

Recent Approaches Toward Lattice Computing

Session Chairs

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Abstract

Ever since its inception, the area of fuzzy sets and systems has explicitly or implicitly profited from lattice theory that draws on both order theory and universal algebra. Many types of information granules such as truth values, numbers, intervals, sets, symbols, graphs, possibility and probability distributions as well as fuzzy and L-fuzzy sets can be lattice ordered. Note that L-fuzzy sets include type-2, interval-valued, bipolar, and intuitionistic fuzzy sets.

These and other classes of information granules yield complete lattices that have instrumentally been used in different domains including non-classical logics, formal concept analysis, automated decision making, computing with words, computer vision as well as image processing and analysis, in particular mathematical morphology. Notions and facts drawn from lattice theory have also enabled some researchers to propose novel extensions of computational intelligence paradigms such as fuzzy inference systems, fuzzy associative memories, artificial neural networks, fuzzy adaptive resonance theory, and self-organizing maps.

Keywords

Lattice computing, L-fuzzy sets and systems, morphological neural networks, granular computing

Description

This special session is meant as a forum for researchers with interests in lattice computing. The objective is to present high-quality, state-of-the-art research results. An array of novel mathematical tools, design practices and real world applications will be presented. We are welcoming contributions that are potentially related to all theoretical and practical aspects of lattice computing. Topics include, but are not limited to:

- * Theoretical aspects of extended fuzzy sets such as fuzzy multisets, rough sets, and shadowed sets; complex, type-2, interval-valued, bipolar, intuitionistic and hesitant fuzzy sets;
- * L-fuzzy sets and systems;
- * Image algebra;
- * Minimax, a.k.a. max-plus algebra or tropical linear algebra, and its applications;
- * Non-classical logics;
- * Formal concept analysis;
- * Lattice fuzzy transforms;

- * Mathematical morphology on complete lattices and semilattice
- * Fuzzy and L-fuzzy mathematical morphology;
- * Lattice computing methods for computer vision, image/signal processing and analysis;
- * Granular computing;
- * Computing with words;
- * Fuzzy lattice reasoning;
- * Fuzzy, morphological, and lattice associative memories;
- * Morphological neural networks;
- * Lattice-valued distance, similarity, subethood and inclusion measures;
- * Aggregation functions;
- * Automated decision making;
- * Approximate reasoning;
- * Spatial/temporal reasoning;
- * Data mining;
- * Disparate data fusion;
- * Semantic web;
- * Knowledge representation;
- * Applications in pattern recognition and time series prediction.