

Process and device for detecting race walking condition during race walking of an athlete.

KEYWORDS

- SPORT BIOMECHANICS
- ATHLETICS
- GESTURE RECOGNITION
- RACE WALKING
- SENSORS
- WEARABLE DEVICES

AREA

- BIOMEDICAL

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Patent Type

Patent for invention.

Co-Ownership

Sapienza University of Rome 75%,
University of Tuscia 25%.

Inventors

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Industrial & Commercial Reference

The present invention can be appealing for companies that develop sensors applicable in sports.

Time to Market

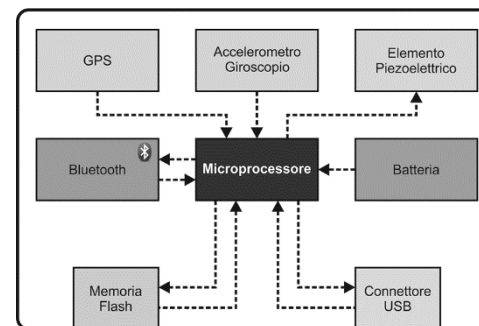
Experimental protocol is being conducted with race walkers. 12-18 months expected for time-to-market.

Availability

Cession, Licensing, Research, Development, Experimentation, Collaboration, Start-up and Spin-off.



Example of sensor positioning on the athlete.



Elements constituting the wearable sensor.

Abstract

The present invention refers to a system for the identification of the race walking conditions, during the race walking of an athlete.

In particular, a specific process for data acquisition and data analysis has been validated for the recognition of faults during the race walking and a device for its implementation during sport.

Publications

- ❖ Taborri, J.; Palermo, E.; Rossi, S. Automatic Detection of Faults in Race Walking: A Comparative Analysis of Machine-Learning Algorithms Fed with Inertial Sensor Data. *Sensors* 2019, 19, 1461.
- ❖ AA.VV. Congress Act 1st National Forum of the Measurements (GMME), Modena (Italy), 13th -16th September 2017.



Process and device for detecting race walking condition during race walking of an athlete.

Technical Description

A process for detecting simultaneously in real-time two or more predetermined gait types of an athlete during a race walk, comprising the following steps:

- acquiring data from at least one triaxial accelerometer and/or at least one triaxial gyroscope fixed to a body segment of said athlete and oriented in order to have the respective measuring axes orthogonal to the three anatomic planes referred to the athlete;
- providing said input data to a stochastic-based classifier to obtain a sequence of states in output, each state corresponding to one of said predetermined gait types and being associated to an estimated probability that said state corresponds to the corresponding gait type.

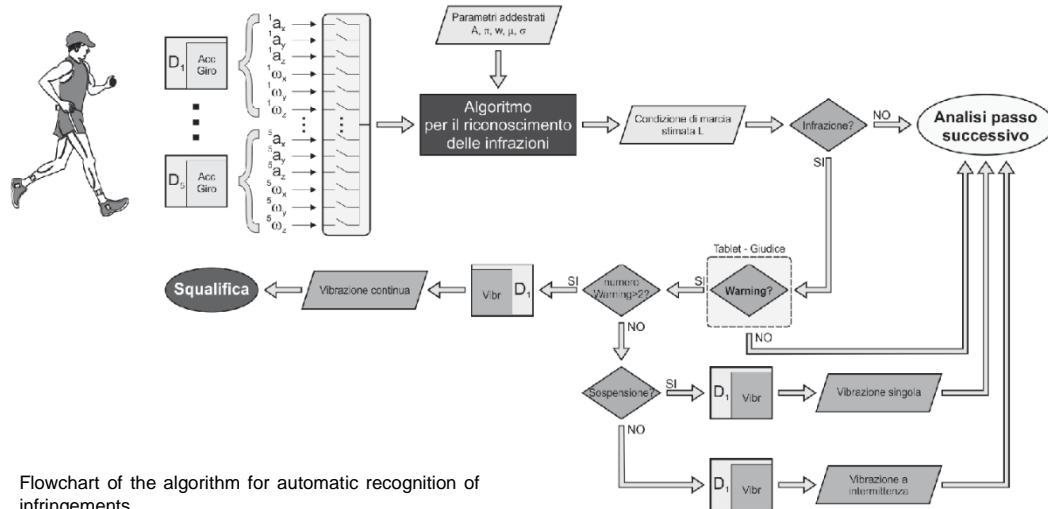
Technologies & Advantages

Nevertheless several devices have been proposed to increase the objectivity in the identification of faults during race walking, no one has been accepted by sports federation since they influence the technical gesture of the athlete and, generally, they are not able to identify both typical faults.

Consequently, the proposed devices have shown some limitations that cause the impossibility of their use during competitions and they are not commercially available.

The limitations are essentially three:

- 1) impossibility to identify both faults;



Flowchart of the algorithm for automatic recognition of infringements.

2) invasive device that influence technical gesture of the athletes;

3) detection algorithms based on threshold values that are athlete-specific.

No device can answer to all the requirements, that are:

- (i) wearability without influencing the technical gesture;
- (ii) identification of both faults;
- (iii) detection algorithm not athlete-specific.

The here proposed device is able to overcome all the above-reported three limitations.

Applications

The main application of the present invention is the identification of faults during race walking.

The proposed process and the device can be used during both the official competition for helping judges in their evaluation and the training stage in order to supervise the quality of the technical gestures of an athlete.

The same system can be considered, from a more general view, as a device able to recognize technical gestures during sport and/or work activities for monitoring performance of a subject.

Thus, the device can reach great industrial interest and it can be applied in several fields.

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