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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte RUSS LEE NORTON
and DARRELL ERICK BUTLER

_____

Appeal 2019-005378
Application 14/718,541
Technology Center 3600

_____

Before JAMES P. CALVE, MICHELLE R. OSINSKI, and
WILLIAM A. CAPP, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the decision of the Examiner to reject claims 1–22. Appeal Br. 2. We have jurisdiction under 35 U.S.C. § 6(b).

We enter a New Ground of Rejection pursuant to our authority under 37 C.F.R. § 41.50(b).

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[1] "Appellant" refers to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies Ford Global Technologies, LLC as the real party in interest. Appeal Br. 2.

CLAIMED SUBJECT MATTER

Claims 1, 14, and 20 are independent. Claim 1 is reproduced below.

1.   A system for controlling a motor vehicle, comprising:
a controller configured to:
        transition between primary driving modes by transitioning from a first primary driving mode to a discrete intermediate driving mode and from the intermediate driving mode to a second primary driving mode;
        calculate the intermediate driving mode based on values for both the first and second primary driving modes; and
        control the motor vehicle according to the second primary driving mode.

REJECTIONS

Claims 1–19, 21, and 22 are rejected under 35 U.S.C. § 112(a) for failing to comply with the written description requirement.

Claims 1–19, 21, and 22 are rejected under 35 U.S.C. § 112(a) for failing to comply with the enablement requirement.

Claims 1–7, 9, and 11–22 are rejected under 35 U.S.C. § 103 as unpatentable over Kodato (US 2015/0088383 A1, pub. Mar. 26, 2015).

Claim 8 is rejected under 35 U.S.C. § 103 as unpatentable over Kodato and Ellis (US 2015/0232096 A1, pub. Aug. 20, 2015).

Claim 10 is rejected under 35 U.S.C. § 103 as unpatentable over Kodato and Brekkestran (US 4,967,385, iss. Oct. 30, 1990).

Claims 1–7 and 11–19 are rejected under 35 U.S.C. § 103 as unpatentable over Shimada (US 2012/0203430 A1, pub. Aug. 9, 2012).

Claim 8 is rejected under 35 U.S.C. § 103 as unpatentable over Shimada and Ellis.

Claim 9 is rejected under 35 U.S.C. § 103 as unpatentable over Shimada and Kodato.

Claim 10 is rejected under 35 U.S.C. § 103 as unpatentable over Shimada and Brekkestran.

Claims 20–22 are rejected under 35 U.S.C. § 103 as unpatentable over Shimada and Kodato.

ANALYSIS

We enter a new ground of rejection of claims 1–22 on the ground that these claims are directed to judicial exceptions under 35 U.S.C. § 101.

Step 1: Are Claims 1–22 to a Statutory Category?

Section 101 of the Patent Act defines patent-eligible-subject matter as:

> 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 (2012). However, "[l]aws of nature, natural phenomena, and abstract ideas are not patentable." *Alice Corp. Pty. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014) (citation omitted).

The *system* of claim 1 and *method* of claims 14 and 20 recite statutory categories under 35 U.S.C. § 101, namely, a machine and a process.

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 claim into a patent-eligible application, e.g., by providing an "inventive concept" that ensures the patent amounts to significantly more than a patent on the ineligible concept. *Id.* at 217–218.

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)). *See* Revised Guidance, 84 Fed. Reg. 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.

Do Claims 1–22 Recite Judicial Exceptions?

Claims 1–19 and 22

Independent claims 1 and 14 and their respective dependent claims recite "[m]athematical concepts—mathematical relationships, mathematical formulas or equations, mathematical calculations." Revised Guidance, 84 Fed. Reg. at 52. Although claims 1 and 14 recite a system and method of controlling a motor vehicle in their preambles, the body of both claims recite mathematical calculations and mathematical concepts and relationships used by a controller to control a motor vehicle with no details of how that is done.

Claim 1 recites "*calculate* the intermediate driving mode based on values for both the first and second primary driving modes." Claim 14 also recites "*calculating* at least one intermediate driving mode based on values for first and second primary driving modes." Appeal Br. 35, 37 (Claims App.) (emphasis added). By their plain language, both claims recite that the claimed intermediate mode is derived as a calculation using the *values* of the first and second primary driving modes.

The Specification describes the claimed intermediate driving mode as "calculated as fractions or percentages of primary modes, formulas requiring little electronic memory may be used to calculate the intermediate modes." Spec. ¶ 33. The Specification provides formulas (equations) that can be used to calculate an intermediate driving mode. *Id.* ¶¶ 35–37.

Claims 1 and 14 also recite a transition feature that is a mathematical relationship between a first and second primary driving mode and "a discrete intermediate driving mode." Claim 1 recites a "transition between primary driving modes by transitioning from a first primary driving mode to a discrete intermediate driving mode and from the intermediate driving mode to a second primary driving mode." Appeal Br. 35 (Claims App.).[2]

The claimed transition merely recites a mathematical relationship between the *values* of the driving modes. The discrete intermediate driving mode is a value that is between the values of the primary driving modes such that the controller transitions from a first primary driving mode to a discrete intermediate mode value and then to a second primary driving mode value.

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[2] Claim 14 recites "incrementally transitioning from the first primary driving mode to the at least one intermediate driving mode and from the at least one intermediate driving mode to the second primary driving mode." *Id.* at 37.

Although claims 1 and 14 recite a limitation of the controller being configured to "control the motor vehicle according to the second primary driving mode," other limitations of those claims make clear that this feature merely involves using a value of the second primary driving mode to control the motor vehicle in an unspecified way. Appeal Br. 35, 37 (Claims App.).

The Specification describes first and second primary driving modes as *values* that a controller *calculates* with look up tables, formulas, and/or other logic. Spec. ¶¶ 32, 34, 41. Appellant's Figure 4, reproduced below, shows this relationship between the primary and intermediate driving mode values.
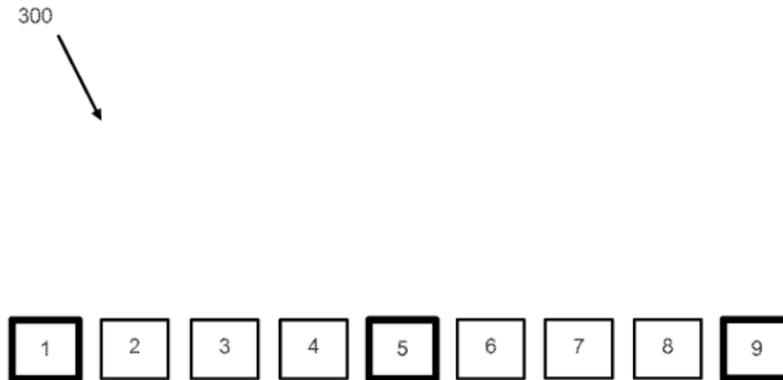

FIG. 4

Figure 4 above depicts the mathematical relationship of a group 300 of primary driving modes 1, 5, 9 and intermediate driving modes 2, 3, 4, 6, 7, 8. Intermediate modes are calculated as *fractions/percentages* of primary mode values. Spec. ¶¶ 32, 33, 35–37. Figure 4 illustrates intermediate mode 2 having a value between the values of primary mode 1 and primary mode 5. The value of intermediate mode 2 is closer to the value of primary mode 1 than it is to the value of primary mode 5 as depicted above.

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Intermediate mode values 2–4 are calculated as follows (Spec. ¶ 36):

Intermediate mode value = (mode constant x primary mode 1 value) + ((1 – mode constant) x primary mode 5 value).

Intermediate mode values 6–8 are calculated as follows (*id.* ¶ 37):

Intermediate mode value = (mode constant x primary mode 5 value) + ((1 – mode constant) x primary mode 9 value).

Exemplary intermediate mode constants for calculating intermediate mode values using the above equations include the following:

Mode constant for mode 2 = about 70% to about 90%
Mode constant for mode 3 = about 50% to about 70%
Mode constant for mode 4 = about 30% to about 50%
Mode constant for mode 6 = about 65% to about 85%
Mode constant for mode 7 = about 45% to about 65%
Mode constant for mode 8 = about 15% to about 35%

Intermediate mode constants may be given a single value as follows:

Mode constant for mode 2 = about 80%
Mode constant for mode 3 = about 60%
Mode constant for mode 4 = about 40%
Mode constant for mode 6 = about 75%
Mode constant for mode 7 = about 55%
Mode constant for mode 8 = about 25%

See id. ¶¶ 39, 40.

As an example, using a mode constant of 0.8 (80%) for mode 2 and 0.6 (60%) for mode 3, modes 2 and 3 would be calculated as follows:

0.8 (primary mode 1 value) + 0.2 (primary mode 5 value)
0.6 (primary mode 1 value) + 0.4 (primary mode 5 value)

As can be seen from the calculations and equations above, the mode constants weight the value of an intermediate mode closer to the value of the primary mode to which it is proximate. Intermediate mode 2 is weighted more toward the value of primary mode 1 than is intermediate mode 3.

Primary driving modes 1, 5, 9 include "modes designed for normal driving, comfort, or performance driving." *Id.* ¶¶ 18, 27. The transition recited in claims 1 and 14 employs the mathematical relationship/concept that a transition between primary driving mode values 1 and 5 is smoother and less abrupt if the transition is done in smaller increments using one or more of intermediate driving mode values 2, 3, 4 to transition from primary driving mode 1 to primary driving mode 5. *Id.* ¶¶ 18, 28, 30, 32, 39, 44, 45.

Claims 1 and 14 recite this feature solely as a mathematical concept or relationship involving calculations of *values* of intermediate driving modes using the *values* of primary driving modes calculated as discussed above.

Indeed, in response to the Examiner's rejections of the claims for lack of a written description and enablement of how the driving modes control a motor vehicle and its various subsystems and what control steps are used to do so (Final Act. 8–12; Ans. 39–45), Appellant argues that

> the Office's focus on the minute details of a process or algorithm go beyond the high-level transitions between driving modes, which are the subject of the pending claims. The minutiae associated with the operation of every vehicle subsystem in every mode is not the focus of the present application . . . .

Reply Br. 2. These arguments and representations regarding the scope of the claims also support our determination that the claims recite abstract ideas.

The dependent claims also recite these same abstract ideas. Claim 2 recites "wherein the controller is configured to *calculate* the first and second primary driving modes *using logic* stored in electronic memory accessible by the controller and based on *data* for one or more conditions associated with the motor vehicle." Appeal Br. 35 (Claims App.) (emphasis added).

Claim 15, which depends from claim 14, recites a similar abstract idea that the controller uses logic to calculate primary driving modes. *Id.* at 37.

Claim 3 recites an abstract mathematical calculation and formula as

> the controller is configured to *calculate* the intermediate driving mode by *multiplying* each of the first and second primary driving modes by a *predetermined constant* stored in electronic memory accessible to the controller and *summing results* of *multiplying* each of the first and second primary driving modes by the predetermined constant.

Id. at 35 (emphasis added); *see also id.* at 37 (claim 16).

Claim 4 recites further aspects of the mathematical relationship of the first and second primary driving modes and the intermediate driving mode as "the controller is configured to use at least two discrete intermediate driving modes when transitioning from the first primary driving mode to the second primary driving mode." Claim 5 further recites that "the at least two discrete intermediate driving modes are consecutive intermediate driving modes from an available group of intermediate driving modes between the first and second primary driving modes." *Id.* at 35; *see id.* at 38 (claims 17 and 18).

These limitations recite the mathematical concept that a transition between driving modes may be more gradual if the transition occurs through several intermediate mode values. Spec. ¶¶ 18, 31. Claims 6 and 18 recite that the transition between modes or intermediate driving modes occurs "after a predetermined amount of time has occurred between each driving mode transition." Appeal Br. 36, 38 (Claims App.). This time-related feature recites the concept that delaying a change in driving modes "may facilitate smooth driving mode transitions by preventing multiple driving transitions from occurring within a short period of time." Spec. ¶ 45.

The "adaptive control mode" of claims 8 and 19 recites "the controller is configured to automatically determine[s] the second primary driving mode for the motor vehicle based on the data received from the sensing system." Appeal Br. 36 (Claims App.); *id.* at 38 (claim 19). This feature also involves mathematical formulas or calculations to perform automatic determination.

The Specification describes logic, look up tables, and formulas used to compute the driving modes. Spec. ¶ 2, 18, 25, 32, 34. It also incorporates U.S. Patent No. 8,600,614 (the '614 patent) to describe how data received by sensing system 230 (traffic, road, driver's state, vehicle state, and safety condition information) is used by controller 210 to "automatically select a driving mode for a motor vehicle 100." Spec. ¶¶ 22–25. The '614 patent describes controller 106 evaluating driving conditions 126 obtained from sensor estimates to determine a drive mode *automatically* using the *decision logic 200* of Figure 2. '614 patent, 7:43–56, 8:16–29. A controller's use of logic to determine driving modes automatically recites calculations and the use of mathematical formulas.

Claim 9 recites a mathematical relationship when a user selects a transition between a first and a second driving mode and "the controller is further configured to transition directly from the first primary driving mode to the second primary driving mode without using an intermediate driving mode." Appeal Br. 36 (Claims App.). Controller logic is not concerned with a gradual transition as for an automatic transition so the transition "is made as fast as possible" without using any intermediate mode. Spec. ¶ 47.

Claim 10 recites another mathematical relationship as logic causing the controller to transition to a predetermined default driving mode when a fault occurs with the controller. Appeal Br. 36 (Claims App.).

Claim 11 recites a sensing system "configured to detect or receive data related to one or more of traffic information, road state information, safety assessment information, driver state information, and vehicle state information." *Id.* According to the '614 patent, which is incorporated into Appellant's Specification, the sensing system may include known detection and known computation/information generated from measuring devices used to gather data. '614 patent, 4:17–23. Thus, the sensing system is configured to use mathematical equations and formulas to perform calculations, which is an abstract idea under the Revised Guidance.

A controller configured to control vehicle subsystems in claim 12 is recited as mathematical formulas, equations, or calculations used to control vehicle subsystems for the second primary driving mode. Appeal Br. 37 (Claims App.). Such control involves the controller making calculations tailored to each vehicle subsystem using look up tables, formulas, and logic. Spec. ¶¶ 25, 26, 32, 38, 41, 42, Fig. 5. Clams 13 depends from claim 12 and recites motor vehicle subsystems. Appeal Br. 37 (Claims App.).

Independent Claim 20

Claim 20 recites a method of controlling a motor vehicle to a first primary driving mode, selecting a second primary driving mode manually or automatically by user input, transitioning from the first primary driving mode to the second primary driving mode by a method that depends on whether the second primary driving mode is selected automatically by a controller or by user input, and controlling the motor vehicle according to the second primary driving mode. *Id.* at 38. As discussed above, controller selection of primary driving modes and transitions recites mathematical calculations and formulas. *See* Spec. ¶¶ 18, 25, 32, 34, 38, 41.

The system and method claims may be treated the same for patent-eligibility analysis because they recite the same abstract concepts discussed above. *See Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Canada (U.S.)*, 687 F.3d 1266, 1277 (Fed. Cir. 2012).

Claims to steps of analyzing information that people go through in their minds or using mathematical algorithms, without more, recite abstract ideas. *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016). The Specification discloses equations used to calculate intermediate modes using values for first and second primary driving modes taken from look up tables. Spec. ¶¶ 34–49. For example, "Intermediate mode value = (mode constant x primary mode 5 value) + ((1 – mode constant) x primary mode 9 value)" where the mode constant is a percentage expressed as 0.60. *Id.* ¶¶ 37–38. These calculations can be performed as mental processes as illustrated by Appellant's Figure 5, which is reproduced below.
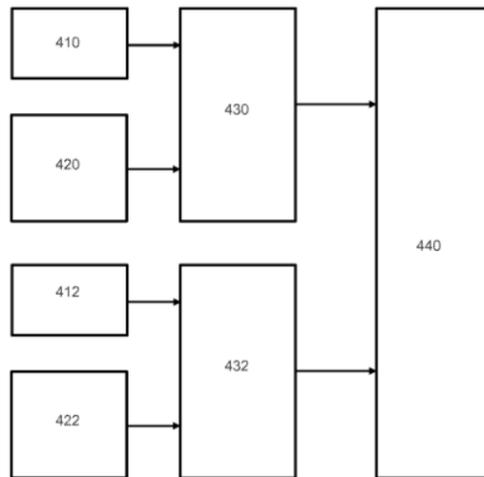

FIG. 5

Appellant's Figure 5 illustrates a method used by controller 210 to calculate a driving mode value for a vehicle subsystem. *Id.* ¶ 41.

In step 410, controller 210 accesses a mode constant for intermediate mode stored in electronic memory. In step 420, controller 210 calculates a first primary mode value by accessing a look up table, formulas, or logic. In step 430, the controller multiples that value by the mode constant. *Id.*

In step 412, the controller subtracts the mode constant from one. *Id.* In step 422, the controller calculates the second primary mode. *Id.* In step 432, the controller multiplies the value calculated in step 412 by the value of the second primary mode in step 422. In step 440, the controller sums the products from steps 430 and 432 to produce an intermediate mode value. *Id.*

Even if we read these equations into the "calculation" and "transition" steps and limitations of the claims, they simply recite details of the abstract mathematical concepts and formulas, which are not patent-eligible. As discussed above, the claimed calculations define mathematical relationships between the *values* of intermediate and primary driving modes.

Essentially, the claims recite methods and a system of organizing information (driving modes) through mathematical correlations recited at a high level of generality in the claims without tying the abstract ideas to a specific structure or machine. *See Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1350–51 (Fed. Cir. 2014). The driving modes are similar to device profiles determined to be abstract ideas in *Digitech*. *Id.*

Accordingly, we determine that claims 1–22 recite mathematical concepts—mathematical relationships, mathematical formulas or equations, mathematical calculations. Because the calculations also involve equations that may be performed in the human mind or using pen and paper, we also determine that the claims recite mental processes. *See* Revised Guidance, 84 Fed. Reg. at 52 & n.14.

Are the Claims Integrated into a Practical Application?

We next consider whether the claims recites additional elements that integrate the abstract ideas into a practical application. Revised Guidance, 84 Fed. Reg. at 54 (Revised Step 2A, Prong Two). It is well-settled that reciting concrete, tangible components does not confer patent eligibility to an abstract idea when the Specification describes the components generically to perform generic functions that provide a generic environment to carry out the abstract idea. *In re TLI Commc'ns LLC Patent Litig.*, 823 F.3d 607, 611, 613–15 (Fed. Cir. 2016) (merely reciting a "telephone unit," "server," and "control unit" that perform *generic functions*, such as "the 'control unit' predictably 'controls' various aspects of the claimed functionality" did not make the claims patent-eligible).

Here, a "controller" performs generic functions. It *calculates* driving modes values using logic stored in memory, predetermined mode constants, and primary driving mode values. It *transitions* between primary driving modes values. It *communicates* with and *controls* subsystems of the vehicle, which processes are described generically in the Specification. Spec. ¶¶ 17–19, 26, 28, 29. The claimed functions use generic look up tables, formulas, and logic to perform generic calculation of driving modes. *Id.* ¶¶ 2, 18, 25, 32, 34. The functions may be performed by multiple control units or several components of a single controller. Spec. ¶ 21. The controller may include structural components such as microprocessors "that provide the function of a controller." *Id.* Such general, functional descriptions of the "controller" does not make the recited abstract ideas patent-eligible. *TLI*, 823 F.3d at 615 (holding that "vague, functional descriptions of server components are insufficient to transform the abstract ideas into a patent-eligible invention.").

As our reviewing court has held in a similar context:

> 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 computer required by some of Bancorp's claims is employed only for its most basic function, the performance of repetitive calculations, and as such does not impose meaningful limits on the scope of those claims.

> As in *Bilski,* the claims do not effect a transformation, and the fact that the required calculations could be performed more efficiently via a computer does not materially alter the patent eligibility of the claimed subject matter.

Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Canada (U.S.), 687 F.3d 1266, 1278 (Fed. Cir. 2012).

The Specification discloses "[t]he controller is configured to control the motor vehicle according to a selected driving mode." Spec. ¶ 17. To do so, the controller may be in communication with one or more subsystems of the motor vehicle to control the subsystems according to the driving mode determined by the controller. *Id.*

Independent claims 1, 14, and 20 lack even this degree of specificity. They merely "control" the "motor vehicle" according to a driving mode. They do not integrate the mathematical concepts into a control mechanism for vehicle subsystems such as brakes, steering, suspension, and the like. That feature is recited in claim 12 as "the controller is configured to be in signal communication with one or more vehicle subsystems of the motor vehicle in order to control one or more vehicle subsystems according to the second primary driving mode of the vehicle." Appeal Br. 37 (Claims App.). Even this feature is recited generically with generic "vehicle subsystems."

Here, the claims do not transform or reduce an article to a different state or thing. They recite limitations involving mathematical calculations or relationships that use logic, look up tables, and equations that are not patent-eligible when recited at such a high level of generality. *See* Spec. ¶¶ 2, 18, 25, 32, 34; *Elec. Power Grp.*, 830 F.3d at 1355 (holding claims that merely select and manipulate information without requiring inventive components or methods such as measurement devices or techniques to generate new data and do not invoke inventive programming do not make abstract processes into patent-eligible ones); *Digitech Image*, 758 F.3d at 1351 ("Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible."); *see Parker v. Flook*, 437 U.S. 584, 585, 594–95 (1978) (holding a post-solution application of a mathematical calculation of alarm limits to control chemical processes in catalytic conversion of hydrocarbons was not patent-eligible).

Sensing system 220 includes one or more devices 250 "to detect or receive data" related to traffic information, state of a road, a driver's state, safety conditions, a vehicle state, or a current driving mode of a vehicle. Spec. ¶ 23. Claims 7 and 8 recite that the controller receives data from the sensing system and determines a second primary driving mode based on that data received from the sensing system. Appeal Br. 36 (Claims App.).

The mere physical nature of these claims does not make them patent-eligible. *See Chamberlain Grp., Inc. v. Techtronic Indus. Co.*, 935 F.3d 1341, 1346–47, 1348–49 (Fed. Cir. 2019) (holding a generic "controller" that receives *status conditions* about *operating states* of a movable barrier (garage door) from a generic wireless transmitter was not patent-eligible).

Similarly, in *Vehicle Intelligence*, claims to a method and system of screening an equipment operator to detect potential impairment and then controlling operation of the equipment if the selective testing indicates that the operator is impaired recited an abstract idea of testing operators that was not a patent eligible application. *Vehicle Intelligence and Safety LLC v. Mercedes-Benz USA, LLC*, 635 F. App'x 914, 916, 917. (Fed. Cir. 2015).

Like the claimed method and system, the method and system in *Vehicle Intelligence* used sensed data from vehicle subsystems such as gas and brake pedals and steering wheels. *Id.* at 919; *see* Spec. ¶ 26 (brakes, cruise control, power steering). Like the claimed method and system, the method and system in *Vehicle Intelligence* recited "a control module" that generically controlled the operation mode of the vehicle based on the sensed data of generic modules. *Vehicle Intelligence*, 635 F. App'x at 916, 919.

The Court determined the idea to be abstract because the patent did not describe how the operator characteristics were measured by the vehicle subsystems, how the decision module decided which control response to make, or how the chosen vehicle control response is made. *Id.* at 918.

> Vehicle Intelligence's argument harkens back to our pre-*Alice* machine-or-transformation test in arguing that the claimed methods are tied to particular machines and that alone is sufficient to confer eligibility. But, post-*Mayo/Alice,* this is no longer sufficient to render a claim patent-eligible. *DDR Holdings, LLC v. Hotels.com, L.P.,* 773 F.3d 1245, 1256 (Fed. Cir. 2014). *Merely stating that the methods at issue are performed on already existing vehicle equipment, without more, does not save the disputed claims from abstraction.*

Id. at 919 (emphasis added) (finding that the claims did not require anything beyond a generic computer implementation described in the specification).

Merely sensing physical conditions such as vehicle subsystems in the present application does not make an abstract idea patent-eligible as is clear from *Electric Power*, which involved claims to receiving data from power systems. *See Elec. Power*, 830 F.3d at 1351–52, 1353–54 (holding that the use of off-the-shelf, generic computer and network technology that are not even arguably inventive are insufficient to establish an inventive concept).

In *Thales*, the claims were not directed to abstract ideas because they "specif[ied] a particular configuration of inertial sensors and a particular method of using the raw data from the sensors in order to more accurately calculate the position and orientation of an object on a moving platform." *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017).

Here, the claims do not recite a particular configuration of sensors for measuring vehicle subsystem parameters more accurately or efficiently to control driving modes better. The "sensing system" detects or receives data related to various conditions and communicates that data to the controller. Such generic activity is not an integration. *See id.* (distinguishing claims that recite an abstract idea of using mathematical equations to determine the relative position of a moving object to a moving frame of reference as abstract compared to the claimed invention).

Here, a controller configured to calculate driving modes from logic stored in generic memory using data received from a generic sensing system merely applies the abstract ideas in a particular environment. The controller and its operation and configuration are recited at a high level of generality to perform generic functions discussed above that do not provide an inventive concept or integrate the abstract ideas into a practical application.

"[C]laims are not saved from abstraction merely because they recite components more specific than a generic computer." *BSG Tech LLC v. BuySeasons, Inc.*, 899 F.3d 1281, 1286 (Fed. Cir. 2018). Furthermore, "[i]t 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 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) ("[A] claim for a *new* abstract idea is still an abstract idea."); *Versata Dev. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1335 (Fed. Cir. 2015) (claims that improved an abstract idea, but not a computer's performance, were held unpatentable).

"[C]ontrol[ling] the motor vehicle according to the second primary driving mode" does not meaningfully limit the mathematical calculations and concepts and instead simply recites insignificant extra-solution activity. Revised Guidance, 84 Fed. Reg. at 55 n.31. If there are inventive features in this process, they are not claimed. *See Am. Axle and Mfg., Inc. v. Neapco Holdings LLC*, 939 F.3d 1355, 1363 (Fed. Cir. 2019) (holding the use of a formula to tune an axle liner of a driveline propeller shaft was not patent eligible and asserted innovations in this process were not claimed).

Stripped of these extra-solution activities and generic components that merely recite a particular environment of a "motor vehicle," the claims recite mathematical calculations and concepts at a high level of generality without specifying any innovation in hardware or software components or functions.

Performing calculations on generic computers or as mental processes is similar to patent-ineligible processes in *Gottschalk v. Benson*, 409 U.S. 63 (1972). There, "[t]he mathematical procedures can be carried out in existing computers long in use, no new machinery being necessary. And, as noted, they can also be performed without a computer." *Id.* at 67. The Court held "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to patentability of a process claim that does not include particular machines." *Id.* at 70. Here, there is no transformation.

Diamond v. Diehr illustrates the distinction. The Court held that a mathematical equation, by itself, was not patent-eligible subject matter even if it was limited to a particular technological environment or was used with "insignificant post-solution activity." *Diamond v. Diehr*, 450 U.S. 175, 191–92 (1981). However, the use of that equation in a process of curing rubber beginning by loading a mold and ending by opening of the press to produce a synthetic rubber product that was perfectly cured and unknown in the art was patent-eligible. *Id.* at 192–93 & n.15.

Here, the claims boil down to the abstract ideas of calculating a first primary driving mode and a second primary driving mode, and transitioning from one mode value to the other using an intermediate driving mode value. Control of the motor vehicle is insignificant extra-solution activity. *See CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1375 (Fed. Cir. 2011) (holding that the use of the machine must impose meaningful limits on the claim's scope and play a significant part in permitting the claimed method to be performed).

Accordingly, we determine that the claims do not include additional elements that integrate the abstract ideas into a practical application.

Do the Claims Include an Inventive Concept?

We next consider whether the claims recite 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) (internal quotations and citation omitted); *see also* 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).

As discussed above, the claims recite limitations drawn to what courts have recognized as well-understood, routine, and conventional computer functions, namely, performing calculations based on values and logic and changing modes of operation at an abstract level. Individually, the claims recite the abstract ideas discussed above applied on generic components.

USPTO Memorandum of April 19, 2018, ''Changes in Examination Procedure Pertaining to Subject Matter Eligibility, Recent Subject Matter Eligibility Decision (*Berkheimer v. HP, Inc.*)'' (Apr. 19, 2018), *available at https://www.uspto.gov/sites/default/files/documents/memo-berkheimer-20180419.PDF* ("*Berkheimer* memo"), indicates that the Specification may describe additional elements in a manner that indicates the elements are sufficiently well-known that the specification need not describe their particulars to satisfy 35 U.S.C. § 112(a). *Berkheimer* memo at 3–4. This is just such a case as discussed above. *See* Spec. ¶¶ 17–42, Figs. 1–5.

Nor is there anything unconventional about the "ordered combination" that is not merely the sum of the parts. *See In re TLI Commc'ns Patent Lit.*, 823 F.3d at 615 (holding "recited physical components [that] behave exactly as expected according to their ordinary use," through "steps that generically spell out what it means to 'apply it on a telephone network' also cannot confer patent eligibility"); *Chamberlain Grp.*, 935 F.3d at 1348 ("Simply appending conventional steps, specified at a high level of generality, [i]s not enough to supply an inventive concept.") (quoting *Alice*, 573 U.S. at 222); *Two-Way Media Ltd. v. Comcast Cable Commc'ns*, *LLC*, 874 F.3d 1329, 1339 (Fed. Cir. 2017) (holding an ordered sequence of data processing, routing, controlling, and monitoring with conventional technology lacked an inventive concept because it did not specify a communications protocol or signal parameters).

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 ideas into patent eligible subject matter.

As a result, we reject claims 1–22 as directed to patent-ineligible subject matter under a judicial exception to 35 U.S.C. § 101.

Because we determine that the claims are not patent-eligible, we do not reach the prior art, written description, and enablement rejections. *See In re Comiskey*, 554 F.3d 967, 973 (Fed. Cir. 2009) ("We do not reach the ground relied on by the Board below–that the claims were unpatentable as obvious over Ginter in view of Walker, Perry, and 'Arbitration Fee Schedule'–because we conclude that many of the claims are 'barred at the threshold by § 101.'") (citation omitted); *Ex Parte Gutta*, 93 USPQ2d 1025, 1036 (BPAI 2009) (precedential) (same).

CONCLUSION

Claims Rejected	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed	New Ground
1–22	101	Judicial Exception			1–22
1–19, 21, 22	112(a)	Lack of Written Description			
1–19, 21, 22	112(a)	Lack of Enablement			
1–7, 9, 11–22	103	Kodato			
8	103	Kodato, Ellis			
10	103	Weiss, Brekkestran			
1–7, 11–19	103	Shimada			
8	103	Shimada, Ellis			
9	103	Shimada, Kodato			
10	103	Shimada, Brekkestran			
20–22	103	Shimada, Kodato			
Overall Outcome					1–22

This decision contains a new ground of rejection entered pursuant to 37 C.F.R. § 41.50(b). Section 41.50(b) provides that "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review." Section 41.50(b) also provides:

> When the Board enters such a non-final decision, the appellant, within two months from the date of the decision, must exercise one of the following two options with respect to the new ground

of rejection to avoid termination of the appeal as to the rejected claims:

  (1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the prosecution will be remanded to the examiner. The new ground of rejection is binding upon the examiner unless an amendment or new Evidence not previously of Record is made which, in the opinion of the examiner, overcomes the new ground of rejection designated in the decision. Should the examiner reject the claims, appellant may again appeal to the Board pursuant to this subpart.

  (2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same Record. The request for rehearing must address any new ground of rejection and state with particularity the points believed to have been misapprehended or overlooked in entering the new ground of rejection and also state all other grounds upon which rehearing is sought.

Further guidance on responding to a new ground of rejection can be found in the MANUAL OF PATENT EXAMINING PROCEDURE § 1214.01 (9th Ed., Rev. 08.2017, Jan. 2018).

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).

<u>AFFIRMED; 37 C.F.R. § 41.50(b)</u>