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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/562,642	12/27/2021	Nir Even Chen	104099-1256012-003200US	4572

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EXAMINER
MA, CALVIN

ART UNIT	PAPER NUMBER
2693	

NOTIFICATION DATE	DELIVERY MODE
07/22/2022	ELECTRONIC

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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Office Action Summary	Application No. 17/562,642	Applicant(s) Even Chen et al.	
	Examiner CALVIN C MA	Art Unit 2693	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 12/27/2021.

☐ 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) 1-17 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) 1-17 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 12/27/2021 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

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

Claim Rejections - 35 USC § 103

2. 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 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, 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.

3. **Claims 1-17** are rejected under 35 U.S.C. 103 as being unpatentable over Furman et al. (US Pub: 2017/0202518 A1) in view of Oweiss et al. (US Pub: 2011/0307079 A1).

As to claim 1, Furman teaches a method of interpreting signals from a brain-machine interface (BMI) (i.e. Furman discloses figure 1 and 2 embodiment which shows

a brain machine interface (BMI) system which interprets user neural signal to actionable control in the user interface 109) (see Fig. 1, [0046-0049]), the method comprising:

receiving neural signals from a brain of a subject into a BMI signal processor (i.e. as seen in figure 1 the processor is the Pre-processing element 105) (see Fig. 1, [0049]);

determining an activity change of the subject based on a sensor (i.e. the Processor 106 is able to detect changes in the reference range for the textual activity for the set model fitment in the Classification element 108) (see Fig. 1, [0052-0054]);

routing the neural signals from a first model to a second model in the BMI decoder based on the determined activity change (i.e. the modeling system of Furman is adapted by the requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, as well as in the presence of similar inputs) (see [0067-0068]);

translating, using the second model in the BMI decoder, the neural signals into a command (i.e. as seen in figure 5-6 the system of Furman is able to go from into different algorithm to correct for error detected in the output from the classification systems) (see Fig. 5-6, [0067-00668], [0085-0102]);

sending the command to a controller (i.e. as seen in figure 1, the command is sent to the control of the user interface to input into a computer system in application such as gaming and transportation) (see Fig. 1, [0108-0111]).

However, Furman do not explicitly teach a decoder in the BMI processing system (i.e. though Furman does not mention the functionality of a decoder, one of ordinary skill

in the art at the time of the invention's filing would have appreciated that Furman's processing device must have a decoder hardware to enable the signal input and digital processing method of figure 1 embodiment).

Oweiss teaches a BMI interface using a dedicated Decoder hardware (i.e. as seen in figure 1 the Decoder hardware is shown to output the feedback loop of the system of Oweiss to take place for the user to access the neurons in the interface controls) (see Fig. 1-2, [0087-0095]).

Since both Furman and Oweiss teaches BMI and human computer interface, they are analogous in have the same field of endeavor. Therefore, it would have been obvious to have further enhanced the BMI system of Furman with the specified Decoder based interface design of Oweiss, in order to create an advanced decoding system having superior performance without noise (see Oweiss [0161-0162]).

As to claim 8, Furman and Oweiss teaches a method of interpreting signals from a brain-machine interface (BMI) (i.e. Furman discloses figure 1 and 2 embodiment which shows a brain machine interface (BMI) system which interprets user neural signal to actionable control in the user interface 109) (see Fig. 1, [0046-0049]), the method comprising:

Oweiss teaches receiving a first set of neural signals from a brain of a subject into a BMI decoder(i.e. as seen in figure 1 the Decoder hardware is shown to output the feedback loop of the system of Oweiss to take place for the user to access the neurons in the interface controls) (see Fig. 1-2, [0087-0095]);

translating, using a first model in the BMI decoder, the first set of neural signals into a first command (i.e. the system of Furman is able to use the decoder design of

Oweiss and implement the Processor 106 is able to detect changes in the reference range for the textual activity for the set model fitment in the Classification element 108) (see Fig. 1, [0052-0054]);

detecting, from further neural signals from the subject, a frustration from the subject (i.e. Furman teaches the real-time detection of error of output this means that the user is getting inaccurate output which the system is said to be able to detect and initiate self-correction and recalibration algorithm) (see Fig. 1-2. [0067-0068]);

inhibiting the first command based on the detecting (i.e. the error rejection and recalibration by definition is design to block the error from occurring in the future) (see Furman [0067-0068]);

routing a second set of neural signals from the brain of the subject to a second model in the BMI decoder based on the detecting (i.e. the system of Furman is able to create a second set of neural signal that is corrected based on the recalibration algorithm) (see Fig. 1-2, [0067-0068]);

interpreting, using the second model, the second set of neural signals into a second command (i.e. the modeling system of Furman is adapted by the requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, as well as in the presence of similar inputs) (see [0067-0068]); and

sending the second command (i.e. the corrected command) (see Fig. 5-6, [0067-0068]).

Since both Furman and Oweiss teaches BMI and human computer interface, they are analogous in have the same field of endeavor. Therefore, it would have been

obvious to have further enhanced the BMI system of Furman with the specified Decoder based interface design of Oweiss, in order to create an advanced decoding system having superior performance without noise (see Oweiss [0161-0162]).

As to claim 14, Furman and Oweiss teaches a method of adjusting an implanted or wearable brain-machine interface (BMI) device (i.e. Furman discloses figure 1 and 2 embodiment which shows a brain machine interface (BMI) system which interprets user neural signal to actionable control in the user interface 109) (see Fig. 1, [0046-0049]), the method comprising:

receiving neural signals from a brain of a subject into an implanted or wearable BMI device (i.e. as seen in figures 1-2 of Furman and figure 1 of Oweiss teaches both wearable and implanted BMI system) (see Furman, Fig. 1-2, [0046-0049], Oweiss, Fig. 1-2, [0087-0095];

determining an activity change of the subject based on a sensor (i.e. the processor of the BMI system of Furman senses an error which is detected) (see Furman, [0067-0068]);

switching from a first compression algorithm to a second compression algorithm based on the determined activity change (i.e. since the system of Oweiss using compressing algorithm as seen in figure 27 the compression algorithm of the decoder system of Oweiss would be adopted into the system of Furman whereby different algorithm can be instituted to prevent error in the future operation) (see Oweiss Fig. 27, [0246-0251]);

compressing, using the second compression algorithm in the BMI device, the neural signals into a data stream (i.e. the modeling system of Furman is adapted by the

requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, as well as in the presence of similar inputs which when view together with Oweiss require a change in the overall algorithm for correction recalibration purpose) (see Furman [0067-0068], Oweiss, Fig. 27, [0246-0252]);

sending the data stream to a BMI controller off-board the subject (i.e. Oweiss implementation of figure 29 clearly offload the data stream to network asset which is off-board the subject) (see Fig. 29, [0261-0262]).

Since both Furman and Oweiss teaches BMI and human computer interface, they are analogous in have the same field of endeavor. Therefore, it would have been obvious to have further enhanced the BMI system of Furman with the specified Decoder compression method-based interface design of Oweiss, in order to create an advanced decoding system having superior performance without noise and with better performance by reducing data size (see Oweiss [0161-0162]).

As to claim 2, Furman and Oweiss further teaches the method of claim 1 wherein the activity change is a change between the subject interfacing with a graphical user interface (GUI) to the subject manipulating a physical device (i.e. Furman teaches a gaming application which used direct cursor and motor control of directional movement which is also taught in Oweiss Fig. 29 embodiment which shows a GUI interface displaying for the user as movement takes place) (see Furman, [0108-0110], Oweiss, Fig. 29).

As to claim 3, Furman and Oweiss teaches the method of claim 2 wherein the activity change is from the subject interfacing with a graphical user interface (GUI) to the

subject manipulating a physical device (i.e. Furman teaches a gaming application which used direct cursor and motor control of directional movement which is also taught in Oweiss Fig. 29 embodiment which shows a GUI interface displaying for the user as movement takes place) (see Furman, [0108-0110], Oweiss, Fig. 29).

As to claim 4, Furman and Oweiss teaches the method of claim 2 wherein the interfacing with the GUI involves moving a cursor, entering text, or selecting words, and the manipulating a physical device involves operating a robotic arm or steering a wheelchair(i.e. Furman teaches a gaming application which used direct cursor and motor control of directional movement which is also taught in Oweiss Fig. 29 embodiment which shows a GUI interface displaying for the user as movement takes place) (see Furman, [0108-0110], Oweiss, Fig. 29).

As to claim 5, Furman teaches the method of claim 1 wherein the neural signals pass through metal electrodes in a cerebral cortex of the brain (i.e. Furman teach the deep stimulation of the user's brain in Parkinson's patient which is a metal electrode direct connection type) (see [0057-0058]).

As to claim 6, Oweiss teaches the method of claim 5 further comprising: converting, through an analog-to-digital converter (ADC), voltages or currents from the electrodes; detecting spikes from the voltages or currents; and forwarding the spikes as the neural signals (i.e. Oweiss teaches a detail conversion process of analog to digital data and detecting spikes from the voltage or current and forward the spikes as the neural signals in figure 27 embodiment) (see Fig. 27, [0244-0254]).

As to claim 7, Furman and Oweiss teaches the method of claim 1 wherein the first or second model includes 2 binning neural spikes as a function of frequency (i.e.

the modeling system of Furman is adapted by the requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, this is further seen in figure 10 and 15A embodiment of Oweiss which uses 2 binning neural spikes as a function of frequency with the firing rate and the spike train being training in N1 and N2) (see Furman [0067-0068], Oweiss, Fig. 10, 15A, [0157-0159]).

As to claim 9, Furman teaches the method of claim 8 wherein the inhibiting includes sending a cancelation of the first command (i.e. the modeling system of Furman is adapted by the requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, as well as in the presence of similar inputs) (see [0067-0068]).

As to claim 10, Furman and Oweiss teaches the method of claim 8 wherein the second command is sent to a cursor, a keyboard, a robotic arm, or a wheelchair (i.e. Furman teaches a gaming application which used direct cursor and motor control of directional movement which is also taught in Oweiss Fig. 29 embodiment which shows a GUI interface displaying for the user as movement takes place) (see Furman, [0108-0110], Oweiss, Fig. 29).

As to claim 11, Furman and Oweiss teaches the method of claim 8 wherein the neural signals pass through metal electrodes in a cerebral cortex of the brain (i.e. Furman teach the deep stimulation of the user's brain in Parkinson's patient which is a metal electrode direct connection type) (see [0057-0058]).

As to claim 12, Furman and Oweiss teaches the method of claim 11 further comprising: converting, through an analog-to-digital converter (ADC), voltages or currents from the electrodes; detecting spikes from the voltages or currents; and forwarding the spikes as the neural signals (i.e. Oweiss teaches a detail conversion process of analog to digital data and detecting spikes from the voltage or current and forward the spikes as the neural signals in figure 27 embodiment) (see Fig. 27, [0244-0254]).

As to claim 13, Furman and Oweiss teaches the method of claim 8 wherein the first or second model includes binning neural spikes as a function of frequency (i.e. the modeling system of Furman is adapted by the requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, this is further seen in figure 10 and 15A embodiment of Oweiss which uses 2 binning neural spikes as a function of frequency with the firing rate and the spike train being training in N1 and N2) (see Furman [0067-0068], Oweiss, Fig. 10, 15A, [0157-0159]).

As to claim 15, Furman and Oweiss teaches the method of claim 14 wherein the neural signals pass through metal electrodes in a cerebral cortex of the brain (i.e. Furman teach the deep stimulation of the user's brain in Parkinson's patient which is a metal electrode direct connection type) (see [0057-0058]).

As to claim 16, Furman and Oweiss teaches the method of claim 15 further comprising: converting, through an analog-to-digital converter (ADC), voltages or currents from the electrodes; detecting spikes from the voltages or currents; and forwarding the spikes as the neural signals (i.e. Oweiss teaches a detail conversion

process of analog to digital data and detecting spikes from the voltage or current and forward the spikes as the neural signals in figure 27 embodiment) (see Fig. 27, [0244-0254]).

As to claim 17, Furman and Oweiss teaches the method of claim 14 wherein the first or second model includes binning neural spikes as a function of frequency (i.e. the modeling system of Furman is adapted by the requirement of the threshold signaling as taught figure 5A, 5B, 6A and 6B to correct for error and to change to a second recalibration algorithms in order to avoid further errors in similar contexts, this is further seen in figure 10 and 15A embodiment of Oweiss which uses 2 binning neural spikes as a function of frequency with the firing rate and the spike train being training in N1 and N2) (see Furman [0067-0068], Oweiss, Fig. 10, 15A, [0157-0159]).

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art Shoaran et al. (US Pub: 2016/0278713 A1) is cited to teach the figure 1 and 2 embodiment which shows another type of BMI device with compressing sensing capacity.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CALVIN C. MA whose telephone number is (571)270-1713. The examiner can normally be reached 8:00AM-5:00PM.

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, Benjamin C. Lee can be reached on 571-272-2963. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/CALVIN C MA/
Primary Examiner, Art Unit 2693
July 16, 2022