URN etd-0407109-183718-1502
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Statistics This thesis had been viewed 45 times. Download 0 times.
Department
Year 2004
Semester 1
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title Study of human body pulse information system for arterial stiffness measurement
Date of Defense 0000-00-00
Page Count 67

Keyword
Arteriosclerosis
Pulse wave velocity
String pulse

Abstract
People had paid much attention to health care gradually. Especially some chronic diseases correlate with arteriosclerosis. However, many clinical instruments, which are used to evaluate arteriosclerosis degree, are expensive and profession required. Besides, them always can be used to measure single area of human body. The goal of the study is to develop a multi-channel arterial stiffness measurement system. Two functional measurements are included in the system. Using electrocardiogram (ECG) and photoplethysmography (PPG) on finger and Toe to measure pulse wave velocity and peripheral blood vessel arterial stiffness value. Another, the system can calculate String Pulse classification W/T in Chinese Medicine by using pressure wave detection on radius artery.
This system mainly contains the analog bio-signal circuit, the pulse platform and rear-site software analysis. Infrared photoplethysmography circuit, electrocardiogram circuit and pressure wave circuit were designed to transfer the analog signals. Multi-channel technique was used to process the bio-signals to mixed signal processor (MSP430). Then, using RS-232 serial transmission to personal computer, and use the Visual Basic graphical user interface (GUI) technique to design analysis interface.
Accuracy evaluations of this system were tested by two methods. To evaluate sampling rate and synchronization, oscilloscope and function generator were used. To compare correlation between the system and the high-accurate PWV measurement system, the experimental data of the subjects were recorded and analyzed. Thirty-one subjects were recruited in this study that average age is 23.3±2.0 years old. The results revealed that there are high correlation existed between the two methods.
Advisory Committee Hsien-Tsai Wu - advisor

Files No Any Full Text File.
Date of Submission 0000-00-00