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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DOUGLAS SCOTT PRICE, XIAOSONG ZHOU, and
HSI-JUNG WU

Appeal 2016-001780
Application 13/443,745¹
Technology Center 2400

Before THU A. DANG, TERRENCE W. McMILLIN, and
MATTHEW J. McNEILL, *Administrative Patent Judges*.

McNEILL, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1, 3–17, 19–26, and 28–51, which are all the claims pending in this application.² We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

¹ According to Appellants, the real party in interest is Apple Inc. App. Br. 2.

² Claims 2, 18, and 27 have been canceled. App. Br. 16–19.

STATEMENT OF THE CASE

Introduction

Appellants' application relates to a system and method of selecting frames from a video sequence that have high visual appeal and can be coded at a high quality when frame rates of coded video drop such that perception of moving video is lost. Abstract. Claims 1 and 40 are illustrative of the subject matter on appeal and read as follows:

1. A video coding method, comprising, when a coding frame rate drops below a predetermined threshold:

buffering a plurality of input video frames generated by a camera,

for each buffered input frame, assigning a weight based on a frame quality metric evaluating a quality of the frame, the frame quality metric being a function of a rate of change of auto-exposure settings of the camera during capture of the frame,

coding a highest weighted frame of the plurality of buffered input frames, and

discarding a plurality of lower-weighted frames of the plurality of buffered input frames from the buffer without coding.

40. A video coding method comprising, when a coding frame rate drops below a predetermined threshold:

selecting an input frame for coding,

for each pixel block of the input frame:

performing a motion estimation search between the respective pixel block and a plurality of locally-stored reference frames,

for each candidate reference frame identified by the search, determining a similarity measure between the

respective pixel block and a matching pixel block from the respective candidate reference frame, scaling the similarity measures according to the candidate reference frames' temporal locations, and

selecting a matching pixel block as a prediction reference for the input pixel block based on the scaled similarity measures, and

coding the input pixel block with reference to the prediction reference.

The Examiner's Rejections

Claims 40–43 stand rejected under 35 U.S.C. § 102(b) as anticipated by Hsu et al., “Arbitrary Frame Rate Transcoding Through Temporal and Spatial Complexity,” IEEE Transactions on Broadcasting, Vol. 55, No. 4, Dec. 2009, pp. 767–775 (“Hsu”). Final Act. 3–5.

Claim 40 stands rejected under 35 U.S.C. § 102(b) as anticipated by Sethuraman et al. (US 6,526,097 B1; Feb. 25, 2003). Final Act. 5.

Claims 1, 3, 4, 16, 17, 19, 20, 26, 28, 29, 39, and 44–46 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hsu and Rychagov et al. (US 2007/0041657 A1; Feb. 22, 2007). Final Act. 6–11.

Claims 5–11, 21, 30–34, and 47 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hsu, Rychagov, and Jouppi et al. (US 2005/0152447 A1; July 14, 2005). Final Act. 11–12.

Claims 12–15, 22–25, 35–38, and 48–51 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hsu, Rychagov, and Dai et al. (US 2010/0027663 A1; Feb. 4, 2010). Final Act. 13–14.

Claims 1, 17, and 26 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Sethuraman and Rychagov. Final Act. 14–16.

ANALYSIS

We have reviewed the Examiner's rejections in consideration of Appellants' contentions and the evidence of record. Appellants persuade us the Examiner fails to establish the claims are unpatentable.

Claims 40–43: Anticipation by Hsu

The Examiner finds Hsu discloses “scaling the similarity measures according to the candidate reference frames' temporal locations,” as recited in claim 40. Ans. 3–4. Appellants argue the Examiner erred because Hsu does not disclose scaling any measures based on a frame's *temporal* location. App. Br. 6. In particular, Appellants argue Hsu discloses a similarity measure based on the content of frames compared to previous frames, but does not disclose *scaling* this similarity measure based on the temporal location of the frames. App. Br. 6 (citing Hsu 770).

The Examiner responds that “[s]caling is a mathematical function which could be a weighting function or a linear transformation between domains . . . [i]f the scaling coefficient is unity, it is a one to one correspondence between two domains.” Ans. 3. The Examiner finds Hsu's similarity measure is calculated by equation 11, the skipping/non-skipping selection is made by equation 3, and both of these equations are scaled by a weighting function of unity. Ans. 4.

Appellants have persuaded us of Examiner error. We agree with Appellants that the cited sections of Hsu disclose a similarity measure but do not disclose scaling the similarity measure based on the frames' temporal location. The Examiner finds the similarity measure is scaled by a factor of unity, or 1. Ans. 4. However, the Examiner has not supported this finding

with any evidence that the similarity measure is scaled by any value, including unity. Accordingly, on this record, we do not sustain the rejection of claim 40 as anticipated by Hsu. We also do not sustain the rejection of claims 41–43 as anticipated by Hsu, which depend from claim 40.³

Claim 40: Anticipation by Sethuraman

The Examiner finds Sethuraman discloses “scaling the similarity measures according to the candidate reference frames’ temporal locations,” as recited in claim 40. Appellants argue Sethuraman does not disclose the scaling limitation because Sethuraman is silent with respect to scaling a similarity measure as a function of the reference frame’s temporal location. App. Br. 8–9.

We are persuaded of Examiner error. As argued by Appellants, the cited sections of Sethuraman disclose encoding the time between the previous encoded frame and the current frame, but do not disclose using the temporal location to scale the calculated similarity measure. App. Br. 8–9 (citing Sethuraman 7:11–15). Accordingly, on this record, we do not sustain the rejection of claim 40 as anticipated by Sethuraman.

Claim 1: Obviousness over Hsu and Rychagov

The Examiner finds Hsu and Rychagov teach or suggest “for each buffered input frame, assigning a weight based on a frame quality metric evaluating a quality of the frame, the frame quality metric being a function

³ Because we are persuaded of error with regard to the identified issue, which is dispositive of the rejection of claim 40 as anticipated by Hsu, we do not reach the additional issues raised by Appellants’ arguments.

of a rate of change of auto-exposure settings of the camera during capture of the frame,” as recited in claim 1. Appellants argue the Examiner admits Hsu does not teach or suggest this feature and relies on Rychagov for the limitation. App. Br. 10. Appellants argue Rychagov does not teach or suggest the frame quality metric being a function of a rate of change of auto-exposure settings, instead merely disclosing that image quality may depend on various factors, including a degree of exposure. App. Br. 10 (citing Rychagov ¶ 6).

Appellants have persuaded us of Examiner error. The cited section of Rychagov teaches “[t]he quality of the photographed image may differ due to various causes, such as the degree of the exposure” Rychagov ¶ 6. However, this section of Rychagov does not teach or suggest a frame quality metric being a function of a *rate of change* of a degree of exposure. Accordingly, we agree with Appellants the Examiner erred in finding the combination of Hsu and Rychagov teaches or suggests “the frame quality metric being a function of a rate of change of auto-exposure settings of the camera during capture of the frame.” We, therefore, do not sustain the rejection of claim 1 as unpatentable over Hsu and Rychagov. We also do sustain not the rejections of claims 3, 4, 16, 17, 19, 20, 26, 28, 29, 39, and 44–46 as unpatentable over Hsu and Rychagov; claims 5–11, 21, 30–34, and 47 as unpatentable over Hsu, Rychagov, and Jouppi; and claims 12–15, 22–25, 35–38, and 48–51 as unpatentable over Hsu, Rychagov, and Dai.⁴

⁴ Because we are persuaded of error with regard to the identified issue, which is dispositive of the rejection of claim 1 as unpatentable over Hsu and Rychagov, we do not reach the additional issues raised by Appellants’ arguments.

Claim 1: Obviousness over Sethuraman and Rychagov

Appellants argue the Examiner erred in rejecting claim 1 as unpatentable over Sethuraman and Rychagov. App. Br. 14–15. In particular, Appellants argue the Examiner admits Sethuraman does not teach or suggest the “for each buffered input frame” limitation and relies on Rychagov. *Id.* Appellants argue Rychagov fails to teach this limitation for the same reasons as articulated above in the rejection of claim 1 as unpatentable over Hsu and Rychagov. We are persuaded of Examiner error for the same reasons discussed above. Accordingly, we do not sustain the rejection of claim 1 as unpatentable over Sethuraman and Rychagov. We also do not sustain the rejection of claims 17 and 26 as unpatentable over Sethuraman and Rychagov for the same reasons.

DECISION

We reverse the decision of the Examiner rejecting claims 40–43 under 35 U.S.C. § 102(b) as anticipated by Hsu.

We reverse the decision of the Examiner rejecting claim 40 under 35 U.S.C. § 102(b) as anticipated by Sethuraman.

We reverse the decision of the Examiner rejecting claims 1, 3, 4, 16, 17, 19, 20, 26, 28, 29, 39, and 44–46 under 35 U.S.C. § 103(a) as unpatentable over Hsu and Rychagov.

We reverse the decision of the Examiner rejecting claims 5–11, 21, 30–34, and 47 under 35 U.S.C. § 103(a) as unpatentable over Hsu, Rychagov, and Jouppi.

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Application 13/443,745

We reverse the decision of the Examiner rejecting claims 12–15, 22–25, 35–38, and 48–51 under 35 U.S.C. § 103(a) as unpatentable over Hsu, Rychagov, and Dai.

We reverse the decision of the Examiner rejecting claims 1, 17, and 26 under 35 U.S.C. § 103(a) as unpatentable over Sethuraman and Rychagov.

REVERSED