J-BHI Special Issue on "Camera-Based Monitoring for Pervasive Healthcare Informatics"

Measuring physiological signals from the human face and body using cameras is an emerging research topic that has grown rapidly in the last decade. Avoiding mechanical contact of skin, remote cameras can be used to measure vital signs (e.g. heart rate, heart rate variability, respiration rate, blood oxygenation saturation, pulse transit time, body temperature, etc.) from an image sequence registering the human skin, which leads to long-term, contactless, continuous and comfortable heath monitoring. Imaging methods for recovering vital signs also present new opportunities for machine vision applications that require better understanding of human physiology (e.g. affective computing). In addition to quantifying physiological information, camera-based measurements also enable the analysis of high-level image/video semantics and context for health monitoring, by leveraging computer vision and artificial intelligence techniques, such as facial expression analysis for pain/discomfort/delirium detection, emotion recognition for depression analysis, body motion for sleep staging or bed exit/fall detection, activity recognition for patient actigraphy or gait analysis, clinical workflow monitoring and optimization, etc. Context monitoring is one of the unique advantages of camera sensors as compared to contact-based biosensors. Camera-based monitoring will bring a rich set of compelling healthcare applications that directly improve upon contact-based monitoring solutions and impact people's care experience and quality of life, such as in care units in the hospital, sleep/senior centers, assisted-living homes, telemedicine and e-health, home-based baby/elderly care, fitness and sports, driver monitoring in automotive, pilot/astronaut monitoring, etc.

Only high-quality and original research contributions will be considered. The special issue will highlight, but not be limited to, the following topics:

- Novel/improved apparatus/imaging devices for contactless sensing of physiological signals, including multi-spectral, hyper-spectral, time sequential, time-of-flight, depth, stereo vision, long-distance, portable, wearable (e.g. VR/AR glass), and consumer-grade cameras that are sensitive at visible, near-infrared, or thermal wavelengths; DC spectroscopy, radar, etc.
- Novel/improved methods/algorithms for extracting various physiological signals/variables from imaging devices, including pulse rate, pulse rate variability, respiration rate, blood oxygen saturation, pulse transit time, pulse wave velocity, blood pressure, jugular venous pressure, atrial fibrillation, arterial stiffness, blood glucose, skin hydration, body temperature, etc.
- Novel/improved computer vision and machine learning methods/algorithms that assist camera-based health monitoring, such as deep learning based face/skin/human detection, motion analysis and tracking, clinical scene segmentation, human activity recognition, quality metric learning, multi-modal fusion, physiological pattern recognition, algorithmic optimization, etc.
- Camera-based physiological measurements for various machine vision applications, such as affective computing and emotion/cognition recognition, psychological assessment (e.g. stress and depression), video surveillance in the wild, face anti-spoofing and liveness detection, biometric recognition, human-computer interaction for entertainment and marketing, etc.
- Clinical trials and studies focused on camera-based health monitoring in domains of Intensive Care Unit, Neonatal Intensive Care Unit, Coronary Care Unit, general medical wards, triage in emergency department, respiratory gating for CT/MRI, sleep center, senior center, baby/elderly care at home. Applications such as sleep monitoring (e.g. apnea detection), bed exit/fall detection and prevention, gait analysis, fitness cardio-training, driver monitoring in automotive, etc.
- Camera-based context monitoring and scene understanding for clinical/home-based healthcare applications.
- Camera-based activity monitoring and behavior analysis for clinical/home-based healthcare applications.
- Camera-based facial expression analysis for pain/discomfort/delirium detection in health monitoring applications.
- Camera-based clinical workflow monitoring and optimization.
- New public benchmarks, datasets and literature reviews for camera-based vital signs monitoring or activity monitoring.
- Multi-modal sensor fusion of camera and other wireless sensors (e.g. RF sensors, Wi-Fi) for health monitoring.
- AI-assisted healthcare applications.

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- Submission deadline: **August 1st, 2020**
- First reviews due: **October 1st, 2020**
- Revised manuscript due: **December 1st, 2020**
- Final decision: **January 1st, 2021**
- Camera ready version: **February 1st, 2021**