

Continuous Blood Pressure Measurement from Pulse Transit Time Techniques

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Abstract : Pulse Blood pressure (BP) is one of the vital signs, and is an index that helps determining the stability of life. In this respect, some spinal cord injury patients need to take the tilt table test. While doing the test, the posture changes abruptly, and may cause a patient's BP to change abnormally. This may cause patients to feel discomfort, and even feel as though their life is threatened. Therefore, if a continuous non-invasive BP assessment system were built, it could help to alert health care professionals in the process of rehabilitation when the BP value is out of range. In our research, BP assessed by the pulse transit time technique was developed. In the system, we use a self-made photoplethysmograph (PPG) sensor and filter circuit to detect two PPG signals and to calculate the time difference. The BP can immediately be assessed by the trend line. According to the results of this study, the relationship between the systolic BP and PTT has a highly negative linear correlation ($R^2=0.8$). Further, we used the trend line to assess the value of the BP and compared it to a commercial sphygmomanometer (Omron MX3); the error rate of the system was found to be in the range of $\pm 10\%$, which is within the permissible error range of a commercial sphygmomanometer. The continue blood pressure measurement from pulse transit time technique may have potential to become a convenience method for clinical rehabilitation.

Keywords : continous blood pressure measurement, PPG, time transit time, transit velocity

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