

1. Record Nr.	UNINA9910483557103321
Titolo	Fuzzy logic hybrid extensions of neural and optimization algorithms : theory and applications // editors, Oscar Castillo, Patricia Melin
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-68776-7
Descrizione fisica	1 online resource (ix, 383 pages) : illustrations
Collana	Studies in computational intelligence ; ; Volume 940
Disciplina	511.3
Soggetti	Fuzzy logic Neural networks (Computer science) Soft computing Lògica difusa Xarxes neuronals (Informàtica) Optimització matemàtica Informàtica tova Algorismes Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Contents -- Estimation of the Number of Filters in the Convolution Layers of a Convolutional Neural Network Using a Fuzzy Logic System -- 1 Introduction -- 2 Literature Review -- 2.1 Convolutional Neural Networks -- 2.2 GSA -- 2.3 FGSA -- 3 Proposed Method -- 4 Results and Discussion -- 5 Conclusions -- References -- Optimization of Membership Function Parameters for Fuzzy Controllers in Cruise Control Problem Using the Multi-verse Optimizer -- 1 Introduction -- 2 Fuzzy Systems -- 2.1 Mamdani Model -- 2.2 Sugeno Model -- 3 Control Systems -- 4 Metaheuristics and Multi-verse Optimizer -- 4.1 Multi-verse Optimizer -- 4.2 Applications of MVO -- 5 Test and Results -- 5.1 Benchmark Function Test and Results -- 5.2 Applications Test and Results -- 6 Conclusions -- References -- Performance Analysis of a Distributed Steady-State Genetic Algorithm

Using Low-Power Computers -- 1 Introduction -- 2 Distributed Steady-State Genetic Algorithm -- 2.1 Application of Distributed Steady-State Genetic Algorithm in the n-Queens Problem -- 2.2 Application of Distributed Steady-State Genetic Algorithm in the Travelling Salesman Problem -- 3 Master-Slave Low Power Architecture -- 3.1 Rationale on Master-Slave Architecture Starting Procedure -- 3.2 Function Evaluation Task on Slave-Devices -- 3.3 Fail-Safe Algorithm on Master-Device -- 4 Computational Results -- 4.1 Experimental Setup -- 4.2 n-Queens Problem Experimental Arrangement Results -- 4.3 Travelling Salesman Problem Results -- 5 Conclusions and Future Work -- References -- Ensemble Recurrent Neural Networks for Complex Time Series Prediction with Integration Methods -- 1 Introduction -- 2 Problem Statement and Proposed Method -- 2.1 Analyze the Time Series -- 2.2 Creation of the Recurrent Neural Network -- 2.3 Integration by Average -- 2.4 Integration by Weighted Average. 2.5 Integration by Gating Network -- 2.6 Type-1 and Type-2 Fuzzy System Integration -- 2.7 Generalized Type-2 Fuzzy System -- 3 Simulation Results -- 4 Conclusions -- References -- Genetic Optimization of Ensemble Neural Network Architectures for Prediction of COVID-19 Confirmed and Death Cases -- 1 Introduction -- 2 Basic Concepts -- 2.1 Artificial Neural Networks -- 2.2 Nonlinear Autoregressive Neural Network -- 2.3 Fuzzy Logic -- 2.4 Genetic Algorithms -- 3 Proposed Method -- 4 Results of the Experiment -- 4.1 Genetic Algorithms -- 5 Conclusions -- References -- Optimization of Modular Neural Networks for the Diagnosis of Cardiovascular Risk -- 1 Introduction -- 2 Literature Review -- 2.1 Flower Pollination Algorithm -- 2.2 Bird Swarm Algorithm -- 2.3 Blood Pressure and Hypertension -- 2.4 Cardiovascular Disease and Heart Age -- 2.5 Framingham Heart Study -- 3 Proposed Method -- 4 Results -- 5 Conclusions and Future Work -- References -- A Review on the Cuckoo Search Algorithm -- 1 Introduction -- 2 An Analogy with Nature -- 2.1 Cuckoo Search Algorithm -- 2.2 Algorithm Rules -- 2.3 Levy Flights -- 2.4 Mathematical Formulas -- 2.5 Flowchart CS -- 3 Implementation of Levy Flights in Other Algorithms -- 4 Variants of the Cuckoo Search Algorithm -- 5 Applications -- 6 Conclusions -- References -- An Improved Convolutional Neural Network Based on a Parameter Modification of the Convolution Layer -- 1 Introduction -- 2 Background and Basic Concepts -- 2.1 Convolutional Neural Network Concepts -- 2.2 Edge Detectors -- 2.3 Sobel Operator -- 2.4 Prewitt Operator -- 2.5 Laplacian Operator -- 3 Proposed Approach -- 3.1 Proposed Architecture -- 3.2 Convolution Kernel Initialization -- 4 Experiments -- 4.1 Case Study MNIST Handwritten Digits -- 4.2 Case Study MNIST American Sign Language -- 4.3 Case Study Mexican Sign Language Database -- 5 Conclusions. References -- Parameter Optimization of a Convolutional Neural Network Using Particle Swarm Optimization -- 1 Introduction -- 2 Convolutional Neural Network -- 2.1 Input Layer -- 2.2 Convolution Layer -- 2.3 Non-linearity Layer -- 2.4 Pooling Layer -- 2.5 Classifier Layer -- 3 Particle Swarm Optimization -- 3.1 Global Best PSO -- 3.2 Local Best PSO -- 4 Proposed Method -- 4.1 Parameter Optimization of the CNN -- 4.2 CNN-PSO Optimization Process -- 5 Experiments and Results -- 5.1 Exploratory Experiment -- 5.2 American Sign Language Alphabet (ASL Alphabet) Experiment -- 5.3 American Sign Language MNIST Experiment -- 5.4 Analysis and Comparison of Results -- 6 Conclusion and Future Work -- References -- One-Dimensional Bin Packing Problem: An Experimental Study of Instances Difficulty and Algorithms Performance -- 1 Introduction -- 2 The Bin Packing

Problem -- 2.1 Instances -- 2.2 Index Description -- 2.3 Performance Measures -- 3 Algorithms -- 3.1 First Fit Decreasing (FFD) -- 3.2 Best Fit Decreasing (BFD) -- 3.3 Minimum Bin Slack (MBS) -- 3.4 GGA-CGT -- 4 Results -- 5 Experimental Analysis -- 5.1 Class BPP.25 -- 5.2 Class BPP.5 -- 5.3 Class BPP.75 -- 5.4 Class BPP1 -- 6 Conclusions and Future Work -- References -- Looking for Emotions in Evolutionary Art -- 1 Introduction -- 2 In Search of Lost Emotions -- 2.1 Humans in the EA Loop -- 3 Methodology: Analysis of Emotions in the Era of Evolutionary Art -- 3.1 The Line -- 3.2 Simplifying the Problem -- 3.3 Evospace-Interactive Module -- 4 Results -- 4.1 Analyzing Formal Elements -- 4.2 Are Emotions Properly Understood? -- 4.3 Audience Analysis -- 4.4 International Art Competitions -- 5 Conclusion -- References -- Review of Hybrid Combinations of Metaheuristics for Problem Solving Optimization -- 1 Introduction -- 2 Review of Hybrid or Combined Metaheuristics -- 3 Discussion -- 4 Conclusions. References -- GPU Accelerated Membrane Evolutionary Artificial Potential Field for Mobile Robot Path Planning -- 1 Introduction -- 2 Fundamentals -- 2.1 Membrane Computing -- 2.2 Evolutionary Computation -- 2.3 Artificial Potential Field Method -- 3 GPU Accelerated MemEAPF -- 4 Results -- 4.1 Path Planning Results -- 4.2 Performance Results -- 5 Conclusions -- References -- Optimization of the Internet Shopping Problem with Shipping Costs -- 1 Introduction -- 1.1 Definition of the Problem -- 2 The General Structure of the Memetic Algorithm -- 2.1 Selection by Tournament -- 2.2 Crossover Operator -- 2.3 Mutation Operator -- 2.4 Local Search -- 2.5 Memetic Algorithm (MAIShOP) -- 3 Computational Experiments -- 4 Conclusions -- References -- Multiobjective Algorithms Performance When Solving CEC09 Test Instances -- 1 Introduction -- 2 Multiobjective Optimization -- 3 CEC09 Test Functions -- 4 Multiobjective Optimization Algorithms -- 5 Performance Metrics of Multiobjective Optimization -- 6 Computational Experiments -- 7 Conclusion and Future Work -- References -- Analysis of the Efficient Frontier of the Portfolio Selection Problem Instance of the Mexican Capital Market -- 1 Introduction -- 2 Multiobjective Algorithms in Comparison -- 3 CellDE -- 4 GDE3 -- 5 IBEA -- 6 MOCeII -- 7 NSGA-II -- 8 NSGA-III -- 9 OMOPSO -- 10 PAES -- 11 SPEA2 -- 12 Computational Experiments -- 13 Conclusions -- References -- Multi-objective Portfolio Optimization Problem with Trapezoidal Fuzzy Parameters -- 1 Introduction -- 2 Elements of Fuzzy Theory -- 2.1 Fuzzy Sets -- 2.2 Generalized Fuzzy Numbers -- 2.3 Addition Operator -- 2.4 Graded Mean Integration (GMI) -- 2.5 Order Relation in the Set of the Trapezoidal Fuzzy Numbers -- 2.6 Pareto Dominance -- 3 Multi-objective Portfolio Optimization Problem with Trapezoidal Fuzzy Parameters -- 4 Proposal Algorithm T-NSGA-II. 4.1 Representation of the Solutions -- 4.2 Evaluating the Solutions -- 4.3 One-Point Crossover Operator -- 4.4 Uniform Mutation Operator -- 4.5 Initial Population -- 4.6 Population Sorting -- 4.7 No-Dominated Sorting -- 4.8 Calculating the Crowding Distance (Deb et al. 2000) -- 4.9 Calculating the Spatial Spread Deviation (SSD) (Santiago et al. 2019) -- 4.10 Pseudocode of the T-NSGA-II Algorithm -- 5 Proposed Strategy to Assess the Performance of Multi-objective Algorithms in the Fuzzy Trapezoidal Numbers Domain -- 6 Computational Experiments -- 7 Conclusions -- References -- A Study on the Use of Hyper-heuristics Based on Meta-Heuristics for Dynamic Optimization -- 1 Introduction -- 2 Background and Definitions -- 2.1 Dynamic Multi-objective Optimization Problem -- 2.2 Dynamic Multi-objective Evolutionary Algorithm -- 2.3 Hyper-heuristic -- 2.4

Indicators to Evaluate DMOEAs Performance Over DMOPs -- 3 Relevant Properties to Consider from DMOPs -- 3.1 Objective Function -- 3.2 Decision Variables -- 3.3 Constraints -- 4 Known Hyper-heuristic Approaches Towards Solving DOPs -- 5 Proposed Checklist and Design Guide for Dynamic Hyper-heuristics -- 6 Case Studies Using the Proposed Guide and Checklist -- 6.1 Case Study 1 -- 6.2 Case Study 2 -- 7 Conclusions and Future Work -- References -- On the Adequacy of a Takagi-Sugeno-Kang Protocol as an Empirical Identification Tool for Sigmoidal Allometries in Geometrical Space -- 1 Introduction -- 2 Methods -- 2.1 Model of Complex Allometry -- 2.2 TSK Fuzzy Model -- 2.3 Data -- 2.4 Reproducibility Assessment -- 2.5 TSK Identification Procedures -- 2.6 Piecewise-Linear Schemes -- 3 Results -- 4 Discussion -- 5 Conclusion -- References -- A New Hybrid Method Based on ACO and PSO with Fuzzy Dynamic Parameter Adaptation for Modular Neural Networks Optimization -- 1 Introduction -- 2 Proposed Method. 2.1 Ant System and ACO Algorithm.
