

Granular Computing models in Machine Learning

Abstract

Traditional Machine Learning (ML) models are unable to effectively cope with the challenges posed by the many V's (volume, velocity, variety, etc.) characterizing the Big Data phenomenon. This has triggered the need to revisit the underlying principles and assumptions ML stands upon. Dimensionality reduction, feature/instance selection, increased computational power and parallel/distributed algorithm implementations are well-known approaches to deal with these large volumes of data.

In this talk we will introduce *Granular Computing* (GrC), a vibrant research discipline devoted to the design of high-level information granules and their inference frameworks. By adopting more symbolic constructs such as sets, intervals or similarity classes to describe numerical data, GrC has paved the way for a more human-centric manner of interacting with and reasoning about the real world. We will go over several granular models that address common ML tasks such as classification/clustering and will outline a methodology to appropriately design information granules for the problem at hand. Though not a mainstream concept yet, GrC is a promising direction for ML systems to harness Big Data.

Speaker Bio

Rafael Falcon received his PhD degree in Computer Science from the School of Information Technology and Engineering at the University of Ottawa in 2012. Previously, he attained his Bachelor and MSc degrees in Computer Science from the Universidad Central de Las Villas, Cuba. He currently works as a Research Scientist for Larus Technologies Corporation, an Ottawa-based firm that specializes in high-level information fusion and decision support from a Computational Intelligence angle. He is also an Adjunct Professor with the School of Electrical Engineering and Computer Science, University of Ottawa and chairs the IEEE Computational Intelligence/ Systems, Man and Cybernetics Ottawa chapter. His research interests are in the area of Computational Intelligence with applications to wireless sensor networks, robotics, maritime domain awareness and multi-sensor data fusion.