We claim:

1. A subject-monitoring system for monitoring a living subject during a monitoring period, comprising:
   (a) an array of accelerometer modules that produce acceleration signals during the monitoring period, the acceleration signals representing the accelerations of at least one body-segment of the subject relative to each of the x, y, and z -axes of a reference-frame;
   (b) attachment means for attaching said array to the body-segment;
   (c) an acceleration signal processing means for processing the acceleration signals to yield 6-DOF data relevant to the body-segment; and
   (d) a first data storage means for storing the 6-DOF data.

2. A subject-monitoring system as claimed in Claim 1, wherein said array of accelerometer modules comprises a sufficient number of accelerometer modules to produce six discrete and substantially simultaneous acceleration signals during the monitoring period.

3. A subject-monitoring system as claimed in Claim 2, wherein said array of accelerometer modules comprises three biaxial accelerometer modules.

4. A subject-monitoring system as claimed in Claim 1, further comprising:
   (a) a first 6-DOF data processing means for processing the 6-DOF data to obtain body-segment movement information descriptive of the movements of the body-segment during the monitoring period; and
   (b) at least one display means for displaying the body-segment movement information in at least one format comprehensible to humans.

5. A subject-monitoring system as claimed in Claim 4, further comprising:
   (a) a second 6-DOF data processing means for processing the 6-DOF data to obtain body-segment position and orientation information descriptive of the position and orientation of the body-segment during the monitoring period; and
   (b) at least one display means for displaying the body-segment position and

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orientation information in at least one format comprehensible to humans.

6. A subject-monitoring system as claimed in Claim 4, further comprising:
   (a) a third 6-DOF data processing means for processing the 6-DOF data to obtain subject movement information descriptive of the movements of the subject during the monitoring period; and
   (b) at least one display means for displaying the subject movement information in at least one format comprehensible to humans.

7. A subject-monitoring system as claimed in Claim 6, wherein said third 6-DOF data processing means further comprises means for discriminating information descriptive of falls from information descriptive of other sudden movements.

8. A subject-monitoring system as claimed in Claim 6, wherein said 6-DOF data processing means further comprises means for determining the directionality of falls.

9. A subject-monitoring system as claimed in Claim 4, further comprising:
   (a) a fourth 6-DOF data processing means for processing the 6-DOF data to obtain subject position and orientation information descriptive of the position and orientation of the subject during the monitoring period; and
   (b) at least one display means for displaying the subject position and orientation information in at least one format comprehensible to humans.

10. A subject-monitoring system as claimed in Claim 4, further comprising:
   (a) a fifth 6-DOF processing means for processing the 6-DOF data to obtain functional information descriptive of at least one function of the subject during the monitoring period; and
   (b) at least one display means for displaying the functional information in at least one format comprehensible to humans.

11. A subject-monitoring system as claimed in Claim 10, wherein the functional information comprises energy expenditure information.

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12. A subject-monitoring system as claimed in Claim 11, wherein said fifth 6-DOF data processing means comprises neural network analysis for computing said energy expenditure information.

13. A subject-monitoring system as claimed in Claim 10, wherein the functional information comprises respiratory function information.

14. A subject-monitoring system as claimed in Claim 4, further comprising:

(a) at least one local unit, comprising

(i) said array;

(ii) a power source;

(iii) said acceleration signal processing means; and

(iv) said attachment means;

(b) at least one remote unit, comprising the first 6-DOF data processing means; and

(c) a data transfer means for transferring data between said local unit and said remote unit.

15. A subject-monitoring system, as claimed in Claim 14, wherein said remote unit further comprises:

(a) a second data storage means for storing the body-segment movement information; and

(b) a remote display means for displaying the body-segment movement information in at least one format comprehensible to humans.

16. A subject-monitoring system as claimed in Claim 1, further comprising:

(a) means for acquiring raw physiological data regarding the subject;

(b) a physiological data processing means for processing the raw physiological data to obtain physiological information regarding the subject; and

(c) a display means for displaying the physiological information in at least one format comprehensible to humans.

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17. An improved subject-monitoring system as claimed in Claim 16, wherein at least one type of physiological data acquired is selected from the group consisting of:

heart rate data, electrocardiogram data, body temperature data, blood O_2 partial pressure data, blood CO_2 partial pressure data, respiration rate data, respiration depth data, micturition data, and skin conductance data.

18. A subject-monitoring system as claimed in Claim 16, further comprising:

(a) data synchronizing means for synchronizing the 6-DOF data and the physiological data;

(b) a synchronized data processing means for processing the synchronized 6-DOF data and physiological data to obtain synchronized information regarding the physiological status and movements of the subject during the monitoring period; and

(c) means for displaying the synchronized information in at least one format comprehensible to humans.

19. A subject-monitoring system as claimed in Claim 18, further comprising:

(a) at least one local unit, comprising

(i) said array;

(ii) a power source;

(iii) said acceleration signal processing means;

(iv) said means for acquiring physiological data; and

(v) said attachment means;

(b) at least one remote unit, comprising

(i) said 6-DOF data processing means;

(ii) said physiological data processing means;

(iii) said data synchronizing means; and

(iv) said synchronized data processing means; and

(c) data transfer means for transferring data between said local unit and said remote unit.

20. A method of monitoring a subject during a monitoring period, comprising the steps of:

(a) attaching at least one array of accelerometer modules to at least one body-segment

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of the subject, the accelerometer modules having an aggregate of at least six axes of measurement;

(b) acquiring from the array acceleration signals representing the accelerations of the body-segment relative to each of the x, y, and z - axis of an anatomical reference-frame;

(c) processing the acceleration signals to obtain 6-DOF data representing the movements of the body-segment with respect to an inertial reference-frame; and

(d) storing the 6-DOF data.

21. The method of Claim 20 further comprising the step of manually calibrating the accelerometer modules by carrying out the steps of:

(e) positioning the subject in at least three substantially stationary poses, the poses being sufficiently different from one another to produce appreciable differences in the acceleration signals acquired at step (c);

(f) averaging the acceleration signals acquired at step (e) to minimize the effects of noise and involuntary motion;

(g) acquiring from the averaged acceleration a gravity vector;

(h) applying the gravity vector to the acceleration signals to obtain a correction factor for correcting the orientation of each of the axes of measurement relative to the anatomical reference-frame; and

(i) correcting the 6-DOF data obtained in step (c) by incorporating the correction factor obtained at step (h), whereby the corrected 6-DOF data more accurately represent the movements of the body-segment with respect to the inertial reference-frame.

22. The method of Claim 20 further comprising the step of adaptively calibrating the accelerometer modules by applying recursive prediction-error analysis comprising the steps of:

(j) constructing a model of the subject's movements based on the 6-DOF data acquired at step (c);

(k) guessing a value with respect to some chosen future point in time for at least one parameter used to construct the model;

(l) measuring the value when the future point in time arrives;

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