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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID SHERWOOD, JAMES WILLIAM WALKER, and
TRAVIS WALTON

Appeal 2017-006552
Application 13/906,056¹
Technology Center 2100

Before JOSEPH L. DIXON, MARC S. HOFF, and JASON M. REPKO,
Administrative Patent Judges.

HOFF, *Administrative Patent Judge.*

DECISION ON APPEAL
STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a Final Rejection of claims 21–40. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

Appellants' invention is an apparatus, method, and computer program product for producing random digital data. Responsive to a request for random data, an entropy manager determines whether a higher level of entropy is required by a consuming entity, by analyzing one or more events in accordance with one or more rules. Responsive to a determination that a

¹ The real party in interest is International Business Machines Corporation. App. Br. 2.

higher level of entropy is not required, the entropy manager sets an entropy state to a lower level and obtains random data from an entropy source having a lower level of entropy. Responsive to a determination that a higher level of entropy is required, the entropy manager switches the entropy state to a higher level and obtains random data from an entropy source having a higher level of entropy. *See Abstract.*

Claim 21 is exemplary of the claims on appeal:

21. A digital data apparatus for producing random digital data, comprising:

at least one physical processor;

a physical system memory;

a plurality of entropy sources each generating respective random source digital data having a corresponding level of entropy, including a first entropy source generating random source digital data having a first level of entropy, and a second entropy source generating random source digital data having a second level of entropy lower than said first level of entropy, said second entropy source being independent of said first entropy source;

a random number generator embodied as computer program code storable in said physical system memory and executable on said at least one physical processor, said random number generator receiving input from each said plurality of entropy sources, said random number generator generating a random digital data output by a deterministic algorithm using input from a selective one of said plurality of entropy sources as a seed for said deterministic algorithm;

an entropy manager embodied as computer program code storable in said physical system memory and executable on said at least one physical processor, wherein said entropy manager automatically selects one entropy source among said plurality of entropy sources as input for the seed for said deterministic algorithm used by said random number generator, said entropy manager automatically selecting one entropy source among said

plurality of entropy sources by determining a minimum level of entropy required by a consuming entity from among multiple possible minimum levels of entropy required, wherein the consuming entity consumes random digital data output by said random number generator to perform at least one data processing function, wherein the minimum level of entropy required by the consuming entity is a minimum level required as input for the seed for said random number generator to produce the random digital data output consumed by the consuming entity, said entropy manager further automatically selecting an entropy source from among said plurality of entropy sources having the lowest corresponding level of entropy which meets said minimum level of entropy required by the consuming entity.

The Examiner relies upon the following prior art in rejecting² the claims on appeal:

Rose	US 2008/0263117 A1	Oct. 23, 2008
Zhang	US 2010/0002877 A1	Jan. 7, 2010
Herbert	US 2010/0332574 A1	Dec. 30, 2010

Claims 21–40 stand rejected under 35 U.S.C. § 101 as being directed to ineligible subject matter.

Claims 21–23, 26–30, 33–36, 39, and 40 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang and Rose.

Claims 24, 25, 31, 32, 37, and 38 rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhang, Rose, and Herbert.

Throughout this Decision, we make reference to the Appeal Brief (“App. Br.,” filed Oct. 3, 2016) and the Examiner’s Answer (“Ans.,” mailed Jan. 30, 2017) for their respective details.

² The Examiner has withdrawn the § 112, first paragraph, rejection of claim 40. Ans. 2.

ISSUES

1. Are the claims directed to patent-eligible subject matter?
2. Does the combination of Zhang and Rose disclose or suggest determining a minimum level of entropy required by a consuming entity from among multiple possible minimum levels of entropy required?

PRINCIPLES OF LAW

The Supreme Court

set forth a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts. First, . . . determine whether the claims at issue are directed to one of those patent-ineligible concepts. . . . If so, we then ask, “[w]hat else is there in the claims before us?” . . . To answer that question, . . . consider the elements of each 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. . . . [The Court] described step two of this analysis as a search for an “inventive concept”—*i.e.*, 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 Corp. Pty. Ltd. v. CLS Bank Int’l, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66 (2012)).

ANALYSIS

§ 101 REJECTION

Applying *Alice* step one, the Examiner first finds that the claimed invention is drawn to an abstract idea, *i.e.*, “apparatuses, methods, and computer program products which perform mathematical steps. . . .

[E]ntropy information is gathered in the form of binary numbers and is manipulated mathematically to generate random data, which is also represented in binary.” Ans. 3.

Applying step two of the Alice analysis, the Examiner finds that the limitations beyond the abstract mathematical steps are merely elements found in a general purpose computer. *Id.* The Examiner characterizes the claimed “entropy manager” as “merely code stored in the memory and used to perform certain steps in the mathematical algorithm.” Similarly, “entropy sources” are regarded as “merely the sources used to generate numbers,” and the claimed “random number generator” is described as “merely code and hardware used to generate further numerical information using the entropy data.” *Id.*

The Examiner criticizes Appellants’ argument concerning alleged improvement to a computer system, stating that Appellants never define “certain less essential purposes” for which “relatively lower entropy data” would be appropriate. Ans. 4.

We conclude that the Examiner erred in rejecting the claims as directed to non-statutory subject matter. We agree with Appellants that the Examiner has overgeneralized the claimed invention by summarizing it as the mere performance of mathematical steps, or as information gathered in the form of binary numbers that is manipulated mathematically to generate random data. *See App. Br. 11; Ans. 3.*

Appellants’ claimed invention is directed to generating random digital data for use by a consuming entity. For certain purposes, e.g., strong encryption, random data having higher entropy is required; for other purposes, lower entropy (and thus quicker to gather) random data will

suffice. *See* Spec. 1–3. In the invention, an entropy manager determines the minimum level of entropy required by a consuming entity, and selects the random data (i.e., entropy) source that supplies random data having a requisite level of entropy for the consuming entity’s purposes.

We do agree generally with the Examiner’s conclusion that Appellants’ claimed invention is drawn to an abstract idea. The claims under appeal are drawn to method and apparatus for producing random digital data, including a random number generator for generating said random digital data by following a deterministic algorithm using input from one of a plurality of entropy sources as a seed.

Appellants persuade us, however, that the claims are, nonetheless, statutory under the second prong of the *Alice* analysis. Representative claim 21 recites, *inter alia*, an entropy manager that “automatically selects one entropy source” from among a plurality, as the seed for the deterministic algorithm. The entropy manager makes this selection “by determining a minimum level of entropy required by a consuming entity . . . the minimum level of entropy required by the consuming entity is a minimum level required as input for the seed for said random number generator . . . said entropy manager further automatically selecting an entropy source from among said plurality of entropy sources having the lowest corresponding level of entropy which meets said minimum level of entropy required by the consuming entity.”

In support, Appellants’ Specification discloses that “[h]igh-entropy data is difficult for a computer to generate,” and even if one resorts to techniques such as monitoring network traffic, “it takes time in order to gather such random data.” Spec. 10. Appellants’ invention, thus, sets forth

a system that automatically balances the tradeoff between (a) high entropy, hard to predict (and thus hard to attack) data that is scarce, time-consuming to produce, or both, and (b) lower entropy, less difficult to predict (but less secure) data that is easier to gather, less computationally intensive to produce, or both. *See* Spec. 9–10.

We conclude that the function of the entropy manager in the claimed invention results in claims drawn to significantly more than an abstract idea. *See Alice*, 134 S. Ct. at 2355. Like the animation method in *McRO Inc. v. Bandai Namco Games America Inc.*, 837 F.3d 1299 (Fed. Cir. 2016), we conclude that the claims under appeal are limited to rules with specific characteristics. *McRO*, 837 F.3d at 1314–15. Like the self-referential logical table in *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016), we conclude that the appealed claims focus on a specific means or method that improves the relevant technology. *See Enfish*, 822 F.3d at 1335. Here, Appellants’ invention focuses on a specific method of providing an entropy manager to make a decision concerning the appropriate entropy level to be employed, in order to supply random digital data of sufficient entropy while conserving computer processing power and/or time.

We agree with Appellants that the Examiner erred in rejecting 21–40 as being directed to ineligible subject matter. We do not sustain the Examiner’s § 101 rejection.

§ 103(a) REJECTION OVER ZHANG AND ROSE

We do not agree with the Examiner’s finding that Zhang discloses determining a minimum level of entropy required by a consuming entity from among multiple possible minimum levels of entropy, as the claims

require. Ans. 5. The Examiner characterizes Zhang as disclosing two possible minimum levels of entropy: “[e]ither the entropy level ‘satisfies/reaches’ the predetermined security strength or it surpasses this threshold.” Ans. 5 (citing Zhang ¶ 31). In contrast to the Examiner, we find that Zhang discloses only the aforementioned “predetermined security strength.” Zhang ¶¶ 23–31. The Examiner has not identified a teaching in Zhang that this predetermined security strength takes on one of *multiple* possible values. Zhang teaches only that this *single* value is *the* threshold against which the entropy of a string of bits from the entropy data acquisition module is assessed. Zhang ¶¶ 28–31.

We find that the combination of Zhang and Rose does not teach all the limitations of claims 21–23, 26–30, 33–36, 39, and 40. Accordingly, we do not sustain the Examiner’s § 103(a) rejection.

§ 103(a) REJECTION OF CLAIMS 24, 25, 31, 32, 37, AND 38

Each of these claims depends from either independent claim 21, independent claim 28, or independent claim 34.

We have reviewed Herbert, and we find that it does not remedy the deficiencies of Zhang and Rose, as we expressed *supra*. Accordingly, we do not sustain the § 103(a) rejection of claims 24, 25, 31, 32, 37, and 38 over Zhang, Rose, and Herbert, for the same reasons expressed with respect to parent claims 21, 28, and 34, *supra*.

CONCLUSIONS

1. The claims are directed to patent-eligible subject matter.
2. The combination of Zhang and Rose does not disclose or suggest determining a minimum level of entropy required by a consuming entity from among multiple possible minimum levels of entropy required.

ORDER

The Examiner's decision to reject claims 21–40 is reversed.

REVERSED