This document includes some recent decisions of the EPO in 2019 with regards to software related inventions and shows relevant extracts from the respective decisions.

T 1559/14 (Processing search information/EBAY) of 11.1.2019

European Case Law Identifier: ECLI:EP:BA:2019:T155914.20190111

Methods and systems to process search information

Inventive step - (no)
Inventive step - mixture of technical and non-technical features

Application number: 05802369.8
IPC class: G06F 17/30
Applicant name: eBay Inc.
Cited decisions: T 0505/13

Board: 3.5.07

https://www.epo.org/law-practice/case-law-appeals/pdf/t141559eu1.pdf

Claim 1 of the main request reads as follows:

"A method at a first machine (28) to generate a user interface (297, 398, 400) to display data items (85) in a first area of the user interface (297, 398, 400) on a client machine (22), the method comprising:

receiving a query and in response to the query determining a set of data items found (85) for display in the first area of the user interface (297, 398, 400) on the client machine (22);

counting the number (472) of the data items found (85);

comparing the number (472) of data items (85) with a predetermined threshold;

if the number (472) of data items (85) is equal to or greater than the predetermined threshold, generating the user interface (297, 398, 400) for display on the client machine (22) to include the first area and a second area that is complementary in size to the first area, wherein the first area displays data items (85) and the second area displays user selectable browsing options (303) to allow a user to identify data items (85),

if the number (472) of data items (85) is less than the predetermined threshold, generating the user interface (297, 398, 400) for display on the client machine (22) with the size of the first area maximized to display data items (85) and the size of the second area minimized to minimize the display of browsing options (303) and the first and second areas complementary

in size, whereby the user interface emphasizes the data items (85) found rather than the browsing options (303); and

communicating the generated user interface (297, 398, 400) to the client machine (22) for display."

The invention

2. The general purpose of the invention is to facilitate client-side user searching for data items provided by a computer system, e.g. a web server in a network-commerce system (see paragraphs [0006], [0007], [0061] and [0065] and Figure 2 of the international publication).

2.1 When a user enters a query in the client system, the query is communicated to the computer system, where it is processed by search applications (paragraphs [0052] to [0055], Figure 1). A user interface is generated and sent to the client system (paragraphs [00150], Figures 19 and 20). Different passages of the international application describe how the user interface is generated, as explained below.

2.2 According to the description in paragraph [0073], search applications "may enable the classification of information (e.g., item listings) published via the computer-based system 12, and may also enable the subsequent searching of the items with keyword queries, concept queries, and multi-path browsing".

2.3 The determination of areas of a user interface is also described in paragraph [0010] and original claims 64 to 81. In those embodiments, a search application receives a request for a user interface that includes a first area for displaying data items and a second area for displaying other information such as browsing options. These two areas are "complementary in size". The display area of the first area is increased and that of the second area is decreased if the number of data items to be displayed is less than the predetermined threshold. The size of the first area is decreased and that of the second area is increased if the number of data items is equal to or greater than the predetermined threshold.

Main request

3. Inventive step - claim 1

3.1 **Claim 1** defines a method, to be performed in a first machine, of generating a user interface for displaying data items in a first area of the user interface on a client machine. The method essentially comprises the steps of receiving a query, determining a set of data items found for display on the client machine in response to the query, generating the user interface for display on the client machine that includes the first area for the data items and a second area for the browsing options, and communicating the generated user interface to the client machine for display. If the number of data items is under a threshold, the size of the first area is increased relative to the second area.

3.2 At the priority date of the present application, **web-based systems implementing online shops were well known**. Such systems comprised a server machine running server

applications, e.g. a search application for searching data items corresponding to a query, and a client machine running a browser. In such a well known electronic commerce system, the server obtained queries from the client, determined a set of data items corresponding to the query and communicated the results to the client for display. The results sent to the client for display were typically transmitted in the form of one or more web pages for displaying the set of items.

In fact, the present application acknowledges the existence of such "network commerce systems" or "electronic marketplace[s]" in paragraphs [0003] to [0005] of the application and describes the implementation of parts of the invention with existing technology or systems, including a web browser, a seller application to be employed as a web programmatic client and the "Buy-it-Now (BIN) technology" (see paragraphs [0061], [0065], [0068] and Figure 2).

That network commerce system acknowledged in the application is the starting point for assessing inventive step in the following.

At the oral proceedings, the appellant conceded that the features defined in the first part of the claim were known from the acknowledged prior art, namely, the features describing a method to generate, in a first machine, a user interface for displaying data items in a first area of the user interface on a client machine, the method including the steps of receiving a query and, in response to the query, determining a set of data items found for display in the first area of the user interface on the client machine. It argued that the claimed method differed from the prior art in that it included all the further steps defined in claim 1.

However, the user interface for displaying data items on a client machine is generated in the first machine for the purpose of displaying the items on the client. The step of communicating the generated user interface to the client machine is hence intrinsically linked to that first feature and known from the acknowledged prior art.

3.3 The claim further specifies the steps of:

(a) counting the number of data items found;

(b) comparing the number of data items with a predetermined threshold;

(c) including in the user interface a second area for displaying browsing options that is complementary in size to the first area, in which

(c1) if the number of data items is equal to or greater than the predetermined threshold, user-selectable browsing options that allow a user to identify data items are displayed in the second area,

(c2) if the number of data items is less than the predetermined threshold, the size of the first area is maximised and the size of the second area minimised, whereby the user interface emphasises the data items found rather than the browsing options.

3.4 At the oral proceedings, the **appellant argued** that the threshold had a technical function and allowed switching between two types of interfaces depending on the amount of data being

displayed. For example, if a user received fifty results, there was no need to further narrow the search because fifty results was small enough to be processed by the user. In such a case, the second area would be de-emphasised so that the user could concentrate on the displayed items. The distinguishing features solved the problem of improving the user interface to allow refinement of search results in an efficient manner based on the response of the user to the data. It would not have been obvious to refine the query result because the skilled person would rather have paginated the list of data items if too many items had to be displayed in the limited display area.

The Board does not agree with the appellant's formulation of the technical problem. The method of claim 1 is not related to the refinement of search results by the system. The browsing options could take the form of "previous" and "next" buttons that allow the user to browse through sub-sets of results of a single search.

In general, the implementation of a user interface includes non-technical aspects of the GUI layout, e.g. the graphical design of menus or the positioning of a control button according to user preferences, but also technical aspects regarding the user-computer interaction (see T 505/13 of 6 June 2018, reasons 8.3). In the present case, the layout of the areas in the display and the emphasising of specific areas are non-technical aspects of the invention. However, since the technical and non-technical features are tightly intermingled in claim 1, which makes it difficult to initially separate them, the following deals with the distinguishing technical and non-technical features in combination.

The combined distinguishing features solve over the acknowledged prior art the problem of presenting an arbitrary number of data items to the user in a limited area of the client's display.

At the priority date of the present application, it was well known to display the results of a query in more than one web page and to display user-selectable browsing options (e.g. next, previous) on each web page to let the user browse through the result pages to identify data items.

It would therefore have been obvious for the skilled person facing the above mentioned problem to have added the steps of counting the number of data items, comparing this count with a threshold representing the maximum number of data items to be displayed on a page and adding a second display area for the browsing options according to features (a) to (c1).

The remaining features relate to presentation of information as such and are, in any case, obvious options. If the results fit on one page, the browsing options for changing to the other pages of results are not necessary. In this case, it is obvious to reduce the size of the area occupied by the browsing options and leave more space for the area displaying the data items, thereby emphasising the data items found rather than the browsing options. Since the display area is limited, the second area for displaying browsing options should then be complementary in size to the first area.

In its letter and at the oral proceedings, the appellant argued that the threshold was not an arbitrary value and had a technical character. It could be set on the basis of parameters such as display size, resolution, data-item display size or font size. However, the claim is not limited

to any particular threshold. For instance, the maximum number of items to be listed simultaneously according to user preferences is also a threshold within the meaning of the claim. In any case, the Board's inventive-step reasoning is not limited to any type of threshold.

3.5 From the above, the subject-matter of claim 1 of the main request does not involve an inventive step (Articles 52(1) and 56 EPC).

T 0817/16 (Document scoring/GOOGLE) of 10.1.2019

European Case Law Identifier: ECLI:EP:BA:2019:T081716.20190110

Information retrieval based on historical data

Inventive step - all requests (no)

Application number:	04784004.6
IPC class:	G06F 17/30
Applicant name:	Google LLC
Cited decisions:	G 0003/08, T 0121/85, T 0107/87, T 0258/97, T 1177/97, T 0258/03, T 1543/06, T 1784/06, T 1741/08, T 1214/09, , T 1358/09, T 0042/10, T 0306/10, T 2230/10, T 1321/11, T 1370/11, T 1463/11, T 2035/11, T 2418/12, T 0136/13, T 0650/13, T 2330/13,
Citing decisions:	T 0064/16, T 2573/16, T 0697/17, T 1924/17

Board: 3.5.07

https://www.epo.org/law-practice/case-law-appeals/pdf/t160817eu1.pdf

Claim 1 of the main request reads as follows:

"A method for scoring a document, comprising:

identifying a document;

obtaining one or more types of history data associated with the document, the one or more types of history data including data relating to changes to a content of the document over time,

wherein obtaining the data relating to changes to the content of the document over time includes:

monitoring signatures of the document to determine (i) a frequency at which the content of the document changes over time, and (ii) an amount by which the content of the document changes over time; and

generating a score for the document based, at least in part, on the one or more types of history data associated with the document,

wherein the generating the score for the document includes scoring the document based, at least in part, on the frequency at which the content of the document changes over time and the amount by which the content of the document changes over time."

2. The invention

2.1 The application relates to **search engines.** Its background section explains that, ideally, a search engine provides the user with the results most relevant to the user's query. Relevant documents are typically identified on the basis of a comparison of the search-query terms to the words contained in the documents and other factors such as the existence of links to or from the documents. The detailed **description discloses a number of techniques for scoring documents, which may be used to improve the search results returned in response to a search query**.

2.2 The claimed invention is directed to the embodiment described on page 6, second full paragraph, to page 7, third full paragraph, of the published application. It proposes scoring a document on the basis of "history data" that reflects the frequency at and the amount by which the content of the document changes over time. This history data is obtained by "monitoring signatures of the document".

3. Main request - inventive step

3.1 Unlike claim 1 of the first and second auxiliary requests, claim 1 of the main request is not worded as a "computer-implemented" method and therefore arguably encompasses mental acts as such, which are excluded from patentability under Article 52(2) and (3) EPC. But since the appellant at the oral proceedings expressed its willingness to limit the claim to a "computer-implemented" method, the Board will, for the purpose of assessing inventive step, interpret claim 1 accordingly.

3.2 Since the method of claim 1 can be performed on a general-purpose computer, the Board considers such a computer to be a suitable starting point for assessing inventive step. The subject-matter of claim 1 differs from this prior art in the steps listed in claim 1.

These steps define the algorithm underlying the computer-implemented method in abstract, functional terms that do not imply any interaction with specific technical means. In particular, the step "**monitoring signatures of the document**" calculates and compares signatures for different versions of the document without specifying a technical mechanism by which different versions are detected or retrieved. And "**generating a score for the document"** and "scoring the document" merely associate the document with a calculated score value. The **steps of claim 1 are thus non-technical, apart from their implementation on a computer.**

It therefore has to be analysed whether, and to what extent, the steps interact with the technical feature of the claim, i.e. the feature (which the Board reads into the claim for the

purpose of assessing inventive step) specifying that the method is "computer-implemented", to produce a technical effect over a general-purpose computer.

3.3 The **Board concurs with the Examining Division that assigning a score to a document based on the frequency and the amount of changes to the document is not a technical task, even if performed by a computer**. The appellant originally did not dispute this, but at the oral proceedings it suggested that providing good scores improved the search results returned by the search engine and that improved search results resulted in a reduction in the number of search queries, which amounted to a saving of resources.

A similar argument was dealt with in decision T 306/10 of 4 February 2015 in the context of recommendation engines. The board there considered that **a reduction in the number of search queries and the corresponding saving of resources did not qualify as a technical effect of the (improved) recommendations, as they depended on subjective choices made by the user** (see reasons 5.2). It referred to decision T 1741/08 of 2 August 2012, reasons 2.1.6, where the argument was made that **a chain of effects cannot be used as evidence of a technical effect if one of the links between the effects is not of a technical nature (**but, for example, of a psychological nature).

In the present case, the **appellant's argument fails for the reason alone that claim 1 is silent on what the generated score is used for**. **Merely assigning a score to a document is not a technical effect. This is not different if the score is somehow based on the frequency and the amount of changes made to the document.**

3.4 The appellant also argued that the method of claim 1 achieved a technical effect by implementing the task of assigning a score to a document based on the frequency and the amount of changes to the document in a particularly resource-efficient manner. Instead of storing the current version of a document in its entirety to allow the amount of changes in the next version of the document to be determined, the method of claim 1 only stored a "signature" and determined the amount of changes by comparing the signatures of the previous and new versions.

3.5 Document signatures are well known in the art but are usually suitable only for determining whether two documents differ, not for measuring the degree in which they differ. In this respect, the application, on page 7, lines 1 to 3, states the following:

"For example, search engine 125 may store 'signatures' of documents instead of the (entire) documents themselves to detect changes to document content. In this case, search engine 125 may store a term vector for a document (or page) and monitor it for relatively large changes."

The Board notes that term vectors are well known in the art. They essentially represent the content of text documents as vectors of word frequencies. Measuring the "semantic similarity" between two text documents by computing the normalised inner product of their term vectors is a standard technique. Term vectors are thus indeed suitable for determining the amount of changes between two documents or two versions of a document.

For the purpose of assessing inventive step, the Board will therefore - to the appellant's benefit - interpret "signature" narrowly as "term vector".

3.6 At least for larger documents, it is plausible that the term vector of a document takes up less memory space than the full document. But the claimed method does not achieve any savings of memory space over a general-purpose computer - which is the prior art that the Board has taken as the starting point for assessing inventive step. Indeed, performing the method of claim 1 on a general-purpose computer necessarily uses more memory resources than not performing the method. What performing the method does achieve is a particular scoring of documents, but that is not a technical effect. It also causes - like any program execution - some usage of memory and processor resources, which is at least a physical effect, but which is not a technical effect for the purpose of inventive step in so far as it does not go beyond the inherent effects of running a program on a computer (see decisions T 258/03, OJ EPO 2004, 575, reasons 5.4; T 1543/06 of 29 June 2007, reasons 2.7 and 2.8; and T 2230/10 of 3 July 2015, reasons 3.7; see also T 258/97 of 8 February 2002, reasons 6).

3.7 Nevertheless, the jurisprudence of the boards of appeal acknowledges the possibility that the design of particular non-technical method steps to be implemented on a computer has been motivated by technical considerations, in particular concerning the internal functioning of the computer, resulting in a specific technical effect being achieved when the method is run on the computer (see decisions T 258/03, reasons 5.8; T 1358/09 of 21 November 2014, reasons 5.5; and T 2330/13 of 9 May 2018, reasons 5.7.9 and 5.7.10).

According to opinion G 3/08 (OJ EPO 2011, 10), reasons 13.5 and 13.5.1, such considerations would have to go beyond "merely" finding a computer algorithm to carry out some procedure. Mere algorithmic efficiency is generally not considered to be a technical effect (see decisions T 1784/06 of 21 September 2012, reasons 3.1.2; T 42/10 of 28 February 2013, reasons 2.11; T 1370/11 of 11 March 2016, reasons 10 to 10.5; and T 2418/12 of 14 July 2017, reasons 3.3).

3.8 In the present case, the appellant's position is essentially that, in the context of a (computer-implemented) method of scoring a document on the basis of the frequency at and the amount by which the document's content changes over time, the decision to determine the frequency and the amount of changes between two versions of the document by comparing their term vectors requires technical considerations, in particular relating to memory usage.

If the appellant's point of view is correct, then that decision cannot be included in the formulation of the technical problem to be solved. Rather, it contributes to the solution of the problem of implementing a method of scoring a document on the basis of the frequency at and the amount by which the document's content changes over time in a memory-efficient manner.

3.9 According to a second point of view, determining the frequency and the amount of changes between two versions of the document by comparing their term vectors is merely an algorithmic and thus a non-technical solution to the problem of determining the frequency and the amount of changes. Although comparing document versions in their entirety may be the more straightforward solution, **the degree of originality of a solution is not a criterion for technicality**.

If the decision is indeed non-technical, then it can be included in the formulation of the technical problem to be solved.

3.10 As a variation on the second point of view, it could also be argued that the non-technical purpose of claim 1 is not "scoring a document on the basis of the frequency at and the amount by which the document's content changes over time" but "scoring a document on the basis of the frequency at and the amount by which the document's term vector changes over time". Indeed**, a term vector, being a vector of word frequencies, is not an inherently technical object.**

It is clear that the argument for the appellant and against this variation would be that this formulation of the non-technical purpose of claim 1 incorrectly hides the technicality of the decision to use term vectors in the claimed context.

3.11 Although it cannot be denied that measuring the difference between two text documents by comparing their term vectors is an algorithmic solution, this does not on its own mean that the second point of view is the correct one.

For example, in decision T 650/13 of 2 October 2018, reasons 6, this Board confirmed the holding of the older decision T 107/87 of 26 April 1991 that a data coding rule for identifying and eliminating statistical redundancy contributes to the solution of a technical problem where it is used to reduce the amount of data to be stored or transmitted. This means that if a computer-implemented method includes steps of losslessly compressing and decompressing intermediate results to reduce the amount of memory space required for storing those results, at least those steps will make a technical contribution. Still, the implementation of the coding rule will normally be algorithmic in nature.

In the Board's view, the justification for attributing a technical character to a redundancy-reducing coding rule when used for reducing the amount of data to be stored or transmitted is that such rules can fairly be said to be based on technical considerations: they would have been **formulated by an engineer in the field of digital signal processing** rather than by a non-technical person such as the "notional mathematician" (Article 52(2)(a) EPC) or the "notional computer programmer" (Article 52(2)(c) EPC).

3.12 More generally, the Board considers that if non-technical claim features interact with technical claim features to cause a physical effect over the prior art, such as an effect on memory usage in a general-purpose computer, the physical effect is to be regarded as a technical effect for the purpose of assessing inventive step if the non-technical features are based on technical considerations aimed at controlling that physical effect (see e.g. decisions T 2230/10, reasons 3.8; and T 2035/11 of 25 July 2014, reasons 5.2.3).

A **useful test for determining whether such technical considerations are present is to ask whether the non-technical features would have been formulated by a technical person rather than by a non-technical person or persons** (see e.g. decisions T 1214/09 of 18 July 2014, reasons 4.8.8; T 1321/11 of 4 August 2016, reasons 5.3.5; T 1463/11 of 29 November 2016, reasons 20 and 21; and T 136/13 of 11 September 2018, reasons 3.6). This is not an enquiry into the actual state of technical or non-technical knowledge at the effective filing date; **the question is rather whether the knowledge required for coming up with the non-technical features in the particular case is of a kind that only a technical person, i.e. a person not working exclusively in areas falling under Article 52(2) EPC, could possess**.

3.13 Compared with techniques for lossless data compression, it is less evident that the idea of reducing a text document to a term vector to lower memory requirements while still being able to determine the amount of changes between consecutive versions is technical. **The concept of determining the semantic similarity between documents by means of term vectors belongs to the field of linguistics, which is a non-technical area** falling under Article 52(2) EPC (see decisions T 121/85 of 14 March 1989, reasons 5.7; T 1177/97 of 9 July 2002, reasons 3 and 7; and T 2418/12, reasons 3.1). And **the idea to use this concept in a computer program to reduce the amount of data to be stored is arguably one that the notional computer programmer would have had - more data requiring more memory being a concept inherent to computer programming.**

3.14 But in the present case the Board need not make a judgment as to the technicality of the use of term vectors in the context of claim 1, as the outcome of the inventive-step assessment does not depend on it.

Accepting, for the sake of argument, the appellant's position, the objective technical problem to be solved is that of implementing, on a computer and in a memory-efficient manner, a method of scoring a document on the basis of the frequency at and the amount by which the document's content changes over time.

Starting from a general-purpose computer and faced with this problem, the skilled person would have realised that memory can be used efficiently by storing the current version of the document in a reduced form which is still suitable for measuring the difference with another document or document version. He would therefore have looked for a suitable reduced form.

At the priority date it was well known that term vectors, which the application mentions only once (in the passage cited in point 3.5 above) and without explaining it, were used for comparing the semantic content of text documents. At the oral proceedings, the appellant did not dispute this, but it argued that the invention used them for a new purpose. However, the Board judges that the skilled person would have recognised that term vectors not only were suitable for comparing text documents but also took up, at least in the case of larger documents, less memory space than the entire documents. He would therefore have chosen to store the term vector of the current document version and would so have arrived at the subject-matter of claim 1 without the exercise of inventive skill.

3.15 Hence, the subject-matter of claim 1 lacks inventive step (Article 56 EPC).

T 0489/14 (Pedestrian simulation/CONNOR) of 22.2.2019

European Case Law Identifier: ECLI:EP:BA:2019:T048914.20190222

Simulation of the movement of an autonomous entity through an environment

Patentable invention - simulation method

Referral to the Enlarged Board of Appeal

Catchwords:
The following questions are referred to the Enlarged Board of Appeal for decision:

1. In the assessment of inventive step, can the computer-implemented simulation of a technical system or process solve a technical problem by producing a technical effect which goes beyond the simulation's implementation on a computer, if the computer-implemented simulation is claimed as such?

2. If the answer to the first question is yes, what are the relevant criteria for assessing whether a computer-implemented simulation claimed as such solves a technical problem? In particular, is it a sufficient condition that the simulation is based, at least in part, on technical principles underlying the simulated system or process?

3. What are the answers to the first and second questions if the computer-implemented simulation is claimed as part of a design process, in particular for verifying a design?

Application number:	03793825.5
IPC class:	G06F 17/50
Applicant name:	Connor, James Douglas
Cited decisions:	G 0001/03, G 0001/04, G 0002/07, G 0003/08, G 0001/12, T 0208/84, T 0115/85, T 0163/85, T 0453/91, T 0769/92, T 0939/92, T 0190/94, T 1173/97, T 0641/00, T 0125/01, T 0914/02, T 0258/03, T 0424/03, T 0154/04, T 1351/04, ,T 0365/05, T 0471/05, T 1147/05, T 1227/05, T 1567/05, T 1029/06, T 1820/06, T 0887/07, T 1670/07, T 1806/07, T 1875/07, T 0531/09, T 1265/09, T 0309/10, T 1842/10, T 0625/11, T 1630/11, T 0988/12, T 2330/13
Citing decisions:	T 0697/17

Board: 3.5.07

https://www.epo.org/law-practice/case-law-appeals/pdf/t140489ex1.pdf Claim 1 of the main request reads as follows:

"A computer-implemented method of modelling pedestrian crowd movement in an environment, the method comprising:

simulating movement of a plurality of pedestrians through the environment, wherein simulating movement of each pedestrian comprises:

providing a provisional path (9) through a model of the environment from a current location (6) to an intended destination (7);

providing a profile for said pedestrian;

determining a preferred step (112'), to a preferred position (123'), towards said intended destination based upon said profile and said provisional path, wherein determining said

preferred step comprises determining a dissatisfaction function expressing a cost of taking a step comprising a sum of an inconvenience function expressing a cost of deviating from a given direction and a frustration function expressing a cost of deviating from a given speed;

defining a neighbourhood (29) around said preferred position (123');

identifying obstructions in said neighbourhood, said obstructions including other pedestrians (21) and fixed obstacles (25);

determining a personal space (24) around said pedestrian;

determining whether said preferred step (112') is feasible by considering whether obstructions (21, 25) infringe said personal space over the course of the preferred step (112')."

The application

2. The invention relates to a computer-implemented method, computer program and apparatus for **simulating the movement of a pedestrian crowd through an environment.**

The published application, on pages 11 to 56, describes a mathematical model of individual pedestrians and an algorithm for simulating their movement through an environment. This is followed, on pages 56 to 70, by the description of a design system which performs the simulation. This system, shown in Figure 21, allows the user to build a model of an environment by creating it or importing a design from a computer-aided-design (CAD) source (page 58, lines 28 to 32). During the execution of the simulation, a sequential set of snapshots is displayed showing the current position of each pedestrian in the modelled environment. These simulation results can be analysed either online, i.e. while the simulation is running, or offline after the simulation has finished and the results have been recorded (page 60, line 18, to page 61, line 5).

The **main purpose of the simulation is its use in a process for designing a venue such as a railway station or a stadium,** as shown in Figure 22 and described on pages 65 to 70. Essentially, the designer creates or imports an architectural venue design, specifies the constituents of a pedestrian population that is typical for the venue being designed, and performs a number of simulations of pedestrian flows which the designer can specify at a high level (in terms of sources (entrances), sinks (exits) and supply rate). The simulation results are then examined and the design is revised if necessary.

In addition to the use of the simulation method for designing venues, the description, on page 3, lines 17 to 19, also mentions its use for troubleshooting flow problems, operational management, setting and implementing safety standards and quality control. These purposes are not independently elaborated elsewhere in the application.

Examination of claim 1 of the main request

3. Claim 1 of the main request relates to a computer-implemented method of modelling pedestrian crowd movement in an environment. The method simulates a plurality of pedestrians as they move through the environment. For each pedestrian, a "preferred step" is

determined on the basis of a pedestrian-specific profile, a provisional path through a model of the environment and certain "dissatisfaction", "inconvenience" and "frustration" cost functions, and it is furthermore determined whether the step is feasible in view of obstructions in the neighbourhood of the pedestrian and the pedestrian's personal space.

4. Ignoring for a moment the feature "computer-implemented", claim 1 specifies a series of procedural steps which could be performed independently of any specific technical means. They can be carried out with the help of a computer, but also - at least in principle - exclusively mentally. In other words, without the feature "computer-implemented", the scope of claim 1 encompasses methods for performing mental acts as such, which are excluded from patentability under Article 52(2) and (3) EPC.

In this context the Board notes that, as a matter of practical reality, someone carrying out the prescribed sequence of steps for a larger number of pedestrians and a more complicated environment may need some help, for example in the form of pencil and paper, to keep track of intermediate calculation results or to visualise the end results. But **complexity of an activity is not normally considered to be sufficient to escape the mental act exclusion** (see e.g. decision T 309/10 of 19 June 2013, reasons 16).

5. The appellant argued that the steps of claim 1 were in fact technical because they dealt with physical concepts, such as direction and length, which could be expressed in terms of physical quantities. However, **a method that can be performed mentally is still excluded even if it can be said to involve technical considerations.** In opinion G 3/08 (OJ EPO 2011, 10), the Enlarged Board confirmed this when it explained that no contradiction existed between the statement that programming - more precisely, the intellectual activity of working out what are the steps to be included in a computer program - always involved technical considerations and the statement that programming was a mental act excluded from patentability (reasons 13.3). The Enlarged Board drew the following analogy:

"Designing a bicycle clearly involves technical considerations (it may also involve non-technical, e.g. aesthetic, considerations) but it is a process which at least initially can take place in the designer's mind, i.e. it can be a mental act and to the extent that it is a mental act would be excluded from patentability, just as in the cited cases T 833/91, T 204/93 and T 769/92 (cf. also T 914/02, General Electric, dated 12 July 2005, Reasons, point 2.3 and T 471/05, Philips, dated 06 February 2007, Reasons, points 2.1 and 2.2)."

6. The presence of non-technical features in claim 1 does not mean, however, that its subject-matter is excluded from patentability under Article 52(2) and (3) EPC as a "non-invention". The limitation to a "computer-implemented" method ensures that any embodiment of the claimed invention involves the use of a computer, which is undoubtedly a technical means. It is well established in the jurisprudence of the boards of appeal that a method claim involving technical means is not excluded from patentability (see decision T 258/03, OJ EPO 2004, 575, reasons 4).

This narrow interpretation of the exclusions of Article 52(2) and (3) EPC is based on the principle that whether particular subject-matter is excluded is to be decided without regard to the prior art. In decision G 2/07 (OJ EPO 2012, 130), the Enlarged Board confirmed this

principle when it held that the same should apply to the delimitation of essentially biological from patentable processes for the production of plants or animals (reasons 6.4.1).

7. On the other hand, the jurisprudence also holds that inventive step can be based only on the technical part of the invention, i.e. on those features that contribute to the solution of a technical problem; features that cannot be considered as contributing to the solution of any technical problem by providing a technical effect have no significance for the purpose of assessing inventive step (see T 641/00, OJ EPO 2003, 352, reasons 4 to 6; G 3/08, reasons 12.2.1 and 12.2.2). Non-technical features are therefore to be taken into account in the assessment of inventive step to the extent that they interact with the technical subject-matter of the claim to solve a technical problem or, equivalently, to bring about a technical effect (see G 1/04, OJ EPO 2006, 334, reasons 5.3; T 154/04, OJ EPO 2008, 46, reasons 5, under (F), and 13 to 15).

8. In the present case, the method steps of claim 1 interact with the feature requiring the method to be "computer-implemented" at least to the extent that the method steps are to be implemented on a computer.

In some cases, the problem of implementing a non-technical method on a computer may have a non-obvious solution, namely if the implementation requires non-trivial technical features. In such cases, those technical features are essential features of the invention and thus have to be included in the claim in order to comply with Rule 43(1) and (3) EPC. This is not such a case: the implementation of the steps of claim 1 is straightforward, requiring only basic knowledge of data structures and algorithms.

In other cases, the implementation of a non-technical method on a computer may in itself be a straightforward programming exercise, but the design of the method may still have been motivated by technical considerations concerning the internal functioning of the computer, resulting in a specific technical effect being achieved when the method is run on the computer (see e.g. decision T 2330/13 of 9 May 2018, reasons 5.7.9 and 5.7.10). **In those cases, the technical problem to be solved cannot be formulated as being how to implement the non-technical method on a computer but has to be reformulated, essentially, as being how to achieve the effect.** But this is not one of those cases either, as the steps of claim 1 directly reflect the simulation to be performed, and no considerations relating to the internal functioning of a computer are alluded to in the application or can otherwise be recognised by the Board.

Hence, if its implementation on a computer were to be considered the only technical aspect of the claimed method, the conclusion would be that the method lacks inventive step over a known general-purpose computer.

9. It therefore has to be assessed whether further technical aspects can be identified in the subject-matter of claim 1. In this respect, the **appellant** submitted that the invention produced a technical effect in the form of "a more accurate simulation of crowd movement". Since a general-purpose computer does not inherently simulate crowd movement at all, the appellant's submission amounts to the argument that the computer-implemented simulation of crowd movement qualifies as a technical effect and that the steps of claim 1 contribute to that effect.

The Board observes that claim 1 does not explicitly specify what information is ultimately provided to the user of the method, but it accepts that claim 1 provides information about the simulated movement of pedestrians through a modelled environment.

10. As to the technicality of simulating crowd movement, the **appellant** argued that simulating the movement of pedestrians yielded results which were no different from those obtained by modelling an electron using numerical methods. Like the simulation of an electron, the claimed simulation of the movement of pedestrians was based, at least in part, on the laws of physics.

The **Board** does not disagree with these observations but is not convinced that numerically calculating the trajectory of an object as determined by the laws of physics is in itself a technical task producing a technical effect.

11. **In the Board's view, a technical effect requires, at a minimum, a direct link with physical reality**, such as a change in or a measurement of a physical entity. Such a link is not present where, for example, the parabolic trajectory followed by a hypothetical object under the influence of gravity is calculated. Nor can the Board detect such a direct link in the process of calculating the trajectories of hypothetical pedestrians as they move through a modelled environment, which is what is claimed here. In fact, the environment being modelled may not exist and may never exist. And the simulation could be run to support purely theoretical scientific investigations, or it could be used to simulate the movement of pedestrians through the virtual world of a video game.

In this context, the Board notes that the Enlarged Board of Appeal in decision G 2/07, reasons 6.4.2.1, stated that "[h]uman intervention, to bring about a result by utilising the forces of nature, pertains to the core of what an invention is understood to be". It appears to the Board that using a computer to calculate the trajectories of hypothetical pedestrians as they move through a modelled environment does not utilise the forces of nature to bring about a result in any way different from using a computer to perform any other type of calculation.

12. The Board's analysis so far would lead it to **conclude that the subject-matter of claim 1 indeed lacks inventive step over a known general-purpose computer.** However, the **appellant** also **relied on decision T 1227/05, arguing that modelling pedestrian crowd movement in an environment constituted an adequately defined technical purpose for a computer-implemented method.**

Decision T 1227/05

13. In case T 1227/05, the deciding board came to the conclusion that the claimed numerical simulation of a noise-affected circuit described by a model featuring input channels, noise input channels and output channels and a system of differential or algebroid differential equations was a functional technical feature.

The board was satisfied that the claim was limited to the simulation of "an adequately defined class of technical items" ("eine hinreichend bestimmte Klasse von technischen Gegenständen"), where "adequately defined" appears to be essentially a clarity requirement

(reasons 3.1 and 3.1.1). The board's reasons for finding the simulation to be a technical process are given in point 3.2.2 of the reasons, which reads as follows:

"Die Simulation erfüllt technische Aufgaben, die für eine moderne Ingenieurtätigkeit typisch sind: Die Simulation erlaubt eine realitätsnahe Vorhersage des Verhaltens eines entworfenen Schaltkreises und unterstützt dadurch dessen Entwicklung im Idealfall so genau, dass vor einer Fertigung abgeschätzt werden kann, ob der Bau eines Prototyps Erfolg verspricht. Die technische Bedeutung dieses Ergebnisses vervielfacht sich mit zunehmender Geschwindigkeit des Simulationsverfahrens, denn damit kann eine umfangreiche Klasse von Entwürfen virtuell getestet und auf erfolgversprechende Kandidaten durchsucht werden, bevor mit einer aufwendigen Herstellung von Schaltkreisen begonnen wird.

Ein vorausschauender Test eines komplexen Schaltkreises und/oder eine qualifizierte Auswahl aus einer Vielzahl von Entwürfen wäre ohne technische Hilfe nicht oder nicht innerhalb annehmbarer Zeit möglich. Das computergestützte Simulationsverfahren zum virtuellen Ausprobieren stellt somit ein praktisches und praxisrelevantes Werkzeug des Elektroingenieurs dar. Dieses Werkzeug ist gerade deshalb wichtig, weil in der Regel keine rein mathematische, theoretische oder gedankliche Methode existiert, die eine vollständige und/oder schnelle Voraussage des Schaltkreisverhaltens unter Rauscheinflüssen liefern würde."

[The English translation in the Official Journal reads: "Simulation performs technical functions typical of modern engineering work. It provides for realistic prediction of the performance of a designed circuit and thereby ideally allows it to be developed so accurately that a prototype's chances of success can be assessed before it is built. The technical significance of this result increases with the speed of the simulation method, as this enables a wide range of designs to be virtually tested and examined for suitability before the expensive circuit fabrication process starts.

Without technical support, advance testing of a complex circuit and/or qualified selection from many designs would not be possible, or at least not in reasonable time. Thus computer-implemented simulation methods for virtual trials are a practical and practice-oriented part of the electrical engineer's toolkit. What makes them so important is that as a rule there is no purely mathematical, theoretical or mental method that would provide complete and/or fast prediction of circuit performance under noise influences."]

14. In the **present case, the method of claim 1 can be viewed as a method of testing - by simulation - a modelled environment with respect to pedestrian crowd movement.** Viewed in this way, there is an evident analogy with a method of testing - by simulation - a modelled circuit with respect to noise influences. Just as the simulation method claimed in T 1227/05 can be used to predict the performance of a designed circuit in the presence of noise before it is built, so too can the simulation method claimed here be used **to predict the performance of a designed environment in the presence of pedestrians before it is constructed.** (The claims in both cases refer to a "modelled" rather than a "designed" circuit and environment.)

Although the term "environment" is broad, the claim is limited to the simulation of environments through which pedestrians move and which have fixed obstacles. The Board

considers that such environments, when they exist in physical reality, are technical and that an environment's "behaviour" when a crowd of pedestrians moves through it, for example the rate at which pedestrians can pass through the environment, is a technical property of the environment, not unlike the ability of a roof to drain rainwater. While it is true that the movement of a pedestrian is determined to a large extent by subjective decisions taken by the pedestrian, ultimately the pedestrian's movement cannot fail to obey the laws of physics: a pedestrian cannot move through a wall or through other pedestrians. Designing a train station that can handle a million people passing through it per day or a building that can be evacuated within a matter of minutes is **primarily the work of an engineer,** even if the insights of a behavioural psychologist can be of assistance.

As noted above, at least in principle the calculations underlying the simulation of pedestrian crowd movement as claimed here can be performed purely mentally; the role of the computer is that of ensuring satisfactory and reliable performance. But the same can be said of the method considered in T 1227/05. In both cases, the practical usefulness of the simulation method increases with the speed at which it is executed, as a greater speed allows a wider range of designs to be virtually tested and examined for suitability before the expensive manufacturing or construction process starts. In both cases, advance testing of a complex circuit or environment or an appropriate selection from many designs would not be possible within a reasonable time without computer support.

15. In sum, the Board agrees with the appellant that decision T 1227/05 supports his case. However, the Board is not fully convinced by the decision's reasoning. Its doubts are twofold.

First, although a computer-implemented simulation of a circuit or environment is a tool that can perform a function "typical of modern engineering work", it **assists the engineer only in the cognitive process of verifying the design of the circuit or environment**, i.e. of studying the behaviour of the virtual circuit or environment designed. The circuit or environment, when realised, may be a technical object, but **the cognitive process of theoretically verifying its design appears to be fundamentally non-technical**.

Second, the decision appears to rely on the greater speed of the computer-implemented method as an argument for finding technicality. But **any algorithmically specified procedure that can be carried out mentally can be carried out more quickly if implemented on a computer, and it is not the case that the implementation of a non-technical method on a computer necessarily results in a process providing a technical contribution** going beyond its computer implementation (see e.g. decision T 1670/07 of 11 July 2013, reasons 9).

16. Decision T 1227/05 indirectly addresses the claimed simulation method's lack of a direct physical effect on the real world in point 3.4 of its reasons, where decision T 453/91 of 31 May 1994 is discussed. In that case, the deciding board had insisted on the addition of a step of "materially producing the chip so designed" to a method for designing a chip, because the claims rejected by the examining division concerned methods that could be interpreted as delivering a mere design which did not exist in the real world and which could or could not become a real object (see T 453/91, reasons 5.2).

The board which decided T 1227/05 acknowledged the tension with decision T 453/91. It pointed out that industrial simulation methods were becoming more and more crucial to technological progress and that, in a globally distributed industry, development and production were becoming increasingly separated, both materially and geographically. It therefore considered specific patent protection to be appropriate for numerical development tools designed for a technical purpose (reasons 3.4.2).

There is no doubt that the significance of numerical development tools has increased even more since case T 1227/05 was decided, yet the Board is hesitant to base its decision on policy considerations relating to the appropriate scope of patent protection that have not been expressed by the legislator and have in fact arisen only since the relevant provisions of the EPC were enacted (the Diplomatic Conference for the revision of the EPC in 2000 not having materially changed them). The Board is aware that the legislator deliberately refrained from defining the terms "technical" and "technology" in order not to preclude adequate protection being available for the results of future developments in fields of research which the legislator could not foresee (cf. decision G 2/07, reasons 6.4.2.1), but it sees a difference between the emergence of a new field of innovation and a change in the perceived significance of an existing field.

17. Nevertheless, in view of the important role that numerical development tools and in particular computer-implemented simulations play nowadays in the development of new products, legal certainty in respect of the patentability of such tools is highly desirable. **Although the Board would tend to consider the subject-matter of claim 1 of the main request to lack inventive step over a general-purpose computer, it recognises that the approach developed in case T 1227/05 suggests a different finding**. That approach has so far not been adopted in a great many decisions of the boards of appeal, but it is the approach which currently prevails in the jurisprudence (see Case Law of the Boards of Appeal, 8th edition, 2016, I.A.2.4.3, under f)). It is also included in Part G, Chapter II, 3.3.2, of the Guidelines for Examination in the EPO (November 2018).

18. Were the Board to follow decision T 1227/05, it would have to acknowledge that some or all of the steps of the simulation method of claim 1 contribute to a technical effect of the invention and could thus not be ignored when assessing inventive step. It would hence be necessary to compare the invention with prior art other than a general-purpose computer. Such prior art is available but was not considered in the decision under appeal. The Board would therefore remit the case to the Examining Division for further prosecution.

19. **The present case therefore requires a decision to be taken on - to put it in general terms for now - the patentability of simulation methods. This is a point of law which relates to the interpretation of Articles 52(2) and (3) and 56 EPC and cannot be answered directly and unambiguously by reference to the EPC, i.e. it is a point of law of fundamental importance** (cf. decision G 1/12, OJ EPO 2014, A114, reasons 10). The answer is important not just for the present case but for a potentially large number of cases involving computer-implemented simulations (see, for example, the decisions discussed in points 38 to 41 below, which were taken by four other organisational boards of appeal). Moreover, the Board at present intends to deviate from the interpretation and explanations of the EPC given on this point in decision T 1227/05 so that the uniform application of the law is also at issue. The Board further notes that the considerations necessary for settling the point of law are

likely to help clarify the meaning of Article 52(2) and (3) EPC and its interaction with Article 56 EPC more generally. The Board therefore considers that it should refer the point of law to the Enlarged Board of Appeal in the form of the questions formulated below.

T 2099/12 (Automatic event coordination / GET WELL NETWORK) of 21.11.2018

European Case Law Identifier: ECLI:EP:BA:2018:T209912.20181121

SYSTEMS AND METHODS FOR COORDINATING THE FLOW OF EVENTS IN A HEALTH CARE SETTING USING WORKFLOW MODULE

Inventive step - (no
Inventive step - obvious automation of non-technical steps normally carried out by a human)

Application number: 06720382.8
IPC class: G06Q 10/00, G06F 9/44
Applicant name: Get Well Network Inc.

Board: 3.5.01

https://www.epo.org/law-practice/case-law-appeals/pdf/t122099eu1.pdf

Claim 1 of the main request reads:

A method of automatically coordinating at least a portion of events that occur between a time that a person enters a health care setting and a time that the person is discharged from the health care setting by generating a health care setting specific workflow module that controls communication between components of an automated event coordination system, the method comprising:

receiving a selection of at least one predetermined event;

associating at least one workflow process with the at least one predetermined event, wherein the at least one workflow process comprises a plurality of predetermined system component activities that are to be performed by the system after the at least one predetermined event occurs; and

implementing the at least one workflow process in the system using a software program after the at least one predetermined event occurs,

characterised by:

re-implementing the at least one workflow process in the system if a component of the system does not perform a predetermined activity from the plurality of system component activities after a predetermined amount of time.

VI. In the grounds of appeal, the **appellant** argued that:

…
The coordination between system component activities and the communication between system components required to perform that coordination required technical considerations. The invention was not merely concerned with automating a non-technical method; it was concerned with improving the technical performance and coordination of such an automated system.

The step of re-implementing the workflow process when one of the predetermined activities did not take place for a period of time allowed an increased level of user flexibility (e.g. the possibility of deferring various activities) in an automated system without a consequent burden of human intervention.

The technical problem to be solved could therefore be considered as how to increase the level of user flexibility in an automated event coordination system. The solution lied in the re-implementation operation, which provided a function that permitted deferral of the operation of a system component within a system of interlinked components, without stalling or otherwise halting operation of the system. This function of the system was not disclosed or suggested in any prior art document.

…

1.1 The invention is about coordinating events in a health care setting, for example a hospital.

1.2 Between the time that a patient enters a hospital and the time that he is discharged, a series of events take place. The invention automates the coordination of at least a portion of those events using a workflow module, which is essentially a software program that controls workflow processes implemented on a computer system.

…

2. Main request, claim 1

2.1 **Claim 1 of the main request is very broad and general**. It defines neither the events nor the activities performed by the system, and it is not clear which steps of the method are performed automatically. Indeed, the description suggests that at least some of the steps in claim 1, for example the step of associating a workflow process with an event, may be performed, manually, by a nurse (see paragraph [0022]).

In its communication, the Board raised doubts whether the definitions in claim 1 were sufficient to allow a meaningful understanding of the invention, and consequently, whether claim 1 was clear. The appellant did not reply, and the Board sees no reason to depart from its

preliminary view expressed in the communication that the subject-matter of claim 1 is not clear (Article 84 EPC).

2.2 The subject-matter of claim 1 is considerably broader than the two examples in the description. Those examples concern specific activities (watching a video, completing a survey; see point 1.3 above), and in both of them, the system is waiting for the user to provide an input. This is not reflected, at all, in claim 1. Therefore, the Board takes the view that claim 1 is not supported by the description as required by Article 84 EPC.

…

2.5 The Board does not see any error in the examining division's conclusion that the subject-matter of claim 1 of the main request lacks an inventive step. In the Board's view, claim 1 does not provide anything technical, apart from the automation of activities typically performed by a human. Indeed, the nurse could ask or remind the patient to watch the safety video or to complete the survey. The Board agrees with the examining division that it would have been obvious to use a (known) computer to automate those non-technical steps.

The Board furthermore agrees with the examining division that the subject-matter of claim 1 of the main request would have been obvious in view of a well-known automatic reminder, in combination with a system for performing the activities of the workflow (e.g. displaying the safety video)

2.6 The **appellant** argued that the invention as defined in claim 1 was concerned with the interaction of different system components of a computerised system, which was clearly technical. The coordination of activities and the communication between system components required to perform the coordination required technical considerations. Furthermore, according to the appellant, the step of re-implementing the workflow process when one of the predetermined activities did not take place for a period of time had the technical effect of increasing user flexibility (e.g. the ability to defer various activities) without otherwise halting operation of the system.

2.7 The appellant's arguments do not persuade the Board. Every computer program involves interaction between various system components, for example between a processor and memory. This is just normal interaction between software and hardware in a computer. The application does not define any particular interaction, which goes beyond that.

Furthermore, the **Board is not convinced that increased user flexibility is a technical effect, which could support the presence of an inventive step. The same level of flexibility would be achieved when the nurse reminds the patient.**

2.8 For these reasons, the Board concludes that the subject-matter of claim 1 according to the main request lacks an inventive step (Article 56 EPC).
