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Abstract
Arteriosclerosis has a huge influence on human’s health. Currently the diagnosis of arteriosclerosis is based on invasive cardiac catheter measurement, but this method could cause subject’s great inconvenience and might be dangerous. In this regard, this paper proposes a non-invasive pulse characteristic points locating system for arteriosclerotic degree examination. The pulse characteristic points we use include pacemaker, percussion wave peak, dicrotic notch and dicrotic wave peak. From the pulse characteristic points, we can calculate the arteriosclerotic degree examination parameters, such as pulse wave velocity, stiffness index and reflection index, etc. Those parameters can be used for diagnosing the degree of arteriosclerosis.

This system mainly contains the front-end pulse interception and back-end software analysis. In the first part, we used a non-invasive infrared measurement method based on the dual channel simultaneous measurement technique. We measured the photo-plethysmograph from the subject’s fingers and toes simultaneously, then used an analog circuit and central control unit to process the signals. Finally, the digital volume pulse data is processed by a personal computer. Because the characteristic points of digital volume pulse always occur in sharp variations, this paper proposes two algorithms to solve this problem. First, we find the pacemaker and percussion wave peak from transient slope variation, and then locate the dicrotic notch and dicrotic wave peak by using the wavelet transformation algorithm. When we analyze the data, we use the Visual Basic graphical user interface, which together with the Matlab is the core of the system.

This proposed system has been used and proved to be useful at National Cheng Kung University Medical Center for diagnosis on the degree of arteriosclerosis.
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