

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTEL CORPORATION,
Petitioner,

v.

HEALTH DISCOVERY CORPORATION,
Patent Owner.

IPR2021-00554
Patent 8,095,483 B2

Before LYNNE H. BROWNE, GARTH D. BAER, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

Opinion for the Board filed PER CURIAM.

Opinion Dissenting filed by Administrative Patent Judge BAER.

PER CURIAM.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Intel Corp. (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1, 5–7, 132, 18, 22, and 32 (the “challenged claims”) of U.S. Patent 8,095,483 B2 (Ex. 1001, the “’483 patent”). Paper 3 (“Petition” or “Pet.”). Health Discovery Corp. (“Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). On September 20, 2021, we instituted trial. Paper 19 (“Inst. Dec.”). Patent Owner filed a Response to the Petition (Paper 22, “Resp.”), Petitioner filed a Reply (Paper 25, “Reply”), and Patent Owner filed a Sur-reply (Paper 27, “Sur-reply”). We held an oral hearing on June 14, 2022, and the hearing transcript is included in the record. *See* Paper 35 (“Tr.”).

We have jurisdiction to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons below, we determine that Petitioner has not shown by a preponderance of evidence that claims 1, 5–7, 132, 18, 22, and 32 of the ’483 patent are unpatentable.

A. RELATED MATTERS

The parties identify the following related proceeding involving the ’483 patent: *Health Discovery Corp. v. Intel Corp.*, Civil Action No. 6:20-cv-666 (W.D. Texas July 23, 2020).

B. THE ’483 PATENT

The ’483 patent “relates to the use of learning machines to identify relevant patterns in datasets, and more particularly to a method and system for selection of features within the data sets which best enable classification of the data.” Ex. 1001, 1:30–34. Figure 2 is reproduced below.

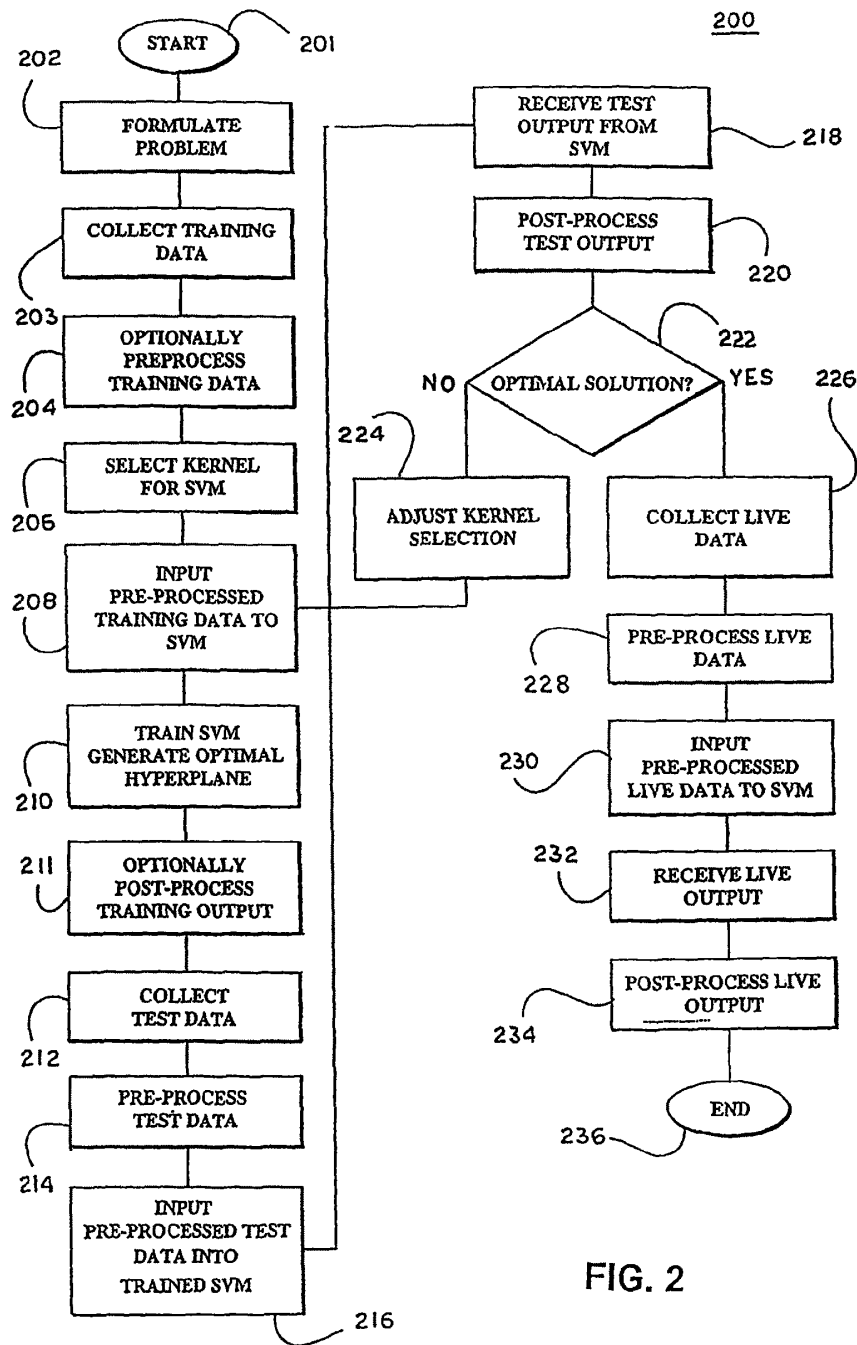


FIG. 2

Figure 2 is a flowchart illustrating “an exemplary method for increasing know ledge that may be discovered from data using a support vector machine” (“SVM”). *Id.* at 4:63–65. As shown in Figure 2, the SVM is trained using training data to generate an optimal hyperplane. *Id.* at 10:2–4.

Test data is input into the trained SVM “to determine whether the SVM was trained in a desirable manner.” *Id.* at 10:11–14. If not, the kernel selection is adjusted at step 224 and the training process is repeated from step 208. *Id.* at 10:48–52.

After the optimal kernel is selected, live data (i.e. data that has not been previously evaluated) is collected. Ex. 1001, 10:60–62. The live data is processed in the same manner as the test data, and it is input into the SVM for processing. *Id.* at 10:65–11:1. The live output of the SVM is then post-processed. *Id.* at 11:1–2.

C. CHALLENGED CLAIMS

Petitioner challenges claims 1, 5–7, 13, 18, 22, and 32 of the ’483 patent. Pet. 1. Challenged claims 1, 7, 13, 18, 22, and 32 are independent. Claim 1 is reproduced below.

1. A computer-implemented method comprising:
 - (a) inputting into a computer processor programmed to execute a support vector machine a set of training examples having known labels with regard to two or more classes, each training example described by a vector of feature values for a plurality of features, the support vector machine comprising a decision function having a plurality of weights, wherein each feature has a corresponding weight;
 - (b) training the support vector machine by optimizing the plurality of weights so that a cost function is minimized and support vectors comprising a subset of the training examples are defined, wherein the decision function is based on the support vectors;
 - (c) computing ranking criteria using the optimized plurality of weights, wherein the ranking criterion estimates for each feature the effect on the cost function of removing that feature, and wherein features having the smallest effect on the cost function have the smallest ranking criteria;

- (d) eliminating one or more features corresponding to the smallest ranking criterion to yield a reduced set of features;
- (e) repeating steps (c) through (d) for the reduced set of features for a plurality of iterations until a subset of features of predetermined size remains, wherein the subset of features comprises determinative features for separating the set of training examples into the two or more classes; and
- (f) generating at a printer or display device an output comprising a listing of the determinative features.

Ex. 1001, 70:27–57.

D. ASSERTED GROUNDS OF UNPATENTABILITY

Petitioner asserts the following grounds of unpatentability. *See* Pet. 5.

Claim(s) Challenged	35 U.S.C. §¹	References/Basis
1, 5–7, 13, 18, 22, 32	103	Kohavi ² , Boser ³ , Hocking ⁴
5	103	Kohavi, Boser, Hocking, Cristianini ⁵

See Pet. 3. Petitioner also relies on the Declarations of Dr. Theodoros Evgeniou (Exs. 1003, 1094). Patent Owner counters with the Declaration of Dr. Clayton Scott (Ex. 2014).

¹ The Leahy-Smith America Invents Act (“AIA”) amended 35 U.S.C. § 103. *See* Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011). As the application that issued as the ’188 patent was filed before the effective date of the relevant amendments, the pre-AIA version of § 103 applies.

² Kohavi et al., “Wrappers for Feature Subset Selection,” *Artificial Intelligence* 97, 273-324 (1997) (Ex. 1007).

³ US Patent No. 5,649,068, July 15, 1997 (Ex. 1008).

⁴ Hocking et al., “Selection of the Best Subset in Regression Analysis,” *Technometrics*, 9:4, 531–540 (1967) (Ex. 1009).

⁵ Cristianini, N., et al., “An Introduction to Support Vector Machines and Other Kernel-based Learning Methods,” Cambridge University Press (2000) (Ex. 1010).

II. DISCUSSION

A. LEGAL STANDARDS

Petitioner has the burden of proof for establishing the challenged claims are unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”).

Section 103(a) forbids issuance of a patent when “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when available, evidence such as commercial success, long felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”). The Court in *Graham* explained that these factual inquiries promote “uniformity and definiteness,” for “[w]hat is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context.” 383 U.S. at 18.

The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have

been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To support this conclusion, however, it is not enough to show merely that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*; *see also Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1273 (Fed. Cir. 2018) (“The question is not whether the various references separately taught components of the ’330 Patent formulation, but whether the prior art suggested the selection and combination achieved by the ’330 inventors.”).

In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude the combination would have been obvious without identifying any reason *why* a person of skill in the art would have made the combination. *Metalcraft of Mayville, Inc. v. Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017). As factfinders, we also must be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.” *KSR*, 550 U.S. at 421.

Applying these general principles, we consider the evidence and arguments of the parties.

B. LEVEL OF SKILL IN THE ART

Petitioner contends a person of ordinary skill in the art at the time of the alleged invention of the ’483 patent (a “POSITA”) would have had “at

least a Master’s degree in electrical engineering, computer science, or the equivalent with three years of experience in machine learning and data-analysis techniques.” Pet. 19–21 (citing Ex. 1003 ¶ 15). Petitioner contends further that “[a]dditional education could substitute for professional experience, and vice versa. *Id.* at 21. Patent Owner does not contest that a skilled artisan would have this kind background knowledge and experience, except that it “believes that the use of the term ‘at least’ is inappropriate inasmuch as it would extend to persons having more than ordinary skill in the art.” Resp. 24. We agree with Patent Owner and adopt the parties’ articulation of the level of ordinary skill in the art without the term “at least.” This articulation is supported by Dr. Evgeniou’s testimony and appears commensurate with the level of ordinary skill as reflected in the asserted prior art and the ’483 patent.

C. CLAIM CONSTRUCTION

Petitioner proposes that we construe the term “data” as “biological data.” Pet. 19. Patent Owner disputes Petitioner’s construction, and asserts that we need not construe the term to resolve any asserted ground in this petition. *See* Resp. 21–24. We agree with Patent Owner that no claim terms require express construction in order to determine whether or not to institute *inter partes* review. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

D. ASSERTED PRIOR ART

1. *Kohavi (Ex. 1007)*

Kohavi is titled “Wrappers for Feature Subset Selection.” Kohavi teaches a feature subset selection method for selecting a relevant subset of features upon which to focus a learning algorithm’s attention, while ignoring the rest. Ex. 1007, abstract.

2. *Boser (Ex. 1008)*

Boser teaches a “pattern recognition system using support vectors”—i.e., an SVM. Ex. 1008, code (54). Boser’s Figure 5 is reproduced below.

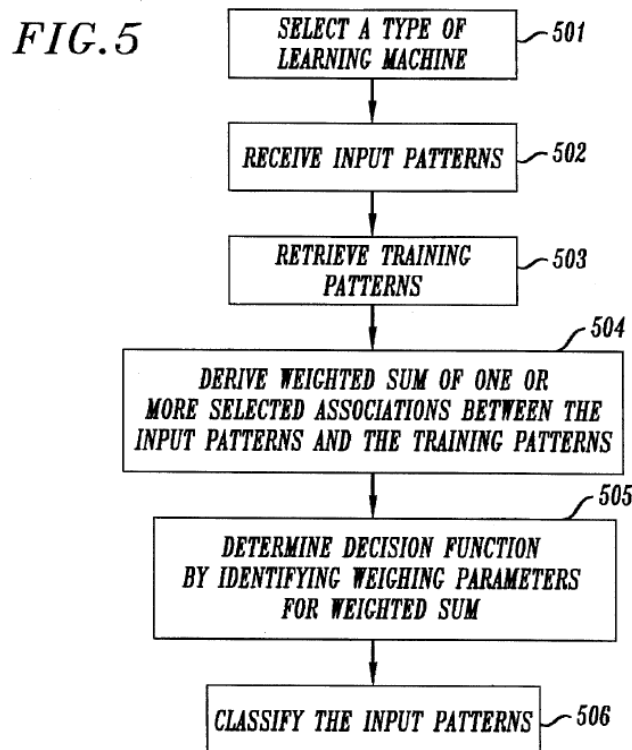


Figure 5 is a flow diagram that implements the principles of Boser’s SVM. *Id.* at 3:7–9.

3. *Hocking (Ex. 1009)*

Hocking is titled “Selection of the Best Subset in Regression Analysis.” Ex. 1009, 531. Hocking teaches an iterative process that

removes variables based on weight-vector ranking, until a subset that provides the best regression is identified. Ex. 1003 ¶ 265 (citing Ex. 1009, 531, 533).

E. GROUND 1: OBVIOUSNESS OF CLAIMS 1, 5–7, 13, 18, 22, AND 32 BASED ON THE COMBINED TEACHINGS OF KOHAVI, BOSER, AND HOCKING

In its first ground of unpatentability, Petitioner contends that claims 1, 5–7, 13, 18, 22, and 32 would have been obvious in view of Kohavi, Boser, and Hocking. Pet. 3, 20–77. For all claims at issue in this proceeding,⁶ Patent Owner alleges that Petitioner’s proposed “modification of Kohavi (or of Kohavi-Boser) . . . is not a mere combination of prior art elements as the petition contends,” but a modification “of such a character that it undermines the very rationale of Petitioner’s own Kohavi-Boser combination.” Resp. 26, 39.⁷ Because this issue is dispositive and because we find Petitioner’s evidence unpersuasive for the reasons explained below, we find Petitioner has not made an adequate showing that claims 1, 5–7, 13, 18, 22, and 32 are unpatentable.

1. *Petitioner’s Contentions*

Petitioner’s challenge, as set forth in Ground One, first modifies Kohavi in view of Boser, and then modifies this combination in view of

⁶ The discussion below focuses on the combination as it pertains to independent claims 1, 7, 13, 22, and 32, but applies equally to dependent claims 5 and 6, based on their dependence from claim 1.

⁷ In addition, for independent claims 1 and 22, Patent Owner argues that Petitioner has failed to establish the recited computer-implemented method for identifying patterns in data including “computing ranking criteria using the optimized plurality of weights” as recited in each of these claims. PO Resp. 40–53; Ex. 1001, 70:41–42, 73:19–20. As Patent Owner’s first argument is persuasive and pertains to claims 1 and 22, we do not address this argument.

Hocking. Pet. 26–31. Specifically, Petitioner contends that a person of ordinary skill in the art “would have been motivated to use Boser’s SVM as the induction algorithm with Kohavi’s RFE method. Pet. 26. Then, Petitioner asserts that a person of ordinary skill in the art “would have been motivated to use Hocking’s simple and computationally efficient ranking based on weight values with the SVM-RFE of the combined system.” *Id.* at 29.

For the Kohavi-Boser combination, Petitioner contends that “[b]ecause Kohavi considers the induction algorithm as a black box, Kohavi does not provide details regarding the operation and implementation of the induction algorithm.” Pet. 26. Therefore, according to Petitioner, a person of ordinary skill in the art would “have been motivated to look to other references with detailed disclosures of induction algorithm concepts, such as Boser which is directed to “learning machines.” *Id.* (citing Ex. 1008, 1:9; Ex. 1003 ¶ 263). Petitioner asserts that a person of ordinary skill in the art “would have been motivated to make the proposed combination to achieve better generalization with reduced computational burden.” *Id.* (citing Ex. 1003 ¶ 264). Regarding the reasons for modification of the Kohavi-Boser combination in view of Hocking, Petitioner contends that “[n]o substantive modifications are needed to the Boser-Kohavi system other than the use of Boser’s feature weight values as the ranking criteria.” *Id.* at 29.

2. *Patent Owner's Response*⁸

Patent Owner argues that Petitioner's reasoning in support of the proposed modification of the Kohavi-Boser combination in view of Hocking's teachings undermines its reasoning in support of modifying Kohavi in view of Boser's teachings to produce this combination. Resp. 39. Specifically, Patent Owner argues that Petitioner's proposed modification of Kohavi's wrapper method is premised on the fact that Kohavi considers the induction algorithm to be a black box. *Id.* at 29 (quoting Ex. 1007, 274). Whereas, Petitioner's modification of the Kohavi-Boser combination, does not treat the induction algorithm as a black box, but requires exposure of "the contents of the black box to the feature selection search module." *Id.* at 35. Patent Owner argues that Petitioner does not adequately explain why "it would be obvious to *expose* the induction algorithm to the feature selection search module, turning the concept of a black box on its head." *Id.* at 37–39 (citing Pet. 29–31).

3. *Petitioner's Reply*

Petitioner replies that Patent Owner's "argument is a fundamental mischaracterization of the concept of a 'black box' in Kohavi. Reply 4. Petitioner asserts that "Kohavi's feature subset selection is not ignorant of

⁸ Patent Owner casts its argument as a principle of operation issue requiring us to determine that use of the induction algorithm as a black box is a principle of operation of Kohavi's wrapper method. We see no need to make such a determination, as Patent Owner's arguments identify a flaw in Petitioner's reasoning regardless of whether use of the induction algorithm as a black box is a principle of operation in Kohavi's wrapper method. Accordingly, we focus our discussion on the substance of Patent Owner's arguments and set aside its characterization of use of the induction algorithm as a black box as a principle of operation of Kohavi's wrapper method.

the induction algorithm; it is simply agnostic as to what induction algorithm a practitioner selects to use with it. In this manner, “[t]he induction algorithm is used as a ‘black box’ by the subset selection algorithm’ of the wrapper method.” *Id.* at 5 (citing Ex. 1007, 274). Petitioner asserts further that “Kohavi’s wrapper method is interoperable with any selected induction algorithm and requires no knowledge of the inner workings of the algorithm, just the interface, so it can send inputs (feature set) and receive an output (a hypothesis) from the algorithm.” *Id.* (citing Ex. 1003 ¶¶ 249–250; Pet. 20).

Regarding modification of the Kohavi-Boser combination in view of the teachings of Hocking, Petitioner reiterates its arguments “that ‘one can trivially use a cost function instead of accuracy as the evaluation function for the wrapper’” and that “using Boser’s feature weight values, estimated by optimizing a cost function for evaluation with Hocking’s ranking principle in Kohavi’s feature subset selection would likewise be a trivial substitution of known methods.” Reply 7 (citing Ex. 1007, 309; Pet. 29; Ex. 1003 ¶ 267; Ex. 2013, 76:20–77:19).

4. *Patent Owner’s Sur-Reply*

Patent Owner replies that “Petitioner now proposes entirely new theories of obviousness in an effort to resuscitate its failed case” and that “[t]he Board should not permit Petitioner to rely on these new theories and, instead, should hold Petitioner to its original arguments.” Sur-Reply 3 (citing Reply 7–10) (other citations omitted). Patent Owner then reiterates its argument that as a result of the proposed modification “the support vector machine ‘induction algorithm’ be a ‘black box’ because the weights of that induction algorithm would necessarily be exposed to the ‘feature selection search’ module.” *Id.* (citing Resp. 34–39).

5. *Analysis*

After studying the submissions by both parties, we find that the reasoning Petitioner has proffered in support of combining the teachings of Kohavi, Boser, and Hocking in the manner proposed in the Petition lacks rationale underpinning. Specifically, the evidence and reasoning do not demonstrate persuasively that a person of ordinary skill in the art would have been motivated to modify Kohavi's wrapper method to use a cost function instead of accuracy as the evaluation function for the wrapper method.

At most, the combined Kohavi-Boser-Hocking disclosures suggest that a person of ordinary skill in the art, once presented with the separate pieces of highlighted information from those references, *may* have understood that they *could be* combined in the manner claimed, but that is not enough because Petitioner has not shown persuasively why a person of ordinary skill in the art *would have known* to pick out those three references and combine them to arrive at the claimed invention. *See Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993 (Fed. Cir. 2017) (holding that the Board's reasoning that "a person of ordinary skill in the art reading Woodhill and Stefik would have understood that the combination of Woodhill and Stefik would have allowed for the selective access features of Stefik to be used with Woodhill's content-dependent identifiers feature" to be deficient to establish a motivation because it "say[s] no more than that a skilled artisan, once presented with the two references, would have understood that they could be combined. And that is not enough: it does not imply a motivation to pick out those two references and combine them to arrive at the claimed invention").

Petitioner states that a skilled artisan “would have been motivated to use Hocking’s simple and computationally efficient ranking based on weight values” generated by Boser’s SVM, but Petitioner provides no persuasive basis to find that a skilled artisan would have viewed Hocking’s “ranking based on weight values” to be a simple or computationally efficient ranking criteria in Kohavi’s wrapper method used with an SVM. Pet. 29. Although Petitioner’s expert refers to Hocking’s teaching that an optimal subset of variables can be derived “with a minimum of computation” (Ex. 1003 ¶ 256), we find little persuasive value in this representation as a motivating factor because it is unclear a person of ordinary skill in the art would have recognized a link between the minimal computational benefits of Hocking’s ranking when applied to the Kohavi-Boser combination. It is undisputed that Hocking’s ranking is characterized as using “a minimum of computation” in the context of a very different application than SVMs and relies on different objectives and assumptions. Ex. 1009, 531. Petitioner has not shown persuasively, however, that those computational gains would also have been recognized by persons of ordinary skill to occur in the context of Kohavi’s wrapper method applied to Boser’s SVM.

Petitioner expert *suggests* that, because Kohavi describes use of a “recursive approach to feature selection in a system that does not include iterative feature selection,” “Hocking’s teachings of simple and computationally efficient ranking based on weight values” would have motivated further improvement to Kohavi’s wrapper method.” Ex. 1003 ¶¶ 264, 267. No persuasive technical reasoning or evidence, however, is offered to actually demonstrate that a person of ordinary skill in the art would have reasonably expected an improvement to occur; for example,

neither Petitioner, nor its expert, explains *how* the modification would have improved upon what was previously known. All that is provided is a conclusory statement that has little, if any, evidentiary value.

Additionally, Patent Owner makes two points that diminish the persuasiveness of Petitioner's contention that Hocking's ranking would have been recognized to be simple or computationally efficient in the context of the Kohavi's wrapper method and Boser's SVM. Although cast as a principle of operation issue, Patent Owner's argument highlights that Kohavi teaches that its wrapper approach "exists as a wrapper *around* the induction algorithm" with the idea being the induction algorithm is a black box (i.e, no knowledge of the algorithm is needed, just the interface). Resp. 20, Ex. 1007, 274, 284 (emphasis added). Setting aside whether Petitioner's proposed modification changes Kohavi's *principle* of operation for the reasons noted above, the proposed modification would indeed change the operation of Kohavi's wrapper method to one that is dependent upon knowledge of the algorithm that an induction algorithm uses, because the wrapper method would have to have knowledge of what variables are computed in the process of providing a classifier. We are not persuaded that adapting a wrapper method to the specific algorithm of an induction algorithm in order to rank the features according to their corresponding weight values would have been viewed by a person of ordinary skill to be simpler than (or even as simple as) ranking the features according to the results provided by an induction algorithm and evaluating its performance.

Regarding Petitioner's contention that such modification would have been more computationally efficient, Patent Owner's expert credibly and persuasively explains why a person of ordinary skill in the art *would not*

have recognized Hocking’s linear regression model to be reducible to the computationally efficient form that Petitioner’s expert suggests. Ex. 2014 ¶¶ 40–61. In particular, we find it credible that such a person would not have known at the time of the invention that the estimated variance values of the combined Hocking’s Equations (5) and (6) could be treated as a constant and, as a result, canceled out of the equations. *Id.* In view of this fact, we are not persuaded that Hocking’s reference to simplicity and computational efficiency demonstrates a person of ordinary skill in the art had a motivation to make the modification Petitioner proposes. Furthermore, because such a person would not have recognized at the time of the invention that Hocking’s Equations (5) and (6) were reducible to the form Petitioner proposes, Petitioner’s contention that the proposed modification would have yielded predictable results is also unpersuasive.

Petitioner notes that “Kohavi uses accuracy as ranking criteria, [but] explains that “one can trivially use a cost function instead of accuracy as the evaluation function for the wrapper.” Pet. 29 (citing Ex. 1007, 309). Petitioner summarily concludes that “using Boser’s feature weight values as the evaluation function of Kohavi’s wrapper method, according to the teachings of Hocking, would [likewise] be a trivial substitution of known methods.” *Id.* (citing Ex. 1003 ¶ 267). However, neither Petitioner nor its expert provide any evidence or technical reasoning that demonstrates a person of ordinary skill in the art would have connected the “cost function” referenced by Kohavi to the use of Boser’s feature weight values for the evaluation function. In fact, Petitioner’s expert declaration simply parrots the Petition in this respect. *Compare* Pet. 29 to Ex. 1003 ¶ 267. And there is no persuasive support at page 309 of Kohavi for Petitioner’s reasoning; to

the contrary, page 309 of Kohavi suggests that the referenced “cost function” relates to “misclassification costs,” which is just another way of evaluating the classification *result* produced by an induction algorithm. We are not persuaded Kohavi suggests more generally that any cost function associated with an induction algorithm would be a “trivial” modification.

There is also little persuasive weight afforded to Petitioner’s contention that a person of ordinary skill in the art would have been motivated to modify Kohavi’s ranking criteria to estimated feature weights because Kohavi, Boser, and Hocking all involve techniques that are based on similar classical statistic principles. *See* Pet. 32–33. This contention “say[s] no more than that such a person, once presented with the [three] references, would have understood that they could be combined. And that is not enough: it does not imply a motivation to pick out those two references and combine them to arrive at the claimed invention” *Personal Web Techs.*, 848 F.3d at 993. Furthermore, in applying the classical statistical principle Hocking teaches to this case, we agree with Patent Owner that Petitioner relies on erroneous assumptions, which a person of ordinary skill in the art would not have made, that undermines the persuasiveness of Petitioner’s contention. And if the classical statistic principles Hocking does disclose were applied, it is not clear that the feature subset selected for use with an SVM would provide accurate classifications. *See* Ex. 2014 ¶¶ 52–53.

When all of Petitioner’s evidence and arguments regarding the combination of Kohavi, Boser, and Hocking are viewed in light of Patent Owner’s arguments, we are not persuaded that using the weights generated by an SVM to rank the features according to their corresponding weight values in Kohavi’s wrapper method would have been a known technique to

those of ordinary skill in the art at the time of the invention for selecting a subset of features. Hocking teaches the use of weights to select features in the context of a different application than the one presented by Kohavi-Boser combination, moreover, Hocking's teaching is based on objectives and assumptions that are inapplicable to this combination. Petitioner has not shown persuasively that a person of ordinary skill would have recognized Hocking's technique to be readily applicable to both applications. Petitioner has not provided sufficient evidence or technical reasoning to demonstrate persuasively that the weight ranking criteria used in Hocking would have been a known technique for selecting a feature subset in Kohavi-Boser combination. Petitioner provides no evidence that a person of ordinary skill would have recognized that the weights generated by an SVM to classify a feature subset may also be evaluated to rank feature subsets to optimize the operation of an SVM. In fact, Petitioner fails to even establish more generally that it was known that an SVM's feature weights may be used as ranking criteria to select the feature subsets to be run with an SVM. There is therefore no persuasive basis to find a person of ordinary skill in the art at the time of the invention would have known that an SVM's feature weights could have been used to address the computation burdens associated with selecting an optimal subset of features enabling the learning machine/induction algorithm to create a more accurate classifier.

As a result, we find that Petitioner has not persuasively articulated reasoning with rationale underpinning that would have motivated a person of ordinary skill in the art at the time of the invention to combined the teachings of Kohavi, Boser, and Hocking in the manner proposed in the Petition. Therefore, after reviewing all of the evidence of record, including

Petitioner's cited evidence and the declaration of Dr. Evgeniou, we determine that Petitioner has not shown by a preponderance of the evidence that claims 1, 5–7, 13, 18, 22, and 32 are unpatentable based on the combined teachings of Kohavi, Boser, and Hocking.

F. GROUND 2: OBVIOUSNESS OF CLAIM 5 BASED ON THE COMBINED
TEACHINGS OF KOHAVI, BOSER, HOCKING, AND CRISTIANINI

Petitioner asserts that claim 5 is unpatentable over the combined teachings of Kohavi, Boser, Hocking, and Cristianini. Pet. 3, 77–80. This ground relies on Petitioner's proposed combination of Kohavi, Boser, and Hocking and does not remedy the deficiency explained above. Therefore, Petitioner has not met its burden to show that claim 5 would have been obvious over the asserted prior art.

III. CONCLUSION

We have reviewed the Petition, Patent Owner Response, Petitioner Reply, and Patent Owner Sur-Reply. We have considered all of the evidence and arguments presented by Petitioner and Patent Owner, and have weighed and assessed the entirety of the evidence as a whole. For the reasons above, we determine, on this record, that Petitioner has not demonstrated by a preponderance of evidence that claims 1, 5–7, 13, 18, 22, and 32 of the '483 patent are unpatentable over the asserted prior art.

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 5-7, 13, 18, 22, 32	103	Kohavi, Boser, Hocking		1, 5-7, 13, 18, 22, 32
5	103	Kohavi, Boser, Hocking, Cristianini		5
Overall Outcome				1, 5-7, 13, 18, 22, 32

ORDER

It is hereby: ORDERED that Petitioner has not shown that claims 1, 5–7, 13, 18, 22, and 32 of the '483 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the asserted prior art; and

FURTHER ORDERED that this Decision is final, and a party to this proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Before LYNNE H. BROWNE, GARTH D. BAER, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

BAER, *Administrative Patent Judge*, dissenting.

I respectfully dissent from the majority's decision finding none of the challenged claims are unpatentable.

The majority finds Petitioner did not show a sufficient motivation to implement Hocking's weight-vector ranking criteria in Kohavi's wrapper-based method. *Supra* Section II.E.5. I disagree. Petitioner explained, with support from its expert, Dr. Evgeniou, that its proposed addition of Hocking's vector weight ranking criteria "applies a known technique (Hocking's variable selection) to a known device (Kohavi's RFE method using Boser's SVM) which is ready for improvement to yield predictable

results.” Pet. 30 (citing *KSR*, 550 U.S. at 417; Ex. 1003 ¶ 269). As the Supreme Court has explained, “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416. I agree with Petitioner that the claimed invention is an obvious combination of known techniques applied to a known device, yielding only predictable results and thus obvious under *KSR*’s framework.

In my opinion, Petitioner has shown sufficiently that the challenged claims of the ’483 patent are unpatentable.

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