

IEEE - Task Force

Contributed by admin

Welcome to the IEEE Computer Society Task Force on Adaptive and Evolving Fuzzy Systems

Fuzzy systems have demonstrated the ability to formalize in a computationally efficient manner the approximate reasoning typical of humans. One of the important research challenges today is to further develop fuzzy systems theory towards the design of truly intelligent systems with a higher level of adaptation, structural flexibility, and autonomy that can develop their understanding of the environment and ultimately their intelligence. During the last decade neural network structures were intensively used for the design, learning, and representation of fuzzy systems leading to neuro-fuzzy systems constructs. To address the new challenges related to the dynamically evolving and often unknown and unpredictable, non-stationary environment when solving problems of modelling, control, prediction, classification and data processing a system must be able to autonomously learn from the environment, to detect and react to shifts and drifts in the data pattern, to adapt the learning itself, in addition to the structure and parameters of the system instead of relying entirely on pre-trained and fixed system structures and learning concepts. That is, the system must be able to evolve, to self-develop, to self-organize. Fuzzy rule-based and neuro-fuzzy systems are particularly suitable model framework because of their interpolation, extrapolation, and approximation abilities, their cooperative manner of producing the overall output/result, their granularity and knowledge capture abilities, mimicking reasoning, and in an analogy to the way human beings learn rules during their entire life accumulating knowledge and experience. The area of Adaptive and Evolving Fuzzy Systems has emerged during the last decade addressing demands from a range of industries (advanced manufacturing, chemical and petro-chemical industry, defence, on-line web mining etc.) and was quickly recognised by the community including academia and the industry. For a relatively short period of time a series of events were organised at the leading IEEE Conferences (including FUZZ-IEEE 2006-onwards, IJNN 2006-onwards, WCCI2006-onwards, a specially dedicated Symposium, 2006 and partially a Workshop, 2008, special issue of IEEE TFS-2007/8, edited volumes by IEEE Press – 2006, 2008, Working Groups at EUSFLAT, Data Mining groups etc.). These efforts will be better directed and bring more return to the community if they are performed under the umbrella of the especially dedicated Task Force.