

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIROAKI TSUTSUI, ATSUSHI KUROSAKI; KAZUYUKI KAMIMURA
and TADAHIKO MATSUBA

Appeal No. 97-1622
Application No. 08/109,179¹

ON BRIEF

Before BARRETT, FLEMING and RUGGIERO, **Administrative Patent Judges.**

RUGGIERO, **Administrative Patent Judge.**

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1 through 6, all of the claims pending in the present application.

¹ Application for patent filed August 19, 1993.

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The claimed invention relates to an apparatus for estimating the state of a system based on recorded historical data which relate input and output data. Appellants disclose on pages 12-16 of the specification that Figs. 1-4 illustrate the quantization of data in an input space in accordance with the required precision of output data, the development of a causal relationship model based on the number of occurrences of output data corresponding to particular combinations of input data, and the calculation of areas of precision (i.e. neighborhoods) in input space which correspond to output data having the required precision. New input data is then placed in the calculated neighborhood and the neighborhood is enlarged or zoomed to extract similar case data based on the degree of enlarging. Appellants also disclose on pages 30-35 of the specification various mathematical techniques for determining the similarity of cases for extraction which are then utilized to estimate system output state based on the new input events. An application of the state estimating apparatus to a heating/cooling system to estimate air conditioning load is disclosed by appellants at page 17 of the specification and illustrated at Figs. 5A and 5B.

Representative claim 1 is reproduced as follows:

1. A state estimating apparatus for inferring a value of single output data from a plurality of input data given as input factors and estimating a state of a system, the plurality of input data and the single output data being time series data which continuously change, and the plurality of input data and the single output data having an implicit relationship which continuously changes, comprising:

input space quantization means for quantizing an input space having the input data from case data indicating a plurality of past input data and past single output data stored in advance, in accordance with a required precision of the single output data;

storage means for calculating a number of times of occurrence of the single output data corresponding to each input event in the input space quantized by said input space quantization means, a mean value of the single output data, and a mean value of change amounts of the single output data, and for storing a set of the number of times of occurrence and the mean values as a causal relationship model;

means for, on the basis of a concept of continuous mapping of a topology, calculating a neighborhood of the input space which satisfies the required precision of the single output data as a statistical amount of all input data of the case data, and for expressing the calculated neighborhood of the input space as a quantization number by which the input space is quantized;

similar case extraction means for, when a new input event is input, enlarging the calculated neighborhood of the input space to a predetermined degree, and extracting an input case similar to the calculated neighborhood from an input case in the input space;

similarity determination means for determining a similarity between the new input event and the extracted similar input case on the basis of the predetermined degree of enlarging; and

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The Examiner has failed to set forth a *prima facie* case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the express teachings or suggestions found in the prior art, or by implications contained in such teachings or suggestions. *In re Sernaker*, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." *Para-Ordnance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), *cert. denied*, 117 S.Ct. 80 (1996) *citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

In regard to the rejection of claims 1-6 under 35 U.S.C. § 103 as being unpatentable over DARPA and Hanson, Appellants initially argue on page 20 of the Brief that DARPA lacks any teaching of calculating the neighborhood of an input space in accordance with the required precision of the output data and

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further has no disclosure of the expression of such calculated neighborhood by a quantization number. We note that Appellants' claim 1 recites

means for, on the basis of a concept of continuous mapping of a topology, calculating a neighborhood of the input space which satisfies the required precision of the single output data as a statistical amount of all input data of the case data, and for expressing the calculated neighborhood of the input space as a quantization number by which the input space is quantized;

The Examiner (answer, page 9) relies on a teaching of Hanson for this feature although DARPA was relied on in the statement of the ground of rejection (answer, page 4). The Examiner contends that the setting up of the histogram in Hanson would meet the claim requirements. Hanson is directed to a statistical process control technique in which historical frequency distribution data from selected variables are plotted to develop a histogram (e.g. Figs. 4 and 5), the data of which can be analyzed utilizing various statistical control techniques such as trend analysis to develop control parameters such as alarm limits. The Examiner has argued (page 9 of answer) that the establishment of a histogram would necessary include a quantization and the calculation of input

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space neighborhood of required precision. The Examiner further offers an analogy of increasing the amount of "bins" which receive data and correspond to the contiguous vertical bars in the Fig. 4 histogram of Hanson dependent on the precision required. Upon a careful review of DARPA and Hanson, we find that neither reference teaches the claimed calculation of neighborhood input space. While we agree with the Examiner that the setting up of a histogram such as illustrated in Hanson involves a quantization of input space, such quantization does not involve a calculation of a neighborhood of input space which satisfies the required precision of single output data. We further agree with Appellants (page 8 of reply brief) that Hanson is silent as to the expression of a calculated neighborhood as a quantization number as claimed.

Appellants further argue on pages 20 and 21 of the Brief that DARPA does not teach the enlargement of the calculated neighborhood to extract similar cases and further does not teach a similarity determination based on a predetermined degree of enlarging. Appellants recite in claim 1

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similar case extraction means for, when a new input event is input, enlarging the calculated neighborhood of the input space to a predetermined degree, and extracting an input case similar to the calculated neighborhood from an input case in the input space;

similarity determination means for determining a similarity between the new input event and the extracted similar input case on the basis of the predetermined degree of enlarging;

The Examiner, in arguing (answer, page 10) that DARPA discloses this feature, submits that the concept of "partial matching" which avoids searching extensively through all the stored cases for exact matches would involve enlarging of a neighborhood. The examiner states at page 10 of the answer

In the "Indexing" section of pages 6-7 DARPA clearly teaches that "stored cases are unlikely to match exactly," thus one must "perform some form of partial matching." This clearly teaches enlarging the neighborhood to extract a similar case.

Appellants have responded at page 9 of the reply brief and after a careful review of DARPA we agree that although "partial matching" might involve the selection of most-on-point cases from cases which do not match exactly, such technique falls short of disclosing the claimed enlargement of

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calculated neighborhood to a predetermined degree to find a better match among the stored cases as well as the claimed similarity determination on the basis of that predetermined degree of enlarging .

We are not inclined to dispense with proof by evidence when the proposition at issue is not supported by a teaching in a prior art reference, common knowledge or capable of unquestionable demonstration. Our reviewing court requires this evidence in order to establish a *prima facie* case. *In re Knapp-Monarch Co.*, 296 F.2d 230, 232, 132 USPQ 6, 8 (CCPA 1961); *In re Cofer*, 354 F.2d 664, 668, 148 USPQ 268, 271-72 (CCPA 1966). In regard to the Hanson reference which is relied on by the examiner as teaching the quantization feature of claim 1, Appellants argue on pages 19 and 20 of the Brief that Hanson does not disclose a quantization of input space in accordance with a required precision of single output data and further that Hanson merely analyzes measured data to obtain frequency of appearance among past accumulated data. Appellants recite in claim 1

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input space quantization means for quantizing an input space having the input data from case data indicating a plurality of past input data and past single output data stored in advance, in accordance with a required precision of the single output data; storage means for calculating a number of times of occurrence of the single output data corresponding to each input event in the input space quantized by said input space quantization means, a mean value of the single output data, and a mean value of change amounts of the single output data, and for storing a set of the number of times of occurrence and the mean values as a causal relationship model;

The Examiner argues (answer, pages 7 and 8) that the very act of setting up a histogram would necessary include quantizing of input space. On this point we reiterate our earlier discussion of the "quantization" teachings of Hanson. We agree with appellants argument on pages 5-7 of the reply brief that although Hanson discloses a quantization of data, such is not a quantization which relates input data to a required precision of single output data nor does it result in the development of a causal relationship model as claimed.

Claims 2-5 and 6 are dependent on independent claim 1 and as they include all the limitations of claim 1 the rejection of these claims is also reversed.

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In regard to independent claim 4, Appellants argue on page 26 of the Brief that this claim calls for the input space quantization feature recited in independent claim 1 and relies on previous arguments as to lack of teaching of this feature in DARPA or Hanson. Appellants further contend that claim 4 calls for classification means, counting means, possibility distribution generation means, determination means, and possibility-of attribution determination means. These claimed means are also recited in claim 5 which is dependent on claim 1. On pages 24 and 25 of the brief, appellants contend that Hanson does not disclose the specific classification means recited nor any of the other recited means.

The examiner has applied the same rejection to independent claim 4 as to claim 1 (answer, pages 4 and 12). We find that independent claim 4, although directed to a different embodiment than claim 1, includes a recitation of quantization similar to that of independent claim 1 and agree with appellants' arguments at page 26 of the brief that neither DARPA nor Hanson provide such a feature as claimed. In addition, claim 4 adds limitations directed to clustering, possibility distribution, and possibility-of attribution

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determination which on careful review we find are not
disclosed in either Hanson or DARPA.

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We have not sustained the rejection of claims 1-6 under
35 U.S.C. § 103. Accordingly, the Examiner's decision is
reversed.

REVERSED

LEE E. BARRETT)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
MICHAEL R. FLEMING)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
)	
)	
JOSEPH F. RUGGIERO)	
Administrative Patent Judge)	

jrg

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JENINE GILLIS

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Serial No. 08/109,179

Judge Ruggiero

Judge Fleming

Judge Barrett

Received: 1/19/99

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DECISION: REVERSED

Send Reference(s): Yes No
or Translation(s)

Panel Change: Yes No

3-Person Conf. Yes No

Remanded: Yes No

Brief or Heard

Group Art Unit: 2765

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