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Recent Advances, Emerging Methods and Applications of Pattern Recognition

J.UCS Special Issue

Jörg Keller
(Faculty of Mathematics and Computer Science, FernUniversität in Hagen, Germany
joerg.keller@fernuni-hagen.de)

Manuel Grana
(Faculty of Informatics, UPV/EHU University of the Basque Country
Donostia-San Sebastian, Spain
Manuel.grana@ehu.es)

Rafał Kozik
(University of Science and Technology, UTP Bydgoszcz, Poland
rkozik@utp.edu.pl)

Tomasz Andrysiak
(University of Science and Technology, UTP Bydgoszcz, Poland
andrys@utp.edu.pl)

Michał Choraś
(University of Science and Technology, UTP Bydgoszcz, Poland
chorasm@utp.edu.pl)

Nowadays advanced pattern extraction and analysis techniques have been successfully used in a variety of domains. Nonetheless, many challenges still exist. In particular, the majority of practical applications of pattern recognition are still struggling with huge amounts of data that exhibits such challenges as concept drift, non-stationary underlying processes, noise, and common lack of labels or additional metadata that could be useful for further analysis.
In addition to that, scalability of those practical applications and ability to adapt to constantly changing environment is still a problem. Moreover, problems with heterogeneous and multi-source data that require a dedicated approach also emerge.

Therefore, in this Special Issue, we covered recent solutions to the abovementioned problems, novel methods and algorithms, advances, challenges, as well as practical applications of pattern recognition.

The special issue includes, among other submissions from the open call for papers, extended versions of accepted papers from the 10th International Conference on Image Conference and Communications – IP&C 2018. IP&C is a known Image Processing and Communications conference organized at the University of Science and Technology, UTP Bydgoszcz, Poland since 2009. Those extended papers have been invited for submission under the condition of providing at least 50% new content. All

14 submissions were peer-reviewed by top experts in the domain. After revision and re-review, based on the reviews and the judgement of the guest editors, 9 articles were selected for publication in this special issue to represent the breadth of the field.

Łukasz Apiecionek, Marcel Großmann and Udo R. Krieger presented IoT architectures and compared them focusing on security aspects.

Sławomir Bujnowski, Tomasz Marciniak, Beata Marciniak and Zbigniew Lutowski analysed the influence of the network resources control on the transmission properties of the networks. They particularly focused on topologies that are described with irregular graphs.

Dominik Pieczyński, Marek Kraft and Michał Fularz focused on improving the quality of person re-identification with proposed deep learning tools. They hypothesised that including segmentation information in the processing pipeline allows for discarding poor quality detections.

Hubert Michalak and Krzysztof Okarma advance the state of the art of optical character recognition in documents with uneven illumination by means of an innovative local thresholding algorithm of proven robustness.

Waseem Rawat and Zenghui Wang tackle the difficult problem of topology design in the case of convolutional neural networks applying a bayesian search embedded in a genetic algorithm approach with improved results in a well known benchmarking dataset.

Sonia Contreras, Miguel Ángel Manzenado and Álvaro Herrero provide a highly valuable application of hybrid neural system from the social and economical point view, that of analyzing the relation between workplace accidents and the global economical crisis scenario.

Michał Sypetkowski, Grzegorz Sarwas and Tomasz Trzciński present the problem of football players poses recorded and presented on low – resolution images, received from HQ CCTV system located on lighting spots, which are considered to be very efficient and easy to operate.

Jarosław Fastowicz and Krzysztof Okarma analyze different techniques of 3D modelling and printing, which results seem to be very promising. Among others, they draw attention to the advantage of low dependence on the color of the filament for the popular PLA and ABS materials, used typically in different (also: of low budget) devices.

Robert Burduk and Jedrzej Biedrzycki touch upon the case of introducing more sophisticated and developed algorithm of classifier integration in geometric space. In the suggested solution, decision boundaries in the process of integrating instead of class labels or predicted probabilities may help to achieve better results.

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