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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MARK STEVEN YAMAZAKI, HAI YU,  
RAJIT JOHRI, and WEI LIANG<sup>1</sup>

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Appeal 2017-007633  
Application 14/499,476  
Technology Center 3600

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Before JOHN C. KERINS, EDWARD A. BROWN, and  
LYNNE H. BROWNE, *Administrative Patent Judges*.

BROWNE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Mark Steven Yamazaki et al. (Appellants) appeal under 35 U.S.C. § 134 from the rejection of claims 1–6 and 9–21. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART and enter a NEW GROUND OF REJECTION pursuant to our authority under 37 C.F.R. § 41.50(b).

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<sup>1</sup> According to Appellants, the real party in interest is Ford Global Technologies, LLC. *See* Appeal Br. 1.

### CLAIMED SUBJECT MATTER

Claims 1, 16, and 21 are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method, comprising:
  - deriving a first torque compensation value from a road grade estimate;
  - deriving a second torque compensation value from a vehicle mass estimate; and
  - controlling a torque output of an electric machine of an electrified vehicle during a vehicle creep condition, the torque output calculated based at least on the first torque compensation value and the second torque compensation value.

### REFERENCES

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Aoki	US 2006/0137920 A1	June 29, 2006
Leminoux	US 2007/0038357 A1	Feb. 15, 2007
Heap	US 2009/0118883 A1	May 7, 2009
Yamamoto	US 2009/0149295 A1	June 11, 2009
Kwon	US 2011/0029172 A1	Feb. 3, 2011
Marcus	US 2011/0184615 A1	July 28, 2011
Yamazaki	US 2013/0179014 A1	July 11, 2013
Nefcy	US 2013/0244829 A1	Sept. 19, 2013
Hoshiba	US 2015/0065297 A1	Mar. 5, 2015

## REJECTIONS

- I. Claims 1, 2, 4, and 6<sup>2</sup> stand rejected under 35 U.S.C. § 102(a) as anticipated by Kwon.
- II. Claim 3 stands rejected under 35 U.S.C. § 103 as unpatentable over Kwon and Heap.
- III. Claim 5 stands rejected under 35 U.S.C. § 103 as unpatentable over Kwon and Hoshiba.
- IV. Claims 9–11 stand rejected under 35 U.S.C. § 103 as unpatentable over Kwon and Nefcy.
- V. Claims 12–14 stand rejected under 35 U.S.C. § 103 as unpatentable over Kwon and Yamamoto.
- VI. Claim 15 stands rejected under 35 U.S.C. § 103 as unpatentable over Kwon, Marcus, and Yamazaki.
- VII. Claims 16, 19, and 20 stand rejected under 35 U.S.C. § 103 as unpatentable over Kwon and Leminoux.
- VIII. Claim 17 stands rejected under 35 U.S.C. § 103 as unpatentable over Kwon, Leminoux,<sup>3</sup> and Nefcy.

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<sup>2</sup> Although the statement of this rejection includes claim 5, the explanation of the rejection does not address claim 5. *See* Final Act. 4–5. Furthermore, claim 5 stands rejected as unpatentable over Kwon and Hoshiba. Final Act. 6–7. Thus, the inclusion of claim 5 in the statement of this rejection is understood to be a typographical error.

<sup>3</sup> Although the statement of this rejection does not include Leminoux, it refers to the rejection of claim 16 which is based on the combined teachings of Kwon and Leminoux. Accordingly, we understand the omission of Leminoux from the statement of this rejection to be a typographical error.

- IX. Claim 18 stands rejected under 35 U.S.C. § 103 as unpatentable over Kwon, Leminoux,<sup>4</sup> and Aoki.
- X. Claim 21 stands rejected under 35 U.S.C. § 103 as unpatentable over Kwon, Nefcy, and Yamamoto.<sup>5</sup>

## DISCUSSION

### *New Ground of Rejection— 35 U.S.C. § 101*

Claim 1 is rejected under 35 U.S.C. § 101 as being directed to non-patent-eligible subject matter.

The Supreme Court has set forth “a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs, Inc.*, 132 S. Ct. 1296–1297 (2012)). According to the Supreme Court’s framework, we must first determine whether the claims at issue are directed to one of those concepts (i.e., laws of nature, natural phenomena, and abstract ideas). *Id.* If so, we must secondly “consider the elements of each claim both individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* The Supreme Court characterizes the second step of the analysis as “a search

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<sup>4</sup> See note 3.

<sup>5</sup> Although the statement of this rejection includes claim 22, the explanation of the rejection addresses claim 21. See Final Act. 14–15. Furthermore, there is no claim 22. Thus, the listing of claim 22 instead of claim 21 in the statement of this rejection is a typographical error.

for an ‘inventive concept’ — *i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Id.* (alteration in the original) (quoting *Mayo*, 132 S. Ct. at 1294).

For the first step of *Alice*, we observe that claim 1 recites “*deriving a first torque compensation value from a road grade estimate,*” “*deriving a second torque compensation value from a vehicle mass estimate,*” and “the torque output *calculated* based at least on the first torque compensation value and the second torque compensation value.” Appeal Br. 9 (Claims App.) (emphasis added). As described in the Specification, the claimed first torque compensation value “represents the amount of torque the electric machine 66 must additionally output to compensate for the road grade estimate during the vehicle creep condition,” and the claimed second torque compensation value “represents the amount of torque the electric machine 66 must additionally output to compensate for the vehicle mass estimate during the vehicle creep condition.” Spec. ¶¶ 67–68. The Specification discloses that the vehicle system 60 determines the first and second torque compensation values. *Id.* at ¶¶ 67–68, 71. The Specification further discloses that “[a] control unit 64 of the vehicle system 60 may be *programmed with one or more algorithms* adapted to execute the vehicle control strategy 100, or any other control strategy.” *Id.* at ¶ 64 (emphasis added). Considering claim 1 in its entirety, including the limitations noted above, and in light of Appellants’ disclosure, we find that the claimed subject matter is directed to the concept of gathering data and manipulating data for controlling a vehicle.

Similar data gathering and data manipulating steps as those in claim 1 have been held ineligible under § 101. *See Content Extraction and Transmission LLC v. Wells Fargo Bank, National Ass’n*, 776 F.3d 1343, 1347 (Fed. Cir. 2014) (holding the concept of “1) collecting data, 2) recognizing certain data within the collected data set, and 3) storing that recognized data in a memory” abstract); *see also Intellectual Ventures ILLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1370 (Fed. Cir. 2015) (concluding that customizing information and presenting it to users based on particular characteristics is abstract as well); *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1353–1354 (Fed. Cir. 2016) (explaining that an invention directed to the collection, manipulation, and display of data is an abstract process). Accordingly, we determine that claim 1 is directed to an abstract idea.

Having determined that claim 1 is directed to an abstract idea, we must determine whether the additional elements of the claim transform it into patent-eligible subject matter, according to the second step of *Alice*. Although claim 1 sets forth that certain data is collected by being estimated and derived or calculated (e.g., a road grade estimate, a vehicle mass estimate, a first torque compensation value, a second torque compensation value, and a torque output), it does not specify how the estimation is accomplished nor indicate how the torque compensation values are derived from the estimates. Even if claim 1 implies that an algorithm may be used to collect or manipulate data (e.g., by a system comprising a controller programmed with one or more algorithms as disclosed by the Specification), and that the results of the application of this algorithm are to be communicated to a vehicle, claim 1 at best, merely requires using

“mathematical algorithms to manipulate existing information to generate additional information.” *See Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014). On this record, we do not find that claim 1 is narrowly directed to application of particular rules for achieving an improved technological result. *Cf. McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1316 (Fed. Cir. 2016).

Claim 1 further recites “controlling a torque output of an electric machine of an electrified vehicle during a vehicle creep condition.” This step is merely a post-solution activity. *See Parker v. Flook*, 437 U.S. 584, 590 (1978) (“The notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over substance.”). Thus, these limitations of claim 1 do not transform the abstract idea embodied in the claim. Rather, they simply implement that idea.

Futhermore, the elements of claim 1, when considered individually and as an ordered combination, are well-understood, routine, and conventional to a skilled artisan. Regarding the limitation “deriving a first torque compensation value from a road grade estimate,” the Specification discloses that

[t]he road grade estimate may be part of the load present during a vehicle creep conditions [sic] and may be estimated using *any known road grade estimation technique*. In one non-limiting embodiment, the road grade estimate may be calculated based on the relationship between one or more of vehicle speed, vehicle acceleration, yaw rate, wheel torques, vehicle mass, drag forces, etc.

Spec. ¶ 67 (emphasis added). Regarding the limitation “deriving a second torque compensation value from a vehicle mass estimate,” the Specification discloses that

[t]he vehicle mass estimate is another portion of the load that may be present during a vehicle creep condition and may be estimated using *any known vehicle mass estimation technique*. In one non-limiting embodiment, the vehicle mass estimate may be calculated based on the relationship between one or more of longitudinal acceleration, wheel torques, vehicle speed, yaw rate, longitudinal acceleration, etc.

Spec. ¶ 68 (emphasis added). Regarding the limitation “the torque output calculated based at least on the first torque compensation value and the second torque compensation value,” the Specification discloses that an output torque such as a feed-forward torque,  $T_{FF}$ , can be calculated by simply adding torque values such as the first torque compensation value derived from the road grade estimate,  $T_G$ , and the second torque compensation value derived from the vehicle mass estimate,  $T_M$ , along with other torque values. Spec. ¶ 73.

Regarding the steps involving “deriving” and calculating” of values, which includes merely adding the values, such data gathering and manipulation are recognized as being well-understood, routine, and conventional to a skilled artisan. *See Content Extraction*, 776 F.3d at 1348–1349; *Intellectual Ventures ILLC*, 792 F.3d at 1368; and *Electric Power Group, LLC*, 830 F.3d at 1355. We further note that the Specification merely discloses that a control unit 64 may be programmed with one or more algorithms to execute a vehicle control strategy (Spec. ¶ 64), that the control unit 64 commands a torque output to the electric machine 66 (*id.* at 74), and that the electric machine 66 adjusts the torque output (*id.* at 64). Thus, the

elements of claim 1, when considered individually and as an ordered combination, are well-understood, routine, and conventional activities or components to a skilled artisan. Thus, they amount to nothing more than an attempt to patent the abstract idea embodied in the steps of this claim. *See Alice*, 134 S. Ct. at 2355 (quoting *Mayo*, 132 S. Ct. at 1298). Accordingly, the limitations of claim 1 fail to transform the nature of this claim into patent-eligible subject matter. *See id.* (citing *Mayo*, 132 S. Ct. at 1297, 1298).<sup>6</sup>

### *Rejection I*

The Examiner finds that Kwon discloses a method comprising deriving a first torque compensation value from a road grade estimate and deriving a second torque compensation value from a vehicle mass estimate. Final Act. 4 (citing Kwon ¶¶ 113, 117). The Examiner explains that “two values which have a compensation effect on a torque value read on the claim language (i.e.  $mg$  and  $\sin(\theta)$  of Kwon).” Ans. 4.

Appellants contend that “*Kwon* fails to teach or suggest controlling a torque output of an electric machine based on a ‘torque compensation value’ that is derived from a vehicle mass estimate.” Appeal Br. 3. In support of this contention, Appellants note that “there is only one torque compensation value disclosed by *Kwon* – the slope load value” and that “separate torque

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<sup>6</sup> Having determined that claim 1 is directed to non-patent-eligible subject matter, we leave it to the Examiner to determine if the claims that depend from claim 1 are also directed to non-eligible subject matter, should there be further prosecution of these claims. Our decision not to address the claims that depend from claim 1 should not be construed as a determination that the dependent claims are or are not patent-eligible.

compensation values are not calculated from each of 1) a road grade estimate; and 2) a vehicle mass estimate.” *Id.* (citing Kwon ¶¶ 113–117).

Appellants further note that “*Kwon* specifically states that it does not actively detect changes in vehicle weight.” *Id.* at 3–4 (citing Kwon ¶ 117).

Kwon discloses “a process of applying a final motor torque, obtained by adding the calculated motor torque and a torque corresponding to a slope load value ( $mgsin\theta$ ) detected by the slope angle sensor and provided as a feedforward input to the motor.” Kwon ¶ 133. Thus, Kwon discloses that  $mgsin\theta$  is a slope load value that corresponds to a torque (i.e., a single torque). The Examiner’s finding that the  $mgsin\theta$  value described in Kwon corresponds to both a first torque compensation value from a road grade estimate and a second torque compensation value from a vehicle mass estimate, is not supported by Kwon’s Specification. Thus, the Examiner’s finding is in error.

Accordingly, the rejection of claim 1, and of claims 2, 4, and 6 depending therefrom, is not sustained.

#### *Rejections II–VI*

Rejections II–VI rely on the same erroneous finding with regard to Kwon as Rejection I. Final Act. 5–11. Heap, Hoshiba, Nefcy, Yamamoto, Marcus, and Yamazaki are not applied in a manner that cures the deficiencies of this finding. Accordingly, we do not sustain Rejections II–VI for the reasons discussed *supra*.

*Rejection VII*

The Examiner finds that Kwon discloses a vehicle system comprising a control unit in communication with an electric machine and configured to estimate a road grade and modify a torque output of the electric machine to compensate for variations in the road grade and the vehicle mass during vehicle creep conditions. Final Act. 11 (citing Kwon, Figs. 7, 9–11; ¶¶ 6, 22, 23, 27, 28, 52, 79, 81, 90, 110–113, 117, 143, 161).

Appellants contend that Kwon does not “modify the torque output based on variations of the vehicle mass.” Appeal Br. 6.

As discussed above, Kwon is concerned with a slope load value,  $mgsin\theta$ , which corresponds to a single torque. Kwon further discloses that “[a]lthough the slope angle is continuously measured and *a change in weight is not suitably detected*, the change in weight, such as a change in the number of passengers, can be sufficiently compensated by a motor position feedback control.” Kwon, ¶ 117. Thus, Kwon does not modify a torque output of an electric machine to compensate for variations in the vehicle mass during vehicle creep conditions, as claimed. Accordingly, the Examiner’s finding is in error. The Examiner’s reliance on Leminoux does not cure the deficiency of this finding.

Accordingly, the rejection of claim 16, and of claims 19 and 20 depending therefrom, is not sustained.

*Rejections VIII–IX*

Rejections VIII–IX rely on the same erroneous finding as Rejection VII. Final Act. 12–14. Nefcy and Aoki are not applied in a manner that

cures the deficiencies of this finding. Accordingly, we do not sustain Rejections VIII–IX for the reasons discussed *supra*.

#### *Rejection X*

The Examiner finds that Kwon, Nefcy, and Yamamota disclose or suggest all of the limitations of claim 21. *See* Final Act. 15. Particularly, the Examiner finds that “it was old and well known in the art to take into account inertia of drive line components when conducting a torque control calculation and that inertia torque is required to spin up a drive line component and generated when a drive line component is spinning.” *Id.* at 14 (citing Yamamota Figs. 12–17, ¶¶ 7, 18–21, 74, 151, 155–157, 173–180). The Examiner further finds that “it was also known in the art to take into account drive line losses when calculating a control torque for a vehicle including spin losses and many other factors and dynamic inertia losses.” *Id.* at 15 (citing Nefcy ¶¶ 31, 40–50, 69).

Appellants argue that “none of the asserted prior art teaches or suggests commanding *different* torque outputs during vehicle creep conditions depending on whether or not the input shaft of a transmission gearbox is spinning.” Appeal Br. 7 (emphasis added); *see also* Reply Br. 5. Claim 21, however, does not specify that the first and second torque outputs are different. *See id.* at 11 (Claims App.).

Appellants further assert that, in Nefcy, “spin losses have nothing to do with commanding torque outputs based on whether or not the input shaft is spinning in the first place” and that “Yamamota also lacks any discussion of torque output based on the spin status of the transmission input shaft.” *Id.* at 7–8.

Responding to these arguments, the Examiner explains that “one of ordinary skill in the art would recognize that when the references speak of inertia, this applies to both claimed limitations” at issue. *Id.* The Examiner further explains that “[t]he inertia of a body can be measured by its mass, which governs its resistance to the action of a force, or by its moment of inertia about a specified axis, which measures its resistance to the action of a torque about the same axis.” *Id.* (citing Merriam-webster.com, <http://www.merriam-webster.com/dictionary/inertia>).

Turning to Appellants specific assertions, the Examiner finds that “Nefcy is not just directed at spin losses.” Ans. 11. Rather, the Examiner finds that “Nefcy teaches taking into account inefficiencies and losses, including spin losses, proportional losses which are dependent on speed, and dynamic inertial losses.” *Id.* (citing Nefcy ¶¶ 31, 40–50, 69). The Examiner further finds that “Nefcy clearly teaches that the input speed of the transmission affects losses and that there are dynamic inertia losses in the system and that these losses should be accounted for when controlling a transmission to achieve a desired outcome.” *Id.* at 11–12 (citing Nefcy ¶¶ 40–50 and 69). In support of this finding, the Examiner provides an example demonstrating that “Nefcy clearly teaches taking into account the spinning state of an input to a transmission when determining a torque to command and adjusting the torque accordingly based on the spinning state/speed.” *Id.* at 12.

Regarding Yamamoto, the Examiner explains that Yamamoto furthers Nefcy’s teachings by “illustrat[ing] that it is already known in the art to take into account the inertial torque, specifically of the input shaft of the transmission.” Ans. 13–14.

In response, Appellants do not contest the Examiners further explanation and findings. *See* Reply Br. 5. Rather, Appellants argue that Nefcy and Yamamoto are directed to torque inputs received by the motor rather than torque outputs from an electric machine, as claimed. *See id.* This argument is raised for the first time in the Reply Brief and does not appear to be raised in response an argument in the Answer. *See generally* Ans. In accordance with 37 C.F.R. § 41.41 (b)(2), lacking a showing of good cause, we do not consider the untimely arguments raised for the first time in the Reply Brief that are not responsive to an argument raised in the Answer.

For these reasons, we sustain the Examiner’s decision rejecting claim 21.

#### DECISION

The Examiner’s rejections of claims 1–6 and 9–20 under 35 U.S.C. § 103 are REVERSED.

The Examiner’s rejection of claim 21 under 35 U.S.C. § 103 is AFFIRMED.

We enter a NEW GROUND OF REJECTION for claim 1 under 35 U.S.C. § 101.

#### FINALITY OF DECISION

This decision contains new grounds of rejection pursuant to 37 C.F.R. § 41.50(b). Section 41.50(b) provides “[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.

AFFIRMED-IN-PART; 37 C.F.R. § 41.50(b)