The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.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. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GERARD DE HAAN
and ANNA PELAGOTTI

Appeal No. 2004-2297
Application No. 10/196,817

ON BRIEF

Before THOMAS, HAIRSTON, and LEVY, Administrative Patent Judges.
LEVY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 4 and 11, which are all of the claims pending in this application.

BACKGROUND

Appellants' invention relates to a problem area location in an image signal and interpolating images between existing images (specification, pages 3 and 4). An understanding of the

invention can be derived from a reading of exemplary claim 4, which is reproduced as follows:

4. A method of locating problem areas in an image signal, the method comprising the steps:

estimating a motion vector field for said image signal;

detecting edges in the motion vectors field; and

comparing edge locations in successive field periods to identify both foreground and background.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Brailean et al. (Brailean)	5,717,463	Feb. 10, 1998
Rosenberg	5,832,115	Nov. 3, 1998

Claims 4 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brailean in view of Rosenberg.

Rather than reiterate the conflicting viewpoints advanced by the examiner and appellants regarding the above-noted rejection, we make reference to the examiner's answer (Paper No. 13, mailed December 3, 2003) for the examiner's complete reasoning in support of the rejection, and to appellants' brief (Paper No. 12, filed August 15, 2003) for appellants' arguments thereagainst. 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. See 37 CFR § 41.37(c)(1)(vii).

OPINION

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

Upon consideration of the record before us, we reverse, essentially for the reasons set forth by appellants. We observe at the outset appellants' statement (brief, page 3) that "claims 4 and 11 stand and fall together." Accordingly, we select claim 4 as representative of the group.

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 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. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985); 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. 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, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

The examiner's position (answer, page 4) is that Brailean does not explicitly disclose distinguishing both foreground and background in the disclosed comparison of edge locations in successive field periods. To overcome this deficiency of Brailean, the examiner turns to Rosenberg for a teaching of detecting objects in an image where edge locations in successive frame periods are compared to distinguish both foreground and background. The examiner argues (id.) that “[b]y comparing edges in successive frames, pixels that are not varied by intensity by more than a threshold within a given number of frames are included as background, otherwise as foreground." In the examiner's opinion (id.) the modification would have been obvious because “because obtaining exact contours in an image will result in a reliable motion estimation and therefore will achieve very good estimates of both the displacement, as well as, background and foreground of the moving objects within a video sequence.”

Appellants acknowledge (brief, page 4) that while Rosenberg does detect edges, Rosenberg does not detect edges in the motion vector field. It is argued (id.) that Rosenberg does not compare edge locations in successive field periods, but rather only

analyzes pixel values that are on an edge in one field, with pixel values that are at the same spatial locations in preceding fields. Appellants add (brief, page 5) that as a result, Rosenberg's analysis is confined to the location that happens to be on an edge in the current field, and that in the preceding fields, the edge may be at a completely different location.

It is further argued (id.) that an artisan would not combine the teachings of Rosenberg with Brailean because Brailean deals with edges in the motion vector field whereas Rosenberg deals with edges in video data. Appellants argue (id.) that even if the two references were combined, the resulting combination would compare video data in an edge location in the current field with video data at the same location in a preceding field.

Appellants additionally argue that the examiner is taking various terms of Rosenberg out of context in an attempt to show the subject invention. Appellants argue that although Rosenberg refers to GME, there is no disclosure that the GME discloses a motion vector field, detecting edges in the motion vector field, and that detected edge locations in successive field locations should be compared to identify both foreground and background.

The examiner responds (answer, page 6) that limitations disclosed by the primary reference need not be disclosed by the

secondary reference, and that from Rosenberg's disclosure of "GME calculates displacement for frame sequences as frame-to-frame displacement in the tracking data calculated for each frame," the examiner finds evidence of the generation of motion vector fields.

From our review of Brailean, we find that Brailean is directed to the use of motion estimation in video coding (col. 1, lines 6-8). Brailean discloses that the displacement of a pixel may be represented by a vector which points to the location of the pixel in a previous image plane. The displacement vector field (DVF) describes the motion of all pixels between a given set of image planes, and accurate estimation of the DVF in a video sequence is crucial in many applications (col. 1, lines 16-24). Motion information is represented using vectors which point from a location in the current frame to where that same location originated in the previous frame (col. 1, line 67 through col. 2, line 3). The motion vector associated with a block in the present frame is found by searching over a predetermined area in the previous temporally adjacent frame for a best match (col. 2, lines 6-9). The motion vector points from the center of the block in the current frame to the center of the block which provides the best match in the previous frame.

Utilizing the estimated motion vectors, a copy of the previous frame is altered by each vector to produce a prediction of the current frame. This operation is referred to as motion compensation (col. 2, lines 12-17).

Brailean further discloses that the need exists for accurately estimating motion within a video sequence (col. 3, lines 54 and 55). Brailean discloses (col. 3, lines 56-60) that "[t]he method and system are required to regularize the estimation of the . . . DVF . . . and estimate the boundaries or discontinuities that exist within the DVF." An estimate of object boundaries is obtained through segmenting the image frame into regions of similar intensity. The boundaries separating these regions are considered to the boundaries of objects within the sequence. This object boundary information is used to determine the first estimate of the DVF. Using the DVF, a first estimate of the object boundary is obtained, and any boundary found to be non-moving is removed.

From this estimate of the moving object boundaries, a second, improved estimate of the DVF is determined. As a final step, the improved DVF and the moving object boundaries are refined to create a third estimate of the DVF and a second estimate of the moving object boundaries (col. 4, lines 32-59).

From the disclosure of Brailean, we find no teaching of comparing edge locations in successive fields to identify both foreground and background.

Turning to Rosenberg, we find that the reference is directed to detecting objects in an image, and in particular to real-time object tracking. The invention provides improved image compression control that is well suited for video phone systems and video-conferencing equipment using PSTN channels and other low bit-rate channels requiring high levels of video compression (col. 1, lines 8-10 and col. 7, lines 3-7). Because Rosenberg is directed to video compression for video-conferencing over PSTN lines that are of low bandwidth, and is not directed to correcting problem areas in an image signal, we find no reason that would have taught or suggested an artisan to combine the teachings of Brailean and Rosenberg. The motivation provided by the examiner is not a motivation at all, but rather is a statement of the result of making the proposed modification. A statement of the result of making a modification is not a basis for making the modification itself. In addition, even assuming arguendo, that we combined the teachings of Brailean and Rosenberg, we agree with appellants (brief, page 5) that the

resulting combination would not arrive at the claimed invention, for the reasons which follow.

From the disclosure of Rosenberg (col. 12, lines 36-44) we find that “[t]he ObjectMask routine 21 compares the edge pixels found by Sobel high-pass filter operators 19 to stored intensity values for each such pixel to generate a background-object mask that is factored into the current edge map 20 to provide a foreground edge map 22. Pixels that have not varied in intensity by more than a threshold amount within a given number of previous frames are included as background pixels in the object mask used by the ObjectMask routine 21.” From this disclosure, we agree with the examiner (answer, page 4) that pixels that are not varied in intensity by more than a threshold within a given number of frames are included as background. However, we agree with appellants that in Rosenberg the detected edges are edges in video data, not edges of a motion vector field. The examiner asserts (answer, page 5) that "Rosenberg's teachings are merely cited for comparing successive video images to distinguish both background and foreground." However, this is not sufficient to meet appellants claims because Rosenberg does not disclose comparing edge locations for motion vector fields. As noted by the examiner Rosenberg discloses (col. 12, lines 56-59) that

"[s]pecifically, GME calculates displacements for frame sequences as frame-to-frame displacements in the tracking data calculated for each frame. GME then adjusts the coordinate axes of succeeding frames to overlay the tracking data derived from earlier frames." However, as asserted by appellants (brief, page 7) "there is no detecting of edges in the motion vector field and the comparing of (these) edge locations in successive field periods to identify foreground and background." Although Rosenberg additionally discloses that the optional GME would be useful in systems having portable cameras or zoom to correct for the large image displacements they produce (col. 12, lines 23-27 and 52-55), we find no disclosure that the ObjectMask routine 21 would utilize detected edges in successive motion vector field periods to identify both background and foreground, as Rosenberg discloses that pixels that have not varied in intensity by more than a threshold amount within a given number of previous frames are included as background pixels.

From all of the above, we find that even if we combined the teachings of Brailean and Rosenberg, the resultant combination would fall short of the claimed invention. Accordingly, we find that the examiner has failed to establish a prima facie case of

obviousness of claims 4 and 11. The rejection of claims 4 and 11 under 35 U.S.C. § 103(a) is therefore reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 4 and 11 under 35 U.S.C. § 103(a) is reversed.

REVERSED

JAMES D. THOMAS Administrative Patent Judge	)	
KENNETH W. HAIRSTON Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)	

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