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Proceedings

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FOREWORD

This volume contains a broad collection of research of both foundational and applied type, written by both well-known groups of experts and young researchers. In these papers different theories, algorithms, data driven approaches and formalisms have been applied to modeling of different aspects of intelligent applications. It contains 27 sessions in 18 streams. Ten of the sessions are invited ones and 2 are poster sessions in various fields. This volume constitutes the proceedings of IS'16 - The 2016 IEEE International Conference on Intelligent Systems held on September 4-6, 2016 in Sofia, Bulgaria. The IS'16 is the eighth conference in the well known and highly respected line of conferences in this series which have been biannually organized since 2002, across EU, in Bulgaria, Poland and the United Kingdom.

Three sessions (PL-1, PL2 and PL-3) are included in the Plenary lecture (PL) stream. They include a research on fuzzy systems, industrial applications of control systems, spiking neural networks for stream data analysis, a new machine learning concept called randomized machine learning and semiotic operations over sets of signs aiming at boosting the extent of autonomy of robotic coalitions.

Three sessions from the streams S6 and S8 are devoted to autonomous and other innovative systems and applications. The presented 20 papers aim to resolve different real world problems and to increase the effectiveness of the existing systems and applications. More and more of the applications are not only algorithmically-based, but are data-driven ones. This fact may be inspired by the rise of Data Science theories and applications.

One session S7 concerns different data science aspects. Described are original data-driven fuzzy models to learn balanced manufacturing data; an initialization of mixtures of normal components in real application fields; the refinement of skyline queries; the use of classical and logically-oriented constraint satisfaction approaches to refine SAS Enterprise Miner solutions.

Traditionally we receive a large amount of research papers on artificial neural networks and on machine learning. This time four of them are chosen to be included in the session S3 on artificial neural networks and five to S5, the session on machine learning.

The research on intelligent control systems is concentrated in session S9 (5 papers).

Clustering and recognition problems are investigated in session stream S10 (10 papers).

The first invited session IS1 contains 5 papers and is on EU Project activity and innovative research. Session 'The Intelligent Systems of 2020' is an opportunity for scientists from all over the world to share ideas and achievements in the theory and practice of intelligent systems out looking their vision for 2020.

IS2 is a special session on intelligent pattern recognition, biometrics, computational intelligence and security. Many researchers from these fields submitted papers to other sessions of IEEE IS'16, so an active discussion is expected at this session.

The next invited session IS3 Special is on data-driven decision making: methodology and applications.

Invited session IS4 is on Intelligent Systems for industrial and environmental applications. This session offers the opportunity for discussing advances in intelligent systems for industrial and environmental scenarios, both from the theoretical and application points of view.

Two of the invited sessions IS5 are included in the stream on hybrid intelligent systems. These systems have been very useful and have been applied to various fields for solving real world problems. This session focus on HISs applied in Control, Pattern Recognition, Biometrics, Time Series Prediction, both in the theories, and practical applications in solving real world problems including a fuzzy environment.

Two of the invited sessions (IS6 and IS7) are devoted to the theoretical and applied research, related to intuitionistic fuzzy sets.

Two other invited sessions from stream IS8 are devoted to the theoretical and applied research, related to generalized nets.

The discussion from other two invited sessions (IS9 and IS10) is on intelligent control and optimization.

Two poster sessions (P1 and P2) contain 19 communications. Intelligent applications are considered in different aspects from intelligent measurement through intelligent control to various applications.

The broad variety of theories and their applications in different types of intelligent systems represents our strong and rapidly developing field that changes all spheres of human activities. We anticipate that our forum will develop new connections and collaboration and will lead to new research projects at EU and/or other international level.

We are glad to note that again, as usually, a great number of the participants are young people. This time we didn't prepare special student sessions, and the students from Europe, Asia, Africa and America frequently represented large international teams. Nowadays the participation in different international teams and interdisciplinary research seem to be the main formula of success.

IEEE IS'16 Proceedings offer many papers, containing new and original results in the area of theory and applications of intelligent systems. We believe that these papers will provoke the interest of the scientific community world-wide. Another reason for our optimism is the fact that many communications, presented during the previous editions of the IEEE Intelligent Systems Conference, have already received very positive international response and abundant citations.

Welcome to IEEE Eighth International Conference on Intelligent Systems.

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