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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte LING FENG HUANG,
HARI GANESH THIRUNAGESWARAM,
HARIHARAN G. LALGUDI,
SUMIT MOHAN, and KAI WANG

Appeal 2018-009008
Application 13/801,622
Technology Center 2400

Before JEAN R. HOMERE, JASON V. MORGAN, and GREGG I. ANDERSON, *Administrative Patent Judges*.

MORGAN, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Introduction

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–4, 6–12, 15, 17–21, 23–29, 32, 34–36, and 38. Claims 5, 13, 14, 16, 22, 30, 31, 33, and 37 are canceled. Appeal Br. 16, 18, 20. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

Summary of the disclosure

Appellant discloses a method of efficiently searching for candidate blocks for inter- or intra-coding that searching selected "candidate blocks based on a format of the video data." Abstract.

Representative claim (*key limitations emphasized*)

1. An apparatus for performing motion estimation, the apparatus comprising:

a processor configured to:

identify a size of an initial set of candidate blocks of video data to be searched for estimating motion for a current block;

select an initial set of candidate blocks for estimating motion for the current block, the initial set including an initial number of candidate blocks equal to the size, the set including at least one candidate block corresponding to a first block included in a first frame of the video data and at least one candidate block corresponding to a second block included in a second frame of the video data;

[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 Qualcomm Incorporated. Appeal Br. 3.

> generate a set of candidate blocks to search by removing a candidate block from the initial set based on a distance between the candidate block and a previously searched block;
>
> *select a search complexity level for searching the selected candidate blocks based on a format of the video data, wherein the format of the video data comprises a size of the frame and a frame rate of the video data*;
>
> identify an estimation block from the selected candidate blocks, the identification performed according to a search method of the selected complexity level;
>
> estimate the motion for the current block based on the estimation block;
>
> *in response to detecting a first format for the video data, search the first block in the set of candidate blocks before searching any other blocks in the set of candidate blocks*; and
>
> *in response to detecting a second format for the video data, search the second block in the set of candidate blocks before searching any other blocks in the set of candidate blocks.*

The Examiner's rejections and cited references

The Examiner rejects claims 1, 2, 4, 18,[2] 19, 21, 35, and 36 under 35 U.S.C. § 103(a) as being unpatentable over He et al. (US 2008/0084491

[2] Claim 18 is a method claim that recites both: (1) *in response to detecting a first format for the video data, searching the first block in the set of candidate blocks before searching any other blocks in the set of candidate blocks* and (2) *in response to detecting a second format for the video data, searching the second block in the set of candidate blocks before searching any other blocks in the set of candidate blocks*. These are not conditional recitations, and thus it appears that both the first block and the second block are to be searched before any other blocks, which is not possible if the first

A1; published Apr. 10, 2008) ("He"), Fandrianto et al. (US 2001/0046264 A1; published Nov. 9, 2001) ("Fandrianto"), Yu et al. (US 2008/0123733 A1; published May 29, 2008) ("Yu"), and Kim et al. (US 2007/0104274 A1; published May 10, 2007) ("Kim"). Final Act. 6–13.

The Examiner rejects claims 3 and 20 under 35 U.S.C. § 103(a) as being unpatentable over He, Fandrianto, Yu, Kim, and Lund et al. (US 2010/0169410 A1; published July 1, 2010) ("Lund"). Final Act. 16–17.

The Examiner rejects claims 6, 8, 12, 15, 23, 25, 29, and 32 under 35 U.S.C. § 103(a) as being unpatentable over He, Fandrianto, Yu, Kim, and Yi et al. (US 2012/0195356 A1; published Aug. 2, 2012) ("Yi"). Final Act. 17–21.

The Examiner rejects claims 7, 9, 24, and 26 under 35 U.S.C. § 103(a) as being unpatentable over He, Fandrianto, Yu, Kim, Yi, and Sasaki (US 5,959,672; issued Sept. 28, 1999). Final Act. 21–23.

The Examiner rejects claims 10, 11, 17, 27, 28, and 34 under 35 U.S.C. § 103(a) as being unpatentable over He, Fandrianto, Yu, Kim, and Tsai et al. (US 2006/0203914 A1; published Sept. 14, 2006) ("Tsai"). Final Act. 14–16.

The Examiner rejects claim 38 under 35 U.S.C. § 103(a) as being unpatentable over He, Fandrianto, Yu, Kim, and Cote et al. (US 2011/0032992 A1; published Feb. 10, 2011) ("Cote"). Final Act. 23–24.

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and second block differ. In the event of further prosecution, the Examiner should ascertain whether claim 18 and the claims that depend therefrom are indefinite under 35 U.S.C. § 112, second paragraph.

ADOPTION OF EXAMINER'S FINDINGS AND CONCLUSIONS

We agree with and adopt as our own the Examiner's findings as set forth in the Answer and in the Action from which this appeal was taken, and we concur with the Examiner's conclusions. We have considered Appellant's arguments, but do not find them persuasive of error. We provide the following explanation for emphasis.

ANALYSIS

In rejecting claim 1 as obvious, the Examiner finds that He's teaching that the complexity of a video stream can be adjusted by modifying its size or frame rate teaches or suggests *wherein the format of the video data comprises a size of the frame and a frame rate of the video data*. Final Act. 8 (citing, e.g., He ¶ 6). Appellant contends the Examiner erred because "[n]owhere does He specify that the format of a video data comprises 'a size of the frame and a frame rate of the video data.'" Appeal Br. 10. That is, Appellant argues "a discussion of 'reducing picture size' or 'reducing frame rate' does not teach that a video format comprises 'a size of the frame and a frame rate of the video data.'" *Id.*; *see also* Reply Br. 2.

Appellant's arguments are unpersuasive because He's picture size and frame rate teachings show that that the format of video data in He includes both a frame size and a frame rate.

In rejecting claim 1 as obvious, the Examiner relies on He's teaching regarding the effect on motion estimation of evaluating the complexity of a set of video image information to teach or suggest *selecting a search complexity level for searching the selected candidate blocks based on a format of the video data*. Final Act. 8 (citing He ¶¶ 6, 25, 33); *see also* Ans. 5. Appellant contends the Examiner erred because "the motion search

methods of He are selected based on the power savings factor (PSF) and not 'based on a format of the video data.'" Appeal Br. 11; *see also* Reply Br. 2–3.

Appellant's arguments are unpersuasive because He teaches "[t]he workload of the codec is varied based on the complexity of the information being processed," where complexity can be reduced "by reducing picture size (spatial resolution) or reducing frame rate (temporal resolution)." He ¶ 6. The search method can be further modified based on a power savings factor, as Appellant contends. Appeal Br. 11; *see also* He ¶ 25. This does not obviate, however, He's teaching or suggestion that search complexity is also determined by picture size and video frame rate (i.e., based on the format of the video data).

In rejecting claim 1 as obvious, the Examiner relies on Kim's distinction between inter- and intra-frames in searching video data to teach or suggest: (1) *in response to detecting a first format for the video data, search the first block in the set of candidate blocks before searching any other blocks in the set of candidate blocks* and (2) *in response to detecting a second format for the video data, search the second block in the set of candidate blocks before searching any other blocks in the set of candidate blocks*. Final Act. 11–12 (citing Kim ¶¶ 3, 7, 60–62, Fig. 8, 9); Ans. 7–8. In particular, the "Examiner interprets the intra and inter frame types of a frame to be a first format and second format of the video data, since video data includes frames because video comprises [a] plurality of frames." Final Act. 3. Appellant contends the Examiner erred because, although Appellant acknowledges "Kim describes consideration of the frame type of a frame,"

"Claim 1 recites 'in response to detecting a first format for the video data.'" Appeal Br. 14; *see also* Reply Br. 4–5.

Appellant's arguments are unpersuasive because Appellant fails to distinguish the claimed first format for the video data and second format for the video data from Kim's inter- and intra-frames. Appellant argues that "consideration of 'a size of the frame **and** a frame rate of the video data' . . . would frustrate the purpose of Kim." Reply Br. 4. The Examiner correctly notes, however, that "[t]he term 'a first format' and 'a second format' for the video data is broad and can be interpreted to be anything that relate[s] to [the] format of [the] video data because the claim does not cite a first [or second] format to be a frame size or frame rate." Ans. 7. That is,

> [t]he limitation of "the format of the video data comprises a size of the frame and a frame rate" . . . does not cite that the format of the video data *only* include[s] a size of the frame and a frame rate. Therefore, [the] format of the video data can include other things that related to video data.

Id. (italicized emphasis added).

For these reasons, we agree with the Examiner that the combination of He and Kim teaches or suggests the disputed recitations. Final Act. 8, 11–12. Accordingly, we sustain the Examiner's 35 U.S.C. § 103(a) rejections of claim 1, and claims 2–4, 6–12, 15, 17–21, 23–29, 32, 34–36, and 38, which Appellant does not argue separately with persuasive specificity. Appeal Br. 14; Reply Br. 6.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 2, 4, 18, 19, 21, 35, 36	103(a)	He, Fandrianto, Yu, Kim	1, 2, 4, 18, 19, 21, 35, 36	
3, 20	103(a)	He, Fandrianto, Yu, Kim, Lund	3, 20	
6, 8, 12, 15, 23, 25, 29, 32	103(a)	He, Fandrianto, Yu, Kim, Yi	6, 8, 12, 15, 23, 25, 29, 32	
7, 9, 24, 26	103(a)	He, Fandrianto, Yu, Kim, Yi, Sasaki	7, 9, 24, 26	
10, 11, 17, 27, 28, 34	103(a)	He, Fandrianto, Yu, Kim, Tsai	10, 11, 17, 27, 28, 34	
38	103(a)	He, Fandrianto, Yu, Kim, Cote	38	
Overall Outcome			1–4, 6–12, 15, 17–21, 23–29, 32, 34–36, 38	

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). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED