

appended claims, taken in conjunction with the accompanying drawings and this background of the disclosure.

Summary of Invention

[0005a] According to an aspect of the present application, there is provided a system for monitoring and determining progress of a patient's rehabilitative treatment. The system comprises: a patient output device for displaying visual and/or presenting auditory instructions to the patient; an electromyography (EMG) device and an inertial measurement unit (IMU) for sensing physiological performance and body portion movement while the patient moves two or more portions of the patient's body in response to the visual and/or auditory instructions; and a processing means for generating first data in response to the sensed movement of a first portion of the patient's body, generating second data in response to the sensed movement of a second portion of the patient's body, calculating a score indicating a result of comparison between the first data and the second data, and determining an objective functional recovery level representing the patient's rehabilitative treatment progress by determining which of predetermined clusters obtained in advance according to a clustering algorithm the calculated score belongs to.

[0005b] According to another aspect of the present application, there is provided a method for monitoring and determining progress of a patient's rehabilitative treatment. The method comprises: sensing physiological performance and body portion movement by an electromyography (EMG) and an inertial measurement unit (IMU) while moving two or more portions of the patient's body in response to visual and/or auditory instructions; generating first data in response to the sensed movement of a first portion of the patient's body; generating second data in response to the sensed movement of a second portion of the patient's body; calculating a score indicating a result of comparison between the first data and the second data; and determining an objective functional recovery level representing the patient's rehabilitative treatment progress by determining which of predetermined clusters obtained in advance according to a clustering algorithm the calculated score belongs to.

[0006] According to at least one embodiment of the present invention, a method for monitoring and determining progress of a patient's rehabilitative

treatment is provided. The method includes sensing physiological performance and body portion movement while moving two or more portions of the patient's body in response to visual and/or auditory instructions, generating first data in response to the sensed movement of a first portion of the patient's body, and generating second data in response to the sensed movement of a second portion of the patient's body. The method further includes determining an objective functional recovery level representing the patient's rehabilitative treatment progress in response to all of a manifested category, a latent category and a significant category of the first data and the second data.

[0007] According to another embodiment of the present invention, a system for monitoring and determining progress of a patient's rehabilitative treatment is provided. The system includes a patient output device, a plurality of sensory devices and a processing means. The patient output device displays visual and/or presents auditory instructions to the patient. The plurality of sensory devices sense physiological performance and body portion movement while the patient moves two or more portions of the patient's body in response to the visual and/or auditory instructions. The processing means generates first data in response to the sensed movement of a first portion of the patient's body, generates second data in response to the sensed movement of a second portion of the patient's body, and determines an objective functional recovery level representing the patient's rehabilitative treatment progress in response to all of a manifested category, a latent category and a significant category of the first data and the second data.

[0008] According to another embodiment of the present invention, a non-transitory computer readable medium containing program instructions for causing a computer to perform a method for monitoring and determining progress of a patient's rehabilitative treatment is provided. The method includes receiving first physiological performance data in response to a sensed physiological performance of a first portion of the patient's body, receiving first sensed movement data in response to a sensed movement of the first portion of the patient's body, and segmenting the first physiological performance data and the first sensed movement data to generate first data. The method also includes receiving second physiological performance data in response to a sensed

2b

physiological performance of a second portion of the patient's body, receiving second sensed movement data in response to a sensed movement of the second portion of the

CLAIMS:

[Claim 1]

A system for monitoring and determining progress of a patient's
 5 rehabilitative treatment, the system comprising:
 a patient output device for displaying visual and/or presenting auditory
 instructions to the patient;
 ~~a plurality of sensory devices~~ an electromyography (EMG) device and an
 inertial measurement unit (IMU) for sensing physiological performance and body
 10 portion movement while the patient moves two or more portions of the patient's
 body in response to the visual and/or auditory instructions; and
 a processing means for generating first data in response to the sensed
 movement of a first portion of the patient's body, generating second data in
 response to the sensed movement of a second portion of the patient's body,
 15 calculating a score indicating a result of comparison between the first data and
 the second data, and determining an objective functional recovery level
 representing the patient's rehabilitative treatment progress ~~in response to all of a~~
 ~~manifested category, a latent category and a significant category of the first data~~
 ~~and the second data~~ by determining which of predetermined clusters obtained in
 20 advance according to a clustering algorithm the calculated score belongs to.

[Claim 2]

The system in accordance with claim 1 wherein the processing means
 generates the first data by generating first physiological performance data in
 response to the sensed physiological performance of the first portion of the
 25 patient's body, generating first sensed movement data in response to the sensed
 movement of the first portion of the patient's body, and segmenting the first
 physiological performance data and the first sensed movement data to generate
 the first data.

[Claim 3]

30 The system in accordance with claim 2 wherein the processing means
 generates the second data by generating second physiological performance data in
 response to the sensed physiological performance of the second portion of the
 patient's body, generating second sensed movement data in response to the sensed
 movement of the second portion of the patient's body, and segmenting the second

physiological performance data and the second sensed movement data to generate the second data.

[Claim 4]

The system in accordance with claim 3 wherein the processing means
 5 determines the objective functional recovery level by determining the objective functional recovery level representing the patient's rehabilitative treatment progress in response to corresponding segmented portions of the first data and the second data.

[Claim 5]

10 The system in accordance with any of claims 1 to 4 wherein the first portion of the patient's body is an affected portion of the patient's body requiring rehabilitative treatment and wherein the second portion of the patient's body is an unaffected portion of the patient's body which is healthy.

[Claim 6]

15 The system in accordance with any of claims 1 to 5 wherein the processing means comprises:

first processing means for generating the first data in response to the sensed movement of the first portion of the patient's body and generating the second data in response to the sensed movement of the second portion of the
 20 patient's body; and

second processing means for determining the objective functional recovery level representing the patient's rehabilitative treatment progress ~~in response to all of the manifested category, the latent category and the significant category of~~ based on the first data and the second data,

25 the system further comprising transceiving means coupled between the first processing means and the second processing means, the transceiving means transmitting the first data and the second data from a first location where the patient is responding to the visual and/or auditory instructions to a second location wherein the objective functional recovery level representing the patient's
 30 rehabilitative treatment progress is determined.

[Claim 7]

The system in accordance with claim 2 wherein the processing means generates the first physiological performance data in response to ~~an~~ the electromyography (EMG) device of the sensed physiological performance of the

first portion of the patient's body and generates the first sensed movement data in response to the inertial measurement units (IMU) of the sensed movement of the first portion of the patient's body.

[Claim 8]

5 The system in accordance with claim 5 wherein the first portion of the patient's body moved comprises an affected one of the patient's arm, the patient's leg, the patient's hand, the patient's foot, the patient's fingers or the patient's toes, and wherein the second portion of the patient's body moved comprises an unaffected other one of the patient's arm, the patient's leg, the patient's hand, the
10 patient's foot, the patient's fingers or the patient's toes.

[Claim 9]

A method for monitoring and determining progress of a patient's rehabilitative treatment, the method comprising:

sensing physiological performance and body portion movement by an
15 electromyography (EMG) and an inertial measurement unit (IMU) while moving two or more portions of the patient's body in response to visual and/or auditory instructions;

generating first data in response to the sensed movement of a first portion of the patient's body;

20 generating second data in response to the sensed movement of a second portion of the patient's body;

calculating a score indicating a result of comparison between the first data and the second data; and

determining an objective functional recovery level representing the
25 patient's rehabilitative treatment progress ~~in response to all of a manifested category, a latent category and a significant category of the first data and the second data~~ by determining which of predetermined clusters obtained in advance according to a clustering algorithm the calculated score belongs to.

~~{Claim 10}~~

30 ~~A non-transitory computer readable medium containing program instructions for causing a computer to perform a method for monitoring and determining progress of a patient's rehabilitative treatment comprising: receiving first physiological performance data in response to a sensed physiological performance of a first portion of the patient's body;~~

~~receiving first sensed movement data in response to a sensed movement of the first portion of the patient's body;~~

~~segmenting the first physiological performance data and the first sensed movement data to generate first data;~~

5 ~~receiving second physiological performance data in response to a sensed physiological performance of a second portion of the patient's body;~~

~~receiving second sensed movement data in response to a sensed movement of the second portion of the patient's body;~~

10 ~~segmenting the second physiological performance data and the second sensed movement data to generate second data; and~~

~~determining an objective functional recovery level representing the patient's rehabilitative treatment progress in response to all of a manifested category, a latent category and a significant category of corresponding segmented portions of the first data and the second data.~~

15