Cadet Training and Management of Intelligent Terminal Research

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Abstract. In this paper, wearable health monitoring technology for reference, according to the characteristics of the cadets training and management, to optimize and develop the research a kind of miniature smart belt and wrist strap, can record the students training status, physical condition and the information such as location and environment, the data stored by the existing wireless networks to the computing center, further prediction and evaluation of training effect, the health situation of students, targeted training plan, leaders at all levels can real time control of the student information through the platform, effective management units.

Overview

The wisdom campus construction is mainly concentrated in the cloud computing, mobile Internet, big data, and knowledge management, and other information technology research and application of the very few on the study of intelligent terminal, especially for the training of the cadets and management terminal equipment is not, based on the movement of the terminal test and health information such as the construction of training, management, network digital platform, students can learn about their own physical health status, access to sports health knowledge with the guidance of professional teachers and positive interaction, teachers can understand students learning task in time, thus to reasonable arrangement of physical monitoring work[1-3]. At the same time, students adjust their status to ensure optimal state testing through the network platform. The departments of the college can also arrange their own departments on this platform to achieve the win-win management goal of teaching and testing. Physique monitoring results and fitness guidance module as the core content of the platform, not only can understand the student's own physical condition, what is more important for students of science fitness guidance strategy, so as to realize JunTi standards in teaching; At the same time, it has a good effect on the rich education resources and perfect education system. At the same time, the students can develop the scientific exercise habit.

The Overall Technical

The terminal is mainly by the movement of students from the sensor devices to collect data, environmental data, and breathing, heart rate, body temperature and blood pressure multiple physiological characteristic information, and real-time or interrupted by wireless transmission technology to mobile devices, and related data processing and analysis of mobile terminal, mobile terminal equipment at the same time by 3 g, 4 g and WiFi long-distance transport will collect data to the server for storage, so that further analysis and processing. Because of the various technologies involved, a reasonable system platform structure can be used more effectively. The system structure is shown in figure 1. The system can be divided into three levels: the data perception layer (terminal), the relay coordination layer, and the background service layer[5-7]. Including data perception layer mainly wear in the human body, relay coordination layer can be configured according to need, the background service layer can be anywhere in the distal, they rely on the network connection together. Each layer provides services for the previous layer, and the upper layer of data.
Terminal Hardware Design

Sensing circuit is integrated with the regulatory research the key theory and technology problems need to be solved in this paper, the main purpose of the integration is to realize the multi-functional integrated chip, will measure, processing, storage and other functions of integrating circuit, and a reduction in the number of the use of electronic components, reduce the volume of circuit module, make it easy to carry. With the emergence of integrated technology, can add some processors in the integrated circuit, the sensor with automatic compensation, the self-adjusting function such as self-diagnosis and logical judgment. These self-regulatory designs guarantee the accuracy of the test devices in multiple times, while also facilitating the user's daily testing. The built wearable cadet training and management terminal architecture is shown in figure 2. It consists mainly of data collection module, processing module, wireless communication module and power supply and management module.

Hardware Structure

The terminal consists of battery module, sensor, flexible circuit board, electronic fabric, CPU and bluetooth module. Based on ARM7TDWI core CPU using ADI company AD u C7024 processor, AD u C7024 excellent processing capability, integrated many peripheral devices and chips on the characteristics of low power consumption, fully qualified for the application of this terminal. This terminal using noninvasive sensors to collect all vital signs parameters of the human body, the collected signal processor soft handle, the information such as body temperature, heart rate, blood pressure can be calculated. And the bluetooth module is used to back up the information to the phone, computer and other devices.
Monitoring Sensor

The sensor is responsible for measuring the collection of vital signs such as motion, environment, respiration, heart rate and temperature. Considering the characteristic of this system can be wearable, in terms of sensor selection, as far as possible choose integration, the product with high sensitivity and accuracy, so can reduce the area of the system circuit, easy to wear, and can improve the stability and reliability of system.

The Flexible Circuit Board

Considering the comfort of the wearer, it is not possible to influence the processing of vital signs. The design of the motherboard USES flexible circuit boards. The circuit adopts the polyimide or polyester film as the backing material, can withstand multiple bending, folding and winding, the cooling performance is good, it combined with electronic fabrics for both clothing comfort is affected, and all the vital signs data collection.

Electronic Fabrics

As far as possible in order to does not affect the wearing comfort conditions to facilitate access to the sensor data, the terminal adopts the traditional metal wire woven into the fabric manufacturing electronic method of fabric to achieve electric connection between the clothing in each module. This protects the wire and reduces the discomfort of the wearer, allowing the sensor to be transmitted to the processor for processing.

Measurement of Abdominal Respiration Measurement Technology

Respiratory monitoring is far less valued and promoted than cardioelectric monitoring, but breathing pattern monitoring can be rich in physiological/pathological information. Breathing information can be through the nose and mouth, eeg, electrical impedance volume and induction airflow volume eeg, such as technology to obtain, in comparison, the muzzle flow wear inconvenient, eeg, electrical impedance volume is not accurate, and easy to introduce motion artifact, are not suitable for dynamic measurement.

Respiratory inductive eeg, technology is a kind of excellent performance of breathing volume measurement technique, can accurately eeg, chest, abdomen breathing exercises, relative to other technical strong anti-jamming capability, particularly suited to use dynamic monitoring, and after calibration quantitative breathing volume, also can get quantitative information, such as pulmonary ventilation tidal volume, is the key technology of wearable system development. Respiratory sensor volume eeg technology the basic principle of electromagnetic induction is used to measure respiratory movement, usually adopts three point test finish, capacitance oscillation circuit structure,
use wire sensor breathing exercise. Simple capacitor three-point oscillation circuit structure for respiration signal is not stable, low signal-to-noise ratio, and the traditional pattern of chest and abdomen with measuring tape used in sliding extremely easily, cause inaccurate measurement. In order to make the technology very well and wearable technology integration, need to study a new type of respiratory inductive volume eeg technology, such as the thinking of the impulse type incentive - detection, the sensing coil as an inductive load to motivate, with high stability of active crystal vibration excitation source, so as to obtain high s/n ratio, low power consumption of the system design effect, the movement of breath can provide high quality signal.

Concludes

Based on wearable technology as the research foundation, this paper will be wearable devices and virtual devices and network technology, such as real-time movement of students from the data information and environmental indicators, so as to realize the visualization of training management. Stimulate learning, training students in training of subjective initiative, scientifically, targeted to carry out the training program, evaluation of training effect, to achieve improved performance in teaching and training. At the same time, it is easy to manage and achieves the goal of scientific management. It's a double harvest of training and management.

References


