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**Datasheet for the decision  
of 25 January 2022**

**Case Number:** T 2689/18 - 3.4.03

**Application Number:** 14757855.3

**Publication Number:** 3028267

**IPC:** G09B19/00

**Language of the proceedings:** EN

**Title of invention:**

METHOD AND SYSTEM FOR MEASURING COMMUNICATION SKILLS OF CREW MEMBERS

**Applicant:**

The Provost, Fellows, Foundation Scholars, and The Other Members of Board, of The College of The Holy and Undivided Trinity of Queen Elizabeth

**Headword:**

**Relevant legal provisions:**

EPC Art. 56, 52(1)

**Keyword:**

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

**Decisions cited:**

T 0641/00, T 0336/07, T 1793/07

**Catchword:**



**Beschwerdekammern**  
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Case Number: T 2689/18 - 3.4.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.03**  
**of 25 January 2022**

**Appellant:** The Provost, Fellows, Foundation Scholars, and  
(Applicant) The Other Members of Board, of The College of The  
Holy and Undivided Trinity of Queen Elizabeth  
Trinity College Dublin  
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**Representative:** Purdylucey Intellectual Property  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 19 June 2018  
refusing European patent application No.  
14757855.3 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** M. Papastefanou  
**Members:** J. Thomas  
T. Bokor

## **Summary of Facts and Submissions**

- I. The appeal is against the decision of the examining division refusing European patent application No. 14 757 855 on the grounds that the main request and the first and second auxiliary requests then on file did not fulfil the requirements of Article 52(1) EPC in combination with Article 56 EPC (lack of inventive step).
- II. At the end of the oral proceedings before the Board the appellant requested that
- the decision under appeal be set aside and
  - a patent be granted on the basis of claims 1 to 15 of the main request or the first auxiliary request, both filed with the statement setting out the grounds of appeal.
- III. The following document is referred to in this decision:  
D1: US 2011/0270605 A1
- IV. The independent claims 1, 11 and 15 of the main request read as follows:

Claim 1:

*A computer implemented method of measuring crew member communication skills with an audio data processing terminal interfaced with a crew training apparatus, comprising the steps of:  
recording and storing audio data corresponding to a conversation between at least two crew members during a training session;*

*extracting respective audio data of each crew member from the stored audio data;*  
*computing a series of measures for at least one prosodic parameter in each respective audio data extracted;*  
*computing a correlation coefficient of the series of measures, wherein the correlation coefficient is indicative of a level of prosodic accommodation between the at least two crew members;*  
*computing an objective rating of a level of communication skills based on the previous computed metrics, using statistical modelling techniques;*  
*wherein the step of computing the series of measures comprises the further step of periodically sampling the respective audio data in a moving time window, which default length is extended to include the speech utterance of each crew member in its entirety; and*  
*outputting the objective rating by a rating for each of the at least two crew members and a joint rating for the two together, which is representative of their ability to adapt vocally to one another and of their cooperating effort towards achieving one or more specific goals during the training session.*

Claim 11:

*A system for measuring crew member communication skills, comprising:*  
*a crew training apparatus having audio capturing means;*  
*a data processing terminal interfaced with at least the audio capturing means and further comprising:*  
*audio signal processing means for recording and storing audio data corresponding to a conversation*

*between at least two crew members during a training session;*

*means for extracting respective audio data of each crew member from the stored audio data, for computing a series of measures for at least one prosodic parameter in each respective audio data extracted, for computing a correlation coefficient of the series of measures, wherein the correlation coefficient is indicative of a level of prosodic accommodation between the at least two crew members; and for computing an objective rating of a level of communication skills based on the previous computed metrics, using statistical modelling techniques; wherein the computing the series of measures comprises periodically sampling the respective audio data in a moving time window, which default length is extended to include the speech utterance of each crew member in its entirety; and*

*means for outputting the objective rating by a rating for each of the at least two crew members and a joint rating for the two together, which is representative of their ability to adapt vocally to one another and of their cooperating effort towards achieving one or more specific goals during the training session.*

Claim 15:

*A set of instructions recorded on a data carrying medium which, when read from the medium and processed by a data processing terminal having audio means, configures the terminal to measure crew member communication skills by performing the data processing steps of recording and storing audio data corresponding to a conversation between*

*at least two crew members during a training session; extracting respective audio data of each crew member from the stored audio data; computing a series of measures for at least one prosodic parameter in each respective audio data extracted; computing a correlation coefficient of the series of measures, wherein the correlation coefficient is indicative of a level of prosodic accommodation between the at least two crew members; computing an objective rating of a level of communication skills based on the previous computed metrics, using statistical modelling techniques; wherein the step of computing the series of measures comprises the further step of periodically sampling the respective audio data in a moving time window, which default length is extended to include the speech utterance of each crew member in its entirety; and outputting the objective rating by a rating for each of the at least two crew members and a joint rating for the two together, which is representative of their ability to adapt vocally to one another and of their cooperating effort towards achieving one or more specific goals during the training session.*

- V. The independent claims 1, 11 and 15 of the first auxiliary request are, when compared to the respective claims of the main request, amended as follows:

Claims 1 and 15:

The following feature is added before "computing a correlation coefficient":

*"time-aligning the computed series of measures for the at least one prosodic parameter of the at least two crew members;"*.

The feature *"computing a correlation coefficient of the time-aligned series of measures"* is further specified by the underlined wording (underlining by the Board).

Claim 11:

The following feature is added before *"for computing a correlation coefficient"*: *"for time-aligning the computed series of measures for the at least one prosodic parameter of the at least two crew members,"*.

The feature *"for computing a correlation coefficient of the time-aligned series of measures"* is further specified by the underlined wording (underlining by the Board).

VI. The appellant's arguments may be summarised as follows:

Document D1 only disclosed prosodic analysis of a single audio trace. The combined analysis of communication skills of crew members with audio data processing means was nowhere disclosed. The claimed subject-matter related to a mixture of technical and non-technical features, and for this reason the Comvik-approach (T 0641/00; OJ EPO 2003, 352) was to be applied. As required by the Comvik-approach, the non-technical features contributed to a further technical effect, namely a better resolution of the output rating. The adjustment of the default length which was extended to include the speech utterance of each crew member in its entirety was disclosed neither in document D1 nor anywhere else. This adjustment of the default length was achieved by flexibly varying a time window used in the calculation of the correlation



coefficient and led to an increased resolution of the output rating. Hence, even if the features were considered to be non-technical, their computer implementation was specific and provided a further technical effect, namely the increase in resolution of the output rating. An inventive step should be acknowledged.

### **Reasons for the Decision**

1. The appeal is admissible.
2. Main request - inventive step
  - 2.1 Document D1 represents the closest prior art, which deals with assessing speech prosody of a person on the basis of a recorded audio trace (e.g. D1: [0005], [0024] and [0025]) using a statistical analysis and modelling technique (e.g. D1: [0047] and [0049]).
  - 2.2 In the terminology of claim 1 document D1 discloses (the references in parentheses in this paragraph refer to D1) a computer implemented method of measuring speech prosody ([0002]; [0025]) using a recorded audio data trace ([0029]) with an audio data processing terminal comprising the steps of:
    - recording and storing audio data of an input speech data ([0029]; step 102);
    - extracting respective audio data from the stored audio data ([0029]; step 104);
    - computing a series of measures for at least one prosodic parameter in the audio data extracted ([0029], [0036]);
    - computing a correlation coefficient of the series of measures ([0027], [0032] and step 208; even if the calculation of a correlation coefficient is not

explicitly mentioned, the comparison of two data traces must be understood as computing a correlation between these data traces in its broadest sense), wherein the correlation coefficient is indicative of a level of prosodic accommodation ([0027], step 210) ~~between the at least two crew members;~~

computing an objective rating of the prosody compared between the audio speech data and text input data, using statistical modelling techniques ([0032], [0036] and [0037]);

wherein the step of computing the series of measures comprises the further step of periodically sampling the respective audio data in a moving time window (Figures 6A and 6B; [0054], [0055] and [0060]), ~~which default length is extended to include the speech utterance of each crew member in its entirety;~~ and outputting the objective rating by a rating ([0005], [0029], [0060] and Figure 13) ~~for each of the at least two crew members and a joint rating for the two together, which is representative of their ability to adapt vocally to one another and of their cooperating effort towards achieving one or more specific goals during the training session.~~

2.3 Consequently, the subject-matter defined in claim 1 differs from the teaching of document D1 by the following two features:

- Two recorded audio traces from two participants in a conversation are compared with each other in order to provide a rating for each of the at least two participants as well as a joint rating for the at least two participants together.
- The calculation of the correlation coefficient is based on a time window, the default length of which is extended to include the speech utterance of each crew member in its entirety.

2.4 None of these two differentiating features can however contribute to an inventive step as set out in the following. Both relate to non-technical features which cannot provide the required further technical advantage or effect associated with their specific implementation over and above the effects and advantages inherent in the excluded subject-matter.

According to the Comvik-approach and related decisions thereto, like T 0336/07 or T 1793/07, an inventive step can only be conceded for non-technical subject-matter falling within the provisions of Article 52(2) EPC if it is based on a specific implementation providing a further technical effect which goes beyond a straightforward computer implementation of the non-technical matter. This technical effect must go beyond the effects, advantages, and benefits inherent in the excluded subject-matter.

2.4.1 The first differentiating feature mentioned under point 2.3 above concerns the measuring of the communication skills between two persons based on analysing and comparing their recorded audio traces of a conversation between them. In D1 there is only one recorded audio trace of one person which is compared to a data trace. In the Board's view comparing and analysing two audio traces (signals) instead of one audio trace with a data trace (as done in document D1) is carried out using the same, generally known signal processing techniques. The application does not provide any details about the signal processing techniques that would indicate otherwise.

The specific prosodic parameters used in the analysis are based on speech utterance and are as such non-

technical, because they involve a mixture of administrative, psychological and mental acts, all of which are non-technical as such. The skilled person would, thus, be provided with the specific parameters to use in the analysis of the recorded audio traces. The same applies to the resulting rating. The rating itself is a numerical outcome of the signal processing of the two audio traces. Its interpretation as representative of the ability of the two crew members to adapt vocally to one another is based on non-technical considerations, which, moreover, are not part of the analysing and comparing process of the two audio traces. In other words, the Board considers that this differentiating feature relates to non-technical aspects (prosodic parameters, prosodic accommodation of two persons, etc.) which are implemented using generally known signal processing techniques.

Moreover, the aural detection of the crew's behaviour during conversation and the objective ranking thereof for the crew members individually and in combination does not go beyond the computer-implementation of the equivalent human ranking realised by a trainer or a supervisor. Even if the objectivity of any ranking might be increased when using a computer, it arises purely from the computer-implementation itself due to the straightforward automation by the computer. Objectivity belongs to the very nature of a computer-implemented method and does not provide anything surprising.

Hence, the first differentiating feature mentioned above cannot provide a basis for an inventive step as required by Articles 52(1) and 56 EPC.

2.4.2 The second differentiating feature mentioned above, concerning the default length of the moving time window as defined in claim 1 does not provide a technical contribution over the teaching of document D1. This feature, as defined in claim 1, is also not to be understood as being a flexibly extendable length of the moving time window as argued by the appellant. The reasons therefore are as follows.

The choice of the length as well as of the positioning of the window are purely subjective choices that have no technical influence on the calculation of the correlation coefficient or the statistical modelling technique, but only affect the quality of the calculated rating. Given the fact that the obtained rating has no technical meaning (see previous point), the Board considers that "a better" or "more accurate" rating has no technical meaning, either, since any interpretation of the rating and its quality is based on non-technical aspects. Therefore, the Board does not accept that "a better quality" or "better resolution" of the output rating is a technical effect. Consequently, the choice of the length of the time window is seen as a choice based on an administrative consideration, a scheme of performing a mental act or a mathematical method, all of which are non-technical in nature (see Article 52(2) EPC) and only have an impact on the non-technical effect of the quality of the final output rating.

In addition to this missing further technical effect, the appellant's argument that the definition of the "default length" related to a flexible moving time window in the sense of an extendable moving time window is also not convincing for the following reasons.

The "default length[, which] is extended to include the speech utterance of each crew member in its entirety", as defined in present claim 1, does not necessarily express the appellant's interpretation that the moving time window is of a flexible or extendable nature. According to the definition of claim 1, it can be understood that the "default length" is adjusted according to the entire duration of the speech utterance of each participant once at the beginning of the statistical modelling. This definition does not allow however to derive unequivocally that the window length is flexibly varied and extended during the course of the analysis. On the contrary, the term "default length" as used in claim 1 can be understood as adjusting the default length in the sense of the "basic length" only once in the beginning of the analysis.

This interpretation is further corroborated by the fact that the application does not define, either, what is exactly meant with the "default length".

The term "default length" is used only once in the description, in paragraph [0049], in very similar wording to claim 1 and without any further specification or explanation. In this paragraph [0049], the advantage of the Time-Aligned-Moving-Average method (TAMA method, which, by the way, seems to be used in document D1 as well) is firstly emphasised and the skilled reader understands that this method can be one of the methods used in the present application. The same paragraph indicates further an alternative to the TAMA method in which the "default duration" of the time windows is to be extended. Paragraph [0049] could be understood as meaning that this extension of the standard length refers to the previously selected

window length of fixed duration (e.g. 20 seconds) in the TAMA method. Hence, in the alternative method mentioned in paragraph [0049], the standard length (default length) is only adapted to the duration of the speech utterances of the two speakers, but a flexibly variable time duration cannot be unequivocally derived therefrom.

Consequently, also the second differentiating feature mentioned above cannot contribute to an inventive step over D1 as required by Articles 52(1) and 56 EPC, since it relates to non-technical subject-matter.

2.5 In conclusion, the subject-matter defined in claim 1 of the main request lacks an inventive step, contrary to the requirements of Articles 52(1) and 56 EPC.

3. First auxiliary request - Inventive step

3.1 The additional feature added to the first auxiliary request compared to the main request cannot make an inventive contribution either for the following reasons.

The "time alignment" as defined in claim 1 lacks a further indication according to what the audio traces should be aligned. Therefore, it must be interpreted in its broadest meaning, in the sense that it covers any type of alignment. Document D1 discloses a time alignment of the two data traces which are to be compared (D1: [0036] and [0037]). The Board, thus, considers that D1 discloses this feature.

3.2 The appellant's arguments related mainly to those presented for the main request referring to the default length of the time window, which should be considered

extendable or time varying. As the Board does not find this arguments convincing, it concludes that claim 1 of the first auxiliary request does not involve an inventive step for the same reasons as claim 1 of the the main request.

4. Conclusion

It follows from the above that the subject-matter of claim 1 of neither the main request nor the first auxiliary request involves an inventive step within the meaning of Articles 52(1) and 56 EPC. Consequently, the appeal is unsuccessful and the examination of the further claims is not necessary.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



S. Sánchez Chiquero

M. Papastefanou

Decision electronically authenticated