

Special Issue on  
**Deep Perception beyond the Visible Spectrum: Sensing,  
Algorithms, and Systems**

# CALL FOR PAPERS

The vision, perception, and sensing of research community typically focus on the development of algorithms and systems for object detection, tracking, and classification with visible range sensors. In contrast, there is relatively lower interest in those sensors within nonvisual spectral range. This is partially due to their high cost, low resolution, lack of broadly available data sets, and/or lack of investigation on the potential merits of the nonvisible component of the spectrum. The rapid development of sensing devices has achieved unprecedented temporal, spatial, and spectral resolutions along with lower cost. Imaging devices with a high dynamic range allow for a growing number of applications including autonomous systems, spectroscopy imaging, aerial surveillance, robotics, precision agriculture, and food security. For example, thermal sensors have been widely employed in night vision-based systems, and near/shortwave infrared sensors are gaining popularity in UAS (Unmanned Aerial System) and/or satellite-based crop analysis, and IR wavelengths have shown merits in many object detection systems. In active imaging, for example, Lidar has been used to reconstruct a 3D map of the regions of interest to ease further analysis.

Despite the advances in sensing, algorithms and vision-based systems on the basis of nonvisible spectrum have still been challenging due to the limited visual information observed in the nonvisible spectral bands. Recent advances in deep learning (DL) offer promising and systematic solutions in diverse fields of research, and thus it is of great interest to develop new algorithms and sensing systems on the basis of DL.

This special issue intends to provide a forum for academics, industrial researchers, and engineers in the field of computer vision, perception, and sensing/imaging. The aim of this special issue is to highlight cutting edge advances in the exponentially growing field of PBVS (Perception Beyond the Visible Spectrum) integrating sensor technologies, algorithms, and systems. In addition, we welcome research in DL applied to all classes of sensors featured in PBVS: thermal, optical, proximity and acoustic, and biological. Innovative research, application, and comprehensive reviews are welcome.

Potential topics include but are not limited to the following:

- ▶ Adversarial learning and robust machine learning
- ▶ Compressive sensing
- ▶ IR/EO/RGBD imaging system
- ▶ Vision and perception for robots and UAVs
- ▶ Spectroscopy/microscopy imaging
- ▶ Sensing for precision agriculture and food security
- ▶ RADAR/SAR imaging
- ▶ Aerial surveillance and perceptions for autonomous cars
- ▶ LIDAR/LDV sensing
- ▶ Multisensor data fusion and processing
- ▶ 3D surface modeling and reconstruction
- ▶ Active imaging

Authors can submit their manuscripts through the Manuscript Tracking System at <https://mts.hindawi.com/submit/journals/js/pbvs/>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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**Submission Deadline**

Friday, 21 June 2019

**Publication Date**

November 2019