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Chair: TBN

"Competitive Perceptrons: The Relevance of Modeling New Bioinspired Properties in Rate-Coding Artificial Neurons"

ABSTRACT

This keynote supports the relevance of modeling new bioinspired properties in rate-coding artificial neurons, focusing on fundamental neuronal properties rarely implemented until now in artificial neurons, such as intrinsic plasticity, metaplasticity of synaptic strength, and lateral inhibition of neighboring neurons. All of these properties are bioinspired through empirical models developed by neurologists, and this in turn contributes to taking perceptrons to a higher potential level. Relevant advances are expected in the context of the developing Industrial Revolution 4.0 based on advances in Machine Learning, and may even initiate a new generation of artificial neural networks. As an example, a single-layer perceptron that includes the proposed advances, called the Competitive Perceptron, is successfully trained to perform the XOR function. This new bio-inspired artificial neural model has potential for non-linear separability, continuous learning and scalability and is suitable for building efficient deep networks, overcomes basic limitations of traditional perceptrons that have challenged scientists for half a century.

Bio: Diego Andina (*Full Prof., IEEE Senior Member*), was born in Madrid, Spain, and works for Universidad Politécnica de Madrid (UPM), where he previously received two Master's degrees (1990) and a Doctorate with honors in 1995. He currently heads a Research Group interested in Interdisciplinary Applications of Artificial Intelligence, Biomimetics and System of Systems Engineering, receiving numerous international awards and recognitions for his novel contributions and business technology transfer proposals. He is author or co-author of more than 350 national and international publications, registered several patents and directed more than 60 R&D projects financed by National and Local Governments, the European Commission and private Institutions and Companies. He is also an associate editorial member of several top international research journals and transactions and has participated in the organization of more than 50 international research, innovation and technology transfer events. He is passionate about Entrepreneurship and Multidisciplinarity, having founded the Latin American Cooperation Network for Intelligent Automation and Control, the UNITOD University Union and several Spinoffs at the National and International level.