UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte ALON MICHAEL SHALITA, MING HUA, and
RYAN ALLEN STOUT

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Appeal 2017-009965
Application 13/690,088[1]
Technology Center 3600

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Before DEBRA K. STEPHENS, DANIEL J. GALLIGAN, and
DAVID J. CUTITTA II, *Administrative Patent Judges*.

Per Curiam.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from a non-final rejection
of claims 1–3, 5, 6, 8, 10, 14, 15, 17–19, and 23–26, which are all of the
claims pending in the application. We have jurisdiction under 35 U.S.C.
§ 6(b). Claims 9, 11, 12, and 21 have been cancelled. Claims 4, 7, 13, 16,
20, and 22 have been withdrawn (App. Br. 2).

We REVERSE.

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[1] According to Appellants, the real party in interest is Facebook, Inc. (App.
Br. 2).

CLAIMED SUBJECT MATTER

According to Appellants, the claims are directed to optimizing the evaluation of an expression in a social networking system by selecting an efficient representation of the expression (Abstract). Claim 1, reproduced below, is representative of the claimed subject matter:

1.   A computer-implemented method comprising:

receiving, by a social networking system, information describing a plurality of expressions, each expression specifying a set of computations using an expression language, each expression comprising operands and one or more operators for combining the operands into a result, the operands comprising attributes of entities represented in the social networking system;

for each expression of the plurality of expressions:

determining whether the expression includes a variable term referring to a different expression using the expression language;

selecting a type of representation for the expression by selecting between a tree representation and a postfix representation based at least in part on whether the expression includes a variable term referring to a different expression,

generating a data structure representing the expression by converting the expression from the expression language to the selected type of representation, and

storing the generated data structure in a cache;

receiving a request to evaluate an expression for a set of entities represented in the social networking system, the request associated with a viewing user;

accessing, from a feature store of the social networking system, values of operands included in the requested expression for the set of entities;

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accessing the data structure representing the requested expression from the cache;

determining, by a processor, an expression result for each entity of the set of entities by evaluating the requested expression using the data structure representing the expression accessed from the cache and using the values of the operands of the requested expression accessed from the feature store;

selecting one or more of the entities based on a ranking of the set of entities according to the expression result for each entity; and

providing the selected one or more entities for presentation to the viewing user.

REJECTION

Claims 1–3, 5, 6, 8, 10, 14, 15, 17–19, and 23–26[2] stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter (Non-Final Act. 2–3).

ISSUE

35 U.S.C. § 101

Appellants argue their invention as recited in claims 1–3, 5, 6, 8, 10, 14, 15, 17–19, and 23–26,[3] is directed to patent-eligible subject matter (App. Br. 8–23). The issue presented by the arguments is:

Issue: Has the Examiner erred in concluding the invention as recited is directed to patent-ineligible subject matter?

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[2] The Examiner's non-final action rejects claims 1–8, 10–20, and 20–26 under 35 U.S.C. § 101 (Non-Final Act. 2). Appellants' April 22, 2016 Response canceled claims 9, 11, 12, and 21 and withdrew claims 4, 7, 13 16, 20, and 22 (Response 2–12). As such, we understand the Examiner's rejection to be directed to claims 1–3, 5, 6, 8, 10, 14, 15, 17–19, and 23–26.
[3] Appellants' Appeal Brief addresses claims 1–8, 10–20, and 22–26. For the reason discussed above, we understand Appellants' arguments to be directed to claims 1–3, 5, 6, 8, 10, 14, 15, 17–19, and 23–26.

ANALYSIS

The Examiner determines the claims do not recite patent-eligible subject matter (Non-Final Act. 2–3). In addressing the first step of the eligibility inquiry (*Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1296–97 (2012))), the Examiner determines the claims are directed to similar abstract ideas of "optimizing expression language using an efficient execution in a social media environment[,] which is a mathematical relationship/formula" (Non-Final Act. 2–3), "organizing information through mathematical correlations" (*id.* at 4), and "employ[ing] mathematical algorithms to manipulate existing information to generate additional information" (Ans. 6).

Appellants argue the claims are not directed to an abstract idea and instead "are directed to an improvement to computer functionality because their purpose and effect are to improve the computer's performance when evaluating expressions in the context of a social network system" (App. Br. 16; Reply Br. 3). Appellants assert that the improvement to computer functionality is provided by the claimed use of "a particular data structure representation (tree or postfix) that will be computationally efficient for a given expression (e.g., based on whether that expression includes variable terms)" (App. Br. 18), i.e., "in order to improve performance of determining expression results, the type of data structure generated specifically depends on the content of the expression" (*id.* at 12).

We are persuaded by Appellants' arguments. Our reviewing court has found it "relevant to ask whether the claims are directed to an improvement to computer functionality versus being directed to an abstract idea, even at

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the first step of the Alice analysis" (*Enfish, LLC v. Microsoft Corp.*, 822
F.3d 1327, 1335 (Fed. Cir. 2016)). Accordingly, "the first step in the Alice
inquiry in this case asks whether the focus of the claims is on the specific
asserted improvement in computer capabilities," i.e., improving
computational efficiency, "or, instead, on a process that qualifies as an
'abstract idea' for which computers are invoked merely as a tool" (*id.* at
1335–36).

Here, based on Appellants' representations, we determine that the
claims are directed to a specific improvement to the way computers operate
and are, as such, not abstract. Claim 1 recites, in pertinent part,

> determining whether the expression includes a variable
> term referring to a different expression using the expression
> language;

> selecting a type of representation for the expression by
> selecting between a tree representation and a postfix
> representation based at least in part on whether the expression
> includes a variable term referring to a different expression,

> generating a data structure representing the expression by
> converting the expression from the expression language to the
> selected type of representation, and

> storing the generated data structure in a cache.

That is, the claim selects either a tree representation or a postfix
representation of an expression; the selection is based on the type of
expression to be represented, namely whether the expression refers to
another, different expression. After selecting the type of representation, a
data structure corresponding to the selected type of representation is
generated and stored for evaluation. Appellants point to their Specification
as evidence that the claimed representation selection "improve[s] the
computer's performance when evaluating expressions" (Reply Br. 3 (citing

Spec. ¶ 61); App. Br. 10 (citing Spec. ¶¶ 59–60), 19–20). The Specification describes the "selection of the representation for an expression based on an efficiency of evaluation of the expression using the type of representation" and "[i]n general . . . prefers a postfix representation for an expression as being efficient compared to other representations" (Spec. ¶ 59). But, the Specification continues, "if the expression uses variables that represent other expressions" then "a tree representation for the expression" is selected because "postfix representation[s] of such expressions [are] difficult to build and maintain" (*id.* ¶ 60). The Specification concludes that "the use of the most efficient representation of each expression provides significant performance improvement" when evaluating expressions (*id.* ¶ 61, Abstract).

Therefore, the Specification states such representation selection and subsequent data structure generation based on expression type would result in the disclosed improvements when evaluating expressions and the skilled artisan would be able to implement those features; we have no basis in the record to the contrary. Although the Examiner fairly points out that the claims recite mathematical algorithms, i.e., expressions (Non-Final Act. 3–4; Ans. 6), the claims are not simply directed to the use of a computer to compute a mathematical expression (Ans. 3, 12). Instead, the claims purportedly enhance how the computer computes the mathematical expression, i.e., improves the computer's functionality, by using a data structure representing either a tree or postfix representation, dependent on the expression type. That is, although a computer is ultimately used to compute the expression, the claims purportedly describe an improvement in how the computer functions to compute the expression. Like *Enfish*, the

presently claimed use of a "specific type of data structure" is "designed to improve the way a computer" functions (822 F.3d at 1339).

"Because the claims are not directed to an abstract idea under step one of the *Alice* analysis, we do not need to proceed to step two of that analysis" (*id.* at 1339). Accordingly, we do not sustain the Examiner's rejection of independent claims 1, 14, and 23, which all similarly recite the expression representation selection and data structure generation limitations discussed above. It follows that we also do not sustain the rejection of dependent claims 2, 3, 5, 6, 8, 10, 15, 17–19, and 24–26 under 35 U.S.C. § 101.

DECISION

The Examiner's rejection of claims 1–3, 5, 6, 8, 10, 14, 15, 17–19, and 23–26 under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter is reversed.

REVERSED