, for the purpose of this decision, it is sufficient to consider claim 1 which reads:

1. A method in a control unit operating as a server device associated with a transit system, the method comprising:

receiving sensor data from a plurality of sensors in the transit system, wherein the plurality of sensors include a mobile device carried by a user availing a transit service in the transit system and a location tracker on a transit vehicle associated with the transit service, wherein the mobile device includes a Global Positioning System (GPS) sensor, a Fare Validation (FV) application, and a pre-purchased transport ticket electronically stored on the mobile device, wherein the control unit is communicatively coupled with the sensors, and wherein each sensor-specific portion of the sensor data includes:

a sensor-specific passenger data received from the mobile device in response to selection on the mobile phone of a desired destination by the user, the sensor-specific passenger data defining one or more attributes of the user, including:

a geographical location of the user;

an Estimated Time of Arrival (ETA) of the user at a first transit station, which is a boarding station selected by the FV application, and

a first identifier for the first transit station;

a sensor-specific vehicle data received from the location tracker on the transit vehicle, the sensor-specific vehicle data defining one or more attributes of the transit vehicle, including:

a geographical location of the transit vehicle, and

a sensor-specific station data defining one or more attributes of the first transit station associated with the transit service;

combining received sensor-specific passenger data to generate a system-specific passenger data, received sensor-specific vehicle data to generate a system-specific vehicle data, and received sensor-specific station data to generate a system-specific station data;

analyzing the system-specific passenger data, the system-specific vehicle data, and the system-specific station data; and

based on the analysis of the system-specific passenger data, the system-specific vehicle data, and the system-specific station data:

dynamically routing the transit vehicle, wherein the transit vehicle is an autonomous transit vehicle and the dynamically routing of the transit vehicle includes transmitting a

command to the autonomous transit vehicle to drive to the first transit station to be at the first transit station by the ETA of the user, and

wherein the transit vehicle includes a gateless entry system to perform validation of the pre-purchased transport ticket autonomously using the FV application without any manual interaction by the user when the user enters a paid area defined by a perimeter of the transit vehicle, and to monitor the user until the user exits the paid area.

The law

7 Section 1(2) of the Act states:

> *1(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of—*
> *…*
> *(c) A scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;*
> *…*
> *but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.*

8 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.*

9 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. Kitchin 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'.

10 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;*

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[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

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

11 My assessment is based on the four-step approach set out in *Aerotel*.

Step (1): Properly construe the claim

12 Although in general the claim is straightforward to construe, it is helpful to clarify some of the elements of claim.

13 The claim uses both the terms “user” and “passenger”. It is clear from paragraph 109 of the description that the terms may be used interchangeably, and I will construe the claim accordingly.

14 Sensor-specific passenger data seems to relate to data relating to the passenger which relates to a specific sensor, e.g. the GPS data. In the “combining step” it is not immediately apparent as to which data is being combined in order to generate system-specific passenger data but, having read the claim in the light of the description, I take it that the passenger data which may arise separately from various sensors is combined into a single dataset to generate the “system-specific passenger data”. Similar considerations apply to the vehicle data and the station data.

15 I note that claim 1 does not define any specific attributes of the first transit station in the sensor-specific station data, although these are defined later in claim 4. For the purposes of construing claim 1 I will consider the dynamic routing to be based on an analysis of at least one undefined attribute of the first transit station, defined in the sensor-specific station data.

16 The last line of the claim refers to the user being monitored until the user exits the paid area. It is not clear what attributes of the user are being monitored, but for the purpose of this decision I will take it that the user is being monitored at least to the extent that the system can determine when they exit the paid area.

Step (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 – 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.*

18 The invention of claim 1 relates to a user (the passenger) using a mobile phone application (the "Fare Validation (FV) Application") associated with a transit system to select a desired destination, with a pre-purchased transport ticket stored on the mobile device. The FV application selects a transit station (the "first transit station"). Data relating to the passenger's geographical location and their Estimated Time of Arrival (ETA) to the first transit station is collected. Data relating to a transit vehicle is also collected, including its geographical location, as is data relating to the transit station itself. This data is combined and analysed and based on this analysis, the transit vehicle is routed to the first transit station so as to be there by the ETA of the user.

19 The claimed invention does not define the basis by which the first transit station, or the transit vehicle, are selected, although the dependent claims do refer, for example, to the number of passengers currently on the transit vehicle and its maximum capacity.

20 Claim 1 also includes a gateless entry system which validates the pre-purchased transport ticket autonomously using the FV application, without any manual intervention by the user, when the user enters a paid area defined as the perimeter of the vehicle. The user is monitored whilst in this area, presumably to determine when the user exits the paid area.

21 In their letter of 03 May 2023 the applicant's attorney identified the contribution as follows:

> *"The contribution of the claimed invention lies in a computer-implemented method that enables the user to avail a transit service, where all that is required on the part of the user is to select a desired destination on the mobile phone in order for (i) the autonomous transit vehicle to be commanded to drive to a boarding station which is selected by the FV application of the mobile device, and (ii) the user to be validated automatically using the FV application of the mobile device when the user enters the transit vehicle."*

22 The applicant's identification of the contribution is framed in terms of the advantages of the invention, particularly the benefits to the user. The contribution should however include both the advantages of the invention and also the claimed features which result in these advantages. I therefore consider the alleged contribution to be:

> A user (the passenger) using a mobile phone application (the "Fare Validation (FV) Application") associated with a transit system to select a desired destination, whereby a pre-purchased transport ticket is stored on the mobile device, the FV application selecting a transit station (the "first transit station" – a boarding station). Data relating to the passenger's geographical location and their Estimated Time of Arrival (ETA) to the first transit station is collected. Data relating to a transit vehicle is also collected, including its geographical location, as is data relating to the transit station itself. This data is combined and analysed and based on this analysis, the transit vehicle is

routed to the first transit station so as to be there by the ETA of the user. A gateless entry system validates the pre-purchased transport ticket autonomously using the FV application, without any manual intervention by the user, when the user enters a paid area defined as the perimeter of the vehicle, and the user is monitored whilst in this area. Thus all that is required on the part of the user is to select a desired destination on the mobile phone in order for (i) the autonomous transit vehicle to be commanded to drive to a boarding station which is selected by the FV application, and (ii) the user to be validated automatically using the FV application when the user enters the transit vehicle.

23 The examiner considered prior art document US 2018/0068315 to be relevant to the contribution in that it teaches that a hands-free gateless entry system may be utilised. It does not however teach that validation of the pre-purchased transport ticket occurs when the user enters a paid area defined by the parameter of the vehicle.

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

24 For convenience I will consider steps (3) and (4) of the *Aerotel* approach together.

25 An invention is not excluded from patentability merely because it is implemented as a program for a computer. What is important is whether the invention makes a technical contribution. The *AT&T* signposts are helpful in determining this question and I will consider these in turn. The applicant's arguments are largely focussed on the first signpost and I will consider this signpost in detail. I will however briefly consider the other signposts.

Signpost i)

26 The applicant's attorney emphasised in their letter of 16 March 2023 that the claimed invention recites "*transmitting a command to the autonomous transit vehicle to drive to the first transit station to be at the first transit station by the ETA of the user.*" They submit that control of the autonomous vehicle meets signpost i) "*because the process carried out by the server device operates on (i.e., controls) something external to the server device (i.e., the autonomous transit vehicle).*"

27 I do not agree that the contribution made by the claimed invention amounts to controlling the autonomous vehicle in a technical sense, for example by controlling the steering, brakes or accelerator. Rather, in response to a selection of a destination made by a user and the selection of a transit station by the FV application, the invention merely transmits a command to the autonomous vehicle to drive to the selected transit station by the ETA of the user. This is, in my view, an administrative process relating to the organisation of transit stations and the transit vehicles to ensure the user's requirements are satisfied. It is not a technical process and does not therefore have a technical effect on a process carried on outside the computer.

28 The applicant referred to the judgment of *Lenovo*[5] to further support their arguments that the contribution made by the claimed invention satisfied signpost i). They referred particularly to paragraph 36 of the judgment of Birss J (as he then was) which states:

> *"36. The key question in this case is whether the invention involves a different physical interaction with the world outside the computer, as compared to what had gone before. As I have said already, I would agree with the reasoning at the end of paragraph 26 if the technical effect relied on resided in pressing a button in a computer system because that is a conventional feature of using conventional computer systems. Those features may be technical in a sense, but they cannot add technical character to make a computer program as such patentable. However, again as explained above, the point of this invention is the opposite. It is in US 438 that the user has to press a button to choose which card to use or to split the payment between two cards. In the Lenovo invention, this is handled automatically at the point of sale because the user's preferences have already been acquired and stored elsewhere. The automatic nature of the process is recognised in the formulation of contribution identified in the decision at paragraph 21. As a result of this automatic feature, the card clash problem experienced with contactless payment cards is solved without the user having to take any extra physical step at the point they use their contactless cards. In my judgment that difference is an effect of the invention which is neither a computer program as such nor a method of doing business as such nor a combination of the two. That difference is technical in character and, in the context of the invention as a whole, it is not just one of the normal incidents of a conventional computer system. The claimed invention may or may not be obvious over US 438, or any other prior art, but what would counts for s1(2) of the 1977 Act / Art 52 EPC is that the invention does have an effect which is of the right character to satisfy the law."*

29 The applicant submitted that *Lenovo* was allowed because it resulted in a different physical interaction with the world outside the computer. They state:

> *"As in that case, certain physical interactions are omitted from the claimed invention such as the selection of the starting point (boarding station) on the mobile phone and the validation of the ticket which may involve having to get out the mobile phone to establish an NFC contact. These are also technical effects on processes which are carried on outside the mobile device and therefore meet signpost (i)."*

30 This however seems to me to be an over-generalisation of the conclusion reached in *Lenovo*. The point in *Lenovo* was that the card clash problem experienced with contactless payment was solved without the user having to take any extra physical step at the point they use their contactless cards. The judge did not state that any invention which involved omitting certain physical interactions would overcome the patentability exclusions. In the present case, the applicant alleges that two physical interactions are omitted, thereby resulting in a technical effect.

31 The first of these relates to the selection of the boarding station by the FV application rather than by a user. This does not however relate to a new technical physical interaction, or omission of such an interaction, but rather to an administrative choice relating to the organisation of the transit network.

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[5] *Lenovo (Singapore) Pte Ltd v Comptroller General of Patents* [2020] EWHC 1706 (Pat)

32 The second relates to automatic validation of a pre-paid ticket when a user enters a paid area defined by a perimeter of a transit vehicle. I am not convinced that *Lenovo* teaches that this necessarily makes a technical contribution. *Lenovo* was dealing specifically with the problem of card clash. In the present case it seems to me that a ticketless entry system to vehicle is a matter of administrative convenience rather than a solution to a technical problem. Ticketless systems are, in general, known, as the examiner indicated in their pre-hearing report. The selection of the perimeter of the vehicle as the zone in which the ticket is validated is also an administrative choice rather than a technical solution to a technical problem.

33 The examiner referred to three prior cases in their pre-hearing report. These are BL O/719/19[6], BL O/445/22[7] and *Bloomberg LLP and Cappellini*[8] (particularly the invention of *Cappellini's application*). The applicant submitted that the present invention is distinguished from each of these cases.

34 I do not rely on these cases in reaching my decision but note that my decision is consistent with these cases. The invention in BL O/719/19 related to recommendations to switch from taxis to car pool services if the time to fulfil the request was shorter. BL O/445/22 related to customer request queues for an online ride hailing platform. In *Cappellini* the invention related to an algorithm for planning a delivery route for a package, using a network of carriers. The algorithm permitted the individual carriers in the network to deviate from their normal, predefined route in order to create new meeting places where two or more carriers can exchange one or more packages In all three cases the claimed invention was found to be excluded from patentability as a program for a computer as such and a method of doing business as such.

35 The applicant distinguished the present invention from these cases in that, in these cases, there is no control of actual physical objects or reference to direct vehicle control or direct provision of transport services per se, with the transport process outside the computer unchanged. The attorney states that "*In contrast to these cases, the claimed invention does not merely make a request to the autonomous vehicle but instead commands the autonomous vehicle to drive to a particular location so that the transit process (the route of the autonomous vehicle) is actually changed*."

36 Whilst I accept that the present invention is distinguished from these cases in that, rather than sending messages to drivers or making recommendations to customers, it provides an instruction to an autonomous vehicle to drive to a particular transit terminal, I do not agree that this is a technical distinction. I do not consider this to be a means for controlling the vehicle in any technical sense. Rather it merely instructs the vehicle to drive to a particular location. This is analogous to sending a message to a driver in the situation where the vehicle is not an autonomous vehicle.

37 I therefore conclude that the claimed invention does not have a technical effect on a process outside of the computer. Signpost i) is not therefore satisfied.

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[6] *Beijing Didi Infinity Technology and Development Co Ltd's Application* (BL O/719/19)
[7] *Beijing Didi Infinity Technology and Development Co Ltd's Application* (BL O/445/22)
[8] *Bloomberg LLP and Cappellini's Applications* [2007] EWHC 476 (Pat)

Signposts ii)-iv)

38 Signposts ii)-iv) relate to improvements to the computer itself. In the present case there is clearly no effect at the level of the architecture of the computer. Nor does the computer operate in a new way, or become a better computer in the sense of running more efficiently and effectively as a computer. These signposts are not therefore satisfied.

Signpost v)

39 In the present invention the problem relates to making it easy for customers to access autonomous transit vehicles via a mobile application whereby the user does not need to select a transit terminal and does not have to carry out any action to validate a ticket. It is solved by using the available data to select a transit terminal and transmitting a command to a transit vehicle to drive to the selected transit terminal so as to be there by the ETA of the user. The ticketless validation problem is solved by defining the parameter of the transit vehicle as the paid area. These are not technical problems and do not have technical solutions. Rather they lie in the administrative process of matching transit terminals and transit vehicles to users and ensuring an efficiently run autonomous transit system for the customer. Signpost v) does not therefore point to a technical contribution.

40 Taking a step back, this invention lies in the organisation of transit vehicles and transit stations so that the passenger receives an efficient service. It achieves this by using a mobile application to select a transit station, transmitting a command to a transit vehicle to drive to that station based on data relating to the geographical location of the user, the transit vehicle, an ETA of the user at the first transit station, and other data relating to the passenger, the vehicle and the transit station, and defining the perimeter of the vehicle as the paid area for a ticketless system. There is no technical contribution in omitting certain interactions such as the user selection of a transit station or the selection of a ticket. Rather these are administrative choices as to how to organise the transit terminals and transit vehicles so as to provide an efficient service to a customer. I therefore conclude that the invention does not make a technical contribution and lies in the excluded field of a program for a computer as such. Moreover, given that the invention is administrative in nature, it also lies in the excluded field of a method of doing business as such.

Conclusion

41 I have found that the invention lies solely in the excluded fields of a program for a computer as such and a method of doing business as such. I therefore refuse the application under section 18(3) of the Act.

Appeal

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

B MICKLEWRIGHT

Deputy Director, acting for the Comptroller