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Datasheet for the decision of 13 December 2022

Case Number: T 2803/18 - 3.2.06

Application Number: 11794955.2

Publication Number: 2582341

IPC: A61F13/42, G08B19/00, G08B23/00, G06N5/04, G06N99/00

Language of the proceedings: EN

Title of invention:
METHOD FOR ANALYSING EVENTS FROM SENSOR DATA BY OPTIMIZATION

Patent Proprietor:
Fred Bergman Healthcare Pty Ltd

Opponent:
Ontex BVBA

Headword:

Relevant legal provisions:
EPC Art. 56
RPBA 2020 Art. 13(2)

Keyword:
Inventive step - (no) - common general knowledge
Amendment after summons - exceptional circumstances (no) - taken into account (no)

Decisions cited:
G 0001/19, T 0641/00

Catchword:

Europäisches Patentamt
European Patent Office
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Beschwerdekammern

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Case Number: T 2803/18 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 13 December 2022

Appellant: (Opponent)	Ontex BVBA Korte Keppestraat 21 9320 Aalst-Erembodegem (BE)
Representative:	Finnegan Europe LLP 1 London Bridge London SE1 9BG (GB)
Respondent: (Patent Proprietor)	Fred Bergman Healthcare Pty Ltd Level 13, 53 Miller Street North Sydney, New South Wales 2060 (AU)
Representative:	Williams, Paul Edwin Lewis Silkin LLP 5 Chancery Lane Clifford's Inn London EC4A 1BL (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 September 2018 concerning maintenance of the European Patent No. 2582341 in amended form.**

Composition of the Board:

Chairman	M. Hannam
Members:	T. Rosenblatt
	C. Almberg

Summary of Facts and Submissions

I. The appellant (opponent) filed an appeal against the interlocutory decision of the opposition division, posted 17 September 2018, in which the opposition division found that European patent No. 2 582 341 in an amended form met the requirements of the EPC.

II. The parties were summoned to oral proceedings before the Board.

In a subsequent communication issued pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA 2020), the parties were informed of the Board's preliminary opinion on the case. The Board *inter alia* opined that independent claim 1 of the set of claims which the opposition division considered to comply with the requirements of the EPC appeared to lack an inventive step.

Oral proceedings took place on 13 December 2022.

III. The appellant requested that the appealed decision be set aside and the patent be revoked.

IV. The respondent (patent proprietor) requested that the appeal be dismissed.

V. The following evidence was *inter alia* referred to by the appellant:

D2 : US 2007/0270774 A1
A1 : extract from Wikipedia, relating to "Cluster analysis", as recorded on web.archive.org on

9 February 2010, retrieved on 13 January 2017.

VI. Claim 1 according to the respondent's sole request reads:

"1. A method for processing sensor signals representing a wetness event in an absorbent article, the method including:

receiving from a sensor sensor signals representing a plurality of wetness events in an absorbent article;

processing the sensor signals to determine a wetness event characteristic of at least one of the wetness events in the absorbent article;

wherein the method is characterised by carrying out a learning phase including the steps of:

receiving sensor signals representing one or more wetness events in each of one or more absorbent articles;

receiving observation data indicative of a cumulative wetness event characteristic of the one or more wetness events in each absorbent article;

and identifying an optimal mathematical model describing a relationship between the sensor signals and the observation data;

and is further characterised in that processing the sensor signals includes identifying automatically a sensor signal that is representative of each individual wetness event in the plurality of events and, from the sensor signals representative of each individual wetness event:

(i) generating a representative vector for that wetness event including one or more values derived from the sensor signal for that event;

(ii) normalizing the elements of the representative vector with respect to a reference range;

(iii) allocating weightings to the normalised elements of the representative vector to generate a weighted representative vector for that wetness event;
and
(iv) comparing the weighted representative vector with clusters of weighted representative vectors to determine which one or more of the clusters the weighted representative vector is most similar to, and allocating a wetness event characteristic of the one or more clusters based on the optimal mathematical model obtained during the learning phase to the weighted representative vector for that wetness event, wherein the characteristic indicates volume of exudate in that wetness event."

VII. The arguments of the appellant, relevant to the present decision, may be summarised as follows.

Claim 1 lacked an inventive step starting from D2 in combination with, for example, common general knowledge. Contrary to the finding of the opposition division, the subject-matter of claim 1 was distinguished over D2 only by step (iv). Contrary to the Opposition Division's finding that a "plurality of wetness events" was not known from D2, this feature was explicitly disclosed in D2, for example in paragraphs, 21, 63, 64, 66, 67, 76, 88 as well as in Figure 6. The only distinguishing feature of claim 1, i.e. step (iv), related to a mathematical method, which was not a technical feature. An objective technical problem could only be formulated as "to find an alternative to the method of D2". The skilled person was not just an expert in the fields of mathematics or diapers, but could be considered to be a team of experts, predominantly in the field of collection of data and

statistical analysis. Clustering belonged to common general knowledge. The skilled person(s) faced with the above objective technical problem would therefore readily consult common general knowledge and arrive at claim 1.

VIII. The arguments of the respondent, relevant to the present decision, may be summarised as follows.

The method of claim 1 defined that each individual wetness event in a sequence or series of a plurality of wetness events could be characterised individually, so that in such a series of wetness events the exudate volume of each single wetness event could be determined independently from the total amount of exudate accumulated over the entire period represented by the sensor signal, allowing thereby even to determine the actual number of individual wetness events. D2 did not contain any disclosure that individual wetness events could be characterised. The method known from D2 rather only allowed to determine as a direct measurement the cumulative or total amount of exudate of a single event. The passages in D2 mentioning multiple wetness events did not disclose these events as being based on a common sensor signal resulting from the use of an absorbent article over a period in which a plurality of wetness events occurred and were recorded by the sensor. Instead, such plural wetness events implied in the cited passages could have been recorded separately with long time periods in between each event and in particular on different absorbent articles. It was clear from paragraphs 71 to 77 that the mathematical model established during the training phase was based on the analysis of single wetness events and required a diaper change after each wetness event. A system trained in this way could not be used to characterise

individually each event in a series of recorded events. Paragraph 76 also only taught a possible embodiment in which the total amount of accumulated moisture in a series of wetness events is monitored to determine when the garment is full and needs changing. D2 did also not disclose the learning phase as defined in claim 1. Other passages, such as paragraph 88 or Figure 6, only disclosed background information, for example in regard to the sensors used or in regard to the form of wetness events. The method of claim 1 was thus distinguished from the method disclosed in D2 by the feature "plurality of wetness events" and step (iv).

The distinguishing features "plurality of wetness events" and feature (iv) contributed to the solution of a technical problem since they were directed to improvements of the indirect measurement, or at least accurate estimation, of a physical state of an object, here the determination of absorbed exudate volume in an absorbent article. Paragraph 99 of G1/19 qualified measurement methods as having technical character.

The technical effect achieved by the two distinguishing features was an accurate estimation of the volume of exudate in an absorbent article allowing to determine the volume of each individual event, or to characterise individual wetness events in a series of a plurality of wetness events, so that the objective technical problem was how to more accurately monitor incontinence in a patient wearing an absorbent article.

If only step (iv) were considered to be a distinguishing feature over the method of D2, the problem would then be "to provide an alternative method".

Even though cluster analysis may have been known, there was no hint to apply this to the method of D2.

Reasons for the Decision

1. The subject-matter of claim 1 lacks an inventive step (Article 56 EPC)

2. It was common ground between the parties that the method disclosed in D2 could be considered to represent the closest prior art to the subject-matter of claim 1.

3. In the impugned decision two distinguishing features had been identified in claim 1 with respect to D2, namely the "plurality of wetness events" and step (iv). As indicated above, the appellant did not contest the lack of disclosure of the latter but argued that D2 disclosed the "plurality of wetness events" feature. During the oral proceedings before the Board, the respondent for the first time in the appeal procedure disputed that the feature of claim 1 defining a learning phase was disclosed.

3.1 The Board decided, pursuant to Article 13(2) RPBA 2020, not to take into account the appellant's assertion that D2 failed to disclose the feature defining a learning phase.

The appellant acknowledged that it had not submitted this contention in its reply to the statement of grounds of appeal. Contesting that the feature was disclosed in D2 introduced a new factual element into the proceedings and was consequently considered to

constitute an amendment to the respondent's appeal case, indisputably submitted only after the notification of a summons to oral proceedings. The appellant did not argue that exceptional circumstances were present. Absent any exceptional circumstances justified by cogent reasons, the Board exercised its discretion according to Article 13(2) RPBA 2020 not to take this assertion into account.

3.2 Regarding the contentious feature "plurality of wetness events", the Board concludes that it is disclosed in D2 for the following reasons.

3.2.1 The Board considers that there can be no doubt that in the method according to D2 sensor signals are received from a sensor which represent a plurality of wetness events according to the first feature defined in claim 1.

Paragraph 64 of D2 discloses that to characterise the volume of an event, the algorithm underlying the method disclosed in D2 applies one or more variables derived from the sensor signals of an individual's absorbent article to a mathematical model which estimates the volume of liquid in the event. The variables derived from the sensor signals may include inter alia a "volume estimated in a previous event" and the "time elapsed since the last detected wetness event". Paragraph 76 of D2 states moreover that the "processor may also monitor the total amount of accumulated moisture in a series of wetness events in a single absorbent article ...". Therefore these paragraphs directly and unambiguously anticipate the first method step defined in claim 1, i.e. "receiving from a sensor sensor signals representing a plurality of wetness events in an absorbent article".

Moreover, the Board finds that in particular the cited passage from paragraph 64 also anticipates that individual wetness events in a series or in a plurality of wetness events are characterised, since the variables derived from the sensor signals include the "volume estimated in a previous event" or the "time elapsed since the last detected wetness event" (emphasis added). Since according to the first sentence of paragraph 64, these specific variables are derived from the sensor signals of an individual's absorbent article, it can only be concluded that the sensor signals must also cover extended periods of use of that article during which several wetness events have occurred ; otherwise it could not be derived from such sensor signals of an individual's absorbent article how much time had elapsed since the last detected event.

As the Board had already opined in its communication pursuant to Article 15(1) RPBA 2020, there is no other method step of claim 1, other than step (iv), which is not known from D2 with regard to the feature "plurality of wetness events".

3.2.2 The respondent has not indicated which particular other method step of claim 1 was not known from D2. The respondent rather concentrated its argument on the allegation that the appellant's arguments and the Board's consideration would be based on a fundamental misinterpretation of the teaching of D2 taken as a whole. Accordingly, the method of D2 concerned only the characterisation of single wetness events so as to determine the total volume of a single voiding, which would then be followed by an immediate change of the absorbent article so that the sensor signals could only

be representative of single voiding episodes.

The Board can agree with the respondent that the method disclosed D2 is directed to the determination of the total volume accumulated in an absorbent article. It is also true that reference is repeatedly made in D2 to "characterisation of a wetness event" (emphasis added by the Board), suggesting that only a method characterising single wetness events might be within the ambit of D2.

The Board is however not convinced that the passages referred to by the respondent concerning the singular form "a wetness event" and the entire teaching of D2 mean that the processing of sensor signals according to the algorithm in D2 pertains necessarily only to the analysis of signals representative for a single wetness event. This is not what the skilled person would have understood from D2. The respondent's contention would mean that any single wetness event, irrespective of the amount of exudate, be it so small to be just detectable by the sensor(s) and far too small for making a wearer feel uncomfortable or for reaching the limits of the absorption capacity of such an absorbent article, possibly resulting just from dribble (see also paragraphs 23 or 65 of the patent in suit), would lead to stopping the (receiving and) processing of sensor signals. This would signify in practice that the absorbent article requires change, despite being charged only by a very small amount of exudate. If it were considered that such a small amount would nevertheless not require a change, as a skilled person would do, then one of two conditions would exist. Of these two, the first would be that the receiving, processing and analysing of sensor signals must continue, which means that future wetness events would

be detected by the sensors, thus received, processed and analysed, leading to the conclusion that the method of D2 necessarily characterises individual wetness events in a series of wetness events. The second would be the wetness detection system and method becoming useless, since sensor signals (after a single dribble event had occurred and was processed) would not be received or at least would no longer be processed and analysed despite then possibly reaching the total absorption capacity of the absorbent article during such future wetness event(s). Clearly the skilled person would have understood that this latter option cannot be meant to be intended by the system and method according to D2. This conclusion is corroborated by the disclosure in, for example, the passages referred to above (point 3.2.1), dealing explicitly with series of wetness events and characterisation of individual events, as well as by, for example, the introductory portion of D2, see paragraph 12, relating to problems perceived with prior art systems and methods, such as when very small exudate volumes may have triggered unnecessarily an alarm indicating a need for changing a diaper. Finally, the respondent has not pointed to any passage in D2 which discloses, explicitly or implicitly, that in the assessment phase, i.e. during the normal use of an absorbent article provided with wetness sensors and a corresponding system for the processing of the sensor signals, absorbent articles would have to be changed after every single wetness event.

The Board can also not agree that D2 would disclose far too little technical detail in regard to processing and analysing sensor signals for the characterisation of individual wetness events in a plurality of wetness events. The variables to be derived from the sensor

signals mentioned in paragraph 64 of D2 do not impose any difficulty in being carried out by the skilled person. They only rely on basic signal processing, such as: the determination of a slope in a signal for detecting, for example, an onset or decrease of an event represented in the signal; determination of minima or maxima of the signal for detecting minimal or maximum intensity or periods and duration of voiding events;or the area under the signal curve for deriving a volume of exudate collected in the article. All these signal processing requirements are based on numerical analysis routines implementing well known principles of differential and integral calculus. It is noted that claim 1 of the patent in suit also only generally defines characterising features or elements of wetness events and that the remaining disclosure of the patent also fails to give more detail in this respect. The Board has no doubt that D2 discloses the information required to process and analyse sensor signals representative of a plurality of (successive) wetness events and to characterise individual events thereof (paragraph 64 of D2).

The training methodology disclosed in paragraphs 71 to 77 of D2, to which the respondent referred during the oral proceedings, does indeed relate only to the analysis of single wetness events for deriving an optimal mathematical model which is then later to be employed in the assessment phase during the normal use of an absorbent article for the analysis of sensor signals recorded on such absorbent article. The Board is however not convinced that the resulting mathematical model could not be employed to the processing, analysis and characterisation of individual wetness events in a plurality of wetness events. The respondent's argument that it was not possible to take

into account, for example, residual wetness of a first wetness event which was not drained away to the absorbent core and remained in the absorbent pad's layer where sensors are arranged, thus giving a false bias for characterising further wetness events, is found unconvincing because claim 1 itself does not define any feature defining that such properties are necessarily taken into account according to the method of claim 1. The claim does not define any particular element of the representative vector for the characterisation of an individual wetness event. It is not excluded that the representative vector according to claim 1 comprises only a single element relating, for example, only to the single wetness event volume. Feature (i) requires in fact only one value ("... including one or more values...", emphasis added by the Board) to be derived from the sensor signal of a given wetness event. Moreover, and as pointed out by the appellant, the learning phase according to claim 1 may also be based on only one wetness event in each absorbent article.

3.2.3 The Board thus confirms its preliminary opinion (see above at the end of point 3.2.1) according to which the feature "plurality of wetness events" is found to be known from D2.

The Board thus concludes that step (iv) is the only distinguishing feature of claim 1 over D2.

4. The objective technical problem based on the single distinguishing feature step (iv) has to be determined. Claim 1 is a mixture of technical features ("receiving from a sensor sensor signals") and features of non-technical nature, relating essentially to mathematical method steps. As stated in the Board's communication

pursuant to Article 15(1) RPBA 2020, the COMVIK-approach (T 641/00, OJ EPO 2003, 352), also referred to in G 1/19 (OJ EPO 2021, A77), would have to be applied in this case.

4.1 It is undisputed that the distinguishing feature step (iv) defines essentially mathematical method steps (comparing vectors with representative vectors of clusters, determining the most similar, allocating the vector to a cluster, based on a mathematical model). The respondent argued that step (iv) contributed to a technical effect and had therefore to be taken into consideration when examining for inventive step. Relying on point 99 of the Reasons in G 1/19, the respondent argued that claim 1 was directed to an indirect measurement or at least to an accurate estimation of the exudate volume collected in an absorbent article.

4.2 The Board doubts that claim 1 provides for any technical effect going beyond the normal operation of a processor performing the processing of the sensor signals. The claim only relates to the processing and analysis of sensor signals received from a sensor and results in a more or less accurate estimation of the volume of collected exudate.

The Board is not convinced by the respondent's argument that the accuracy of the estimation would be increased. The accuracy would depend on many factors (size of training sets, number and type of elements/variables constituting the representative vectors, etc.), none of which are defined in claim 1, so that the results obtained by the claimed method are not necessarily more accurate than the results obtained by the regression analysis, the resulting mathematical model and the

threshold criteria applied in D2. The patent in suit does also not support such an alleged benefit by comparative data.

Whether the processing method in the present case may be qualified as an indirect measurement envisaged by the Enlarged Board of Appeal in point 99 of the Reasons of G 1/19 may be left undecided here, for reasons which will become apparent in the following paragraph. It may just be added that the determination of the volume of a single or of multiple successive wetness events does not provide any technical effect in the sense that the so determined volume necessarily affects the control of any component of the system composed, for example, of an absorbent article comprising sensors and an appropriate processor. Nor does it necessarily imply any action on some other system or a modification of the operation of the system executing the claimed method going beyond the normal physical interaction between the program (here, the processing method for sensor signals representing a wetness event) and the computer (processor) on which the processing algorithm based on the (optimal) mathematical model is run (see also G 1/19, Reasons point 50.). Absent any technical effect of the claimed processing method, the claimed method could not be considered to involve an inventive step.

4.3 The Board considered however, in favour of the respondent, that the (more or less accurate) estimation of the volume of exudate collected in an absorbent product during individual wetness events in a plurality of wetness events could be seen as a technical effect, to which the distinguishing feature step (iv) further contributed. If that were the case, the objective technical problem could nevertheless only be seen in

providing an alternative method of processing sensor signals representing wetness events in an absorbent article, as has been argued by the appellant and acknowledged also by the respondent during the oral proceedings before the Board.

4.3.1 In the present case the fictitious skilled person, which may also be considered as a team of skilled persons, was knowledgeable in the fields of absorbent articles and mathematics, notably in the fields of data analysis and statistics, as it was also argued in the appellant's statement of grounds of appeal, on the thirteenth (unnumbered) page thereof.

The Board has no doubt that cluster analysis, involving also the specific steps of method step (iv), i.e. comparing individual (wetness) event vectors with cluster representative vectors and allocating a certain cluster characteristic to the individual event vector based on its closest similarity to a certain cluster representative vector, was part of common general knowledge of such a skilled person.

The skilled person entrusted with the task of providing an alternative method for processing sensor signals representing a wetness event in an absorbent article, knowing about the advantages and disadvantages of cluster analysis, would thus have applied the corresponding method steps in the method disclosed in D2 without themselves exercising an inventive step. It has not been argued by the respondent that any of the individual actions defined in step (iv) of claim 1, directed to the comparison and the allocation, would provide for any unexpected effect and the Board cannot see that this could be the case.

4.4 During the oral proceedings before the Board the respondent questioned whether cluster analysis could be seen to be proven to belong to the common general knowledge of the skilled person in the present case, since the skilled person had not been defined so far, though acknowledging at the same time that cluster analysis was well known. This argument fails since the appellant had provided a complete chain of argument in this respect already in its statement of grounds of appeal, see in particular the thirteenth and fourteenth pages thereof.

The respondent did not contest that common general knowledge of the indicated fields was indeed relevant to the present case, nor did it provide any other convincing argument which could have led to the conclusion that the application of common general knowledge would, in an obvious manner, not result in the subject-matter of claim 1 being reached. The argument that no prior art documented the application of cluster analysis in the field of wetness detection in absorbent articles is found unconvincing since the method belongs to common general knowledge of the above identified skilled person in that field.

4.5 For these reasons the Board concluded that, irrespective of whether the processing method according to claim 1 could be considered to involve a technical effect, the subject-matter of claim 1 lacks an inventive step in view of the obvious combination of the method known from D2 with common general knowledge.

5. Absent any set of claims complying with the requirements of the EPC, the patent has to be revoked (Article 101(3)(b) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

D. Grundner M. Hannam

Decision electronically authenticated