18th IEEE Workshop on Perception Beyond the Visible Spectrum

PBVS 2022

In Conjunction with

Call for Papers

The objective of this workshop is to highlight cutting edge advances and state-of-the-art work being made in the exponentially growing field of PBVS (previously "Object Tracking & Classification Beyond the Visible Spectrum" - OTCBVS) integrating sensor processing, algorithms, and applications. PBVS involves deep theoretical research in sub-areas of image processing, machine vision, pattern recognition, machine learning, robotics, and augmented reality within and beyond the visible spectrum. Advancing vision-based systems includes frameworks and methods featured in PBVS.

The computer vision community has typically focused mostly on the development of vision algorithms for object detection, tracking, and classification with visible range sensors in day and office-like environments. In the last decade, infrared (IR), depth, thermal and other non-visible imaging sensors were used only in special area like medicine and defense. The relatively lower interest in those sensory areas in comparison to traditional computer vision was due in part to their high cost, low resolutions, poor image quality, lack of widely available datasets, and/or lack of consideration of the potential advantages of the non-visible part of the spectrum. These objections are now being overcome as sensor technology advances rapidly and sensor costs fall dramatically. Imaging devices with high dynamic range and IR sensitivity now appear in an increasing number of applications ranging from defense and automotive to home and office security.

We encourage the submission of original papers that cover the topics of interest mentioned below. In order to develop robust and accurate vision-based systems that operate in and beyond the visible spectrum, not only existing methods and algorithms originally developed for the visible range should be improved and adapted, but also entirely new algorithms that consider the potential advantages of non-visible ranges are certainly required. The fusion of visible and non-visible ranges, like radar and IR images, depth images or IMU information, or thermal and visible spectrum images as well as acoustic images, is another dimension to explore for higher performance of vision-based systems.

This **18th IEEE CVPR Workshop** on Perception Beyond the Visible Spectrum (**PBVS'2022**) fosters connections between communities in the machine vision world ranging from public research institutes to private, defense, and federal laboratories. PBVS brings together academic pioneers, industrial and defense researchers and engineers in the field of computer vision, image analysis, pattern recognition, machine learning, signal processing, artificial intelligence, sensor exploitation, and HCI.

PBVS'2022 is accompanied by the following challenges: **Thermal Image Super-Resolution (TISR'2022), Multi-modal Aerial View Object Classification (MAVOC), and Semi-Supervised Hyperspectral Object Detection (SSHODC)**. For more information about the challenges, the datasets, the evaluation approaches and measures as well as the deadline for participation, please visit the workshop website.

Organizer and General Chair

Riad I. Hammoud
TuSimple, USA

Program Chairs

Michael Teutsch
Hensoldt Optronics, Germany

Erhan Gundogdu
Amazon, Germany

Challenge Chair

Angel D. Sappa
CVC, Spain; ESPOL Univ., Ecuador

Publication Chair

Yi Ding
Thales Group, USA

Honorary Chair

Erik Blasch
Air Force Research Lab, USA

Keynote Speakers

Richard Bamler
German Aerospace Center (DLR)

Alan Bovik
UT Austin, USA

One more keynote tba

Important Dates

- **Submission:** **March 11, 2022**
- Notification: **March 30, 2022**
- Camera ready: **April 5, 2022**
- Workshop day: **June 19, 2022**

Topics of Interest

Sensing/Imaging Technologies

- ***IR/EO/RGBD imaging systems***
- ***Underwater sensing***
- ***Multi-spectral/Satellite imaging***
- ***Spectroscopy/Microscopy imaging***
- ***LIDAR/LDV sensing***
- ***Compressive sensing***
- ***RADAR/SAR imaging***
- ***Radiation sensing***
- ***Active Imaging; Cooperative Sensing***

Applications & Systems

- ***Surveillance and reconnaissance systems***
- ***Unmanned autonomous Systems***
- ***Vehicle, Ship, object classification***
- ***Robotic grasping***
- ***Vision-aided navigation and SLAM***
- ***Night/Shadow vision***
- ***Sensing for agriculture and food safety***
- ***Vision-based autonomous aerial vehicles***
- ***Lifelong & Robust Machine Learning***

Theory and Algorithms

- ***Deep Learning, Reinforcement Learning***
- ***Imagery / Video exploitation***
- ***Object / Target tracking and recognition***
- ***Feature extraction and matching***
- ***Activity / Pattern learning and recognition***
- ***Multimodal / Multi-sensor / INT fusion***
- ***Multimodal Geo-registration***
- ***3D Reconstruction and Shape modeling***
- ***Automatic Caption Generation; Data Labeling***

Website, challenge, and benchmarking data: pbvs-workshop.github.io – contact: michael.teutsch@hensoldt.net or sappa@ieee.org