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J-BHI Special Issue on "Radar-based Physiological Measurement Techniques for Healthcare and Health Monitoring"

In recent years, radar technology for health monitoring has been a subject of concerted research in a broad range of application domains. This includes vital signs extraction, physiological patterns recognition, sportsperson performance analysis, human gait analysis, head motion and eye tracking, human vocal sound detection, gesture recognition, sign language recognition, emotion/cognition recognition, and psychological assessment (e.g., stress and depression). Unlike wearable sensors, a radar-based device measures physiological signals without mechanical contact with the human skin. Contrary to optical/vision sensors, radar signals can penetrate clothing and do not raise privacy concerns. Overall, radar-based health monitoring meets the requirements of a non-disturbing, ubiquitous-use, all-weather, penetrable, privacy-preserving sensing. This has led to emergence of a rich set of useful and interesting healthcare applications ranging from clinical to home care, sports training to automotive autonomy and safety. Lately, there has been a focus on radar-based sensing for more complex applications such as patient/neonatal monitoring in intensive care units, general wards, emergency department triage, MR/CT cardiac and respiratory gating. Radar practitioners are also striving to achieve accurate and robust biometrics in complex challenging environments such as crowded spaces, dynamic body motions, through-wall sensing, and drone-borne radars. This requires exploiting techniques such as sensor fusion, complex array deployments, multiple wavelengths, and advanced signal processing algorithms.

Our goal in the proposed SI is to highlight the above-mentioned developments and thus, cover the breadth and depth of this emerging field, including research on new signal processing models, algorithms, hardware implementations, and sensing platforms to enable intelligent sensing for human enhancement and heath monitoring. This special issue intends to bring together cutting-edge research on radar-aided health monitoring.

Topics of interest include, but are not limited to, the following:

- Novel implementation and development of radar systems, medical imaging from MIMO arrays, life sign detection
- Novel signal processing techniques, robust algorithm, learning algorithms, multi-sensor fusion algorithms
- Novel measurements/new phenomenology/improved understanding of radar signal interacting with human body
- Head motion and eye tracking for alerting driver (or pilot) drowsiness /assisting people
- Millimeter-wave and Terahertz radar-based healthcare monitoring
- Novel radar-based public benchmarks and datasets.
- Novel applications, including sportsperson performance analysis, prenatal care, COVID-19 sensing, fingerprinting, automotive in-cabin physiological monitoring

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