Photoplethysmographic Measurement of Pulse Shape

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Background

Photoplethysmography (PPG) is a noninvasive test that uses a light-emitting diode and a photoelectric cell to detect changes in skin blood volume. Blood volume of the skin can be changes, so too does the amount of light reflected back to the sensor.

We developed multi-channel PPG systems and tested the reproducibility of the system to measure the volume pulse from healthy subjects.

Method

Twenty healthy volunteers were studied (M:F = 6:14) The PPG sensor was applied to the 2nd finger tip of subjects Pulse acquisition was done for 3 min and repeated again with 3 min interval (Sampling rate of 400 Hz). Acquired pulses was synchronously averaged into one representative pulse (only including the pulses with pulse duration of average $\pm$ 1 SD)
Pulse averaging was performed using Visual C++ & Matlab on PC.

Results

In 11 subjects, pulse parameters were calculated and correlation coefficients were r=0.68 for PT1, 0.48 for PT2 and 0.58 for augmentation index

Conclusion

Parameters of digital PPG did not showed reasonable reproducibility. However, further studies including more subjects & advanced devices is warranted.