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Temporal and Spatial Properties of Arterial Pulsation Measurement Using Pressure Sensor Array

Chung-Shing Hu[1], Yu-Feng Chung[1], Cheng-Chang Yeh[2], Ching-Hsing Luo[1,*]

[1] Department of Electrical Engineering, National Cheng Kung University, Tainan 701, Taiwan
[2] Nanjing University of Chinese Medicine, Nanjing 210046, China

robinluo@mail.ncku.edu.tw

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The aim of this work proposed an innovative method to observe the characteristics of wrist artery under temporal and spatial domain. Conventionally, piezo-resistive transducer, piezoelectric ceramic or Polyvinylidene Difluoride (PVDF) were used to obtain the signals of wrist artery. However, the detective element size of the sensors above is too large to building an array sensor to acquire the pulse signals of wrist artery. Therefore, the conventional pulse-taking methodology always detects the pulse signals only by a single sensing element. This is far away from the fingertips sensation of physicians. This work adopted a capacitive array sensor to acquire the signals of wrist artery with a sensing element of 2.5 mm X 2.5 mm and 12 sensing elements in an array sensor. The pulse taking platform can simultaneously obtain the dynamic pressure (i.e., pulse signals) of wrist artery and the hold-down pressure, which cannot be detected by conventional pressure devices. Using this information, three-dimensional pulse mapping (3DPM) can be constructed by surface fitting methods. This is the first time to present a physician's fingertip sensation by a visual way. A researcher can view and analyze the pulse signals in a visual way instead of the finger feeling. This work greatly opens a new page for the quantification of pulse diagnosis.