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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RAPHAEL L. LEVIEN

Appeal No. 95-2827
Application 07/983,211[1]

ON BRIEF

Before THOMAS, TORCZON, and CARMICHAEL, Administrative Patent Judges.

THOMAS, Administrative Patent Judge.

DECISION ON APPEAL

---

[1] Application for patent filed November 30, 1992.

Appellant has appealed to the Board from the examiner's final rejection of claims 1 to 40, which constitute all the claims in the application.[2]

The pertinent portion of independent claims 1, 6, and 11 on appeal is the following:

> Determining the distance to the nearest previously generated output pixel to provide a nearest dot bias value.

Corresponding means language is recited in independent claims 21, 26, and 31 for these apparatus claims. Independent method claim 16 and corresponding apparatus claim 36 do not positively recite this feature in the same manner but utilize "the distance to the nearest previously generated output pixel" as a basis for the determination recited in the outputting a screened image clause.[3]

---

[2] Appellant filed an amendment on November 25, 1994 at the same time as the Brief. This amendment apparently has not been entered by the examiner since no Advisory Action as to it has been issued and no mention of it has been made in the Answer itself.

[3] We note in passing that independent apparatus claims 21, 26, and 36 recite at the end of the preamble of each of these claims "said apparatus comprising the steps of." We

The following references are relied on by the examiner:

Itoh	5,208,684	May 4, 1993 (filing date Apr. 24, 1991)
Eschbach	5,243,443	Sep. 7, 1993 (filing date Dec. 6, 1991)

Rather than repeat the positions of the appellant and the examiner, reference is made to the briefs and the answer for the respective details thereof.

OPINION

We reverse the outstanding rejection of all claims on appeal under 35 U.S.C. § 103.

As to all claims, the examiner relies upon the statement of the rejection in the final rejection. At page 3 of that paper, the examiner recognizes that Eschbach does not determine the distance to the nearest previously generated output pixel as recited in the above-quoted portion of each independent claim on appeal. The examiner then relies upon Itoh which was said to disclose a halftone image processing

---

regard the apparent inadvertent recitation of “the steps of” as a part of the preamble of these apparatus claims as not being a prohibition to us to determining the merits of the art rejections before us.

system which calculates the density of each pixel and corrects the density with the error diffusion approach therein. The examiner then concludes that it would have been obvious for the artisan to have modified "the Eschbach system by injecting the density by the distance with previous dots for a uniform area or density." By this we assume that the examiner intended to reason that it would have been obvious to the artisan to have modified Eschbach by replacing density determinations with distance to previous dots determinations for a uniform area or density determination. Such reasoning is further asserted for each of the respective independent claims on appeal.

As noted by appellant at page 6 of the principal brief on appeal, it is not exactly clear what the examiner is intending to mean by the language "injecting the density by the distance with previous dots." We agree with appellant's belief, also expressed at the bottom of page 6 of the principal brief on appeal, that the examiner was attempting to state that measuring the density in the vicinity of the present pixel in Itoh is somehow equivalent to determining the distance to the

nearest previously generated output pixel in the manner generally referred to in each independent claim on appeal.

After due consideration of the issues as developed by the examiner and appellant, and the disclosed invention as well as the teachings and suggestions of the prior art relied on, it is clear to us that the examiner has misapplied the meaning of the word “density” as taught by Itoh. We begin with the consideration of some basic teachings in Eschbach.

At column 1, lines 10 to 18, it is indicated in the background portion of this reference that image information commonly generated in a bitmap format comprises “a plurality of gray level pixels, i.e. pixels that are defined by digital values, each value representing a gray level among a number of gray levels. Thus, in an 8 bit system, 256 levels of gray are present, where each level represents an increment of gray between black and white.” Eschbach goes on to discuss gray level pixel
values being converted to binary level pixel values, indicating at column 3, lines 39 to 42 “each pixel representing an optical density of the image at a location

within the image." The two embodiments of this reference respectively compare the average gray value of the original image to the average gray value of the output image or the average gray value of the modified image being compared to the average gray value of the output image. The discussion of Figure 1 in this reference indicates that each pixel is defined at a single level or optical density in a set of optical density levels. Column 4, lines 48 to 52. Finally, at column 5, lines 9 to 13, Eschbach states that "[g]ray values are typically expressed as integers, with one example falling in the range from 0 to 255, although greater or lesser number of levels, as well as non-integer representations, are possible."

For his part, Itoh seems to speak the same language as to density. At column 1, lines 14 to 16, Itoh states "an image constituted by a plurality of pixels each of which is formed by density data consisting of a plurality of bits." With respect to Figure 1 of this reference, it is stated at column 3, lines 13 to 16 that "each square denotes one pixel, and a numeral in each square denotes the density of the pixel."

Figure 2B of Itoh shows a linear representation of pixel density from 0 to 255 with various intermediate numerical values associated with it. As to this Figure, column 4, lines 1 to 3 states that “since the density data is expressed by eight bits, 0 to 255 denote the density gradation of the pixel.” Finally, this reference states at column 5, line 65 through column 6, line 2 that “the density data of each pixel is constituted by eight bits so that it is possible to express the density data of the pixel by 256 (integer) density gradations (from 0 to 255). That is, the minimum density is the integer 0, and the maximum density is the integer 255.”

It appears that the examiner is intending to correlate some type of distance value associated with the rather linear, straight line-like determination of pixel density values from 0 to 255. However, as asserted by appellant, pixel density does

not equal distance between pixels. The examiner’s view that Itoh teaches the determination of any distance from any pixel to another pixel because it teaches Laplacian calculations (initially expressed in the abstract) is also misplaced.

These calculations are performed on an object pixel and on peripheral pixels around the object pixel to obtain corrected data. This calculation is performed in such a manner that a difference in density between the object pixel and each of the peripheral pixels is calculated and all the differences are summed. Figure 4 of Itoh shows (and each succeeding embodiment having a corresponding figure shows) that object pixel Dm,n in memory 11 is surrounded by other pixels in its periphery, which are respectively operated upon to determine the Laplacian calculations just mentioned. These calculations in no way
relate to determinations of distances between the pixels depicted but rather operate upon the actual density data value associated with each pixel per se. Thus, the examiner's reliance upon Itoh to teach or otherwise suggest to the artisan some kind of a distance determination between pixels in any manner is misplaced.

Similarly, at pages 3 and 4 of the answer, the examiner's responsive arguments switch to relying upon Eschbach's teaching at column 7, lines 65 to column 8, line 10 as a basis

for distance determinations. A pertinent portion of this reference is:

> It should be noted that the use of the term 'threshholding' throughout this description is meant to encompass other ways of making a distance decision between the input optical density value and the output optical density value.

The examiner's correlation of this "distance" is inappropriate when taken in context in the reference. Such a distance is more aptly described as originally relied upon by the examiner in accordance with the operation of the error determination block 117 in respective embodiment Figures 1 and 2 of Eschbach. This block is shown as a differential amplifier which "calculates a difference between the average gray input value generated at integrator 113 and average gray output value output generated at integrator 111." Column 6, lines 8 to 11. Again, there is no true distance determination between pixels in the manner required by each independent claim on appeal.

Assuming for the sake of argument that it would have been proper to combine the collective teachings of Eschbach and Itoh within 35 U.S.C. § 103, we find that the examiner's

reliance upon either or both references to teach the claimed determination of the distance to the nearest previously generated output pixel to provide a nearest dot bias value as recited in some manner in each independent claim on appeal would not have been obvious to

the artisan.[4] Accordingly, the decision of the examiner rejecting each of claims 1 to 40 under 35 U.S.C. § 103 is reversed.

REVERSED

James D. Thomas Administrative Patent Judge	)	
Richard Torczon Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
James T. Carmichael Administrative Patent Judge	)	

[4] As a result of this finding, we see no need to address whether either reference teaches the hysteresis determination in some of the independent claims on appeal.

Allan J. Jacobson
13310 Summit Square Center
Route 413 & Doublewoods Road
Langhorne, PA 19047

JDT/cam