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Editorial

Special Issue on Intelligent Systems Applications to Multiple Domains Based on Innovative Signal and Image Processing

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Nowadays, intelligent systems are largely applied in multiple domains (e.g., Industry 4.0, smart healthcare, smart agriculture, or marine biology). The role of intelligent systems in dynamic contexts has become crucial and mandatory, with the signal processing step acting as the starting point for many applications, including smart image/video processing, intelligent parameter monitoring, or high-level evaluations of complex events for applications in Industry 4.0, agriculture, medicine, life science, environmental analyses, and others.

Independent from the application scenario, the common focus of new innovations—employing artificial intelligence and innovative processing—requires a strong multidisciplinary effort in the research and development of intelligent systems.

The main purpose of this Special Issue is to collect innovative contributions in the field of signal and image processing (e.g., computer vision systems, new algorithms, or machine/deep learning applications), ranging from new methodologies to innovative approaches in different domains. A particular emphasis has been placed on the application of deep learning techniques to solve common issues known in the literature as well as innovative best practices.

A total of thirteen research papers in various application fields have been collected in this Special Issue, the main findings of which are briefly reported in this editorial, divided by common application areas/domains.

Maskeliūnas et al. [1] presented a deep-learning-based, custom model for Parkinson's disease assessment and diagnosis, aimed at discovering anomalies in the patients' voice to develop an automated screening method.

Uloza et al. [2] described their research outcomes in the development of an artificial-intelligence-based algorithm for the assessment of substituted voice and speech following laryngeal oncosurgery.

Prencipe et al. [3] presented a high accuracy network able to perform liver segmentation from computed tomography scans, developing a model that could help radiologists and experts reduce the annotation time in an objective and repeatable way.

Lonseko et al. [4] used attention-guided convolutional neural networks for gastrointestinal disease classification from endoscopic images, minimizing the burden on clinicians and improving patient outcomes in both diagnosis and treatment.

Mocanu et al. [5] assessed the proof-of-concept for enhancing the interactive voice response of an emergency system based on real-time Romanian transcription of speech and recognition of emotional states within emergency calls.

Renò et al. [6] carried out a study on learning analytics, focusing in particular on the study and development of methodologies useful for the evaluation of learners during online learning sessions.

Mohan et al. [7] worked on multi-focus image fusion rules to obtain all-in-focus or fully focused images useful for information extraction as well as visual perception tasks.

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Kuo et al. [8] efficiently and accurately determined and prevented machine faults in harmonic drives using deep learning models.

Chen et al. [9] assembled and introduced a system for automatic defect detection of polyvinyl chloride (PVC) powder based on an optimized version of the YOLO deep learning model, to be applied to foreign matter recognition and sorting system optimization in PVC manufacturing processes.

Shoriat Ullah et al. [10] presented a method for predicting the remaining Li-ion battery capacity, adopting functional principal component analysis applied to monitoring data.

Pospíchal et al. [11] dedicated their investigation to the use of deep learning models in solar irradiance value prediction to efficiently exploit renewable energy—an area that has wide-ranging application.

Li et al. [12] worked on the optimization of a deep convolutional neural network for processing urban environment data for driving assistance applications, dedicated towards a real-time semantic understanding and segmentation of urban scenes.

Ali et al. [13] worked on intelligent fusion of features aimed at the identification of plant leaf diseases in smart agriculture applications.

We believe that the applications of intelligent systems (both hardware and software) in a diverse range of domains will enable cutting-edge technology transfer in several areas such as Industry 4.0, environmental analyses, smart agriculture, and many more.

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