

CLAIMS

What is claimed is:

1. A method for training an AI regression model for allowing a user to intuitively control an electronic device using neuromuscular movements, comprising:
 - 5 positioning a plurality of sensors at a plurality of particular positions on a human body for sensing electric signals from the human body;
 - recording a first set of electric signals sensed by each of the plurality of sensors in a continuous manner;
 - recording a first set of motion intents in a continuous manner, the first set of motion
 - 10 intents corresponding to a first sequence of body movement;
 - training an artificial intelligence (AI) regression model using a machine learning neural network, the AI regression model continuously mapping the first set of electric signals to the first set of motion intents;
 - receiving a second set of electric signals from the plurality of sensors in a
 - 15 continuous manner;
 - based upon the AI regression model, predicting a motion intent in response to the second set of electric signals; and
 - causing the electronic device to perform an action based upon the predicted motion intent.
- 20 2. The method of claim 1, wherein:
 - the plurality of sensors comprises a plurality of surface electromyographic (sEMG) electrodes; and
 - the electric signals comprise myoelectric signals generated by the plurality of sEMG electrodes.
- 25 3. The method of claim 1, wherein the electric signals comprise at least one of (1) myoelectric signals, (2) neural signals, (3) electric noise associated with movement of tendons, or (4) electric artifact associated with motion intents.
4. The method of claim 1, further comprising
 - recording a third set of electric signals from each of the plurality of sensors in a
 - 30 continuous manner;
 - recording a second set of motion intents associated with a second sequence of body movement in the continuous manner; and
 - updating the AI regression model to take into account of continuous mapping of the third set of electric signals with the second set of motion intents.

5. The method of claim 1, wherein the neural network includes a deep neural network and a modified Kalman (MKF) filter.

6. The method of claim 1, further comprising identifying one or more biological markings or UV tattoos on the human body,

5 wherein the positioning of the plurality of sensors is based on the identified one or more biological markings or UV tattoos.

7. The method of claim 6, further comprising an alignment indicator configured to align one or more markers of the human body with the plurality of sensors.

8. The method of claim 7, wherein the alignment indicator includes one or
10 more custom-positioned grommets coupled to the plurality of sensors and configured to align with one or more markings of the human body.

9. The method of claim 6, wherein the identifying of one or more biological markings or UV tattoos comprises identifying one or more markings using an ultrasonic imaging device.

10. The method of claim 1, wherein each set of motion intents is converted into
15 a plurality of joint angles.

11. The method of claim 1, wherein each set of motion intents is based on a set of motions performed by a virtual hand,

wherein the recording of a first set of electric signals is performed when the human
20 body is mimicking the set of motions performed by the virtual hand.

12. The method of claim 1, wherein each set of motion intents is based on a set of motions performed by a not-amputated limb,

wherein the recording of a first set of electric signals is performed when an amputated limb is mirroring the set of motions performed by the not-amputated limb.

13. The method of claim 12, wherein the set of motions performed by a non-amputated limb is recorded by an imaging device.

14. The method of claim 13, wherein the set of motions performed by the non-amputated limb is aligned based on a deviation of the non-amputated limb from a resting hand position.

15. The method of claim 12, wherein each set of motion intents is generated
30 based on an output of the electronic device operated by the not-amputated limb.

16. The method of claim 15 wherein the electronic device is one of (1) a prosthesis, (2) a keyboard, (3) a game stick, or (4) a switch.

17. A computing system comprising:
one or more processors; and
one or more computer-readable media having stored thereon computer-executable instructions that are structured such that, when executed by the one or more processors,
5 the computer-executable instructions configure the computing system to:
receive a first set of electric signals generated in a continuous manner by a plurality of sensors positioned at a plurality of particular positions on a human body for sensing electric signals from the human body;
receive a first set of motion intents associated with a first sequence of body
10 movements in a continuous manner; and
train an artificial intelligence (AI) regression model using a machine learning neural network, wherein:
the AI regression model continuously maps the first set of electric signals to the first set of motion intents; and
15 in response to receiving a second set of electric signals generated by the plurality of sensors in a continuous manner, the AI regression model is configured to predict a motion intent, causing an electronic device to perform an action associated with the predicted motion intent.
18. The computing system of claim 17, the computing system further
20 configured to:
receive a third set of electric signals generated by the plurality of sensors in a continuous manner;
receive a second set of motion intents associated with a second sequence of body movement in a continuous manner; and
25 update the AI regression model to take into account continuous mapping of the third set of electric signals with the second set of motion intents.
19. The computing system of claim 17, wherein the electric signals comprise at least one of (1) myoelectric signals, (2) neural signals, (3) electric noise associated with movement of tendons, or (4) electric artifact associated with motion intents.
- 30 20. A sleeve connected to an electronic device, comprising:
a plurality of sensors configured to be positioned at a plurality of predetermined positions of a human body to generate electric signals in a continuous manner, in response to sensing neuromuscular movement of the human body; and

an alignment indicator configured to align one or more markers of the human body with one or more markers of the sleeve;

wherein the sleeve is in communication with one or more processors and one or more computer-readable media having stored thereon an artificial intelligence (AI) regression model and computer-executable instructions, wherein the AI regression model
5 is configured to map the electric signals generated by the plurality of sensors to one or more motion intents in a continuous manner, and the computer-executable instructions are structured such that, when executed by the one or more processors, the computer-executable instructions configure the sleeve to:

10 sense a set of electric signals from the human body in a continuous manner;
use the AI regression model to predict a motion intent in response to the set of electric signals; and
cause the electronic device to perform an action based upon the predicted motion intent.

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