

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 22

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JIN LI and SHAW-MIN LEI

Appeal No. 2001-0867
Application 09/016,571

ON BRIEF

Before JERRY SMITH, RUGGIERO and DIXON, Administrative Patent Judges.

JERRY SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal under 35 U.S.C. § 134 from the examiner's rejection of claims 1-4 and 6-28, which constitute all the claims remaining in the application.

The disclosed invention pertains to a method and apparatus for embedded coding of a digital image with rate-distortion optimization. More specifically, the invention determines the encoding order of quantized coefficient symbols

according to that symbol's predicted rate-distortion slope.

Representative claim 1 is reproduced as follows:

1. A rate-distortion optimization method for embedded coding of a digital image, comprising the steps of:

transforming the image to form a set of coefficients;

quantizing the coefficients to form a set of symbols;

calculating, for each symbol, a predicated rate-distortion slope based on an expected distortion decrease and an expected coding rate increase for that symbol;

selecting an encoding order for the symbols by ordering each symbol according to that symbol's calculated predicated rate-distortion slope, such that symbols with a steeper predicated rate distortion slope, and therefore larger predicted distortion decrease, are encoded before symbols with a less steep predicted rate distortion slope.

The examiner relies on the following references:

Copperi et al. (Copperi)	4,811,398	Mar. 07, 1989
Pennebaker et al. (Pennebaker)	5,099,440	Mar. 24, 1992
Schuster et al. (Schuster)	5,778,192	July 07, 1998
		(filed Oct. 26, 1995)

K. Ramchandran et al. (Ramchandran), "Bit Allocation for Dependent Quantization with Applications to Multiresolution and MPEG Video Coders," IEEE Transactions On Image Processing, Vol. 3, No. 5, September 1994, pages 533-545.

J. Li et al. (Li), "On the Improvements of Embedded Zerotree Wavelet (EZW) Coding," SPIE, Vol. 2501, May 24, 1995, pages 1490-1501.

The admitted prior art described in Appellants' specification.

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The following rejections are on appeal before us:

1. Claims 1-3, 6-11, 14, 15, 17-21, 23 and 25-27 stand rejected under 35 U.S.C. § 103 as being unpatentable over the teachings of Li in view of the admitted prior art.

2. Claim 28 stands rejected under 35 U.S.C. § 103 as being unpatentable over the teachings of Li in view of the admitted prior art and further in view of Schuster.

3. Claims 13 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over the teachings of Li in view of the admitted prior art and Schuster and further in view of Pennebaker.

4. Claims 4, 18, 22 and 24 stand rejected under 35 U.S.C. § 103 as being unpatentable over the teachings of Li in view of the admitted prior art and further in view of Ramchandran.

5. Claim 12 stands rejected under 35 U.S.C. § 103 as being unpatentable over the teachings of Li in view of the admitted prior art and further in view of Copperi.

A rejection of claims 20-28 under the first paragraph of 35 U.S.C. § 112 has been withdrawn by the examiner [answer, page 14].

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Rather than repeat the arguments of appellants or the examiner, we make reference to the briefs and the answer for the respective details thereof.

OPINION

We have carefully considered the subject matter on appeal, the rejections advanced by the examiner and the evidence of obviousness relied upon by the examiner as support for the rejections. We have, likewise, reviewed and taken into consideration, in reaching our decision, the appellants' arguments set forth in the briefs along with the examiner's rationale in support of the rejections and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in the claims on appeal. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual

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determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See Id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472,

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223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976). Only those arguments actually made by appellants have been considered in this decision. Arguments which appellants could have made but chose not to make in the brief have not been considered and are deemed to be waived by appellants [see 37 CFR § 1.192(a)].

We consider first the rejection of claims 1-3, 6-11, 14, 15, 17-21, 23 and 25-27 based on Li and the admitted prior art. Each of the six independent claims on appeal is included within this rejection. These six independent claims also stand or fall together as a single group [brief, page 5]. This rejection is set forth on pages 4-10 of the answer. Appellants argue that the applied prior art does not teach calculating the claimed predicted slope. Specifically, appellants argue that Li uses no per-symbol calculations, a predicted rate-distortion slope is not the same as the expectation of a ratio as taught by Li, and none of the applied prior art teaches or suggests calculating a predicted rate-distortion slope at all. Appellants also argue that there is no motivation within the applied prior art for combining the teachings as proposed by the examiner [brief, pages 12-18]. The examiner and appellants consider the exact same

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portions of the applied prior art but reach opposite conclusions as to what the prior art teaches or suggests.

We do not sustain the examiner's rejection of any of the independent claims on appeal. We essentially agree with the arguments made by appellants in the briefs. Each of the independent claims on appeal recites the calculation of a "predicted rate-distortion slope" for use in determining the order of encoding symbols or bits of the digital image. We agree with appellants that neither Li nor the admitted prior art teaches or suggests such a calculation. The portions of Li and the admitted prior art which are relied on by the examiner teach nothing more than the fact that the rate-distortion slope of a transmitted image was a measure of the quality of the transmission. The fact that the rate-distortion slope of a transmitted digital image was a known measure of the quality of the transmission does not teach or suggest that such a measure should be or could be predicted in advance and used to determine the encoding order of symbols and bits as claimed. Therefore, a key feature of each of the independent claims on appeal is not taught or suggested by the applied prior art.

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Each of the rejections made by the examiner relies on the combination of Li and the admitted prior art. This combination fails for reasons discussed above. Although the additional rejections rely on additional prior art references, none of these additional references overcomes the deficiencies in the basic combination discussed above. Therefore, we also do not sustain any of the other rejections set forth by the examiner.

In summary, we have not sustained any of the rejections made by the examiner. Therefore, the decision of the examiner rejecting claims 1-4 and 6-28 is reversed.

REVERSED

JERRY SMITH)	
Administrative Patent Judge)	
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JOSEPH F. RUGGIERO)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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