**南京大学本科生毕业论文（设计）中文摘要**

毕业论文题目： 智能手环产品原型的设计与实现

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摘要：

随着我国居民对健康生活的关注日益增强，越来越多的居民，尤其是老年人参与到了体育锻炼中来。为促使广大居民科学、安全地进行体育锻炼活动，项目组决定开发一套运动数据采集与分析平台。此套平台中的数据采集设备——智能手环的原型基于联发科技的硬件原型平台LinkIt ONE，使用精确度高、成本低廉的三轴数字式加速度传感器ADXL345采集加速度数据，实现了计步、睡眠检测与跌倒报警等功能。智能手环在与智能手机上的移动客户端建立蓝牙连接后，还能从移动端接收即时指令与定时指令，以发声或震动的方式向用户发出提醒。传感器数据经过分析后产生的运动与健康统计数据与跌倒后的紧急求助信息通过蓝牙连接发送给移动客户端，最终汇聚到服务端，由健康工作者进行分析与诊断，给用户提供专业的运动健康反馈意见。除普通用户外，整套平台还有望基于专用目的在专业的医疗、康复机构内集中应用。

本文详细描述了智能手环原型从硬件到软件各方面的构建过程，包括需求分析、硬件选型、概要设计与详细设计等部分。此外，本文还对智能手环原型的嵌入式软件中包含的重要逻辑，如计步算法、跌倒检测算法、运动状态判定等，进行了详细描述，并给出了伪代码参考。

关键词：智能手环；MEMS；运动数据采集

**南京大学本科生毕业论文（设计）英文摘要**

THESIS: Design and Implementation of Intelligent Wristband’s Prototype as the Product

DEPARTMENT: Software Institute

SPECIALIZATION: Software Engineering

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ABSTRACT：

With greater and greater focus on healthy lifestyles from Chinese citizens, more and more of them are participating in sports training actively, especially the elderly. In order for citizens to do sports scientifically and safely, our project team decides to develop a collection and analysis platform of sports data. The data collector in this platform, i.e., prototype of the intelligent wristband, is based on the hardware platform LinkIt ONE powered by MediaTek and collects acceleration data with ADXL345, an accurate and cheap tri-axis digital accelerometer. The wristband implements many features such as pedometer, sleep detection and analysis and fall-down alarming. After establishing Bluetooth connection with mobile clients on smart phones, the wristband can also receive real-time or timed instructions, and notify users according to those instructions by sound or vibration. Statistic data of sports and health generated after analyzing sensor data from the accelerometer and SOS messages are sent to mobile clients via Bluetooth connection and finally converged to servers. They are analyzed and diagnosed by health workers to provide feedbacks of professional sports and health suggestions for wristbands’ users. In addition to normal users, it is hopeful that this platform would be applied in professional medication and rehabilitation agencies for special purposes.

This article describes the building procedure of the prototype of intelligent wristband in every aspect from hardware to software in detail, including requirement analysis, hardware element selection, general design, detailed design and so on. Also, this article as amply as possible describes significant logic included in the prototype, such as pedometer algorithm, fall-detection algorithm and the judgement of sport state. Pseudocode is also given for reference.

KEY WORDS: Intelligent Wristband; MEMS; Sports Data Collection