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EXAMINER
TACSIK, ERNEST G

ART UNIT	PAPER NUMBER
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NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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ChargeLogic LLC - **Ex. 2003**
IPR2026-00381
Tesla Inc. v. ChargeLogic LLC

Office Action Summary	Application No. 18/298,152	Applicant(s) Gorti et al.	
	Examiner ERNEST G TACSIK	Art Unit 2644	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 10APR2023.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-20 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 10APR2023 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Prior Art

While not explicitly cited or relied on in the Rejection(s), the following prior art made of record is believed to be pertinent or material to the present application and has been included in the PTO-892 Notice of References Cited.

- 2019/0187679 to STRUDWICKE et al.
- 2017/0241414 to BILLING et al.
- 2020/0103897 to THORNBERG et al.
- 2018/0232964 to CHEN et al.
- 2012/0063043 to DIVAN
- 2014/0379209 to MATSUDA

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The terms "*low*" and "*high*" in claim 4 are relative terms which render the claim indefinite. The term "*operating temperature*" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree of how "*low/high*" an *operating temperature* would need to be to be considered "*low/high*" respectively (e.g., "minimum" and "maximum" thresholds away from a baseline/normal *operating temperature* (or baseline/normal *temperature* range)). One of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Appropriate correction is required.

Claim Rejections under 35 U.S.C. § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

(a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

Claims 1, 2, 4, 10, 11, 12, 14, and 20 rejected under 35 U.S.C. 102(a)(2) as being anticipated by U.S. Patent Publication 2019/0176639 to KUMAR et al. (hereinafter "KUMAR").

Regarding Claim 1, KUMAR discloses *a vehicular autonomous driving system* (in the case of an autonomous vehicle system … Autonomous functionality may be disabled or curtailed if a degraded battery is identified or if the end of life of the battery is predicted to occur within a short predefined time period. [¶ 0050]) *comprising:*

- *a plurality of autonomous driving components including:*
    - *a plurality of autonomous drive units that control motion of a vehicle* (vehicle 5 may be a hybrid vehicle with multiple sources of torque available to one or more vehicle wheels 55. In other examples, vehicle 5 is … an electric vehicle with only electric machine(s). [¶ 0045] … Battery 58 may also be used for various engine operation related functions. For example, battery 58 may be coupled to a starter motor (not shown) that is used to crank the engine during an engine start. Battery 58 may be implemented with Li-Ion technology. The methods described herein for predicting end of life and the associated control and communication strategies may be adapted to propulsion batteries of this type and to chemistries other than those used in lead-acid batteries as well. A battery monitoring sensor (BMS) 184 may be coupled to battery 58 for estimating

one or more conditions associated with a state of degradation of the battery. Based on input from the BMS 184, controller 12 may calculate an inferred end of life of the battery, as elaborated at FIGS. 3-4. [¶ 0048]. The Examiner notes that *plurality of autonomous driving components* is interpreted consistent with e.g., ¶ 0030 of the present published Specification.)*;*

- *an autonomous driving controller configured to control the plurality of autonomous drive units of the vehicle* (Engine 10 may be controlled at least partially by a control system including controller 12 and by input from a vehicle operator 130 via an input device 132. [¶ 0029] … A battery monitoring sensor (BMS) 184 may be coupled to battery 58 for estimating one or more conditions associated with a state of degradation of the battery. Based on input from the BMS 184, controller 12 may calculate an inferred end of life of the battery, as elaborated at FIGS. 3-4. [¶ 0048])*;*
- *a plurality of autonomous driving sensors coupled to the autonomous driving controller and configured to collect autonomous driving data and transmit the autonomous driving data to the autonomous driving controller* (Controller 12 may receive various signals from sensors coupled to engine 10, in addition to those signals previously discussed, including … mass air flow sensor 122; barometric pressure from BP sensor 137; engine coolant temperature (ECT) from temperature sensor 116 … a profile ignition pickup signal (PIP) from Hall effect sensor 120 … coupled to crankshaft 140; throttle position (TP) from a throttle position sensor; and absolute

manifold pressure signal (MAP) from sensor 124. ... Manifold pressure signal MAP from a manifold pressure sensor may be used to provide an indication of vacuum, or pressure, in the intake manifold. The controller 12 receives signals from the various sensors of FIG. 1A and employs the various actuators of FIG. 1A to adjust engine operation based on the received signals and instructions stored on a memory of the controller. [¶ 0043] ... A battery monitoring sensor (BMS) 184 may be coupled to battery 58 for estimating one or more conditions associated with a state of degradation of the battery. Based on input from the BMS 184, controller 12 may calculate an inferred end of life of the battery, as elaborated at FIGS. 3-4. [¶ 0048] ... At 304, the method includes measuring the selected characteristics online during vehicle operation. For example, the selected characteristics may be measured via one or more battery sensors at the determined sampling frequency. For example, internal resistance of the battery may be measured with a hall-based or shunt-based current measurement and a voltage sensor at sampling frequencies greater than 1 kHz. As another example, a loss in battery capacity due to sulfation may be measured with a single voltage measurement after the battery has been fully charged and has been allowed to rest without charging or discharging for a number of hours. The change in open-circuit voltage of the fully charged battery as it ages is a metric for the capacity loss due to sulfation. [¶ 0066]. The Examiner notes that as illustrated in e.g., Fig. 1A, the BMS 184 is input to the Controller 12);

- *a fault prediction unit, including a processor and memory, configured to predict a potential future fault condition* (characteristics that influence the battery state of health being affected at different rates based on vehicle operating conditions. … some of the characteristics may be significantly affected by temperature. [¶ 0004] … Controller 12 is shown in FIG. 1A as a microcomputer, including microprocessor unit 106, input/output ports 108, an electronic storage medium for executable programs and calibration values shown as non-transitory read only memory chip 110 in this particular example for storing executable instructions, random access memory 112, keep alive memory 114, and a data bus. … Controller 12 may receive various signals from sensors coupled to engine 10. [¶ 0043] … By using an EOL prediction methodology that assesses multiple battery characteristics associated with battery degradation, as elaborated with reference to the routines of FIGS. 3-4, reliability of the EOL prediction is improved. [¶ 0052] … The controller may be configured with computer-readable instructions stored on non-transitory memory for: predicting a state of degradation of the battery based on change in capacity and internal resistances. [¶ 0054]) *by:*
  - *monitoring life accelerating events data associated with the plurality of autonomous driving components* (characteristics that influence the battery state of health being affected at different rates based on vehicle operating conditions. … some of the characteristics may be significantly affected by temperature. [¶ 0004] … batteries may fail

due to multiple causes based on their use history, temperature constraints, and issues associated with the chemical nature of the battery. [¶ 0052] ... BMS measures current, voltage and may also measure battery terminal temperature. [¶ 0057]);

- *updating an expected component life associated with the plurality of autonomous driving components* (a battery management system (BMS) may be present on-board the vehicle, where the BMS is electrically and thermally coupled to the battery and communicates with the vehicle controller. The Battery Monitor Sensor (BMS) monitors and calculates the actual battery condition (State of charge (SOC), state of health (SOH) and state of function (SOF)). It consists of hardware and software. The hardware includes a single chip solution to measure battery voltage, battery current and temperature. These inputs are used to calculate the actual battery state. The BMS learns the battery state of the connected battery over time and keeps the actual battery state in RAM and periodically saves the learned and adapted battery parameters to non-volatile memory (NVM). [¶ 0047] ... the controller may identify one or more battery characteristics affecting battery health that can be measured. The controller compares the data pertaining to those characteristics, collected during vehicle operation, to corresponding thresholds. As elaborated with reference to FIGS. 3-4, the vehicle controller may define the thresholds based on battery history as

well as statistical data collected from various sources … The controller may be configured to use an algorithm that estimates the rate of convergence of the measured data to the defined thresholds, and uses the estimated rate in addition to a previous history of degradation behavior of the battery, sensed data for parameters relating to the battery, as well as based on mapped vehicle driving statistics (such as real-time vehicle driving statistics, or those compiled over a current vehicle drive cycle), to make a statistical prediction regarding the remaining life of the battery. The controller may then provide meaningful information regarding the battery life to the vehicle operator, such as in the form of a distance to service or time to service estimate. As a result, the remaining life expectancy of a battery may be estimated via an approach that runs online in a vehicle and whose accuracy may be enhanced by periodic parameter adaptation using battery data obtained from a fleet of vehicles in the road and batteries replaced in the service. [¶ 0053]. The Examiner notes the *updating* is not required to be based on *monitored events*)*; and*

- *determining the potential future fault condition of one of the plurality of autonomous driving components based on when a service time of the one of the plurality of autonomous driving components exceeds the expected component life associated with the one of the plurality of autonomous driving components* (Batteries may

need to be periodically serviced and diagnosed. In addition, based on their service or degradation history, the remaining life of a battery may vary. Unexpected battery failure may occur due to an incorrect estimation of the battery's end of life (EOL). ... If a battery's end of life can be accurately predicted, the battery can be replaced before failure occurs. This may be particularly advantageous in the case of a vehicle system where a central controller coordinates various vehicle systems to minimize electrical power requirements. For example, in the case of an autonomous vehicle system ... Autonomous functionality may be disabled or curtailed if a degraded battery is identified or if the end of life of the battery is predicted to occur within a short predefined time period. For example, battery low-voltage conditions may cause an electrically-assisted power steering system to lower the steering assist it provides, or to deactivate electrical functions that are not safety-critical. [¶ 0050] ... The performance of a battery in a vehicle is a function of a multitude of characteristics. If the end of life is only defined for each characteristic without taking other characteristics into account, the end time to the end of life may be over-estimated, because small degradations in multiple characteristics may cause significant degradation in total battery performance. [¶ 0052] ... the controller may identify one or more battery characteristics affecting battery health that can be measured. The controller compares the

data pertaining to those characteristics, collected during vehicle operation, to corresponding thresholds. As elaborated with reference to FIGS. 3-4, the vehicle controller may define the thresholds based on battery history as well as statistical data collected from various sources such as fleet data, dealership vehicle data, warranty laboratory data, etc. The controller may be configured to use an algorithm that estimates the rate of convergence of the measured data to the defined thresholds, and uses the estimated rate in addition to a previous history of degradation behavior of the battery, sensed data for parameters relating to the battery, as well as based on mapped vehicle driving statistics (such as real-time vehicle driving statistics, or those compiled over a current vehicle drive cycle), to make a statistical prediction regarding the remaining life of the battery. The controller may then provide meaningful information regarding the battery life to the vehicle operator, such as in the form of a distance to service or time to service estimate. As a result, the remaining life expectancy of a battery may be estimated via an approach that runs online in a vehicle and whose accuracy may be enhanced by periodic parameter adaptation using battery data obtained from a fleet of vehicles in the road and batteries replaced in the service. [¶ 0053] ... As yet another example, loss of Active Mass may be characterized (e.g., in terms of Loss of capacity in Ah due to loss of

active mass). Loss of active mass causes the battery capacity to depreciate. As a further example, a battery Time in Service may be characterized (e.g., in terms of battery time in running vehicle expressed in hours). Statistical distributions of the life expectancy of batteries in specific vehicles may be used to predict the distance to end of life. The prediction may be improved by using statistics of specific vehicles operated in specific regions to define end of life as a function of vehicle usage. For instance, the same batteries may degrade quicker due to corrosion and water loss in a warm/hot environment versus a cold climatic condition. As still another example, charge throughput weighted with respect to Depth of Discharge may be characterized (e.g., in terms of Loss of battery capacity in Ah). Charge throughput may be weighted with respect to battery depth of discharge and integrated over time to estimate aging defined as loss of battery capacity. [¶ 0063] … the battery may be periodically assessed, such as based on a time or distance of vehicle travel elapsed since a last assessment of the battery. In other examples, the selection of the characteristics to assess the battery may be based on an active request received from the operator. This may be in addition to, or independent of, the periodic assessment. For example, an operator may request prognosis of a system battery before embarking on a planned travel route. [¶ 0065] … The prediction of time to the end of life is defined as the

the time remaining until the end of life of the battery is reached. It is calculated by dividing the length of the orthonormal ||{right arrow over (x)}|| by the speed of convergence {right arrow over (v)} along the orthonormal {right arrow over (x)}. The length of the orthonormal ||{right arrow over (x)}|| may be interpreted as the distance to the end of life threshold as illustrated in FIG. 6. The direction of may be parallel to the direction of a specific feature as illustrated in FIG. 2, or as illustrated in FIG. 6, it may progress in another direction. In that case, it may be assumed that battery degradation is captured by multiple features. [¶ 0090] … At 318, the method includes converting the estimated EOL or SOH of the battery to an EOL estimate that can be easily understood by the vehicle operator, such as a remaining time of distance of vehicle operation remaining before complete battery degradation (when the battery dies). At 320, the remaining time or distance may be displayed to the vehicle operator. For example, the estimated time/distance remaining before degradation of the battery may be displayed to the vehicle operator on a display screen of a central console of the vehicle. [¶ 0098] … In further examples, such as where the vehicle is an autonomous vehicle, the controller may also limit or curtail autonomous functions of the vehicle based on the predicted EOL. For example, autonomous operation limitation may

come into effect if the predicted EOL of the battery is predicted to be within a predefined amount of time. [¶ 0103])

Regarding Claim 2, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

KUMAR further discloses:

wherein the life accelerating events data includes

- *an indication of one of a plurality of life accelerating events and*
- *an indication of one or more of the plurality of autonomous driving components associated with the life accelerating event.*

(a battery management system (BMS) may be present on-board the vehicle, where the BMS is electrically and thermally coupled to the battery and communicates with the vehicle controller. The Battery Monitor Sensor (BMS) monitors and calculates the actual battery condition (State of charge (SOC), state of health (SOH) and state of function (SOF)). It consists of hardware and software. The hardware includes a single chip solution to measure battery voltage, battery current and temperature. These inputs are used to calculate the actual battery state. The BMS learns the battery state of the connected battery over time and keeps the actual battery state in RAM and periodically saves the learned and adapted battery parameters to non-volatile memory (NVM). [¶ 0047])

Regarding Claim 4, KUMAR discloses *the vehicular autonomous driving system of claim 2.*

KUMAR further discloses:

- *wherein the plurality of life accelerating events includes an indication of a high operating temperature or a low operating temperature* (characteristics that influence the battery state of health being affected at different rates based on vehicle operating conditions. ... some of the characteristics may be significantly affected by temperature. [¶ 0004] ... a battery management system (BMS) may be present on-board the vehicle, where the BMS is electrically and thermally coupled to the battery and communicates with the vehicle controller. The Battery Monitor Sensor (BMS) monitors and calculates the actual battery condition (State of charge (SOC), state of health (SOH) and state of function (SOF)). It consists of hardware and software. The hardware includes a single chip solution to measure battery voltage, battery current and temperature. These inputs are used to calculate the actual battery state. The BMS learns the battery state of the connected battery over time and keeps the actual battery state in RAM and periodically saves the learned and adapted battery parameters to non-volatile memory (NVM). [¶ 0047] ... batteries may fail due to multiple causes based on their use history, temperature constraints, and issues associated with the chemical nature of the battery ... By using an EOL prediction methodology that assesses multiple battery characteristics associated with battery degradation, as elaborated with reference to the routines of FIGS. 3-4, reliability of the EOL

prediction is improved. [¶ 0052] ... BMS measures current, voltage and may also measure battery terminal temperature. [¶ 0057])

Regarding Claim 10, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

KUMAR further discloses:

- *wherein plurality of autonomous driving components further include components of at least one vehicle accessory* (climate control or entertainment systems. [¶ 0104])

Regarding Claim 11, the features of Claim 11 are essentially the same as Claim 1 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 11 is rejected on the same grounds and motivation as Claim 1.

Regarding Claim 12, the features of Claim 12 are essentially the same as Claim 2 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 12 is rejected on the same grounds and motivation as Claim 2.

Regarding Claim 14, the features of Claim 14 are essentially the same as Claim 4 with *the vehicular autonomous driving system of claim 1* performing *the method of*

claim 11 above. Therefore, Claim 14 is rejected on the same grounds and motivation as Claim 4.

Regarding Claim 20, the features of Claim 20 are essentially the same as Claim 1 with *the vehicular autonomous driving system of claim 1* performing as *the vehicular autonomous driving system of claim 20* above. Therefore, Claim 20 is rejected on the same grounds and motivation as Claim 1.

Claim Rejections under 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

Claims 3 and 13 rejected under 35 U.S.C. 103 as being unpatentable over KUMAR in view of U.S. Patent Publication 2005/0057098 to BOUCHON.

Regarding Claim 3, KUMAR discloses *the vehicular autonomous driving system of claim 2.*

While KUMAR discloses *a voltage spike or a current spike* (significant voltage and current transient. [¶ 0056]), KUMAR does not explicitly disclose, or is not relied on to disclose, in the same field of endeavor BOUCHON teaches:

- *wherein the plurality of life accelerating events includes an indication of*
    - *an over-voltage condition,*
    - *a voltage spike or*
    - *a current spike.*

(More significantly, existing systems tend to be reactionary in nature, and often cannot prevent short but damaging voltage spikes from occurring. For example, in a conventional series hybrid electric vehicle, if a user of the vehicle is accelerating at full throttle, the auxiliary power unit will be operating at full power, supplying its maximum amount of electrical energy to the energy bus in order to power the traction motors. If the user then brakes suddenly, the traction motors suddenly switch from operating as a large energy drain to operating as a generator, supplying a large supply of electrical energy to the energy bus, while at the same time, the auxiliary power unit will still initially be operating at or near

full power, not having had sufficient time to reduce its output. The resulting surplus electrical energy supplied to the energy bus by the traction motors and the auxiliary power unit typically largely exceeds the charge acceptance of the energy storage system, and the resulting over-voltage condition on the energy bus not only has a detrimental effect on the service life of the energy storage system, but is also potentially damaging to other electronic and/or electrical devices connected to the energy bus. [¶ 0011]).

Therefore, it would have been obvious to one of ordinary skill in the art, before the effective filing date of the claimed invention, to combine the teaching of KUMAR with that of BOUCHON for advantage where the effective service lifetimes of the energy storage system and of other electronic components of the vehicle are improved. (BOUCHON: ¶ 0134)

Regarding Claim 13, the features of Claim 13 are essentially the same as Claim 3 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 13 is rejected on the same grounds and motivation as Claim 3.

Claims 5, 6, 15, and 16 rejected under 35 U.S.C. 103 as being unpatentable over KUMAR in view of U.S. Patent Publication 2018/0045089 to RADULESCU et al. (hereinafter "RADULESCU").

Regarding Claim 5, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

While KUMAR does not explicitly disclose, or is not relied on to disclose, in the same field of endeavor RADULESCU teaches:

- *wherein, determining the potential future fault condition of one of the plurality of autonomous driving components includes:*
    - *executing a stress test, when the service time of the one of the plurality of autonomous driving components exceeds the expected component life associated with the one of the plurality of autonomous driving components; and*
    - *determining the potential future fault condition of one of the plurality of autonomous driving components when stress test results compare unfavorably to a stress test threshold.*

(A diamond-like carbon coating (DLC coating) allows higher slider interface stresses in a compact package. ... This application addresses the technology developed to utilize a Diamond-like carbon (DLC) coating on the slider pads of the DVVL switching rocker arm. [¶ 0042] ... The goal of testing was to determine relative contribution each of the factors had on the durability of the slider pad DLC coating. The majority of the test configurations included a minimum of two factors from the test plan. The slider pads **752** were attached to a support rocker **753** on a test coupon **751** shown in FIG. 78. ... Testing was suspended when the coupons exhibited loss of the DLC coating or there was a significant

change in the surface of the camshaft lobe. The testing was conducted at stress levels higher than the application required hastening the effects of the factors. As a result, the engine life assessment described is a conservative estimate and was used to demonstrate the relative effect of the tested factors. Samples completing one life on the test stand were described as adequate. Samples exceeding three lives without DLC loss were considered excellent. [¶ 0550]. The Examiner notes that RADULESCU's *stress testing* continues past the part's lifetime (i.e., its *expected lifetime*) until possible failure (at least until 3x the part's *expected lifetime*.)

Therefore, it would have been obvious to one of ordinary skill in the art, before the effective filing date of the claimed invention, to combine the teaching of KUMAR with that of RADULESCU for advantage of combining prior art elements of KUMAR and RADULESCU according to known methods to yield predictable results.

Regarding Claim 6, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

While KUMAR does not explicitly disclose, or is not relied on to disclose, in the same field of endeavor RADULESCU teaches *further comprising*

- *executing a stress test to generate stress test results; and*
- *comparing stress test results to a stress test threshold;*

- *wherein determining the potential future fault condition of one of the plurality of autonomous driving components is further based on the stress test results compare unfavorably to the stress test threshold.*

(A diamond-like carbon coating (DLC coating) allows higher slider interface stresses in a compact package. ... This application addresses the technology developed to utilize a Diamond-like carbon (DLC) coating on the slider pads of the DVVL switching rocker arm. [¶ 0042] ... The goal of testing was to determine relative contribution each of the factors had on the durability of the slider pad DLC coating. The majority of the test configurations included a minimum of two factors from the test plan. The slider pads 752 were attached to a support rocker 753 on a test coupon 751 shown in FIG. 78. ... Testing was suspended when the coupons exhibited loss of the DLC coating or there was a significant change in the surface of the camshaft lobe. The testing was conducted at stress levels higher than the application required hastening the effects of the factors. As a result, the engine life assessment described is a conservative estimate and was used to demonstrate the relative effect of the tested factors. Samples completing one life on the test stand were described as adequate. Samples exceeding three lives without DLC loss were considered excellent. [¶ 0550]. The Examiner notes that *comparing stress test results* is interpreted as *comparing <u>the</u> stress test results*; and 2) a "lifetime" is interpreted as a *stress test threshold*.)

Motivation to combine the teaching of KUMAR with that of RADULESCU given in Claim 5 above.

Regarding Claim 15, the features of Claim 15 are essentially the same as Claim 5 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 15 is rejected on the same grounds and motivation as Claim 5.

Regarding Claim 16, the features of Claim 16 are essentially the same as Claim 6 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 16 is rejected on the same grounds and motivation as Claim 6.

Claims 7 and 17 rejected under 35 U.S.C. 103 as being unpatentable over KUMAR in view of U.S. Patent Publication 2003/0009311 to USHIKU et al. (hereinafter "USHIKU").

Regarding Claim 7, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

While KUMAR discloses (The nature of the communication and control actions may change as the predicted time to end of life decreases. [¶ 0158]), KUMAR does not explicitly disclose, or is not relied on to disclose:

- *wherein updating the expected component life associated with the plurality of autonomous driving components includes*
    - *decreasing the expected component life associated with a selected one of the plurality of autonomous driving components in response to the life accelerating events data indicating a life accelerating event associated with the selected one of the plurality of autonomous driving components.*

However, in the same field of endeavor USHIKU teaches:

- *wherein updating the expected component life associated with the plurality of autonomous driving components includes*
    - *decreasing the expected component life associated with a selected one of the plurality of autonomous driving components in response to the life accelerating events data indicating a life accelerating event associated with the selected one of the plurality of autonomous driving components* (The precipitated material continues to increase, and immediately before failure of the dry pump 5, a temporal increase in the current level or the power level, the temperature, the vibrations, etc. can be observed due to the accumulation of precipitated material. ... Accordingly, by monitoring this level as a determination reference, life expectancy can be predicted by finding the increasing speed. The life expectancy determination reference of the dry pump 5 is determined by referencing failure data.... a respective determination reference level is set for the characterizing feature data of every process condition, and life expectancy is calculated

through the increasing speed of the characterizing feature data during the process. Moreover, in the case where the increasing speed of the characterizing feature data incidentally changes, not only is life expectancy recalculated, but the life expectancy determination reference level is also updated in line with this. Thus, it becomes possible for the life expectancy prediction to accommodate various process conditions, and also take the process history into consideration. [¶ 0036]. The Examiner notes that "*in response to the life accelerating events data indicating a life accelerating event*" appears to be circular defining the *event* in terms of the *event*.)

Therefore, it would have been obvious to one of ordinary skill in the art, before the effective filing date of the claimed invention, to combine the teaching of KUMAR with that of USHIKU for advantage as it is desirable to accurately diagnose … life expectancy and to operate … without having any waste in terms of time. (USHIKU: ¶ 0008)

Regarding Claim 17, the features of Claim 17 are essentially the same as Claim 7 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 17 is rejected on the same grounds and motivation as Claim 7.

Claims 8 and 18 rejected under 35 U.S.C. 103 as being unpatentable over KUMAR in view of U.S. Patent Publication 2016/0272228 to LEFEBVRE et al. (hereinafter "LEFEBVRE").

Regarding Claim 8, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

While KUMAR does not explicitly disclose, or is not relied on to disclose, in the same field of endeavor LEFEBVRE teaches:

- *wherein an indication of the potential future fault condition is transmitted to a diagnostic unit via a wireless communication link* (Each railcar is equipped with a communication management unit which communicates with each of the wireless sensors deployed on the railcars. The communication management unit is capable of collecting data from each of the wireless sensors and performing higher-level analysis of the data to detect imminent or actual failures. During such data analysis, heuristics may be applied to determine potential failures based on statistical models and empirical data. The communication management unit also is capable of communicating both the data and the results of any analysis to another system remote from the railcar, via any one of a number of communication protocols. [¶ 0013])

Therefore, it would have been obvious to one of ordinary skill in the art, before the effective filing date of the claimed invention, to combine the teaching of KUMAR with that of LEFEBVRE for advantage as from a safety point of view, it is important to

monitor various operational parameters of railcars, for example, bearing temperature, in real time, to be able to predict and stop impending failures. (LEFEBVRE: (P 0004)

Regarding Claim 18, the features of Claim 18 are essentially the same as Claim 8 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 18 is rejected on the same grounds and motivation as Claim 8.

Claims 9 and 19 rejected under 35 U.S.C. 103 as being unpatentable over KUMAR in view of U.S. Patent Publication 2011/0175569 to AUSTIN.

Regarding Claim 9, KUMAR discloses *the vehicular autonomous driving system of claim 1.*

While KUMAR does not explicitly disclose, or is not relied on to disclose, in the same field of endeavor AUSTIN teaches:

- *wherein an indication of the potential future fault condition is transmitted to a diagnostic unit via a charging port of the vehicle* (a vehicle charger for charging a battery of a vehicle and adapted for communication with a first controller remote from the vehicle and vehicle charger, wherein the vehicle charger comprises an electrical power cord releasably attachable to at least one of the vehicle and a source of power; a second controller electrically coupled to the electrical power cord; and at least one of a transmitter and a receiver coupled to the second controller and adapted for communication with the first controller, the second

controller responsive to at least one signal from the first controller by changing a charging state of the vehicle charger. [¶ 0005] ... A vehicle charging cord 22 ... is illustrated in FIG. 5 ... charging cord 22 has a first end 24 adapted to releasably connect to an electrical outlet (not shown) of a business, residence, or other building or facility, and a second end 26 adapted to releasably connect to the electric vehicle 18. [¶ 0054] ... With reference now to FIG. 15 ... the vehicle charging cord 22 has a controller 44 located within the housing 28 and at least partially controlling operations of the vehicle charging cord 22. ... The illustrated vehicle charging cord 22 also has a transceiver 46 coupled to the controller 44, enabling the controller 44 to communicate with another controller. The other controller can be one or more processors of a personal computer, phone, PDA, or other processor-based device associated with a user of the vehicle charging cord 22, one or more processors of a server or other computer associated with a power utility providing power to the vehicle charging cord 22, and the like). In the illustrated embodiment of FIGS. 2, 5-11 and 15, the other controller is a remote computer of a power utility 48, and is indicated at 50. The controller 50 of the power utility 48 is coupled to a power utility transceiver 52 to enable the power utility 48 to communicate with the controller 44 of the vehicle charging cord 22. [¶ 0062] ... Any power line communication (PLC) system or combination of PLC systems adapted for carrying data over power lines 14 can be used for communication between the controllers 44, 50 described above, such as distribution line carrier (DLC) PLC systems, broadband over lines carrier (BLC) systems, low-speed narrow-band communication systems (proposed and used in

Demand Side Management systems), and the like. [¶ 0064]. The Examiner notes that lacking an explicit definition to the contrary, "*port*" is interpreted as would be understood by a Person of Ordinary Skill In The Art (POSITA) at the time of the invention, i.e., as a point where connections start and end." "*Port*" is not necessarily interpreted as reference to an individual connection such as a wire (i.e., "charging" and "communications" may – or may not – be over the same individual connections (see **MPEP § 2111 Claim Interpretation; Broadest Reasonable Interpretation (BRI)**, **MPEP § 2111.01 Plain Meaning**, and **MPEP §2173.01 Interpreting the Claims**.))

Therefore, it would have been obvious to one of ordinary skill in the art, before the effective filing date of the claimed invention, to combine the teaching of KUMAR with that of AUSTIN for advantage where any of the vehicle charging systems described and/or illustrated herein can provide significant control to a user in determining the conditions under which vehicle battery charging will occur. (AUSTIN: (P 0184)

Regarding Claim 19, the features of Claim 19 are essentially the same as Claim 9 with *the vehicular autonomous driving system of claim 1* performing *the method of claim 11* above. Therefore, Claim 19 is rejected on the same grounds and motivation as Claim 9.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERNEST G TACSIK whose telephone number is 571-270-1279. The examiner can normally be reached 9:00 am - 6:00 pm Eastern Time.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathy WANG-HURST can be reached on 571-270-5371. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ERNEST G TACSIK/

Examiner, Art Unit 2644

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