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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte YI HUANG,
PENG FAN, and MAYANK KUMAR

Appeal 2020-000252
Application 14/498,894
Technology Center 3600

Before JAMES P. CALVE, WILLIAM A. CAPP, and
JEREMY M. PLENZLER, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the decision of the Examiner to reject claims 1–4, 6–10, 12–17, 19, and 20. Final Act. 2. Claims 5, 11, and 18 are cancelled. Appeal Br. 17, 19, 21 (Claims App.). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ “Appellant” refers to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Facebook, Inc. as the real party in interest. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Claims 1, 9, and 14 are independent. Claim 1 is reproduced below.

1. A method comprising:
 - receiving, from a third party system, a plurality of business rules specifying criteria for whether a user of an online system is to be included in each of a plurality of audience groups, each business rule including one or more conditions for associating a user with an audience group and each audience group including one or more users;
 - generating a decision tree including the plurality of business rules, the decision tree comprising a root node and one or more paths, each path connecting the root node with one or more nodes each identifying at least one audience group, at least one path comprising an intermediate node identifying a first audience group and a leaf node identifying a second audience group;
 - receiving contextual information from a client device associated with a user of the online system, the contextual information describing an interaction between the user and content of the third party system;
 - determining one or more audience groups associated with the user based on a portion of the received contextual information by traversing the decision tree, wherein traversing the decision tree comprises:
 - traversing one or more paths of the decision tree from the root node using the contextual information,
 - storing identifiers of nodes traversed, and
 - associating the user with the audience groups corresponding to the traversed nodes;
 - selecting an advertisement for presentation to the user based on the one or more audience groups associated with the user; and
 - providing the selected advertisement to the client device of the user.

REJECTION

Claims 1–4, 6–10, 12–17, 19, and 20 are rejected as directed to a judicial exception to 35 U.S.C. § 101.

ANALYSIS

Patent Eligibility of Claims 1–4, 6–10, 12–17, 19, and 20

Appellant argues the claims as a group. Appeal Br. 5–15. We select claim 1 as representative of the group. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Examiner’s Determination

The Examiner determines claim 1 recites the abstract idea of “utilizing business rules and user interactions to associate the user with an audience group and provide an advertisement to the user based on their associated audience group” using decision trees that can be done in the human mind. Final Act. 3; Ans. 4. The Examiner determines that claim 1 lacks additional elements that amount to significantly more than this abstract idea as it does not claim a technical improvement to computers but instead applies a known method of reducing burden in a computer environment. Final Act. 2–3.

Appellant’s Contentions

Appellant argues that the claims recite a specific improvement to how a computer processes data and performs certain operations as follows:

Specifically, the claims are directed to a solution for reducing an amount of processing burden needed by a computer when performing certain operations such as associating a user with an audience group, through the creation and traversal of a specific type of decision tree that reduces path redundancy and allows for multiple audience groups to be determined through a single path traversal.

Appeal Br. 6.

Appellant also argues the following benefits of the decision tree:

[T]he decision tree is constructed in a specific way so as to “reduce a size of the decision tree and improve efficiency of traversals of the decision tree” by sorting the individual conditions present in a set of business rules and constructing the tree “such that conditions occurring in a greater number of business rules appear higher in the decision tree than conditions occurring in fewer business rules.” ¶ [0049]. This results in a tree that contains “at least one path comprising an intermediate node identifying a first audience group and a leaf node identifying a second audience group,” allowing for multiple audience groups to be evaluated through traversal of single path of the decision tree. *See, e.g.*, Claim 1. Thus, the claim is directed to reducing processing burden when associating users with audience groups by generating a specific type of decision tree that combines a set of business rules in a manner that exhibits reduced size and improved traversal efficiency in comparison to conventional decision trees, and traversing the generated tree to identify audience groups.

Id. at 7.

Appellant contends that the present claims are analogous to a “self-referential table” in *Enfish*, which held that the claims were not directed to an abstract idea because they recited a specific type of data structure that improved the way a computer stores and retrieves data in memory and implemented a solution to a problem in the software arts. *Id.* at 7–8 (quoting *Enfish LLC v. Microsoft Corp.*, 822 F.3d 1327, 1339 (Fed. Cir. 2016)). Appellant asserts that the claims are not directed to just any type of decision tree, but to a specific type of decision tree that can classify a user into multiple audience groups through a single path traversal, which process is distinct from conventional decision trees, like the claims in *McRO Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016). *Id.* at 9.

Applicable Legal Principles

Section 101 of the Patent Act states:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

35 U.S.C. § 101. This provision contains an implicit exception: “Laws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. Pty. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

To distinguish patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications, we first determine whether the claims are directed to a patent-ineligible concept. *Id.* at 217. If they are, we consider the elements of each claim, individually and “as an ordered combination,” to determine if additional elements “‘transform the nature of the claim’ into a patent-eligible application” as an “inventive concept” sufficient to ensure the claims in practice amount to significantly more than a patent on the ineligible concept itself. *See id.* at 217–18.

The USPTO has issued guidance about this framework. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Revised Guidance”). Under the Revised Guidance, to determine whether a claim is “directed to” an abstract idea, we evaluate whether the claim recites (1) any judicial exceptions, including certain groupings of abstract ideas listed in the Revised Guidance (i.e., mathematical concepts, certain methods of organizing human activities such as a fundamental economic practice, or mental processes); and (2) additional elements that integrate the judicial exception into a practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h) (9th ed. rev. 08.2017 Jan. 2018) (“MPEP”)). *Id.* at 52–55.

Only if a claim (1) recites a judicial exception and also (2) does not integrate that exception into a practical application, do we then consider 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) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception. *Id.* at 56.

Step 1: Is Claim 1 Within a Statutory Category?

Claim 1 recites “[a] method” which is within a statutory category of 35 U.S.C. § 101, namely, a process. Therefore, we next consider whether it recites a judicial exception.

Step 2A, Prong 1: Does Claim 1 Recite a Judicial Exception?

We agree with the Examiner that claim 1 recites an abstract idea. The Revised Guidance now enumerates this abstract idea as certain methods of organizing the human activity of commercial interactions of advertising activities and mental processes. *See* Revised Guidance, 84 Fed. Reg. at 52.

The Specification describes this process as organizing online users into one or more audience groups based on their interaction activities with third party websites. Spec. ¶ 1. Users are placed into audience groups by these activities so third party advertisers can target advertisements at them.

To allow a third party system to target advertisements more effectively to users of an online system, the online system generates one or more audience groups each including one or more users of the online system. For example, an audience group includes online system users having one or more common characteristics.

Id. ¶ 4. Business rules identify user actions of audience groups. *Id.* ¶ 5.

Claim 1 recites this concept in the final three limitations as follows:

associating the user with the audience groups corresponding to the traversed nodes; selecting an advertisement for presentation to the user based on the one or more audience groups associated with the user; and providing the selected advertisement to the client device of the user.

Appeal Br. 16–17 (Claims App.) (reformatted from original).

Other aspects of this abstract idea include obtaining business rules that specify conditions that are used to associate users with audience groups by

receiving, from a third party system, a plurality of business rules specifying criteria for whether a user of an online system is to be included in each of a plurality of audience groups, each business rule including one or more conditions for associating a user with an audience group and each audience group including one or more users.

Id. at 16. This step involves extra-solution activity of receiving rules used to organize and categorize online activities of users into audience groups that receive targeted marketing in later steps in claim 1 discussed above. It thus recites another aspect of the abstract idea by receiving business rules used to *organize human activity for advertising*. “Each business rule includes one or more conditions for associating a user with an audience group.” Spec. ¶ 5. Rules identify user interactions with website pages to associate a user with an audience group. *Id.* Rules specify other criteria used to associate users with audience groups. *Id.* ¶ 38. Rules may associate a user with an audience group based on a user’s location or the location of content with which a user interacts (e.g., a website for a hotel in Paris). *Id.* Rules may specify a time or type of a user’s actions, e.g., interacting with a third party’s content by viewing a website page, clicking, or interacting with an application. *Id.*

The next step recites another aspect of this abstract idea as generating a decision tree including the plurality of business rules, the decision tree comprising a root node and one or more paths, each path connecting the root node with one or more nodes each identifying at least one audience group, at least one path comprising an intermediate node identifying a first audience group and a leaf node identifying a second audience group.

Appeal Br. 16 (Claims App.).

This step generates a decision tree by combining plural business rules into a decision tree with each path connecting the initial root node to one or more nodes that identify an audience group. This step is specified at a very high level of generality without any specific details of the process by which the business rules are combined to generate the decision tree. Generating “at least one path comprising an intermediate node identifying a first audience group and a leaf node identifying a second audience group” captures the concept of combining audience groups that share a common business rule or condition along the same path so user activity that satisfies the business rule for one audience group also satisfies the same business rule associated with another audience group. This concept thus forms a path based on a business rule that is common to more than one audience group. *See* Spec. ¶ 49.

Appellant argues that claim 1 improves computer operation and data processing of large numbers of individual business rules (Appeal Br. 6), but claim 1 only processes “a plurality of business rules” to generate a decision tree comprising “one or more paths” with “one or more nodes” that identify “at least one audience group.” At least one path is shared by two audience groups, one at an intermediate node and one at a leaf node. Any redundancy reduction is limited to one path and two business rules. *See* Spec. ¶¶ 49, 57.

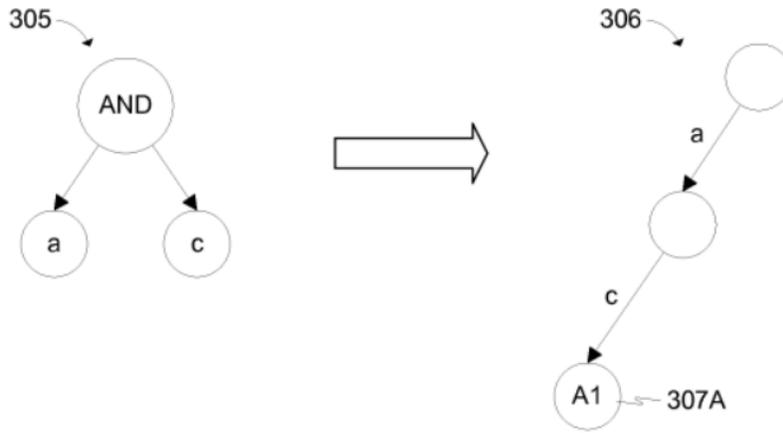
Appellant’s arguments that the claims reduce data processing burdens by reducing redundancy and placing more common conditions higher in the decision tree (Appeal Br. 6–7) are not commensurate with claim 1, which recites neither concept. The claimed decision tree does not sort hundreds or thousands of business rules or eliminate all redundancy. The Specification discloses that the system *may* define business rules to associate users with a large number groups. Spec. ¶¶ 48, 49, 57. We do not limit claim 1 to such an embodiment when the language is so much broader. *See Personalized Media Commc’ns, LLC v. Apple Inc.*, 952 F.3d 1336, 1343 (Fed. Cir. 2020).

Nor does claim 1 recite the concept that “conditions occurring in a greater number of business rules appear higher in the decision tree than conditions occurring in fewer business rules” as asserted. *See Appeal Br. 7.* This feature is not claimed. The step of generating a decision tree does not require a particular placement of conditions in the tree.

Thus, claim 1 does not recite features that allegedly improve computer performance and processing of a large number of business rules as Appellant argues, such as sorting all business rules to reduce all redundancy. Reducing redundancy in business rules of audience groups also depends on how many audience groups share the same business rule(s) that can be combined on the same path. None of these steps are recited either. *See Spec. ¶ 49.*

Claim 1 does not recite, nor does the Specification describe, advances in databases or software used to sort conditions in business rules to reduce redundancy and/or organize common conditions higher along paths in the decision tree. *Id.* ¶¶ 48, 49, 57. The Specification describes the process at a high level of generality as mental processes or steps that can be performed by a person using pen and paper. Claim 1 recites even higher level steps.

Figures 3C and 3D, reproduced below, illustrate how a fragment of a business rule is restructured as path 306 and combined into a decision tree.



Appellant's Figure 3C above illustrates fragment 305 of business rule 300 restructured as path 306. Fulfillment of conditions *a* and *c* associates a user with audience group A1 307A. Spec. ¶ 46.

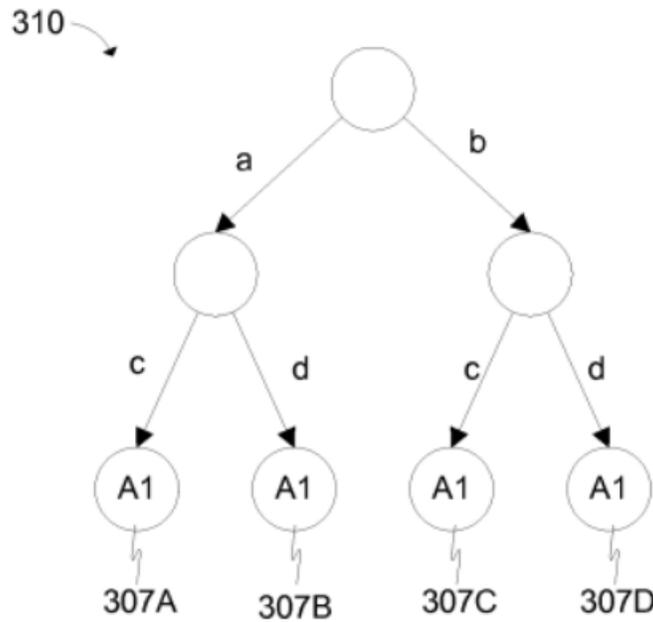


Figure 3D above illustrates path 306 to node 307A with paths to nodes 307B–307D. User activity that satisfies condition *a* or *b* and condition *c* or *d* is associated with audience group A1 if the decision tree is traversed to any of terminals 307A–307D. *Id.* ¶ 47.

Exemplary conditions are that a user views a third party web page with information about flights to Paris (*a*) or London (*b*), and the URL of the web page contains the term “purchase” (*c*) or “book” (*d*). *See id.* ¶ 44.

Decision tree 310 can be generated with other business rules for other audience groups as illustrated in Figure 3E, which is reproduced below.

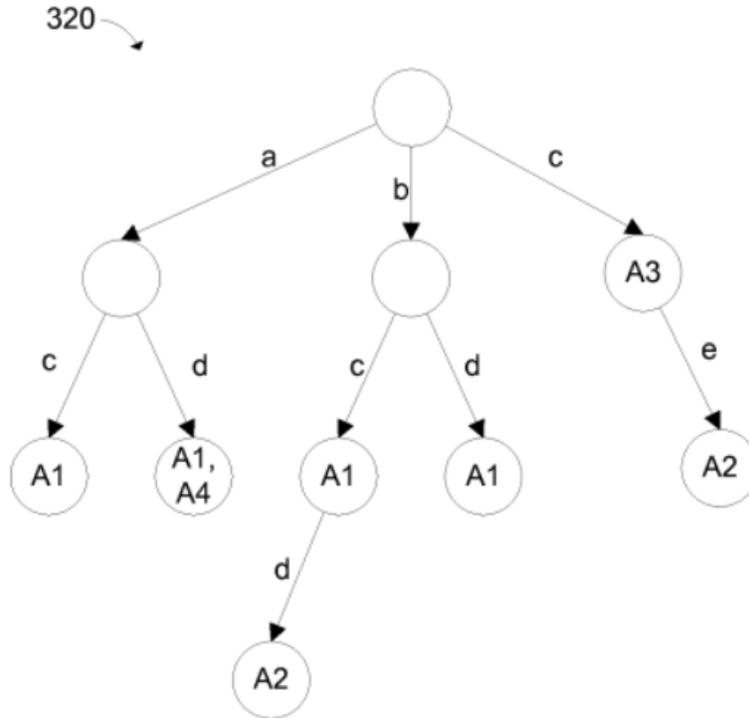


FIG. 3E

Appellant’s Figure 3E above illustrates decision tree 320 for business rules to associate a user with audience groups A1, A2, A3, and A4. *Id.* ¶ 48. The same conditions associate a user with audience group A1. Satisfying conditions *b*, *c*, and *d* or conditions *c* and *e* associates a user with audience group A2. User activity that satisfies condition *c* also associates a user with audience group A3. Satisfaction of conditions *a* and *d* associates a user with audience group A4. *See id.*

Decision tree 320 *may* associate a user with *one or more* of hundreds or thousands of such audience groups. *Id.* However, claim 1 only requires one or more nodes identifying at least one audience group and two audience groups sharing a path. Therefore, we are not persuaded that claim 1 recites a technical improvement to computers or to data processing or data structures that provides any purported technical benefits beyond the abstract idea.

Such steps are similar to claims held to recite mental processes in *CyberSource Corporation v. Retail Decisions, Inc.*, 654 F.3d 1366 (Fed. Cir. 2011). There, the claims recited a method of detecting credit card fraud in online transactions. The first step of obtaining information about other transactions that used an Internet address identified with the credit card transaction “can be performed by a human who simply reads records of Internet credit card transactions from a preexisting database.” *CyberSource*, 654 F.3d at 1372. The second step of constructing a *map* of credit card numbers can be performed by a person writing down a list of credit card transactions made from an IP address. *Id.* (“There is no language in claim 3 or in the ’154 patent’s specification that requires the constructed ‘map’ to consist of anything more than a list of a few credit card transactions.”). The third step of using the map of credit card numbers to determine if the credit card transaction is valid can be performed entirely in the human mind, e.g., by a person simply observing that numerous transactions using different credit cards with different user names and billing addresses all originated from the same IP address. *Id.* at 1373 (“Indeed, CyberSource’s CEO admitted that, before CyberSource created a computer implemented fraud detection system, ‘[w]e could see just by looking that more than half of our orders were fraudulent.’”).

Here, a person can receive and record business rules as a decision tree that specifies the conditions for associating a user with an audience group as claimed and as illustrated in Appellant’s Figures 3C and 3D where business rules and conditions are mapped out in a decision tree format with an “OR” operator that joins “AND” operators or conditions. *See Spec.* ¶¶ 45–48.

A person can generate a decision tree that combines plural business rules as a mental process or with pen and paper as illustrated in Appellant’s Figure 3E above. Common conditions of different rules may be combined as desired. Patent attorneys essentially perform this task when they draft claims in dependent claim format that groups together common elements of a claim or claims to which dependent limitations refer to include when using multiple dependent claim formats. *See MPEP* §§ 608.01(m), 608.01(n).

Similarly, claims to calculating a steradian region of space could be implemented using a pen and paper. *In re Coffelt*, 680 F. App’x 1010, 1011 (Fed. Cir. 2017). Here the relationships of business rules, conditions, and audience groups are depicted spatially as nodes and paths of a decision tree, which can be generated by a person using pen and paper without even the need to perform mathematical calculations that were required in *Coffelt*. *Id.*

Essentially, the step of generating a decision tree including a plurality of business rules tabulates the business rules and their conditions to combine paths of different business rules along their common conditions as illustrated in Appellant’s Figure 3E. In a similar manner, claims to tabulating voter ballots generated by a voting station(s) recite “human cognitive actions” that are nothing more than abstract ideas that can be performed entirely in the human mind. *Voter Verified, Inc. v. Elec. Sys. & Software LLC*, 887 F.3d 1376, 1385–86 (Fed. Cir. 2018) (citing *CyberSource*, 654 F.3d at 1373).

Collecting plural business rules and their conditions for each audience group and generating a decision tree with one or more paths and nodes with at least one path comprising an intermediate and leaf node for two audience groups organizes user activities into sets/subsets as paths and nodes. Claims to similar data organization recited a method of organizing human activity in *In re Jobin*, Appeal 2020-1067, 2020 WL 2298381 (Fed. Cir. May 8, 2020).

Despite its expansive language and its recitation of servers and databases, claim 221 of Jobin’s application is, at bottom, directed to the collection, organization, grouping, and storage of data using techniques such as conducting a survey or crowdsourcing. As the Board correctly concluded, this claim is directed to a method of organizing human activity—a hallmark of claims directed to abstract ideas.

Jobin, 2020 WL 2298381, at *4 (quoting *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1355 (Fed. Cir. 2016) (“[W]e have treated analyzing information by steps people go through in their minds . . . without more, as essentially mental processes within the abstract-idea category.”)); *see also Versata Dev. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1333 (Fed. Cir. 2015) (holding *organizational and product or group hierarchies* used to set price is an abstract idea with no concrete or tangible form or application).

The decision in *Enfish LLC v. Microsoft Corporation*, 822 F.3d 1327, 1336–37 (Fed. Cir. 2016) illustrates the distinction. The claim recited a “means for configuring” computer memory using a four-step algorithm that created a logical table in memory with rows corresponding to records and columns corresponding to fields or attributes, assigned each row and column an object identification number, and stored information about each column in one or more rows to render the table self-referential so new columns could be added simply by creating a new column definition record in *a row*.

Here, claim 1 generates a decision tree with paths and nodes. These elements do not represent advances in technology for decision trees. Paths represent business rules connecting nodes that may identify audience groups. At least one path leads to two audience groups via an intermediate node and a leaf node that identify different groups. Claim 1 does not require a node to identify more than one audience group. A user's association with audience groups depends on the audience group nodes traversed. *See Spec.* ¶ 47.

Claim 1 does not recite a particular sorting procedure for generating the decision tree from a plurality of business rules to provide a common path or to eliminate redundancy. Nor does the Specification describe how the computer processing time used to process plural business rules to generate a single decision tree with at least one common path for two audience groups compares to the computer processing time required to process each business rule separately to determine a user's association with each audience group. Claim 1 does not sort or process hundreds or thousands of business rules, nodes, paths, or audience groups to generate a decision tree. Only a plurality of business rules and associated nodes and paths are processed in some way that is not recited in claim 1 to generate the decision tree.

Distilled to its essence, claim 1 recites the even broader concept that multiple individual decision trees can be organized as a single decision tree by combining some common conditions to reduce some redundancy. The Specification indicates that this feature is just one embodiment. *Spec.* ¶ 57. The reduction in the size of a combined decision tree compared to individual decision trees depends on how many conditions are shared by the individual decision trees and whether those common conditions are combined into a single path. Claim 1 only requires this for "at least one path."

Next, audience groups are determined by traversing the decision tree: receiving contextual information from a client device associated with a user . . . describing an interaction between the user and content of the third party system; determining one or more audience groups associated with the user based on a portion of the received contextual information by traversing the decision tree, wherein traversing the decision tree comprises: traversing one or more paths of the decision tree from the root node using the contextual information, storing identifiers of nodes traversed, and associating the user with the audience groups corresponding to the traversed nodes.

Appeal Br. 16 (Claims App.) (reformatted from original). User contextual information *received* from a client device is used to traverse the decision tree to associate the user with audience groups. Spec. ¶ 45. The method does not *determine* user contextual information unlike Example 37, which tracks user selections of icons of a graphical user interface. *See* Reply Br. 9.

The purported innovation to the decision tree simply combines paths of different audience groups where they share a common business rule or condition. The decision tree includes a root node and paths that connect the root node with nodes that identify an audience group(s). User contextual information is compared to the decision tree and its paths and nodes starting at the root node and traversing the paths and nodes in the usual manner.

Claim 1 encompasses an even broader concept of organizing human activity, namely, that different business rules can be combined if they are converted to the same format of a decision tree with paths for conditions of the business rules and nodes that define audience groups. The Specification describes how “[o]nce structured as a decision tree in which branches are conditions of business rules and nodes identify audience groups, multiple business rules may be combined into a single decision tree.” Spec. ¶ 48.

As recited in claim 1, this concept is similar to a concept determined to be abstract in *Intellectual Ventures I LLC v. Erie Indemnity Company*, 850 F.3d 1315 (Fed. Cir. 2017). There, the claims recited a method of creating an index of tags and metafiles to search for and retrieve data in a database. *Id.* at 1327. Creating such a *common index* to search a database involved conduct that pre-dated the advent of computers and the Internet, namely, library and hard-copy indexing systems that classify, organize, and cross-reference information and resources (books, magazines, and the like) by certain tags such as title, author, subject. *Id.* The claimed tags were used to identify, organize, and locate a desired resource.

Here, the claimed decision tree identifies and organizes business rules and audience groups into a common format of paths and nodes so users may be classified into audience groups by comparing their summary contextual information (e.g., online activities) to the paths and nodes.

BSG Tech LLC v. BuySeasons, Inc., 899 F.3d 1281 (Fed. Cir. 2018) held a similar method of indexing data added to a database by considering “summary comparison usage information” about parameters and values selected by prior users of the database recited an abstract idea. *Id.* at 1286. The method presented summary comparison information to database users before they input their data to conform their input to the existing database structure.

It amounts to having users consider previous item descriptions before they describe items to achieve more consistent item descriptions. Whether labeled as a fundamental, long-prevalent practice or a well-established method of organizing activity, this qualifies as an abstract idea.

BSG, 899 F.3d at 1286.

Here, claim 1 recites a method that generates a decision tree from a plurality of business rules at a very high level of generality that includes “at least one path comprising an intermediate node identifying a first audience group and a leaf node identifying a second audience group.” At best, this step involves identifying, combining, organizing, classifying business rules in the same decision tree format with common conditions of rules placed on the same path in at least one instance. That is what data structures do. They organize and categorize data so it can be accessed more efficiently compared to searching through thousands of unorganized, separate data files/records.

Like the index of tags and metafiles that facilitated database searching in *Erie Indemnity* and summary comparison usage information that stored data more consistently for easier access in *BSG*, the claimed decision tree organizes business rules and audience groups into common paths and nodes that facilitate the subsequent classification of user contextual information in this data structure. Users are classified into audience groups by using their online activity to traverse decision tree paths of business rules and nodes in order to receive targeted advertising based on the audience group(s).

Such tailoring of advertising content based on user activities involving location and time recites an abstract idea. In *Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363 (Fed. Cir. 2015), the court held that tailoring advertising content based on the location of an individual and time of day during which content is viewed recites an abstract idea. *Id.* at 1369–70. Claim 1 similarly recites tailoring of advertising content streamed to an individual based on the user’s audience group, which is determined based on a user’s contextual information, which the Specification describes as actions that include location and time data. *See Spec.* ¶¶ 21, 25, 38.

As our reviewing court held in an analogous context:

This court, however, has held that “customizing information based on . . . information known about the user” is an abstract idea. *Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1369 (Fed. Cir. 2015). The court in the *Intellectual Ventures I* case explained that tailoring of content based on information about the user—such as where the user lives or what time of day the user views the content—is an abstract idea that is as old as providing different newspaper inserts for different neighborhoods. *Id.*

Affinity Labs of Texas LLC v. Amazon.com Inc., 838 F.3d 1266, 1271 (Fed. Cir. 2016); *see also Bridge & Post, Inc. v. Verizon Commc’ns, Inc.*, 778 F. App’x 882, 887 (Fed. Cir. 2019) (“Targeted marketing is a form of ‘tailoring information based on [provided] data,’ which we have previously held is an abstract idea.”) (citation omitted).

Here, claim 1 sends targeted advertisements to users for the audience group(s) in which they are classified by a decision tree based on their online activities. Organizing such activity for advertising recites an abstract idea. *See Revised Guidance*, 84 Fed. Reg. at 52. Accordingly, we determine that claim 1 recites an abstract idea of certain methods of organizing human activity for advertising activities and mental processes as identified above.

Step 2A, Prong Two: Integration into a Practical Application

We next consider whether claim 1 recites additional elements that integrate the abstract idea into a practical application. *Revised Guidance*, 84 Fed. Reg. at 54 (Revised Step 2A, Prong Two). Appellant argues that the Examiner ignores most claim limitations and states in a conclusory manner that additional elements do not amount to significantly more without any analysis of particular claim language. Appeal Br. 11; Reply Br. 10.

This argument is not persuasive because the Examiner determines that all the limitations of claim 1 recite the abstract idea of using business rules to organize user interactions into associations of users with audience groups and provide advertisements targeted to those users based on their audience group. Final Act. 3. The Examiner determines the decision tree is not an additional element that adds significantly more to the abstract idea because the decision tree recites an improvement to an abstract concept rather than an improvement to the way a computer functions. Ans. 4 (“Decision trees exist outside of computers and the Internet and are an evaluation tool that can practically be carried out in the human mind (i.e., an abstract idea.)”); Final Act. 2–3 (“Applicant has not claimed a technical improvement, rather they have taken a known method of reducing burden (e.g. time, effort, and resources) and applied it to a computer environment.”). We agree.

“It has been clear since *Alice* that a claimed invention’s use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention ‘significantly more’ than that ineligible concept.” *BSG*, 899 F.3d at 1290; *see id.* at 1291 (“As a matter of law, narrowing or reformulating an abstract idea does not add ‘significantly more’ to it.”); *see also RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322, 1327 (Fed. Cir. 2017) (“Adding one abstract idea (math) to another abstract idea (encoding and decoding) does not render the claim non-abstract.”); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) (“But, a claim for a *new* abstract idea is still an abstract idea.”); *Versata Dev. Grp.*, 793 F.3d at 1335 (holding claims reciting improvements in an abstract idea of hierarchical data structures but not reciting any of the supposed computer improvements were not patent eligible).

As discussed above, claim 1 does not recite any technical advances that Appellant asserts to be patent eligible, namely, redundancy reduction, improved computer processing efficiency, and/or hierarchical sorting of business rules and conditions. *See* Appeal Br. 6–8. The method does not sort hundreds or thousands of business rules to generate a decision tree with redundancy reduction for such a large number of business rules. It generates a decision tree from a “plurality of business rules” with one common path.

The Specification describes decision tree engine 250 being capable of associating a user with one or more of hundreds or thousands of audience groups (Spec. ¶¶ 48, 57), but claim 1 recites “one or more nodes” that each identify “at least one audience group.” Only “at least one path compris[es] an intermediate node identifying a first audience group and a leaf node identifying a second audience group.” Appeal Br. 16 (Claims App.). Thus, claim 1 recites a method that generates a decision tree “contain[ing] rules for associating a user with three audience groups” as illustrated in Figure 3E above. Spec. ¶ 48. Arguments that claim 1 recites a method that represents a technical advance in computers and data processing (Appeal Br. 6–10) are not commensurate with the scope of claim 1. *See Two-Way Media Ltd. v. Comcast Cable Commc’ns, LLC*, 874 F.3d 1329, 1340 (Fed. Cir. 2017) (“As with claim 1 of the ’187 patent, the problem is that no inventive concept resides in the claims.”).

The Examiner determines the client device in claim 1 is an additional element, but it is recited as a generic computer component that performs generic computer functions that merely implement the abstract idea with a computerized system. *See* Final Act. 4–5; Ans. 5–6. Appellant does not dispute this finding and determination of the Examiner. Nor do we.

The Specification describes the system architecture as illustrated in Figure 1 as comprising one or more client devices 110. Spec. ¶ 15. Client devices are computing devices that receive user input and transmit and/or receive data via network 120. *Id.* ¶ 16. In one embodiment, client device 110 is a conventional computer system like a desktop or laptop computer. *Id.* In other embodiments, it may be a personal digital assistant, a mobile telephone, a smartphone, or another suitable device. *Id.*

Even if we treat the decision tree as an additional element beyond the abstract idea that it represents as set forth in our analysis above, it does not integrate the abstract idea into a practical application. It is recited at a high level of generality without improving computers or data structures, or using a particular machine that is integral to the claim or transforming a particular article to a different state or thing. Revised Guidance, 84 Fed. Reg. at 55.

Although *Enfish* and *McRO* involved analysis under *Alice* Step One, which is comparable to Revised Step 2A, Prong One discussed above in the previous section, those cases illustrates why the claimed decision tree does not recite a technical improvement to make claim 1 patent eligible.

In *Enfish*, the claim recited a logical table with logical rows and columns, but each row and column also included an object identification number (OID) to identify it. The OID acted as a pointer to the associated row or column and therefore was an important aspect of the self-referential table and its technical advancement over known data structures. *See Enfish*, 822 F.3d at 1336–37. The claimed “means for configuring” allowed new columns to be created and appended to the table for immediate use. *Id.* In short, the self-referential table, as claimed, included new data structures in a different arrangement that performed more efficiently. *Id.* at 1337.

Here, claim 1 recites a decision tree that includes generic elements such as a root node, *one* or more paths connecting the root node to one or more nodes, to include intermediate and leaf nodes that identify at least one audience group. As illustrated in Figure 3D above (as well as Appellant's Figure 3A), such elements are generic. The claimed decision tree does not change this configuration of a decision tree when it generates a decision tree for multiple business rules. The decision tree combines business rules into a common format that *may* eliminate redundancy, e.g., where business rules share common conditions as in Figure 3E above. Nor does claim 1 change the way a decision tree is traversed to apply data (contextual information) to the business rules as organized in the decision tree as paths between nodes. The decision tree is traversed from a root node through paths to intermediate nodes and/or leaf nodes and other nodes.

Any elimination of redundancy is recited at a high level of generality as an abstract concept as discussed in the preceding section. Combining common business rules in such a generic manner of paths and nodes is what databases do to organize and store data as illustrated by *Erie Indemnity* and *BSG* also discussed above.

Placing two audience groups on nodes along the same path merely associates different information labels with nodes, which is an abstract idea rather than a technical improvement. The very nature of a decision tree is that it organizes rules or information in a hierarchical, logical fashion that can be traversed through conjunctive/disjunctive connectors. A traversal notes each node that is traversed and whether the condition of that node is satisfied. In the example above, did the user search web pages of Paris or London. Did the URLs include the terms "booking" or "ticket." Spec. ¶ 44.

“Information as such is an intangible” and collecting, analyzing, and displaying that information, without more, is an abstract idea. *See Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1344–45 (Fed. Cir. 2018) (quoting *Elec. Power Grp.*, 830 F.3d at 1353–54 and citing similar decisions holding that displaying different types or sets of information from various sources on a generic display is abstract absent a specific improvement to the way computers or other technologies operate).

Here, claim 1 recites a generic traversal of a decision tree by passing from a root node along paths to other nodes. Moving from a root node along a path to a node may result in classification into an “audience group” which is just a label for traversing a particular path to a particular node. Traversing a path from an intermediate node to a leaf node may associate a user with another “audience group.”

These limitations represent abstract ideas not technological advances in data structures or computer technology. Even if a computer may traverse the claimed decision tree faster than it can move through individual business rules, this fact does not make a computer run faster or more efficiently. *See Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d at 1371 (“Requiring the use of a ‘software’ ‘brain’ ‘tasked with tailoring information and providing it to the user’ provides no additional limitation beyond applying an abstract idea, restricted to the Internet, on a generic computer.”); *Bancorp Servs., L.L.C. v. Sun Life Assur. Co. of Canada (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) (“To salvage an otherwise patent-ineligible process, a computer must be integral to the claimed invention, facilitating the process in a way that a person making calculations or computations could not.”).

The claims in *McRO* recited a new set of rules and parameters for lip synchronization of animated characters. *McRO*, 837 F.3d at 1313, 1315. The claims were directed to the creation of something physical—the display of lip synchronization and facial expressions of animated characters on a display. *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1167 (Fed. Cir. 2018). The method obtained a first set of rules to define an output morph weight stream as a function of phoneme sequence, obtained a timed data file of phonemes having a plurality of sub-sequences, generated an intermediate stream of output morph weight sets and transition parameters between two adjacent morph weight sets by evaluating the sub-sequences against the first set of rules, and generated a final stream of output morph weight sets at a desired frame rate. *McRO*, 837 F.3d. at 1307–08, 1313.

Here, claim 1 generates a decision tree to associate users in audience groups that receive targeted ads. Combining audience groups on a common path is recited as an abstract idea at a high level of generality. *See BSG*, 899 F.3d at 1287 (“[T]he recitation of a database structure slightly more detailed than a generic database does not save the asserted claims at step one.”).

Indeed, the Specification discloses that the decision tree engine 250 *may* simplify a decision tree associated with third party system 130 to reduce a size of the decision tree and improve efficiency of traversals of it. Spec. ¶ 49. “[T]he amount of time spent traversing the decision tree *may be less* than the amount of time needed to separately evaluate each business rule associated with a third party system 130.” *Id.* ¶ 63 (emphasis added). The method may include different and/or additional steps that may be performed in a different order than described in Figure 4, which outlines the method recited in claim 1. *See id.* ¶ 53.

Thus, we are not persuaded that claim 1 recites a technical solution to a technical problem or imposes a meaningful limit on the abstract idea. *See* Reply Br. 2–7; *Ericsson Inc. v. TCL Commc’n Tech. Holdings Ltd.*, 955 F.3d 1317, 1325 (Fed. Cir. 2020) (holding that the specification must always yield to the claim language when identifying the true focus of a claim).

Providing advertisements to a user based on their association with an audience group identified by traversing a decision tree does not integrate the abstract idea into a practical application. *See Voit Techs., LLC v. Del-Ton, Inc.*, 757 F. App’x 1000, 1003 (Fed. Cir. 2019) (“Voit fails to explain how employing different formats, as claimed, improves compression techniques or the functioning of the computer. Instead, the specification demonstrates that the Asserted Claims are directed to use of generic computer components performing conventional compression techniques to carry out the claimed invention.”). Even though the claims in *Voit* recited advanced image data compression techniques that provided rapid transmission of higher resolution digital images, the claims were not patent eligible.

Although Voit alleges the method of the ’412 patent “improves the efficiency of transmitting” high resolution data, Appellant’s Br. 10, we have recognized that claims directed to “improved speed or efficiency inherent with applying the abstract idea on a computer” are insufficient to demonstrate an inventive concept Moreover, Voit has to do more than simply restate the claim limitations and assert that the claims are directed to a technological improvement without an explanation of the nature of that improvement. . . . General statements of “advanced image data compression” or faster communications will not suffice where it is unclear *how* the different compression format claim limitations actually achieve the alleged improvements.

Id. at 1003–04 (citations omitted).

Here, claim 1 recites, at a high level of generality, receiving business rules and generating a decision tree with a root node and one or more paths connecting the root node to one or more nodes identifying an audience group and at least one path includes an intermediate node for a first audience group and a leaf node of a second audience group. Appeal Br. 16 (Claims App.).

If a computer can process user contextual information on a combined decision tree faster than on individual decision trees, any efficiency increase results from combining common paths as an abstract idea. If a technological advance is required to sort individual decision trees to generate the claimed decision tree with a combined path and nodes, such advance is not claimed in contrast to the technical advances claimed in *Enfish* and *McRO*.

Stated another way, the computer is not configured to operate faster or more efficiently. Nor is the decision tree configured to be processed more efficiently beyond the possibility that it may comprise less paths and nodes, which is an abstract idea of organizing human activity discussed above.

Our reviewing court recently held similar activity involving advertising data in a similar context to be an abstract idea:

In short, by dedicating a section of the computer's memory to advertising data, the claimed invention ensures memory is available for at least some advertising data. This does not, however, improve the functionality of the computer itself. Even if we accept Customedia's assertions, the claimed invention merely improves the abstract concept of delivering targeted advertising using a computer only as a tool. This is not what the Supreme Court meant by improving the functioning of the computer itself nor is it consistent with our precedent applying this concept.

Customedia Techs., LLC v. Dish Network Corp., 951 F.3d 1359, 1363 (Fed. Cir. 2020).

The claims did not enable computers to operate more quickly or efficiently, or solve any technological problem because:

The only improvements identified in the specification are generic speed and efficiency improvements inherent in applying the use of a computer to any task. Therefore, the claimed invention is at most an improvement to the abstract concept of targeted advertising wherein a computer is merely used as a tool. This is not an improvement in the functioning of the computer itself.

Id. at 1365 (“They merely recite reserving memory to ensure storage space is available for at least some advertising data.”).

Mere recitation of concrete, tangible components such as a processor is not sufficient to make abstract ideas performed on or with that processor patent-eligible. *Alice*, 573 U.S. at 223 (“[T]he mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.”). Here, the focus of claim 1 is not on a technological advance in processors, databases, or client devices. Rather, the focus is on performing an abstract idea for which computers are invoked as a tool. *See Enfish*, 822 F.3d at 1335–36; *Bancorp*, 687 F.3d at 1278 (“[T]he use of a computer in an otherwise patent-ineligible process for no more than its most basic function—making calculations or computations—fails to circumvent the prohibition against patenting abstract ideas and mental processes.”). Here, claim 1 essentially automates the traversal of a decision tree generated from individual decision trees that otherwise could be traversed as a mental process or by a person using pen and paper.

Accordingly, we determine that claim 1 does not include additional elements that integrate the abstract idea into a practical application.

Step 2B: Does Claim 1 Include an Inventive Concept?

We next consider whether claim 1 recites elements, individually, or as an ordered combination, that provide an inventive concept. *Alice*, 573 U.S. at 217–18. The second step of the *Alice* test is satisfied when the claim limitations involve more than performance of well-understood, routine, and conventional activities previously known to the industry. *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1367 (Fed. Cir. 2018); see Revised Guidance, 84 Fed. Reg. at 56 (explaining that the second step of the *Alice* analysis considers whether a claim adds a specific limitation beyond a judicial exception that is not “well-understood, routine, conventional” activity in the field). Appellant argues that the Examiner has not established that the additional elements are well-understood, routine, and conventional. Appeal Br. 12–14.

Individually, the limitations of claim 1 implement the abstract idea on generic components that perform generic functions. They receive business rules from a third party system and contextual information from a client device. They generate a decision tree and traverse it to associate users with audience groups. See Final Act. 5; Ans. 5–6; MPEP ¶ 2106.05(d)(II) (listing elements that courts have held to be well-understood, routine, conventional activity such as receiving and transmitting data over a network, performing repetitive calculations, and storing and retrieving information in memory).

The client device may be a conventional computer system or generic device configured to communicate over generic networks using standard communication technologies. Spec. ¶¶ 16, 17. Contextual information is received from client devices. It describes user interactions with content of a third party system. *Id.* ¶ 7. However, claim 1 does not recite any features of the process by which the client devices obtain user contextual information.

The third party system is an application provider communicating information describing applications for execution by client device 110 or communicating data to client devices 110 for use by an application executing on the client device. Spec. ¶ 18. It can communicate information to the online system such as advertisements or content. *Id.* Claim 1 recites this system generically to perform a generic function of providing business rules that specify criteria for including users in audience groups.

As discussed above, the claimed decision tree recites the abstract idea identified in Step 2A, Prong One. Therefore, it cannot provide an inventive concept. *See BSG*, 899 F.3d at 1290. Even if the steps are groundbreaking, innovative, or brilliant, that is not enough for eligibility. *See Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 591 (2013); *accord SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1163 (“No matter how much of an advance in the finance field the claims recite, the advance lies entirely in the realm of abstract ideas, with no plausibly alleged innovation in the non-abstract application realm. An advance of that nature is ineligible for patenting.”).

Claim 1 recites no particulars in the way the decision tree is generated to include plural business rules besides a generic root node, path(s), and nodes. Associating nodes with audience groups is illustrated in the decision tree of Figure 3D. The Specification provides no description or indication that this process involves innovations in software or hardware architecture. *See Spec.* ¶¶ 48, 49. If an inventive step is used to sort business rules and generate a decision tree, the step is not claimed. Nor does the Specification describe this process in a way that indicates an inventive step is involved in generating the decision tree beyond the abstract idea identified above.

The “ordered combination” also lacks an inventive concept. The limitations considered together recite the abstract idea identified above, which involves collecting business rules and generating a decision tree to determine audience groups based on user contextual information received from a client device. *See Elec. Power Grp.*, 830 F.3d at 1355 (holding that the claims interpreted in light of the specification required off-the-shelf, conventional computer, network, and display technology to gather, send, and present desired information and “displaying concurrent visualization” required only readily-available displays); *Ericsson*, 955 F.3d at 1330 (“Even assuming that this collection of elements led to a more efficient way of controlling resource access, ‘our precedent is clear that merely adding computer functionality to increase the speed or efficiency of the process does not confer patent eligibility on an otherwise abstract idea.”) (citation omitted); *Customedia*, 951 F.3d at 1366 (“Aside from the abstract idea of delivering targeted advertising, the claims recite only generic computer components.”).

Similar claims to systems and methods of dynamically and selectively generating a hierarchical functional organization from a hierarchical operating organization structure in a generic computer environment did not provide an inventive concept. *In re Morinville*, 767 F. App’x 964, 969 (Fed. Cir. 2019). The claim elements used known computer processes to perform known abstract steps of restructuring a business organization. *Id.* at 970. As such, it was not enough for subject matter eligibility that the techniques may be novel and non-obvious over the prior art when they were an abstract idea. *See id.* Here, claim 1 uses a computer to generate a decision tree of business rules, which is recited as an abstract idea identified above.

Accordingly, we determine that the claims do not recite any elements, individually or as an ordered combination, that provide an inventive concept sufficient to transform the abstract idea into patent eligible subject matter.

Thus, we sustain the Examiner's determination that claims 1-4, 6-10, 12-17, 19, and 20 are directed to patent-ineligible subject matter.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1-4, 6-10, 12-17, 19, 20	101	Eligibility	1-4, 6-10, 12-17, 19, 20	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED