Input Space Partitioning for Machine Learning

Abstract

This talk introduces an input attribute grouping method to improve the performance of learning. During training for a specific problem, the input attributes are partitioned into groups according to the degree of inter-attribute promotion or correlation that quantifies the supportive or negative interactions between attributes. After partitioning, multiple sub-networks are trained by taking each group of attributes as their respective inputs. The final classification result is obtained by integrating the results from each sub-network. Experimental results on several UCI datasets demonstrate the effectiveness of the proposed method.

Brief biography

Steven Guan received his BSc. from Tsinghua University and M.Sc. & Ph.D. from the University of North Carolina at Chapel Hill. He is currently a Professor at Xi'an Jiaotong-Liverpool University (XJTLU) and Honorary Professor at University of Liverpool. He served the head of department position at XJTLU for 4.5 years, creating the department from scratch and now in shape. Before joining XJTLU, he was a tenured professor and chair in intelligent systems at Brunel University, UK.

Prof. Guan has worked in a prestigious R&D organization for several years, serving as a design engineer, project leader, and department manager. After leaving the industry, he joined the academia for three and half years. He served as deputy director for the Computing Center and the chairman for the Department of Information & Communication Technology. Later he joined the Electrical & Computer Engineering Department at National University of Singapore as an associate professor for 8 years.

Prof. Guan's research interests include: machine learning, computational intelligence, big data analytics, mobile commerce, modeling, networking, personalization, security, and pseudorandom number generation. He has published extensively in these areas, with 140+ journal papers and 200+ book chapters or conference papers. He has chaired, delivered keynote speech for 100+ international conferences and served in 190+ international conference committees and 20+ editorial boards. There are quite a few inventions from Prof. Guan including Generalized Minimum Distance Decoding for Majority Logic Decodable Codes, Prioritized Petri Nets, Self-Modifiable Color Petri Nets, Dynamic Petri Net Model for Iterative and Interactive Distributed Multimedia Presentation, Incremental Feature Learning, Ordered Incremental Input/Output Feature Learning, Input/Output Space Partitioning for Machine Learning, Recursive Supervised Learning, Reduced Pattern Training using Pattern Distributor, Contribution Based Feature Selection, Incremental Genetic Algorithms, Incremental Multi-Objective Genetic Algorithms, Decremental Multi-objective Optimization, Multi-objective Optimization with Objective Replacement, Incremental Hyperplane Partitioning for Classification, Incremental Hyper-sphere Partitioning for Classification, Controllable Cellular Automata for Pseudorandom Number Generation, Self Programmable Cellular Automata, Configurable Cellular Automata, Layered Cellular Automata, Transformation Sequencing of Cellular Automata for Pseudorandom Number Generation, Open Communication with Self-Modifying Protocols, etc.