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Recent advances in non-contact opto-physiological monitoring techniques for human metrics

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This paper provides an overview of the most recent advances in non-contact opto-physiological monitoring techniques. Existing contact point measurement techniques, i.e. pulse oximetry probes, are contrasted with the next generation non-contact and imaging implementations, i.e., non-contact reflection and camera-based PPG. The development of effective physiological monitoring techniques relies on novel approaches to opto-physiological modeling and applicable signal processing procedures. Significant progress has been made in the field of non-contact human metrics, i.e. pulsate waveform as a biomedical signature, pulse rate variability as an index of sympathovagal interaction, 3D blood perfusion mapping and regional oxygen saturation mapping for the interpretation of cardiovascular performance. Fundamental research into tissue optics, electronics and photonics is being exploited towards biomedical systems engineering solutions, covering simulation, probe design, programming for signal processing, biomedical systems engineering and scalable manufacturing.

Keywords: photoplethysmography, contact, non-contact, cardiovascular assessment, opto-physiological modeling, signal and image processing, region of interest (ROI)

Biography

Sijung obtained a Ph.D. at Loughborough University, UK, 2000 with fluorescence spectrophotometry. Sijung was invited as a Senior Scientist at Kalibrant Ltd, UK to carry out R&D for *in-vitro* diagnostic instruments from 1999 to 2002. Sijung joined the School of Electronic, Electrical and Systems Engineering, Loughborough University as a research fellow in 2002 and then as Senior Research Fellow and Leader of Photonics Engineering Research Group in 2006 to date, where he has made numerous contributions to opto-physiological monitoring, biomedical signal and image processing, and biomedical systems engineering. Sijung has over 60 articles published in leading Academic Journals, Patents and International Conference Proceedings.

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