20th IEEE Workshop on Perception Beyond the Visible Spectrum

PBVS 2024

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 used to focus 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, X-ray, 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 advantages of the non-visible part of the spectrum. These limitations are now being overcome as sensor technology advances rapidly and sensor costs fall dramatically. Furthermore, the increasing interest in autonomous systems, where safety and reliability are a major concern, has highlighted the importance of robust perception systems. In such critical systems, sensors operating in different spectrums complement each other to overcome the limitations of each individual sensor to provide robust and reliable perception in various lighting and weather conditions.

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 and IMU information, or thermal and visible spectrum images as well as acoustic data, is another dimension to explore for higher performance of vision-based systems.

This **20th IEEE CVPR Workshop on Perception Beyond the Visible Spectrum** (**PBVS'2024**) 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'2024 challenges are: **Thermal Image Super-Resolution Challenge (TISR'2024), Multi-modal Aerial View Imagery Challenge: Classification (MAVIC-C'2024),** and **Multi-modal Aerial View Imagery Challenge: Translation (MAVIC-T'2024)**. 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.

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Important Dates
- Submission: **March 07, 2024**
- Notification: **April 05, 2024**
- Camera ready: **April 12, 2024**
- Workshop day: **June 17, 2024**

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