

ISFUROS 2017 Keynote Talk

Fuzzy Systems for Big data: Why and what for?

Francisco Herrera, Dept. of Computer Science and Artificial Intelligence, University of Granada

In the current big data scenario (data with very high volume, velocity and variety), we open up significant opportunities for employment of fuzzy systems. The use of the "MapReduce programming model" and big data platforms (Hadoop, Spark, Flink, ...) led us to get partial models per Map to be combined to show global models in a big data environment. To study under what conditions fuzzy systems can be an important tool for these problems is a current challenge in the theory of fuzzy systems, which can make them an important tool in this new scenario.

We will focus on classification problems and discuss the reasons for the good performance of Linguistic Fuzzy Rule Based Classification Systems (RBCSs). We discuss the properties and capabilities that allow FRBCS to be accurate and scalable: robustness with respect to the lack of data, and facilities to handle the linguistic rules throughout the MapReduce workflow with an interesting distribution along Reduce tasks. Together with the existing results we will discuss the open challenges.

Short Biography



Francisco Herrera is a Professor in the Department of Computer Science and Artificial Intelligence at the University of Granada. He has been the supervisor of 41 Ph.D. students. He has published more than 300 journal papers that have received more than 51000 citations (Scholar Google, H-index 115). He is co-author of the books "*Genetic Fuzzy Systems*" (World Scientific, 2001) and "*Data Preprocessing in Data Mining*" (Springer, 2015), "*The 2-tuple Linguistic Model. Computing with Words in Decision Making*" (Springer, 2015), "*Multilabel Classification. Problem analysis, metrics and techniques*"

(Springer, 2016), "*Multiple Instance Learning. Foundations and Algorithms*" (Springer, 2016). He currently acts as Editor in Chief of the international journals "Information Fusion" (Elsevier) and "Progress in Artificial Intelligence" (Springer). He acts as editorial member of a dozen of journals.

He belongs to the list of the Highly Cited Researchers in the areas of Engineering and Computer Sciences: <http://highlycited.com/> (Clarivate Analytics, 2014). He is an EurAi Fellow 2009 and IFSA Fellow 2013. Among other, he has been awarded with the 2010 Spanish National Award on Computer Science ARITMEL to the "Spanish Engineer on Computer Science", International Cajastur "Mamdani" Prize for Soft Computing (Fourth Edition, 2010), IEEE TFS Outstanding 2011 and 2015 Paper Award, 2011 Lotfi A. Zadeh Prize Best paper Award of the IFSA, 2013 AEPIA Award to a scientific career in Artificial Intelligence, 2014 University of Jaen Award "Natural de Jaén", University of Granada best paper Award for engineering area (years 2011, 2013, 2014 and 2015 and 2016), 2014 XV Andalucía Research Prize Maimónides and Andalucía Medal 2017 (by the regional government of Andalucía), and Security Forum Award I+D+i 2017 (by the project Real-time video handgun detection system).

His current research interests include among others, computational intelligence (including fuzzy modeling and evolutionary algorithms and deep learning), information fusion and decision making, data science (including data preprocessing, prediction and big data).