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基于三维加速度传感器的人体运动能耗检测算法的研究

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摘　要：

鉴于目前运动能耗检测对人体健康的重要性，研发了一套基于三维加速度传感器的人体运动能耗检测系统。通过人体运动数据的采集和分析，提出了加速度计算公式和运动能耗检测的相关算法。根据现有的仪器佩戴位置，分别进行了腰部、膝盖和臀部的实验对比，最终确定腰部为本系统的最佳方案。并进行了1km/h，5 km/h，10 km/h三种不同速度的实验，实验结果表明，与现有的能耗检测仪相比，本系统的相对精度可达93%以上，本系统及相关算法具有一定的可行性。

关键词：运动能耗；三维加速度传感器；检测算法；佩戴位置

The Research of Energy Expenditure Detection Algorithm Based on Tri-axial Acceleration transducer

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Abstract:

Aiming at the importance of the detection of physical activity energy expenditure(PAEE),a new system of detecting PAEE based on tri-axial acceleration transducer was presented.With collecting and analyzing data ,a method for calculating the acceleration and a new algorithm of detecting PAEE was developed.Having done the comparative experiments between waist,knee and lip,the best position to wear the device is determined to be the waist.The experiment with three different running speeds(1km/h,5km/h and 10 km/h) was also done. The experimental results showed that the accuracy of the system was above 93%. The system and interrelated algorithms was workable.

Keywords: energy expenditure;tri-axial acceleration transducer;detection algorithm;wearable position

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