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Jack Schwartz & Associates, PLLC 6165 Jericho Turnpike Commack, NY 11725			ITSKOVICH, MIKHAIL	
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jack@jschwartzesq.com
pat.verlangieri@technicolor.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RICHARD EDWIN GOEDEKEN

Appeal 2019-001471
Application 14/008,366
Technology Center 2400

Before: JAMES R. HUGHES, MICHAEL M. BARRY, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

HUGHES, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Claims 1 and 3–20 are pending, stand rejected, are appealed by Appellant,¹ and are the subject of our decision under 35 U.S.C. § 134(a). *See* Final Act. 1; Appeal Br. 2.² We have jurisdiction under 35 U.S.C. § 6(b).

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Thomson Licensing. Appeal Br. 2.

² Throughout our decision we refer to Appellant’s Specification (“Spec.”) filed Sept. 27, 2013 (claiming benefit of PCT/US2011/000578, filed Mar. 31, 2011); Appeal Brief (“Appeal Br.”) filed Sept. 14, 2018; Supplemental Appeal Brief (“Supp. Appeal Br.”) filed Oct. 4, 2018; and Reply Brief (“Reply Br.”) filed Dec. 10, 2018. We also refer to the Examiner’s Final

We REVERSE.

CLAIMED SUBJECT MATTER

The invention “generally relates to video data decoders and encoders, and more particularly to techniques for optimizing such decoders and encoders” (Spec. 1:5–6) and, more specifically, decoding according to the H.264 standard using the context-adaptive binary data arithmetic coding (CABAC) process. Spec. 1:9–3:11; Abstract. Claims 1 (reciting a method for decoding), 12 (reciting a computer readable medium), and 13 (reciting a video data decoder apparatus) are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method for decoding transform coefficients, comprising:

[A] decoding consecutive bits of an input compressed bitstream using a CABAC decoder, said decoding comprising computing a minimum number of consecutive most probable symbol bits, wherein said minimum number of consecutive most probable symbol bits, mpbits, being greater or equal to two, wherein $mpbits = (\text{range} - \text{offset} - 1) / \text{subrange}$, wherein range and offset define a range and offset of a current state of the CABAC decoder, and the subrange is calculated using the range and context values of the current state of the CABAC decoder, and said decoding further comprising determining a decoded value of said consecutive bits according to said minimum number of consecutive most probable symbol bits;

[B] computing a first symbol value by adding one to the decoded value of said consecutive bits; and one of

[C] returning the first symbol value, if a total number of the decoded bits is less than a specified bit count; and

[D] computing a second symbol value as a function of the first symbol value, if the total number of the decoded bits

Office Action (“Final Act.”) mailed Apr. 16, 2018 and Answer (“Ans.”) mailed Oct. 31, 2018.

equals the specified bit count, and returning the second symbol value, wherein determining said decoded value further comprises, for the minimum number of consecutive most probable symbol bits, decoding most probable symbol bits with a same CABAC context and without checking the value of each most probable symbol bit.

Appeal Br. 23 (Claims App.) (bracketed claim limitation designations added).

REJECTIONS³

1. The Examiner rejects claims 1 and 3–20 under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter. *See* Final Act. 4–7.

2. The Examiner rejects claims 1 and 3–12 under 35 U.S.C. § 103(a) as being unpatentable over Applicant’s Admitted Prior Art (“AAPA”) and Wei Yu et al., *A High Performance CABAC Decoding Architecture*, Vol. 51, No. 4, 1352–59, IEEE Transactions on Consumer Electronics, Nov. 2005 (“Yu”). *See* Final Act. 8–16.

3. The Examiner rejects claims 13–20 under 35 U.S.C. § 103(a) as being unpatentable over AAPA, Yu, and Shim et al. (US 2007/0009047 A1), filed Jan. 11, 2007 (“Shim”). *See* Final Act. 16–17.

ANALYSIS

Subject Matter Eligibility—35 U.S.C. § 101

Under 35 U.S.C. § 101, a patent may be obtained for “any new and useful process, machine, manufacture, or composition of matter, or any new

³ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103. Because the present application has an effective filing date (Mar. 31, 2011) prior to the AIA’s effective date, this decision refers 35 U.S.C. § 103(a).

and useful improvement thereof.” The Supreme Court has “long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (quoting *Association for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)).

The Supreme Court, in *Alice*, reiterated the two-step framework previously set forth in *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 77–80 (2012). “[F]or distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice*, 573 U.S. at 217. The framework requires us first to consider “whether the claims at issue are directed to one of those patent-ineligible concepts.” *Alice*, 573 U.S. at 217. If so, we then examine “the elements of [the] claim both individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Alice*, 573 U.S. at 217 (quoting *Mayo*, 566 U.S. at 78, 79). That is, we examine the claim for an “inventive concept,” “an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Alice*, 573 U.S. at 217–18 (quoting *Mayo*, 566 U.S. at 72–73).

The Patent Office has published revised guidance concerning this framework and the application of § 101. USPTO’s 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (hereinafter “2019 Revised Guidance”). Under that guidance, we first look to whether the claim recites:

- (1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, mental processes, or certain methods of organizing human activity such as a fundamental economic practice or managing personal behavior or relationships or interactions between people) (hereinafter “Step 2A, prong 1”); and
- (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h)) (hereinafter “Step 2A, prong 2”).⁴

See 2019 Revised Guidance, 84 Fed. Reg. 51–52, 55.

A claim that integrates a judicial exception into a practical application applies, relies on, or uses the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception. *See* 2019 Revised Guidance, 84 Fed. Reg. 54. When the judicial exception is so integrated, then the claim is not directed to a judicial exception and is patent eligible under 35 U.S.C. § 101. *See* 2019 Revised Guidance, 84 Fed. Reg. 54.

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then evaluate whether the claim provides an inventive concept. *See* 2019 Revised Guidance, 84 Fed. Reg. 56; *see also Alice*, 573 U.S. at 217–18.

For example, we look to whether the claim:

- (3) adds a specific limitation beyond the judicial exception that is not “well-understood, routine, conventional” in the field (*see* MPEP § 2106.05(d)); or

⁴ All references to the MPEP are to the Ninth Edition, Revision 08–2017 (rev. Jan. 2018).

(4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.⁵

See 2019 Revised Guidance, 84 Fed. Reg. 56.

With these principles in mind, we turn to the merits of the § 101 rejection. The Examiner rejects Appellant’s claims 1 and 3–20 as being directed to patent-ineligible subject matter. *See* Final Act. 4–7; Ans. 5–6, 8–12. Appellant does not separately argue the claims with specificity and, instead, argues the claims together for this rejection. *See* Appeal Br. 9–13. Accordingly, we address the Examiner’s rejection of independent claim 1 and the claims not separately argued by Appellant as a group based on claim 1, as permitted by 37 C.F.R. § 41.37(c)(1)(iv) (2018). We further address the rejection of Appellant’s claim 1 with respect to whether the claim recites a judicial exception (an abstract idea), which is dispositive of the patent-eligibility issue.

Statutory Subject Matter

Claim 1 recites a “method” (*supra*). Appellant’s “method” uses a CABAC decoder to perform the delineated functionality for decoding transform coefficients. Appeal Br. 23 (Claims App.) (claim 1). Accordingly, we analyze Appellant’s method as a process, which is a statutory category of invention (subject matter) (USPTO’s Step 1).

⁵ Items (3) and (4) are collectively referred to as “Step 2B” hereinafter and in the 2019 Revised Guidance.

Abstract Idea

The Examiner rejects Appellant’s claim 1 as being directed to patent-ineligible subject matter. *See* Final Act. 4–7; Ans. 5–6, 8–12. Specifically, the Examiner concludes claim 1 and Appellant’s other pending claims “appear to be directed toward an abstract idea”—“conversion of numerical information based on a count of a number of bits and comparison to pre-specified values, in the context of processing video data” similar to *RecogniCorp, LLC v. Nintendo Co., Ltd.*, 855 F.3d 1322 (Fed. Cir. 2017) and *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972). Final Act. 5. The Examiner further explains “the present claims are directed entirely to mathematically processing data (computing a symbol value by counting the number of bits in the symbol) without application to particular transformative methodology or even to a specific field of use” (Ans. 5), and this “abstract idea (formula / calculation of a number of bits) combined with a well-established abstract idea (CABAC algorithm that calculates a number of bits) is still . . . an abstract idea and it is not eligible under section 101” (Ans. 6). *See* Ans. 5–6.

Appellant contends the Examiner erred in rejecting the claims as being directed to patent-ineligible subject matter. *See* Appeal Br. 8–13; Reply Br. 3–5. Specifically, Appellant contends, *inter alia*, that “claim 1 is directed to a method of optimizing decoding transform coefficients by accelerating the execution of a CABAC decoding process using a CABAC decoder” (Appeal Br. 9) and “[t]he features of claim[] 1 . . . provide improvements in the functioning of a decoder device itself over the prior art and thus should not be considered an abstract idea” (Appeal Br. 10). Appellant further explains that the “context used by the CABAC decoder” is

“tightly linked to the type of encoded data” and, therefore, “contrary to the assertion in the Examiner’s Answer, is not a pure mathematic solution/abstract idea.” Reply Br. 3–4.

We conclude Appellant’s claim 1 (and, therefore, the other pending claims) recite abstract ideas under the 2019 Revised Guidance, as follows.

Claim 1 (Appeal Br. 23 (Claims App.)) recites “decoding transform coefficients” by “decoding consecutive bits of an input compressed bitstream using a CABAC decoder,” where the decoding comprises “computing a minimum number of consecutive most probable symbol bits” and wherein the minimum number of consecutive most probable symbol bits (“mpbits”) is determined as “being greater or equal to two,” using an algorithm, and the “decoding further comprising determining a decoded value of said consecutive bits according to said minimum number of consecutive most probable symbol bits” (limitation A). The algorithm of limitation A is defined as: “ $mpbits = (\text{range} - \text{offset} - 1) / \text{subrange}$, wherein range and offset define a range and offset of a current state of the CABAC decoder, and the subrange is calculated using the range and context values of the current state of the CABAC decoder.” Claim 1 further recites “computing a first symbol value by adding one to the decoded value of said consecutive bits” (limitation B) and “returning the first symbol value, if a total number of the decoded bits is less than a specified bit count” (limitation C). Alternately, instead of returning the first symbol value, the decoding may comprise “computing a second symbol value as a function of the first symbol value, if the total number of the decoded bits equals the specified bit count” and “returning the [computed] second symbol value.” And, the determining of the “decoded value further comprises, for the minimum

number of consecutive most probable symbol bits, decoding most probable symbol bits with a same CABAC context and without checking the value of each most probable symbol bit” (limitation D).

In summary, claim 1 recites a process of decoding transform coefficients by computing various values contingent on various computation results. Hereinafter, we refer to this process as the “transform coefficient decoding process.”

Appellant contends that the decoding process uses the state of the CABAC decoder, that the context used in the decoding process is dependent on the encoded data and, accordingly, the process is not entirely mathematical—i.e., using a CABAC decoder “is not a pure mathematic solution” (Reply Br. 3). *See* Reply Br. 3–4. We disagree. Appellant’s claim 1 requires calculations that are contingent on other calculations—“the subrange is calculated using the range and context values of the current state of the CABAC decoder” (limitation A), “computing a first symbol value” but “returning the first symbol value” only if “a total number of the decoded bits is less than a specified bit count” (limitations B and C), or instead “computing a second symbol value” “and returning the second symbol value” “if the total number of the decoded bits equals the specified bit count” (limitation D). Although some non-mathematical operations are recited (the claim does not recite only an abstract algorithm and calculations)—for example, inputting the CABAC decoder state (including the context, range, and offset)—the majority of the recited operations/functions are mathematical concepts and the focus of the claim is to decoding (an abstract mathematical concept). *See RecogniCorp*, 855 F.3d at 1326 (“standard encoding and decoding” are “an abstract concept”).

As set forth in the USPTO’s October 2019 Update: Subject Matter Eligibility, § II.A (available at https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf) (“October 2019 Update”), a “claim recites a mathematical concept” when it recites a “mathematical relationship,” a mathematical “formula or equation” (e.g., an algorithm), or “a mathematical calculation.” October 2019 Update 2–3. A “claim does not recite a mathematical concept (i.e., the claim limitations do not fall within the mathematical concept grouping), if it is only based on or involves a mathematical concept.” October 2019 Update 3 (citing *Thales Visionix Inc. v. U.S.*, 850 F.3d 1343, 1348–49 (Fed. Cir. 2017)). Here, however, unlike the claims in *Thales*, Appellant’s claim 1 recites only incidental data acquisition (inputting the state of the CABAC decoder) to make the recited calculations. *See Thales*, 850 F.3d at 1348–49. Appellant’s claim 1 calculates mbits using the delineated algorithm, compares (performs functionality that evaluates the mathematical relationship between) the total number of decoded bits and the specified bit count (i.e., determines if the decoded bits are “less than” or “equal to” the specified bit count), and returns either the first or second symbol based on the result.

Thus, Appellant’s claim 1 (as well as the other pending claims) recites mathematical concepts.

In summary, we conclude Appellant’s claim 1 recites a judicial exception (USPTO’s Step 2A, Prong 1; *see* 2019 Revised Guidance). Specifically, claim 1 recites a process of decoding transform coefficients—the transform coefficient decoding process—by decoding consecutive bits of an input compressed bitstream using a CABAC decoder, computing symbol values, and returning the a particular symbol value based on a comparison of

the total number of the decoded bits and a specified bit count, as discussed *supra*. The transform coefficient decoding process recites mathematical concepts. *See* 2019 Revised Guidance, 84 Fed. Reg. 52.

Practical Application

Having determined that Appellant’s claim 1 recites an abstract idea, we next determine, under Step 2A, Prong 2 of the 2019 Revised Guidance, whether the claims are directed to that abstract idea, or whether the claims integrate the abstract idea into a practical application of that abstract idea. *See* 2019 Revised Guidance, 84 Fed. Reg. 54. In doing so, we evaluate the claim as a whole to determine whether the claim “integrate[s] the [abstract idea] into a practical application, using one or more of the considerations laid out by the Supreme Court and the Federal Circuit.” 2019 Revised Guidance, 84 Fed. Reg. 55; *see also* October 2019 Update 12 (discussing the practical application analysis). That is, we consider any additional elements recited in the claim along with the limitations that recite an abstract idea to determine whether the claim integrates the abstract idea into a practical application. *See* October 2019 Update 12.

Claim 1 recites an additional element beyond the abstract transform coefficient decoding process (the judicial exception). The additional element in claim 1 includes a “CABAC decoder.” Appeal Br. 23 (Claims App.) (claim 1).

Appellant’s Specification describes “context-adaptive binary data arithmetic coding (CABAC)” (Spec. 1:19) and performing the “CABAC decoding process . . . during the transform coefficients decoding process” (Spec. 1:25–26) “by running a loop on a general-purpose CABAC bit

decoding function until a specified bit count . . . is encountered (Spec. 2:5–6).

Appellant characterizes the recited transform coefficient decoding process as a technical improvement over existing decoding functionality and contends claim 1 (as well as the other pending claims) “provide improvements in the functioning of a decoder device itself over the prior art and thus should not be considered an abstract idea.” Appeal Br. 10; *see* Appeal Br. 9–12; Reply Br. 4–5. In other words, Appellant contends the claims recite a technological improvement that amounts to more than simply utilizing a computer as a tool to accomplish the asset management process. Appellant’s contentions correspond to the reasoning in MPEP § 2106.05(a), where additional elements integrate the judicial exception into a practical application.

We find Appellant’s contentions, i.e., that the claim integrates the abstract idea into a practical application, persuasive. As explained by Appellant (*see* Appeal Br. 9–12) and described in Appellant’s Specification (*see* Spec. 4:11–22; 4:29–5:6), the transform coefficient decoding process of claim 1 includes additional functionality beyond the standard CABAC decoding function (*supra*). “In order **to speed-up the decoding process**, the present claimed arrangement advances the state machine of the CABAC decoder for several consecutive bits having the same value in the received bitstream.” “Hence, instead of handling explicitly each bit by calling/executing a decoding function, [the recited transform coefficients decoding process] handle[s] several consecutive bits of the bitstream via the calling of one function.” Appeal Br. 10.

Although Appellant’s claim 1 recites abstract mathematical concepts (*supra*) and standard CABAC decoder functionality, when evaluated as a whole the claim integrates the abstract transform coefficient decoding process into a practical application in a manner that imposes a meaningful limit on the judicial exception, such that it is more than a drafting effort designed to monopolize the exception. *See Alice*, 573 U.S. at 221–24 (citing *Mayo*, 566 U.S. at 78–85); Revised Guidance, 84 Fed. Reg. 55.

Appellant’s claim 1 (and the other pending claims) are similar to the patent-eligible claims in *McRO* directed to “a specific means or method that improves the relevant technology” (*McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016)).

Although Appellant’s claim 1 involves “standard encoding and decoding, an abstract concept long utilized to transmit information” (*RecogniCorp*, 855 F.3d at 1326), the claim recites a specific implementation of decoding using a CABAC decoder, also using the current state information from the CABAC decoder, and returning the a particular symbol value based on a comparison of the total number of the decoded bits and a specified bit count in order to advance the state of the CABAC decoder. Thus, Appellant’s claim 1 is also similar to the patent-eligible claims in *Gemalto* (*Koninklijke KPN NV v. Gemalto M2M GmbH*, 942 F.3d 1143 (Fed. Cir. 2019) (“*Gemalto*”). In *Gemalto*, the Federal Circuit found the claims recited “a sufficiently specific implementation . . . of an existing tool . . . that improves . . . detecting systematic errors in data transmissions.” *Gemalto*, 942 F.3d at 1151. “Importantly, the claims do not simply recite, without more, the mere desired result of catching previously undetectable systematic errors, but rather recite a specific solution for accomplishing that

goal—i.e., by varying the way check data is generated by modifying the permutation applied to different data blocks.” *Id.* Here, similar to the claims in *Gemalto*, Appellant’s claim 1 is “limited to a specific improvement in computer functionality.” *Gemalto*, 942 F.3d at 1152.

In summary, we conclude Appellant’s claim 1 recites a judicial exception, but integrates the judicial exception into a practical application. Accordingly, Appellant’s claim 1 and the other pending claims are *not directed to* an abstract idea. For at least the reasons above, we are persuaded of Examiner error in the rejection of claim 1 under 35 U.S.C. § 101. Thus, we do not sustain the Examiner’s rejection under § 101 of independent claim 1, independent claims 12 and 13, which recite commensurate limitations, and claims 3–11 and 14–20, which depend from claims 1 and 13, respectively.

Obviousness Rejection of Claims 1 and 3–12

The Examiner rejects independent claim 1 (as well as dependent claims 3–12) as being obvious over Applicant’s Admitted Prior Art (AAPA) and Yu. *See* Final Act. 8–12; Ans. 6–8, 12–15. Appellant contends that the AAPA and Yu do not teach the disputed limitations of claim 1. *See* Appeal Br. 13–19; Reply Br. 5–6. Specifically, Appellant contends, *inter alia*, that the AAPA does not teach mbits (most probable symbol bits) or computing the minimum number of consecutive most probable symbol bits, and Yu does not teach determining a decoded value of consecutive bits, or more specifically, determining the minimum number of consecutive most probable symbol bits. *See* Reply Br. 5–6.

We agree with Appellant that the Examiner-cited portions of the AAPA and Yu (*see* Final Act. 9–12 (citing Spec. 1:9–2:24 and Yu 1353)) do

not teach or suggest determining the minimum number of consecutive most probable symbol bits as required by Appellant’s claim 1. *See* Appeal Br. 14–19; Reply Br. 5–6. The Examiner cites Appellant’s Specification (Spec. 1:9–2:24) for teaching CABAC decoding and the other features of claim 1, with the exception of computing a minimum number of consecutive most probable symbol bits (mbits). *See* Final Act. 8–12; Ans. 6–8, 12–15. The Examiner relies on Yu (1353) to teach this feature—“Yu teaches the above claim embodiment in the context of variable length video coding: The state value is used as an index of the estimated probability value of the least probable symbol ‘LPS’ with (code register C which marks the lower bound of the interval[)]” (Final Act. 11; *see* also Ans. 7–8 (quotation marks and internal citations omitted)). The Examiner cited portion of Yu, however, describes a least probable *symbol*, not the minimum number of consecutive most probable symbol *bits* (mbits), much less most probable symbol bits calculated and decoded as recited in claim 1 (computed according to the algorithm in claim 1 and decoded using the same CABAC context without checking the value of each bit). The Examiner does not explain sufficiently how the cited portions of the AAPA in combination with Yu at least suggest the disputed computation of the minimum number of consecutive most probable symbol bits and decoding the most probable symbol bits as required by claim 1.

Consequently, we are constrained by the record before us to find that the Examiner erred in finding that the combination of AAPA and Yu renders obvious Appellant’s claim 1. Claims 3–12 depend from and stand with claim 1.

Obviousness Rejection of Claims 13–20

The Examiner rejects dependent claims 13–20 under 35 U.S.C. § 103(a) as being obvious over AAPA, Yu, and Shim. *See* Final Act. 16–17.

The Examiner does not suggest Shim cures the deficiencies of AAPA and Yu (*supra*). Therefore, we reverse the Examiner’s obviousness rejection of dependent claims 13–20 for the same reasons set forth for claim 1 (*supra*).

CONCLUSION

For the reasons discussed above, we determine that claims 1 and 3–20 are not directed to an abstract idea. We also determine that claims 1 and 3–20 are not rendered obvious in view of the cited prior art. Appellant has shown that the Examiner erred in rejecting claims 1 and 3–20 under 35 U.S.C. § 101. Appellant has also shown that the Examiner erred in rejecting claims 1 and 3–20 under 35 U.S.C. § 103(a). We, therefore, do not sustain the Examiner’s rejection of claims 1 and 3–20.

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1, 3–20	101	Patent-Eligibility		1, 3–20
1, 3–12	103	AAPA, Yu		1, 3–12
13–20	103	AAPA, Yu, Shim		13–20
Overall Outcome				1, 3–20

REVERSED