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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte WEI ZHOU, JANE PERERA, WAYNE D. MICHELSEN,
and SWAROOP CHANDRA

Appeal 2019-001763
Application 14/962,814
Technology Center 2400

Before ELENI MANTIS MERCADER, NORMAN H. BEAMER,
and GARTH D. BAER, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's final rejection of claims 1, 3–5, 7, and 8. We have jurisdiction over the pending rejected claims under 35 U.S.C. § 6(b).

We AFFIRM.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as ARRIS Technology, Inc. (Appeal Br. 3.)

THE INVENTION

Appellant's disclosed and claimed invention is directed to providing improved video quality and compression efficiency during encoding by detecting video segments having film grain approaching the "Red Lady" problem, in which the video frames have a high random noise level due to film grain. (Abstract; Spec. ¶ 8.)

Independent claim 1, reproduced below, is illustrative of the subject matter on appeal:

1. A method for encoding video comprising:
 - obtaining video frames provided to an encoder;
 - obtaining motion estimation (ME) data for the video frames;
 - calculating a ME score for the video frames, wherein the ME score provides a measurement of plotted frame-by-frame temporal differences;
 - comparing the ME score with a threshold;
 - calculating the value of a metric from a temporal variability of the ME score;
 - comparing the temporal variability metric with a predetermined value; and
 - providing a high film grain indication signal to the encoder indicating a particular segment of the video frames contains high film grain when the ME score exceeds a threshold and the ME score temporal variability metric is below a predetermined level,
 - wherein when the high film grain indication signal is provided, the encoder allocates less bits to I frames and more bits to P and B type frames than to other frames of the video.

REJECTION

The Examiner rejected claims 1, 3–5, 7, and 8 under 35 U.S.C. § 103 as being unpatentable over Zhou et al. (US 2004/0130680 A1, pub. July 8,

2004) (hereinafter “Zhou”) and He et al. (US 2006/0140267 A1, pub. June 29, 2006) (hereinafter “He”). (Final Act. 4.)

ISSUE ON APPEAL

Appellant’s arguments in the Appeal Brief present the following issue:²

Whether the Examiner erred in finding the combination of Zhou and He teaches or suggests

calculating a ME score for the video frames, wherein the ME score provides a measurement of plotted frame-by-frame temporal differences,

as recited in independent claim 1, and the commensurate limitation recited in independent claim 5. (Appeal Br. 6–8.)

ANALYSIS

We have reviewed the Examiner’s rejections in light of Appellant’s arguments that the Examiner errs. We disagree with Appellant’s arguments, and we adopt as our own: (1) the pertinent findings and reasons set forth by the Examiner in the Action from which this appeal is taken (Final Act. 2–14); and (2) the corresponding reasons set forth by the Examiner in the Examiner’s Answer in response to Appellant’s Appeal Brief. (Ans. 3–14.)

² Rather than reiterate the arguments of Appellant and the positions of the Examiner, we refer to the Appeal Brief (filed Aug. 28, 2018, hereinafter “Appeal Br.”); the Final Office Action (mailed Dec. 22, 2017, hereinafter “Final Act.”); the Advisory Action (mailed Apr. 18, 2018, hereinafter “Adv. Act.”); and the Examiner’s Answer (mailed Oct. 18, 2018, hereinafter “Ans.”) for the respective details.

We concur with the applicable conclusions reached by the Examiner and emphasize the following.

In finding that the combination of Zhou and He teaches or suggests the independent claim 1 limitation at issue, the Examiner relies on Zhou's disclosure of (1) a temporal signal-to-noise ratio ("TSNR") that measures the level of temporally uncorrelated noise between key frames, (2) measuring motion as the average absolute magnitude of motion vectors that can be reliably tracked between key frames, (3) a fast matching distribution ("FMD") that is a distribution of direct pixel between two key frames versus matching threshold values, (4) a pixel matching ratio ("PMR"), in which both high and low PMR distributions can suggest incorrect parameter settings, and (5) an absolute still ratio ("ASR"), in which a high ASR for images with reasonable amount of motion may indicate improper setting of render parameters. (Ans. 11–13; Zhou ¶¶ 59 67, 88–89.)

The Examiner further relies on He's disclosure of calculating a bit budget for each I, P, and B frame depending on the estimated I, P, and B complexity, in which an I frame in a GOP [group of pictures] will be allocated more bits if the average quantization level for inter coding frames is greater than a predefined level. (Ans. 7–8, 14; He ¶¶ 29–31, 34–40, Figs. 1–3.)

Appellant argues that claim 1 recites

“calculating a ME score for the video frames, wherein the ME score provides a measurement of plotted frame-by-frame temporal differences” *to indicate what a ME score is and how it is different from ME data*

(Appeal Br. 7, emphasis added)³, and that “the ASR in [Zhou ¶ 89] measures the distribution of pixels that can be tracked over a range of frames. Nothing in [the description of] ASR [Zhou ¶ 89] indicates a frame-by-frame temporal difference as claimed in claim 1.”

(Appeal Br. 7.)

Appellant further contends that Zhou does not disclose “a frame-by-frame temporal difference plot measurement, and definitely does not provide such a measurement in addition to general ME data for allocating bits to I or P and B frames.” (Appeal Br. 7.)

We are not persuaded by Appellant’s arguments. The Examiner finds, and we agree, that in Zhou,

1. motion data “is measured by the average absolute magnitude of motion vectors of all pixels that can be reliably tracked between key frames” and is “ME data.” (Ans. 11, citing Zhou ¶ 67.);
2. PMR is a “measurement of ME score” that “measures the percentage of pixels that were reliably estimated over a range of frames within the temporal window.” (Ans. 13, citing Zhou ¶ 88.); and
3. ASR (absolute matching ratio) is a “measurement of ME score” that “measures the distribution of pixels that can easily be tracked over a

³ In the Amendment filed Nov. 6, 2017 adding this limitation, Appellant states that “Applicant has amended claim 1 to indicate that ‘calculating a ME score for the video frames, wherein the ME score provides a measurement of plotted frame-by-frame temporal differences’ to better indicate what a ME score is and how it is different from ME data.” Amendment at 6. No further explanation regarding what “plotted frame-by-frame temporal differences” appears in either the Amendment or Appeal.

range of frames without significant searching effort.” (Ans. 13, citing Zhou ¶ 89.)

We see no error in the Examiner’s detailed findings, and Appellant supplied no Reply to address the Examiner’s findings.

Appellant’s argument regarding use of “general ME data for allocating bits to I or P and B frames” (Appeal Br. 7) is directed to the disclosures of Zhou alone. This argument is unpersuasive given the reliance of the Examiner on the combination of Zhou and He. *In re Keller*, 642 F. 2d 413, 425 (CCPA 1981). The Examiner finds, and we agree, that Zhou teaches that

a full-search motion estimation is performed on a pair of frames selected from key frames using a set of relatively large thresholds which shows temporal difference at frame level

(Ans. 7, citing Zhou ¶ 92, Fig. 7), and He teaches

allocation of bits for I, P and B based on complexity. So more or less bits for I frames can be allocated (which is taught by He). Clearly the equations in paragraphs 34–40 vary bits per frame so that one of ordinary skill will understand that complexity of picture can include temporal variability and [m]otion estimation because the inclusion of that will benefit compression efficiency. Also the combined teaching will accommodate predictable results.

(Ans. 14, citing He ¶¶ 34–40, Fig. 2.)

Again we see no error in the Examiner’s detailed findings, and Appellant supplied no Reply to address the Examiner’s findings.

Accordingly, we affirm the Examiner’s rejection of independent claim 1, and independent claim 5 commensurate in scope, as well as dependent claims 3, 4, 7, and 8 not argued separately. (*See* Appeal Br. 6–8.)

CONCLUSION

For the reasons stated above, we affirm the obviousness rejections of claims 1, 3–5, 7, and 8.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3–5, 7, 8	103	Zhou, He	1, 3–5, 7, 8	

TIME PERIOD FOR RESPONSE

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

AFFIRMED