

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TERRY L. BENZSCHAWEL,
CHI DZENG,
and GREGORY A. BERMAN

Appeal No. 2007-0114
Application No. 10/990,960
Technology Center 3600

Decided: April 30, 2007

Before MURRIEL E. CRAWFORD, HUBERT C. LORIN, and
ROBERT E. NAPPI, *Administrative Patent Judges*.

LORIN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal from a decision of the Examiner rejecting claims 1-6, 8-13, and 15-22. 35 U.S.C. § 134 (2002). We have jurisdiction under 35 U.S.C. § 6 (b) (2002).

We AFFIRM.

The Examiner has finally rejected

- Claims 1-6, 8-13, and 15-22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellants regard as the invention;
- Claims 1-2, 4-6, 8-9, and 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Carney;
- Claims 3 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Carney in view of Barr; and,
- Claims 15-22 under 35 U.S.C. § 103(a) as being unpatentable over Carney in view of Papka.

The Brief¹ separately addresses three of the four grounds of rejections² and treats the claims as a group with respect to each rejection addressed. Pursuant to the rules, the Board selects representative claims 1, 3, 8, 10, 15, and 19 to decide the appeal with respect to each ground of rejection addressed. 37 C.F.R. § 41.37(c)(1)(vii) (2006).

Claims 1 and 8 are the independent claims. Claims 3 and 15, and 10 and 19 depend ultimately on claims 1 and 8, respectively. They read as follows:

¹ Our decision will make reference to Appellants' Appeal Brief ("Br.," filed 27 April 2006), the Examiner's Answer ("Answer," mailed 17 July 2006) and to the Reply Brief ("Reply Br.," filed 11 September 2006).

² One ground of rejection is not addressed. See the decision, section IV.

1. A computerized method for predicting a price movement in a financial market comprising:
 - generating at least one output value, comprising:
 - choosing an output variable indicative of price movements in a financial market;
 - choosing a plurality of input variables that are market-related to the output variable;
 - obtaining market data for the output variable and the input variables over a predetermined time period;
 - constructing at least one training set of data from the obtained market data for the output variable and the input variables;
 - calculating a weight to be assigned to each of the input variables using the at least one training set of data to reflect a correlation between the output variable and the input variable as found in the obtained market data; and
 - generating an output value for the output variable to predict a next price movement in the financial market based on the calculating of the weights; and
 - predicting the next price movement in the financial market based on a majority of output values being substantially the same.
3. The computerized method of claim 2, wherein the choosing input variables comprises:
 - calculating a variable from a plurality of existing financial variables available in the financial market; and
 - choosing the calculated variable as a second one of the plurality of input variables.
8. A computer-readable medium on which is encoded program code, the program code comprising:
 - program code for generating at least one output value, comprising:
 - program code for choosing an output variable indicative of price movements in a financial market;

program code for choosing a plurality of input variables that are market-related to the output variable;

program code for obtaining market data for the output variable and the input variables over a predetermined time period;

program code for constructing at least one training set of data from the obtained market data for the output variable and the input variables;

program code for calculating a weight to be assigned to each of the input variables using the at least one training set of data to reflect a correlation between the output variable and the input variable as found in the obtained market data; and

program code for generating an output value for the output variable to predict a next price movement in the financial market based on the calculating of the weights; and

program code for predicting the next price movement in the financial market based on a majority of output values being substantially the same.

10. The computer-readable medium of claim 9, wherein the program code for choosing input variable comprises:

program code for calculating a variable from a plurality of existing financial variables available in the financial market; and

program code for choosing the calculated variable as a second one of the plurality of input variables.

15. The computerized method of claim 1, further comprising the step of transforming the output value to a score.

19. The computer-readable medium of claim 8, further comprising program code for transforming the output value to a score.

I. Definiteness

A. Issue

The Examiner contends that the phrase "based on a majority of their values being substantially the same" recited in all the claims renders the claims indefinite under 35 U.S.C. § 112, second paragraph. Appellants contend that the phrase is merely broad. The issue is whether, given the phrase, the claims set out and circumscribe a particular area with a reasonable degree of precision and particularity when read in light of the application disclosure as they would be interpreted by one of ordinary skill in the art.

B. Facts

The record supports the following findings of fact by a preponderance of the evidence.

1. The Examiner finally rejected claims 1-6, 8-13, and 15-22 under 35 U.S.C. § 112, second paragraph, as being indefinite.
2. The Examiner finds the claims indefinite under 35 U.S.C. § 112, second paragraph, because the phrase "based on a majority of their values being substantially the same" in all the claims renders them confusing.

Answer 3.

3. The phrase “based on a majority of their values being substantially the same” is recited in the last lines of claims 1 and 8, which lines were added after the application was filed (18 November 2004). See Response to Non-Final Action, filed 3 October 2005.

4. Appellants argue that the aforementioned phrase does not render the claims indefinite under 35 U.S.C. § 112, second paragraph, because “the term ‘substantially’ is well known the art and recognized by the U.S. Patent and Trademark Office as accepted terminology.” Br. 3. According to Appellants, “the term ‘substantially’ is a broad term that is used here with another term to describe a particular characteristic of the claimed invention. Here, “substantially” is used with “the same” to describe the similarity of the values The Patent Office and the Federal Circuit have upheld “substantially” as a definite term, even when paired with a characteristic such as “the same.” Br. 4.

5. The Examiner responds by conceding that the term “substantially” may be a definite term but in the context of the instant claims, when read in light of the specification, one of ordinary skill in the art would not understand how to construe the term.

The point of these clarifications is that while the word “substantially” may be definite, it is only so when considered in light of the specification. A review of Appellants’ specification, however, fails to provide enlightenment as to how one of ordinary skill in the art would understand Appellants’ use of the word. Appellants provide no citation to the specification to clarify, and a thorough review of the

specification by the Examiner does not reveal any explanation of how to construe “substantially.” Note that the case[s] cited by Appellants [i.e., *In re Nehrenberg*, 280 F.2d 161, 126 USPQ 383 (CCPA 1960); *In re Mattison*, 509 F.2d 563, 184 USPQ 484 (CCPA 1975); and, *Andrew Corp. v. Gabriel Electronics*, 847 F.2d 819, 6 USPQ2d 2010 (Fed. Cir. 1988)] did indeed provide technical background for understanding the use of “substantially”; Appellants’ specification does not, and so the word is indefinite.

Answer 8.

6. The term “substantially” is not mentioned or defined in the specification.

7. Appellants reply that “[t]he originally-filed specification provides support for the term ‘substantially’ as it is used in the claim. It is clear from the specification as well as the understanding of one of ordinary skill in the art how this term is used in conjunction with the claimed invention.” Reply

Br. 5. Appellants go on to say:

Claim 1 recited “predicting the next price movement in the financial market based on a majority of output values being substantially the same.” For example, the specification recites, “if 7 out of the 13 models have a B signal (i.e., a majority), one unit of trading is added to the current position (i.e., go long).” Para. [0040]. In this particular example, the output values are exactly the same – the majority have a “B signal.” In the claim, however, in order to show the breadth of the invention, the output values are required only to be “substantially the same.” In other words, although the exemplary embodiment in the specification utilizes buy (B), sell (S), and neutral

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(N) output values, it is within the scope of the invention to use alternative and additional output values, making prediction based on those output values being the same or, more broadly, being substantially the same. Any combination known to one of ordinary skill in the art is feasible and is intended to be within the claim scope. For instance, the neutral output values may be further classified into additional output values such that a high neutral output value can factor into a counting of buy output values. Such an example and usage of the terminology is understood by one of ordinary skill and find support in the specification, MPEP, and the case law.

Reply Br. 5.

C. Principles of Law

1. The test for compliance is whether the claims set out and circumscribe a particular area with a reasonable degree of precision and particularity when read in light of the application disclosure as they would be interpreted by one of ordinary skill in the art. *In re Moore*, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971).

D. Analysis

We are not persuaded that Appellants have shown error in the rejection.

Appellants argue that “substantially” is a broad term which has been found to be definite. FF 3. There is no dispute that “substantially” is a

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broad term that may be definite. FF 5. Just because a term is broad, does not mean it is indefinite. *In re Borkowski*, 422 F.2d 904, 908, 164 USPQ 642, 645 (1970).

However, the question is not whether the term “substantially” is per se definite, but whether the claims set out and circumscribe a particular area with a reasonable degree of precision and particularity when read in light of the application disclosure as they would be interpreted by one of ordinary skill in the art. Specifically, the question here is whether the phrase “based on a majority of their values being substantially the same” as used in the context of the claims is indefinite.

When a claim uses a word of degree, like “substantially,” the specification must provide some standard for measuring that degree. Here the Board must decide whether one of ordinary skill in the art would understand what is claimed when the claim is read in light of the specification. *See Seattle Box Co. v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 826, 221 USPQ 568, 573-74 (Fed. Cir. 1984). The Examiner finds that the phrase “based on a majority of their values being substantially the

same” is not disclosed in the specification. FF 5. The record supports the Examiner’s finding. FF 6. There is no disclosure of the term “substantially” or, as the claims require, of predicting the next price movement in the financial market based on a majority of output values being “substantially” the same. Given no information in the specification as to a standard for measuring when a majority of output values is “substantially” the same, we find that, when the claims are read in light of the specification, the claims do not set out and circumscribe a particular area with a reasonable degree of precision and particularity.

Appellants draw our attention to an example discussed at para. [0040] of the specification. FF 7. Appellants argue that this example shows predicting price movement based on a majority of output values being the same. Appellants state that in this example “the specification utilizes buy (B), sell (S), and neutral (N) output values, it is within the scope of the invention to use alternative and additional output values, making prediction based on those output values being the same or, more broadly, being substantially the same.” FF 7.

We have reviewed the example at para. [004]. We are unable to see how this example shows predicting price movement based on a majority of output values being the same, let alone “substantially” the same. Para. [0040] discusses output signals, not output values. As we understand it (see para. [0039]), a neural network model has an output value (Y) which ranges from about -0.2 to 1.2. The output value is transformed into a discrete integer score, called an N-score, ranging from 1-20. A particular score determines which output signal - a buy (B), sell (S), or neutral (N) output signal - is generated for the respective model (see para. [0037]). Para [0040] discusses a neural network comprising a number of models, each generating a B, S, or N output signal. Predictions using the network are based on which output signal, B, S, or N, garners the majority of models.

To argue, as Appellants have, that the specification at para. [0040] exemplifies predicting price movement based on a majority of output values rather than output signals, presumes that every model’s output value undergoes the same transformation in generating a corresponding output signal. That has not been established. There is insufficient information to

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view output values and output signals interchangeably. As a result, we are not persuaded that when the phrase "based on a majority of their values being substantially the same" is read in light of the example discussed in para. [0040] of the specification, the claims set out and circumscribe a particular area with a reasonable degree of precision and particularity as they would be interpreted by one of ordinary skill in the art.

The rejection is affirmed.

II. Obviousness – Claims 1-2, 4-6, 8-9, and 11-13

A. Issue

Have Appellants shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103 over Carney given the broadest reasonable construction of the claims?

B. Facts

The record supports the following findings of fact by a preponderance of the evidence.

1. The Examiner finally rejected claims 1-2, 4-6, 8-9, and 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Carney. Answer 4.

2. The Examiner finds, and Appellants do not dispute, that Carney discloses all the limitations of claims 1 and 8 but for the last step whereby “that prediction is based on agreement of a majority of output values.”

Answer 5.

3. The Examiner states: “Official Notice is taken that such agreement of output values from multiple sources was old and well known at the time of the invention as a way to predict. For example, inertial navigation systems selected a position in space based on at least two of three INS subunits agreeing on a calculated position.” Answer 5.

4. The Examiner finds that “[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to use such majority based selection because this would improve confidence in the precision of the predicted result.” Answer 5.

5. Appellants argue that Carney, at para. [0062], discloses averaging numerical outputs of a neural network ensemble.

6. Appellants argue that:

- the Official Notice does not cure the deficiencies of Carney (Br. 5-6);
- the Official Notice renders Carney inoperable (Br. 7); and,
- there is no motivation to combine Carney with the Official Notice (Br. 8-10).

C. Principles of Law

1. “The *prima facie* case is a procedural tool of patent examination, allocating the burdens of going forward as between examiner and applicant. *In re Spada*, 911 F.2d 705, 707 n.3, 15 USPQ2d 1655, 1657 n.3 (Fed. Cir. 1990). The term ‘*prima facie* case’ refers only to the initial examination step. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); *In re Rinehart*, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). As discussed in *In re Piasecki*, the examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability. If that burden is met, the burden of coming forward with evidence or argument shifts to the applicant.” *In re Oetiker*, 977 F.2d, 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

D. Analysis

Claims are given the broadest reasonable construction consistent with the specification. *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). Here the instant claims are not limited to the extent the Examiner argues. FF 2. The claims are broad enough to read on generating a single output value and predicting the next price movement in the financial market based on the result of that single output value. The first step the claims recite is “generating at least one output value.” This step encompasses generating a single output value. The last step the claims recite is “predicting the next price movement in the financial market based on a

majority of output values being substantially the same.” This step is not conditioned on there being more than one output value. If only a single output value exists, that would constitute a majority of output values. This is consistent with the first step which, as already explained, covers generating a single output value. We therefore find that the broadest reasonable construction of the claims as interpreted by one of ordinary skill in the art reading the claims as a whole is that they encompass an output value from a single source and basing prediction on price movement on that single output value.

Appellants argue that Carney discloses averaging numerical outputs of a neural network ensemble (FF 5). The persuasiveness of this argument requires us to read the claims as requiring the generating of more than one output value. However, as discussed above, the broadest reasonable construction of the claims as interpreted by one of ordinary skill in the art reading the claims as a whole is that the claims encompass generating an output value from a single source. Accordingly, Appellants’ argument is not commensurate in scope with what is claimed. “Many of appellant’s arguments fail from the outset because, . . . they are not based on limitations appearing in the claims” *In re Self*, 671 F.2d 1344, 1348, 213 USPQ 1, 5 (CCPA 1982).

Because the claims read on a method for predicting a price movement in a financial market based on a single output value, it was not necessary for the Examiner to rely on the Official Notice to argue that “such agreement of

output values from multiple sources was old and well known at the time of the invention as a way to predict.” FF 3.³ In that regard, the claims read on Carney which discloses a neural network producing an output representing a prediction. Para. [0044]; see also Answer 4. Accordingly, Appellants’ arguments with respect to the Official Notice (FF 6) are not persuasive as to error in the rejection. FF 6.

The rejection is affirmed.

III. Obviousness – Claims 3-10

A. Facts

1. The Examiner finally rejected claims 3 and 10 under 35 U.S.C. §103(a) as being unpatentable over Carney in view of Barr. Answer 6.
2. Appellants’ argument is, in total:

Claims 3 and 10 are dependent upon claims 1 and 8, respectively, which are submitted to be allowable in view of Carney for the reasons set forth above [with respect to the rejection of claims 1-2, 4-6, 8-9, and 11-13]. Accordingly, claims 3 and 10 should be allowable under Carney for these reasons as well. Because Barr does not cure the deficiencies of Carney, claims 3 and 10 are not obvious in view of the cited references and should therefore be allowed.

³ The Board is relying on less than all of the references the Examiner applied. But that does not warrant a new ground of rejection. *In re Bush*, 296 F.2d 491,496, 131 USPQ 263,266-67 (CCPA 1961); *In re Boyer*, 363 F.2d 455,458 n.2 150 USPQ 441,444 n.2 (CCPA 1966).

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Br. 10.

B. Analysis

Because Appellants stand on the arguments they used in rebutting the rejection of claims 1-2, 4-6, 8-9, and 11-13 (FF 2) and because those arguments were not found persuasive as to error in the rejection, the rejection is affirmed for the same reasons we used affirm the rejection of claims 1-2, 4-6, 8-9, and 11-13.

III. Obviousness – Claims 15-22

The Examiner finally rejected claims 15-22 under 35 U.S.C. §103(a) as being unpatentable over Carney in view of Papka. Answer 6. The Examiner indicates that Appellants' statement of the grounds of rejection in the Brief fails to indicate that claims 15-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Carney in view of Papka. Answer 2. The Reply Brief does not correct the record. We find no evidence that Appellants have responded to the rejection of claims 15-22 under 35 U.S.C. §103(a) as being unpatentable over Carney in view of Papka. Accordingly, Appellants have not shown error in the rejection of claims 15-22 and the rejection is thus affirmed.

CONCLUSION OF LAW

On the record before us, Appellants have failed to show that the Examiner erred in rejecting the claims under 35 U.S.C. § 112, second

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paragraph and § 103 over the prior art.

DECISION

The Examiner's rejection of claims 1-6, 8-13, and 15-22 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2004).

AFFIRMED

jlb

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