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Whenever conventional imaging techniques fail to address some challenging problems, researchers and engineers try to develop new systems relying on a combination of various sensors/optics and/or processing so as to create nonconventional imaging systems. Intensity information is extracted from bandwidth beyond the visible (x-rays, ultraviolet, infrared ...) and complemented with extra information such as polarization or multiple views from diverse sensors. This special section addresses the problem of quality control by artificial vision in nonconventional imaging systems. It has been made possible by the interest and fervor generated from the researchers participating in the SPIE International Conference on Quality Control by Artificial Vision (QCAV'2015), held in Le Creusot, France, in June 2015, who contributed for half of the papers.

The nonconventional imaging research included in this special section include microscopic images, scanning electron microscopic images, infrared images, high dynamic range infrared images, dispersive x-rays, brain tomographic images from electroencephalography, three-dimensional (3-D) tomographic images, nondestructive testing, 3-D reconstruction from a single image, depth cameras, PTZ cameras, two-camera systems or high-speed cameras.

The microscopes provide significant magnification to study objects that are generally invisible to the naked eye. This magnification comes at the cost of noise introduced due to lens aberration and specular noise due to illumination. Hence, it is important for the methods to be robust during the various stages of image processing. M.B. Khan et al. and L. Drumetz et al. in their articles address the segmentation of microscopic images for activated sludge flocs and the classification of scanning electron microscopic images for cementitious materials, respectively.

Infrared images provide information of the scene and the objects in the region beyond the visible range and can help investigate "inside" the material as well. As the infrared images are in grayscale, therefore, pseudo-coloring is required to provide discrimination between the objects. This also results in better visualization. F. Garcia et al. discuss a real-time visualization method to provide good discrimination when high dynamic infrared images need to be visualized on normal 8-bit displays. Rogotis et al. use appearance features rather than pseudo-coloring to tackle this problem. P. Barnabé et al. design a two-camera system based on visible to near infrared and short-wave infrared for characterizing the metallic alloys. Belkacemi et al. propose an extended version of the scanning from Heating method so as to address simultaneously 3-D reconstruction and nondestructive testing.

Two important nonconventional imaging techniques are topography and tomography. In topography, a map is made based on the information available on the surface, while tomography assesses the information under the surface, too. S.H. Lim et al. create brain topographic maps by using electroencephalogram activity at the scalp from motion estimation techniques. C. Chapoullié et al. describe the structure of fiber and yarn from the tomographic data. L.C. Yung et al. utilized Monte Carlo modeling for bulk substrate porosity verification using the tomographic data from energy-dispersive x-rays.

Depth information provides the additional data that is required for 3-D reconstruction and visualization of objects. Depth information can be obtained using depth estimation techniques, or it can be directly acquired from a depth camera. In their article, R. Liu et al. propose a method for acquiring 3-D information of generalized cylinders from a single image. Cudel et al. use a four-lens device based depth camera to compute the disparity maps. Aubreton et al. propose a new approach "coarse to fine" for 3-D digitization.

Jovančević et al. develop a system relying on a PTZ camera mounted on a robot for exterior aircraft inspection, whereas for Viana et al. the PTZ camera is used in conjunction with a CAD model.

Regarding color and video imaging, Dubosclard et al. propose a system for automatic grading of grain products, Gonzales-Castro et al. present a new texture descriptor for classification of pigmented regions, El Moubtahij et al. investigate a new framework based on polynomial decomposition for video classification, and Chehdi et al. propose an extension of the FCM algorithm for hyperspectral image clustering.

Finally, Aldea et al. propose an extensive work on crack detection, whereas Wang et al. develop a new prototype, relying on a high-speed camera for pharmaceutical capsule inspection.

Thanks to all of the authors who have contributed to this special section and who have met the deadlines by sending in their revised manuscripts within time. We would like to thank all of the reviewers who ensured the high quality of the submissions by reviewing them several times. Finally, last but not least, thanks are due to the JEI editorial staff who patiently helped us bring this special section together and provided valuable advice and guidance throughout the process.