Paper No. 19

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOSHUA B. TENNENBAUM and
WILLIAM T. FREEMAN

Appeal No. 2001-1487
Application No. 08/970,824

Heard: July 11, 2002

Before RUGGIERO, DIXON, and GROSS, **Administrative Patent Judges**.

DIXON, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-17, which are all of the claims pending in this application.

We REVERSE.

BACKGROUND

Appellants' invention relates to a system for analysis and synthesis of multi-factor data using a bilinear model. An understanding of the invention can be derived from a reading of exemplary claims 1 and 6, which are reproduced below.

> 1. A computer-based apparatus for analysis and synthesis of multi-factor data comprising:
>
> means for storing a plurality of observed data values, wherein the data is definable by at least two separable factors;
>
> parameter means for determining a parameter vector for each of the at least two separable factors based upon the observed data; and
>
> matrix means for determining at least one combination matrix representing interaction between the at least two factors, based upon the observed data.
>
> 6. A method for analyzing multi-factor data, comprising the steps of:
>
> representing parameters of known multi-factor data as a bilinear model; and
>
> analyzing unknown multi-factor data based on the represented parameters to determine one of a factor of data included in the unknown multi-factor data and a factor of data missing from the unknown multi-factor data.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Chen et al. (Chen)	5,148,488	Sep. 15, 1992
Levine	5,579,243	Nov. 26, 1996

Claims 1-5 stand rejected under 35 U.S.C. § 102 as being anticipated by Levine.

Claims 6-17 stand rejected under 35 U.S.C. § 103 as being unpatentable over

Chen.

Rather than reiterate the conflicting viewpoints advanced by the examiner and appellants regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 13, mailed Nov. 8, 2000) for the examiner's reasoning in support of the rejections, and to appellants' brief (Paper No. 12, filed Aug. 9, 2000) and reply brief (Paper No. 14, filed Jan. 11, 2001) for appellants' arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by appellants and the examiner. As a consequence of our review, we make the determinations which follow.

Appellants argue that claims 1-17 do not stand or fall together. (See brief at page 10.) Therefore, we will address the claims as separately argued in the brief.

With respect to independent claim 1, appellants argue that the examiner has not established a ***prima facie*** case of anticipation of the recited claimed invention because the examiner has not performed the requisite claim interpretation of the recited limitations in “means-plus-function” format. (See brief at pages 11-12.) Appellants argue that the examiner has not performed the requisite analysis under 35 U.S.C. § 112, sixth paragraph to properly construe the recited limitations in “means-plus-function” format. (See brief at pages 13-14.) Appellants argue that the vectors and the

matrices in Levine are part of the computation process, while in the present application, the vectors and the matrices represent the end product of the computation. (See brief at page 15.) We agree with appellants that the examiner's treatment of claims 1-5 does not explicitly address or identify the structure, acts or materials that correspond to the recited "means."

The examiner maintains that appellants misread the references and that the evidence as to where each limitation of the claim is found in the reference is in the rejection. (See answer at pages 7-8.) The examiner maintains that "each of the applied references were [sic] interpreted in conjunction to the descriptions provided by the appellants on pages 1-5 of the specification." (See answer at page 8.) While we agree with the examiner that citations to the references are present in the statement of the rejection, appellants' argument is that the cited disclosures are not the same as the recited "MEANS-PLUS-FUNCTION" limitations when properly interpreted in light of the structure, acts or materials that correspond to the recited "means." Additionally, the examiner maintains that a vector means is not recited in the language of independent claims 1 and 5. We agree with the examiner, but the parameter means and the matrix means are recited in the claims. We find that the examiner has not performed the requisite factual findings concerning these claim limitations beyond an erroneous statement concerning the matrix means being notoriously well known. (See answer at page 9.)

Appellants argue that claims 1-5 were rejected without consideration of the proper construction of the recited means-plus-function elements. (See brief at page 17.) We agree with appellants. Therefore, the examiner has not established a ***prima facie*** case of anticipation with respect to independent claims 1 and 5, and we cannot sustain the rejection of claims 1-5.

With respect to independent claims 6 and 12, the examiner maintains that Chen teaches the claimed invention and use of a bilinear model. (See answer at page 6 and Chen at column 2.) Appellants argue that Chen teaches the addition of noise to speech which would be a linear model rather than a bilinear model. Appellants' specification at page 5 states that "data is modeled as a product of two linear forms corresponding to parameters of each factor. The data may or may not result from physical processes having a bilinear form that is used to model the data" and at page 7 of the specification states that "[b]ilinear models represent data which can be decomposed into two or more factors." At page 24 of the brief, appellants argue that a "bilinear model requires multiplication, whereas addition results in a linear model, as is well known in the art." We agree with appellants that the language of claims 6 and 12 requires a bilinear model whereas Chen expressly teaches the use of a linear model.

Appellants argue that the inventive technique of Chen uses a linear model and not a bilinear model and determines only noise which is not a data factor. (See brief at page 25.) We agree with appellants. The examiner again maintains that "appellants

misread the applied reference, and the analysis therefore is inaccurate." (See answer at pages 12-13.) It appears that the examiner maintains that the noise signal would be the unknown multi-factor data. The examiner maintains that the "noise signal is in general unknown, the purpose of that is to process the signal X(k) to compensate for the noise and obtain the enhanced speech signal (col. 14 [sic, 4], line 63-col. 5, line 23)." While we agree with the examiner that the noise is determined, the examiner does not address what the known multi-factor data would be in the model asserted to be bilinear if the noise data is considered to be unknown data. With respect to dependent claim 7, the examiner cites to column 9 of Chen which discusses the use of linear prediction to determine a current speech sample yet the examiner does not address the difference between the use of a linear model versus a bilinear model. (See brief at pages 6, 12 and 13.) Therefore, we find that the examiner has not established a ***prima facie*** case of obviousness, and we will not sustain the rejection of independent claims 6 and 12 and their dependent claims 7-11 and 13-17.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-5 under 35 U.S.C. § 102 is reversed, and the decision of the examiner to reject claims 6-17 under 35 U.S.C. § 103 is reversed.

REVERSED

JOSEPH F. RUGGIERO Administrative Patent Judge	)
JOSEPH L. DIXON Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
ANITA PELLMAN GROSS Administrative Patent Judge	)

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