

Contents

Part I: Introductory Concepts and Models

A Survey of Applications of the Extensions of Fuzzy Sets to Image Processing

Humberto Bustince, Miguel Pagola, Aranzazu Jurio, Edurne Barrenechea, Javier Fernández, Pedro Couto, Pedro Melo-Pinto 3

Interval Type-2 Fuzzy Cellular Model Applied to the Dynamics of a Uni-specific Population Induced by Environment Variations

Cecilia Leal-Ramirez, Oscar Castillo, Antonio Rodriguez-Diaz 33

A Genetic Programming Approach to the Design of Interest Point Operators

Gustavo Olague, Leonardo Trujillo 49

Part II: Modular Neural Networks in Pattern Recognition

Face, Fingerprint and Voice Recognition with Modular Neural Networks and Fuzzy Integration

Ricardo Muñoz, Oscar Castillo, Patricia Melin 69

Modular Neural Networks with Fuzzy Response Integration for Signature Recognition

Mónica Beltrán, Patricia Melin, Leonardo Trujillo 81

Optimization of Modular Neural Networks with Interval Type-2 Fuzzy Logic Integration Using an Evolutionary Method with Application to Multimodal Biometry

Denisse Hidalgo, Patricia Melin, Guillermo Licea 111

Comparative Study of Fuzzy Methods for Response Integration in Ensemble Neural Networks for Pattern Recognition

Miguel Lopez, Patricia Melin, Oscar Castillo 123

Part III: Neural Network Models and Time Series Prediction

Ensemble Neural Networks with Fuzzy Integration for Complex Time Series Prediction

Martha Pulido, Alejandra Mancilla, Patricia Melin..... 143

Prediction of the MXNUSD Exchange Rate Using Hybrid IT2 FLS Forecaster

Gerardo M. Mendez, Angeles Hernandez 157

Discovering Universal Polynomial Cellular Neural Networks through Genetic Algorithms

Eduardo Gomez-Ramirez, Enrique Haro Sedeño, Giovanni Egidio Pazienza 165

EMG Hand Burst Activity Detection Study Based on Hard and Soft Thresholding

Mario I. Chacon Murguia, Leonardo Valencia Olvera, Alfonso Delgado Reyes..... 177

Part IV: Optimization and Robotics

Modular Neural Networks Architecture Optimization with a New Evolutionary Method Using a Fuzzy Combination Particle Swarm Optimization and Genetic Algorithms

Feurier Valdez, Patricia Melin, Guillermo Licea..... 199

A Multi-agent Architecture for Controlling Autonomous Mobile Robots Using Fuzzy Logic and Obstacle Avoidance with Computer Vision

Cinthya Solano-Aragón, Arnulfo Alanis 215

Particle Swarm Optimization Applied to the Design of Type-1 and Type-2 Fuzzy Controllers for an Autonomous Mobile Robot

Ricardo Martínez-Marroquín, Oscar Castillo, José Soria 247

Author Index..... 263