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Deep Learning Using Genetic Algorithms Training Neural Networks Using Genetic Algorithms Neural Network Training Using Genetic Algorithms Bio-Inspired Systems: Computational and Ambient Intelligence Training Neural Networks Using Hybrids with Genetic Algorithms Training feedforward neural networks using genetic algorithms Empirical Studies on the Utility of Genetic Algorithms for Training and Designing of Neural Networks Using a Genetic Algorithm in Training an Artificial Neural Network to Implement the XOR Function Applied Genetic Programming and Machine Learning Neurogenetic Learning Evolutionary Algorithms and Neural Networks Classification and Learning Using Genetic Algorithms Automatic Generation of Neural Network Architecture Using Evolutionary Computation Training and Testing of Expert Networks Genetic Learning for Adaptive Image Segmentation Promoting the Conservation and Use of Plant Genetic Resources by Training and Research Enhanced Feature Selections of Adaboost Training for Face Detection Using Genetic Algorithm Practical Computer Vision Applications Using Deep Learning with CNNs Training cellular automata for image processing using a genetic algorithm Evolutionary Machine Learning Techniques Hands-On Genetic Algorithms with Python Evolutionary Computation in Gene Regulatory Network Research Evolutionary Approach to Machine Learning and Deep Neural Networks Machine Learning Control – Taming Nonlinear Dynamics and Turbulence Development of Trading Systems using Genetic Programming with a Case Study An Introduction to Machine Learning The Importance of Genetic Literacy and Education in Medicine SARS-CoV-2: From Genetic Variability to Vaccine Design Learning Cue Phrase Patterns from Radiology Reports Using a Genetic Algorithm Optimizing Convolutional Neural Network Parameters Using Genetic Algorithm for Breast Cancer Classification Dynamical Near Optimal Training for Interval Type-2 Fuzzy Neural Network (T2FNN) with Genetic Algorithm Genetic Programming Track and Field: Beyond Technique Training A Lean System for Operator Training and Skilll Management with Genetic Algorithm Based Allocation for a Complex Manufacturing Environment Multidimensional Particle Swarm Optimization for Machine Learning and Pattern Recognition Artificial Neural Nets and Genetic Algorithms Artificial Neural Nets and Genetic Algorithms On-Line Learning in Neural Networks Research and Development in Intelligent Systems XVIII The Sports Gene

Promoting the Conservation and Use of Plant Genetic Resources by Training and Research Jan 24 2022

Learning Cue Phrase Patterns from Radiology Reports Using a Genetic Algorithm Dec 11 2020 Various computer-assisted technologies have been developed to assist radiologists in detecting cancer; however, the algorithms still lack high degrees of sensitivity and specificity, and must undergo machine learning against a training set with known pathologies in order to further refine the algorithms with higher validity of truth. This work describes an approach to learning cue phrase patterns in radiology reports that utilizes a genetic algorithm (GA) as the learning method. The approach described here successfully learned cue phrase patterns for

two distinct classes of radiology reports. These patterns can then be used as a basis for automatically categorizing, clustering, or retrieving relevant data for the user.

Genetic Learning for Adaptive Image Segmentation Feb 22 2022 Image segmentation is generally the first task in any automated image understanding application, such as autonomous vehicle navigation, object recognition, photointerpretation, etc. All subsequent tasks, such as feature extraction, object detection, and object recognition, rely heavily on the quality of segmentation. One of the fundamental weaknesses of current image segmentation algorithms is their inability to adapt the segmentation process as real-world changes are reflected in the image. Only after numerous modifications to an algorithm's control parameters can any current image segmentation technique be used to handle the diversity of images encountered in real-world applications. Genetic Learning for Adaptive Image Segmentation presents the first closed-loop image segmentation system that incorporates genetic and other algorithms to adapt the segmentation process to changes in image characteristics caused by variable environmental conditions, such as time of day, time of year, weather, etc. Image segmentation performance is evaluated using multiple measures of segmentation quality. These quality measures include global characteristics of the entire image as well as local features of individual object regions in the image. This adaptive image segmentation system provides continuous adaptation to normal environmental variations, exhibits learning capabilities, and provides robust performance when interacting with a dynamic environment. This research is directed towards adapting the performance of a well known existing segmentation algorithm (Phoenix) across a wide variety of environmental conditions which cause changes in the image characteristics. The book presents a large number of experimental results and compares performance with standard techniques used in computer vision for both consistency and quality of segmentation results. These results demonstrate, (a) the ability to adapt the segmentation performance in both indoor and outdoor color imagery, and (b) that learning from experience can be used to improve the segmentation performance over time.

Training Neural Networks Using Genetic Algorithms Apr 07 2023

The Importance of Genetic Literacy and Education in Medicine Feb 10 2021

Artificial Neural Nets and Genetic Algorithms Apr 02 2020 Artificial neural networks and genetic algorithms both are areas of research which have their origins in mathematical models constructed in order to gain understanding of important natural processes. By focussing on the process models rather than the processes themselves, significant new computational techniques have evolved which have found application in a large number of diverse fields. This diversity is reflected in the topics which are subjects of the contributions to this volume. There are contributions reporting successful applications of the technology to the solution of industrial/commercial problems. This may well reflect the maturity of the technology, notably in the sense that 'real' users of modelling/prediction techniques are prepared to accept neural networks as a valid paradigm. Theoretical issues also receive attention, notably in connection with the radial basis function neural network. Contributions in the field of genetic algorithms reflect the wide range of current applications, including, for example, portfolio selection, filter design, frequency assignment, tuning of nonlinear PID controllers. These techniques are also used extensively for combinatorial optimisation problems.

Neurogenetic Learning Jul 30 2022 Abstract: "In this paper, we present a neurogenetic learning algorithm which is an integrated method of designing and training neural networks using gentic [sic] algorithms. The proposed scheme provides an integrated means to design

and train neural networks, and use the gradient- descend approach for fine-tuning of the network weights and biases. The salient characteristics of the neurogenetic learning is that designing of the network structure and the weight tuning is performed simultaneously. This is a clear distinction from other combination [sic] of GA and neural network proposed in the past. Experimental results demonstrate that the method provides a magnitude of speed up in convergence than current methods, and exhibits far better scaling property."

Research and Development in Intelligent Systems XVIII Jan 30 2020 M.A. BRAMER University of Portsmouth, UK This volume comprises the refereed technical papers presented at ES200 l, the Twenty-fIrst SGES International Conference on Knowledge Based Systems and Applied ArtifIcial Intelligence, held in Cambridge in December 200 l, together with an invited keynote paper by Professor Derek Sleeman. The conference was organised by SGES, the British Computer Society Specialist Group on Knowledge Based Systems and Applied ArtifIcial Intelligence. The papers in this volume present new and innovative developments in the fIeld, divided into sections on Machine Learning, Constraint Satisfaction, Agents, Knowledge Representation, Knowledge Engineering, and Intelligent Systems. The refereed papers begin with a paper entitled 'Detecting Mismatches Among Experts' Ontologies Acquired Through Knowledge Elicitation', which describes a systematic approach to the analysis of discrepancies within and among experts' ontologies. This paper was judged to be the best refereed technical paper submitted to the conference. The remaining papers are devoted to topics in important areas such as agents, knowledge engineering, knowledge representation, planning and constraint satisfaction, with machine learning again the largest topic covered in terms of the number of papers accepted for publication. This is the eighteenth volume in the Research and Development series. The Application Stream papers are published as a companion volume under the title Applications and Innovations in Intelligent Systems IX.

Track and Field: Beyond Technique Training Aug 07 2020 This is an inspirational track and field book, unlike anything that has been written on the topic. It challenges those who believe that genetic makeup is the only significant contributing factor to becoming an elite track and field athlete, and goes beyond technique to explore the critical importance of mindset. It offers evidence-based tools to help build sustainable and performance-enhancing training philosophies, with a capacity to support athletes from all parts of the genetic spectrum on their journey to the top. The book is a unique story of one athlete's journey in the decathlon from humble beginnings in rural Latvia, through the US college experience on the plains of Kansas, and most recently training with Olympians in Prague, in the heart of Europe. The book documents the physical and mental challenges encountered, the struggles to overcome them, and the training and coaching lessons learned along the way. The book contains personal stories, observations, collected training wisdom and scientific evidence in an easy-to-read format. It offers practical lessons that are often overlooked in track and field training, but which are crucial both for athletes' development and elite performances. The author is an international decathlete from Latvia, who has trained under Olympic-level coaches, as well as with numerous Olympic athletes and Olympic medalists. The book is structured into three sections:1) Training Lessons2) Recovery and Performance Lessons3) Mindset LessonsThe first section offers fifteen critical training philosophy and methodology-related lessons. The second section provides nine lessons from recovery and performance angles. And the third section describes seven sports psychology lessons that can be applied effectively in track and field. All three sections of the book work together to provide an answer to the same question: how can track and field athletes challenge their assumed genetic potential? The core theory

focuses on the concept of the "cumulative training effect", and the book guides the reader through the different elements of training, recovery and mindset that can offer a significant contribution towards a cumulative training effect. The book is aimed primarily at athletes and coaches involved in the sprint, hurdle and field disciplines of track and field. It is relevant for athletes at all stages of their development, from middle and high school, through college, and onto professional and ultimately high-performance athletes. However, the life experiences and struggles of the author will appeal to anyone involved in track and field, and sport more generally, including sports fans, the families and friends of those in competitive sport, and anyone who enjoys an inspirational tale of triumph over adversity.

Training cellular automata for image processing using a genetic algorithm Oct 21 2021

Hands-On Genetic Algorithms with Python Aug 19 2021 Explore the ever-growing world of genetic algorithms to solve search, optimization, and AI-related tasks, and improve machine learning models using Python libraries such as DEAP, scikit-learn, and NumPy Key Features Explore the ins and outs of genetic algorithms with this fast-paced guide Implement tasks such as feature selection, search optimization, and cluster analysis using Python Solve combinatorial problems, optimize functions, and enhance the performance of artificial intelligence applications Book Description Genetic algorithms are a family of search, optimization, and learning algorithms inspired by the principles of natural evolution. By imitating the evolutionary process, genetic algorithms can overcome hurdles encountered in traditional search algorithms and provide high-quality solutions for a variety of problems. This book will help you get to grips with a powerful yet simple approach to applying genetic algorithms to a wide range of tasks using Python, covering the latest developments in artificial intelligence. After introducing you to genetic algorithms and their principles of operation, you'll understand how they differ from traditional algorithms and what types of problems they can solve. You'll then discover how they can be applied to search and optimization problems, such as planning, scheduling, gaming, and analytics. As you advance, you'll also learn how to use genetic algorithms to improve your machine learning and deep learning models, solve reinforcement learning tasks, and perform image reconstruction. Finally, you'll cover several related technologies that can open up new possibilities for future applications. By the end of this book, you'll have hands-on experience of applying genetic algorithms in artificial intelligence as well as in numerous other domains. What you will learn Understand how to use state-of-the-art Python tools to create genetic algorithm-based applications Use genetic algorithms to optimize functions and solve planning and scheduling problems Enhance the performance of machine learning models and optimize deep learning network architecture Apply genetic algorithms to reinforcement learning tasks using OpenAI Gym Explore how images can be reconstructed using a set of semi-transparent shapes Discover other bio-inspired techniques, such as genetic programming and particle swarm optimization Who this book is for This book is for software developers, data scientists, and AI enthusiasts who want to use genetic algorithms to carry out intelligent tasks in their applications. Working knowledge of Python and basic knowledge of mathematics and computer science will help you get the most out of this book.

Automatic Generation of Neural Network Architecture Using Evolutionary Computation Apr 26 2022 This book describes the application of evolutionary computation in the automatic generation of a neural network architecture. The architecture has a significant influence on the performance of the neural network. It is the usual practice to use trial and error to find a suitable neural network architecture for a given problem. The process of trial and error is not only time-consuming but may not generate an optimal network. The use of evolutionary

computation is a step towards automation in neural network architecture generation. An overview of the field of evolutionary computation is presented, together with the biological background from which the field was inspired. The most commonly used approaches to a mathematical foundation of the field of genetic algorithms are given, as well as an overview of the hybridization between evolutionary computation and neural networks. Experiments on the implementation of automatic neural network generation using genetic programming and one using genetic algorithms are described, and the efficacy of genetic algorithms as a learning algorithm for a feedforward neural network is also investigated. Contents:Artificial Neural NetworksEvolutionary ComputationThe Biological BackgroundMathematical Foundations of Genetic AlgorithmsImplementing GasHybridisation of Evolutionary Computation and Neural NetworksUsing Genetic Programming to Generate Neural NetworksUsing a GA to Optimise the Weights of a Neural NetworkUsing a GA with Grammar Encoding to Generate Neural NetworksConclusions and Future Directions Readership: Scientists, engineers, and researchers interested in artificial intelligence and systems & knowledge engineering. keywords:Artificial Neural Networks;Neural Networworks Architecture;Automatic Neural Networworks Generation;Learning;Genetic Algorithms;Evolutionary Algorithms;Hybridization

Evolutionary Approach to Machine Learning and Deep Neural Networks Jun 16 2021 This book provides theoretical and practical knowledge about a methodology for evolutionary algorithm-based search strategy with the integration of several machine learning and deep learning techniques. These include convolutional neural networks, Gröbner bases, relevance vector machines, transfer learning, bagging and boosting methods, clustering techniques (affinity propagation), and belief networks, among others. The development of such tools contributes to better optimizing methodologies. Beginning with the essentials of evolutionary algorithms and covering interdisciplinary research topics, the contents of this book are valuable for different classes of readers: novice, intermediate, and also expert readers from related fields. Following the chapters on introduction and basic methods, Chapter 3 details a new research direction, i.e., neuro-evolution, an evolutionary method for the generation of deep neural networks, and also describes how evolutionary methods are extended in combination with machine learning techniques. Chapter 4 includes novel methods such as particle swarm optimization based on affinity propagation (PSOAP), and transfer learning for differential evolution (TRADE), another machine learning approach for extending differential evolution. The last chapter is dedicated to the state of the art in gene regulatory network (GRN) research as one of the most interesting and active research fields. The author describes an evolving reaction network, which expands the neuro-evolution methodology to produce a type of genetic network suitable for biochemical systems and has succeeded in designing genetic circuits in synthetic biology. The author also presents real-world GRN application to several artificial intelligent tasks, proposing a framework of motion generation by GRNs (MONGERN), which evolves GRNs to operate a real humanoid robot.

Classification and Learning Using Genetic Algorithms May 28 2022 This book provides a unified framework that describes how genetic learning can be used to design pattern recognition and learning systems. It examines how a search technique, the genetic algorithm, can be used for pattern classification mainly through approximating decision boundaries. Coverage also demonstrates the effectiveness of the genetic classifiers vis-à-vis several widely used classifiers, including neural networks.

Neural Network Training Using Genetic Algorithms Mar 06 2023

Genetic Programming Sep 07 2020 This book constitutes the refereed proceedings of the

Second European Workshop on Genetic Programming, EuroPG '99, held in Göteborg, Sweden in May 1999. The 12 revised full papers and 11 posters presented have been carefully reviewed and selected for inclusion in the book. All the relevant aspects of genetic programming are addressed ranging from traditional and foundational issues to applications in a variety of fields.

Optimizing Convolutional Neural Network Parameters Using Genetic Algorithm for Breast Cancer Classification Nov 09 2020 Breast cancer, as the most-regularly diagnosed cancer in women, can be controlled effectively by early-stage tumour diagnosis. Clinical specialists use Computer-Aided Diagnosis (CAD) systems to help aid in their diagnosis, as accurate as possible. Deep learning techniques, such as Convolutional Neural Network (CNN), due to their classification capabilities, have been widely adopted in CAD systems. The parameters of the network, including the weights of the convolution filters, and the weights of the fully connected layers play a crucial role in classification accuracy. Back-propagation technique is the most frequently used approach for training CNN. However, this technique has some disadvantages, such as getting stuck in local minima. In this thesis, we propose to optimize the weights of the CNN using Genetic Algorithm (GA). The work consists of: designing a CNN model to facilitate the classification process, training the model using three different optimizer (mini-batch gradient descent, Adam, and GA), and evaluating the model through various experiments on BreakHis dataset. We show that the CNN model trained through GA performs as well as the Adam optimizer with a classification accuracy of 85%.

Evolutionary Computation in Gene Regulatory Network Research Jul 18 2021 Introducing a handbook for gene regulatory network research using evolutionary computation, with applications for computer scientists, computational and system biologists This book is a step-by-step guideline for research in gene regulatory networks (GRN) using evolutionary computation (EC). The book is organized into four parts that deliver materials in a way equally attractive for a reader with training in computation or biology. Each of these sections, authored by well-known researchers and experienced practitioners, provides the relevant materials for the interested readers. The first part of this book contains an introductory background to the field. The second part presents the EC approaches for analysis and reconstruction of GRN from gene expression data. The third part of this book covers the contemporary advancements in the automatic construction of gene regulatory and reaction networks and gives direction and guidelines for future research. Finally, the last part of this book focuses on applications of GRNs with EC in other fields, such as design, engineering and robotics. • Provides a reference for current and future research in gene regulatory networks (GRN) using evolutionary computation (EC) • Covers sub-domains of GRN research using EC, such as expression profile analysis, reverse engineering, GRN evolution, applications • Contains useful contents for courses in gene regulatory networks, systems biology, computational biology, and synthetic biology • Delivers state-of-the-art research in genetic algorithms, genetic programming, and swarm intelligence Evolutionary Computation in Gene Regulatory Network Research is a reference for researchers and professionals in computer science, systems biology, and bioinformatics, as well as upper undergraduate, graduate, and postgraduate students. Hitoshi Iba is a Professor in the Department of Information and Communication Engineering, Graduate School of Information Science and Technology, at the University of Tokyo, Toyko, Japan. He is an Associate Editor of the IEEE Transactions on Evolutionary Computation and the journal of Genetic Programming and Evolvable Machines. Nasimul Noman is a lecturer in the School of Electrical Engineering and Computer Science at the University of Newcastle, NSW, Australia.

From 2002 to 2012 he was a faculty member at the University of Dhaka, Bangladesh. Noman is an Editor of the BioMed Research International journal. His research interests include computational biology, synthetic biology, and bioinformatics.

Multidimensional Particle Swarm Optimization for Machine Learning and Pattern Recognition Jun 04 2020 For many engineering problems we require optimization processes with dynamic adaptation as we aim to establish the dimension of the search space where the optimum solution resides and develop robust techniques to avoid the local optima usually associated with multimodal problems. This book explores multidimensional particle swarm optimization, a technique developed by the authors that addresses these requirements in a well-defined algorithmic approach. After an introduction to the key optimization techniques, the authors introduce their unified framework and demonstrate its advantages in challenging application domains, focusing on the state of the art of multidimensional extensions such as global convergence in particle swarm optimization, dynamic data clustering, evolutionary neural networks, biomedical applications and personalized ECG classification, content-based image classification and retrieval, and evolutionary feature synthesis. The content is characterized by strong practical considerations, and the book is supported with fully documented source code for all applications presented, as well as many sample datasets. The book will be of benefit to researchers and practitioners working in the areas of machine intelligence, signal processing, pattern recognition, and data mining, or using principles from these areas in their application domains. It may also be used as a reference text for graduate courses on swarm optimization, data clustering and classification, content-based multimedia search, and biomedical signal processing applications.

Evolutionary Machine Learning Techniques Sep 19 2021 This book provides an in-depth analysis of the current evolutionary machine learning techniques. Discussing the most highly regarded methods for classification, clustering, regression, and prediction, it includes techniques such as support vector machines, extreme learning machines, evolutionary feature selection, artificial neural networks including feed-forward neural networks, multi-layer perceptron, probabilistic neural networks, self-optimizing neural networks, radial basis function networks, recurrent neural networks, spiking neural networks, neuro-fuzzy networks, modular neural networks, physical neural networks, and deep neural networks. The book provides essential definitions, literature reviews, and the training algorithms for machine learning using classical and modern nature-inspired techniques. It also investigates the pros and cons of classical training algorithms. It features a range of proven and recent nature-inspired algorithms used to train different types of artificial neural networks, including genetic algorithm, ant colony optimization, particle swarm optimization, grey wolf optimizer, whale optimization algorithm, ant lion optimizer, moth flame algorithm, dragonfly algorithm, salp swarm algorithm, multi-verse optimizer, and sine cosine algorithm. The book also covers applications of the improved artificial neural networks to solve classification, clustering, prediction and regression problems in diverse fields.

Development of Trading Systems using Genetic Programming with a Case Study Apr 14 2021 Diploma Thesis from the year 2007 in the subject Computer Science - Programming, grade: 1.7, University of Hamburg, language: English, abstract: In this thesis Genetic Progrmming is used to create trading systems for the EUR/USD foreign exchange market using intraday data. In addition to the exchange rates several moving averages are used as inputs. The developed evolutionary algorithm extends the framework ECJ. The created trading systems are being evaluated by a fitness function that consists of a trading simulation. Genetic operators have

been adapted to support "node weights". By using these on the one hand macromutaion is tried to be reduced on the other hand the interpretability of the created trading systems is tried to be improved. Results of experiments show that created trading systems are apparently successfull in profitably using informations contained within the exchange rates. Profits of the created trading systems are maximized by using the optimal position size. It is shown that if the minimum investment period is met the achieved results are optimal even when taking into account the used risk adjusted performance figure.

Bio-Inspired Systems: Computational and Ambient Intelligence Feb 05 2023 This book constitutes the refereed proceedings of the 10th International Work-Conference on Artificial Neural Networks, IWANN 2009, held in Salamanca, Spain in June 2009. The 167 revised full papers presented together with 3 invited lectures were carefully reviewed and selected from over 230 submissions. The papers are organized in thematic sections on theoretical foundations and models; learning and adaptation; self-organizing networks, methods and applications; fuzzy systems; evolutionary computation and genetic algoritms; pattern recognition; formal languages in linguistics; agents and multi-agent on intelligent systems; brain-computer interfaces (bci); multiobjetive optimization; robotics; bioinformatics; biomedical applications; ambient assisted living (aal) and ambient intelligence (ai); other applications.

Using a Genetic Algorithm in Training an Artificial Neural Network to Implement the XOR Function Oct 01 2022

Practical Computer Vision Applications Using Deep Learning with CNNs Nov 21 2021 Deploy deep learning applications into production across multiple platforms. You will work on computer vision applications that use the convolutional neural network (CNN) deep learning model and Python. This book starts by explaining the traditional machine-learning pipeline, where you will analyze an image dataset. Along the way you will cover artificial neural networks (ANNs), building one from scratch in Python, before optimizing it using genetic algorithms. For automating the process, the book highlights the limitations of traditional hand-crafted features for computer vision and why the CNN deep-learning model is the state-of-art solution. CNNs are discussed from scratch to demonstrate how they are different and more efficient than the fully connected ANN (FCNN). You will implement a CNN in Python to give you a full understanding of the model. After consolidating the basics, you will use TensorFlow to build a practical image-recognition model that you will deploy to a web server using Flask, making it accessible over the Internet. Using Kivy and NumPy, you will create cross-platform data science applications with low overheads. This book will help you apply deep learning and computer vision concepts from scratch, step-by-step from conception to production. What You Will Learn Understand how ANNs and CNNs work Create computer vision applications and CNNs from scratch using PythonFollow a deep learning project from conception to production using TensorFlowUse NumPy with Kivy to build cross-platform data science applications Who This Book Is ForData scientists, machine learning and deep learning engineers, software developers.

Evolutionary Algorithms and Neural Networks Jun 28 2022 This book introduces readers to the fundamentals of artificial neural networks, with a special emphasis on evolutionary algorithms. At first, the book offers a literature review of several well-regarded evolutionary algorithms, including particle swarm and ant colony optimization, genetic algorithms and biogeography-based optimization. It then proposes evolutionary version of several types of neural networks such as feed forward neural networks, radial basis function networks, as well as recurrent neural networks and multi-later perceptron. Most of the challenges that have to be

addressed when training artificial neural networks using evolutionary algorithms are discussed in detail. The book also demonstrates the application of the proposed algorithms for several purposes such as classification, clustering, approximation, and prediction problems. It provides a tutorial on how to design, adapt, and evaluate artificial neural networks as well, and includes source codes for most of the proposed techniques as supplementary materials.

Training Neural Networks Using Hybrids with Genetic Algorithms Jan 04 2023

The Sports Gene Dec 31 2019 The New York Times bestseller – with a new afterword about early specialization in youth sports – from the author of Range: Why Generalists Triumph in a Specialized World. The debate is as old as physical competition. Are stars like Usain Bolt, Michael Phelps, and Serena Williams genetic freaks put on Earth to dominate their respective sports? Or are they simply normal people who overcame their biological limits through sheer force of will and obsessive training? In this controversial and engaging exploration of athletic success and the so-called 10,000-hour rule, David Epstein tackles the great nature vs. nurture debate and traces how far science has come in solving it. Through on-the-ground reporting from below the equator and above the Arctic Circle, revealing conversations with leading scientists and Olympic champions, and interviews with athletes who have rare genetic mutations or physical traits, Epstein forces us to rethink the very nature of athleticism.

Applied Genetic Programming and Machine Learning Aug 31 2022 What do financial data prediction, day-trading rule development, and bio-marker selection have in common? They are just a few of the tasks that could potentially be resolved with genetic programming and machine learning techniques. Written by leaders in this field, Applied Genetic Programming and Machine Learning delineates the extension of Genetic Programming (GP) for practical applications. Reflecting rapidly developing concepts and emerging paradigms, this book outlines how to use machine learning techniques, make learning operators that efficiently sample a search space, navigate the search process through the design of objective fitness functions, and examine the search performance of the evolutionary system. It provides a methodology for integrating GP and machine learning techniques, establishing a robust evolutionary framework for addressing tasks from areas such as chaotic time-series prediction, system identification, financial forecasting, classification, and data mining. The book provides a starting point for the research of extended GP frameworks with the integration of several machine learning schemes. Drawing on empirical studies taken from fields such as system identification, finanical engineering, and bio-informatics, it demonstrates how the proposed methodology can be useful in practical inductive problem solving.

Enhanced Feature Selections of Adaboost Training for Face Detection Using Genetic Algorithm Dec 23 2021

SARS-CoV-2: From Genetic Variability to Vaccine Design Jan 12 2021

Training feedforward neural networks using genetic algorithms Dec 03 2022

A Lean System for Operator Training and Skilll Management with Genetic Algorithm Based Allocation for a Complex Manufacturing Environment Jul 06 2020

Dynamical Near Optimal Training for Interval Type-2 Fuzzy Neural Network (T2FNN) with Genetic Algorithm Oct 09 2020 Abstract: Type-2 fuzzy logic system (FLS) cascaded with neural network, called type-2 fuzzy neural network (T2FNN), is presented in this paper to handle uncertainty with dynamical optimal learning. A T2FNN consists of type-2 fuzzy linguistic process as the antecedent part and the two-layer interval neural network as the consequent part. A general T2FNN is computational intensive due to the complexity of type 2 to type 1 reduction. Therefore the interval T2FNN is adopted in this paper to simplify the computational

process. The dynamical optimal training algorithm for the two-layer consequent part of interval T2FNN is first developed. The stable and optimal left and right learning rates for the interval neural network, in the sense of maximum error reduction, can be derived for each iteration in the training process (back propagation). It can also be shown both learning rates can not be both negative. Further, due to variation of the initial MF parameters, i.e. the spread level of uncertain means or deviations of interval Gaussian MFs, the performance of back propagation training process may be affected. To achieve better total performance, a genetic algorithm (GA) is designed to search better-fit spread rate for uncertain means and near optimal learnings for the antecedent part. Several examples are fully illustrated. Excellent results are obtained for the truck backing-up control and the identification of nonlinear system, which yield more improved performance than those using type-1 FNN.

Artificial Neural Nets and Genetic Algorithms May 04 2020 Artificial neural networks and genetic algorithms both are areas of research which have their origins in mathematical models constructed in order to gain understanding of important natural processes. By focussing on the process models rather than the processes themselves, significant new computational techniques have evolved which have found application in a large number of diverse fields. This diversity is reflected in the topics which are the subjects of contributions to this volume. There are contributions reporting theoretical developments in the design of neural networks, and in the management of their learning. In a number of contributions, applications to speech recognition tasks, control of industrial processes as well as to credit scoring, and so on, are reflected. Regarding genetic algorithms, several methodological papers consider how genetic algorithms can be improved using an experimental approach, as well as by hybridizing with other useful techniques such as tabu search. The closely related area of classifier systems also receives a significant amount of coverage, aiming at better ways for their implementation. Further, while there are many contributions which explore ways in which genetic algorithms can be applied to real problems, nearly all involve some understanding of the context in order to apply the genetic algorithm paradigm more successfully. That this can indeed be done is evidenced by the range of applications covered in this volume.

Training and Testing of Expert Networks Mar 26 2022

On-Line Learning in Neural Networks Mar 02 2020 On-line learning is one of the most commonly used techniques for training neural networks. Though it has been used successfully in many real-world applications, most training methods are based on heuristic observations. The lack of theoretical support damages the credibility as well as the efficiency of neural networks training, making it hard to choose reliable or optimal methods. This book presents a coherent picture of the state of the art in the theoretical analysis of on-line learning. An introduction relates the subject to other developments in neural networks and explains the overall picture. Surveys by leading experts in the field combine new and established material and enable nonexperts to learn more about the techniques and methods used. This book, the first in the area, provides a comprehensive view of the subject and will be welcomed by mathematicians, scientists and engineers, both in industry and academia.

Empirical Studies on the Utility of Genetic Algorithms for Training and Designing of Neural Networks Nov 02 2022 Abstract: "This paper reports several experimental results on the speed of convergence of neural network training and designing using genetic algorithms. Recent excitement regarding genetic search lead [sic] some researchers to apply it to training and designing neural networks. There are reports on both successful and faulty results, and, unfortunately, no systematic evaluation has been made. This paper reports results of

systematic experiments designed to judge utility of genetic algorithms for neural network training and designing. As for the training task, we carried out a set of experiments to answer a question that [sic] whether use of genetic algorithm provides any gain in neural network training over existing methods.

An Introduction to Machine Learning Mar 14 2021 This textbook presents fundamental machine learning concepts in an easy to understand manner by providing practical advice, using straightforward examples, and offering engaging discussions of relevant applications. The main topics include Bayesian classifiers, nearest-neighbor classifiers, linear and polynomial classifiers, decision trees, neural networks, and support vector machines. Later chapters show how to combine these simple tools by way of “boosting,” how to exploit them in more complicated domains, and how to deal with diverse advanced practical issues. One chapter is dedicated to the popular genetic algorithms. This revised edition contains three entirely new chapters on critical topics regarding the pragmatic application of machine learning in industry. The chapters examine multi-label domains, unsupervised learning and its use in deep learning, and logical approaches to induction. Numerous chapters have been expanded, and the presentation of the material has been enhanced. The book contains many new exercises, numerous solved examples, thought-provoking experiments, and computer assignments for independent work.

Machine Learning Control – Taming Nonlinear Dynamics and Turbulence May 16 2021 This is the first textbook on a generally applicable control strategy for turbulence and other complex nonlinear systems. The approach of the book employs powerful methods of machine learning for optimal nonlinear control laws. This machine learning control (MLC) is motivated and detailed in Chapters 1 and 2. In Chapter 3, methods of linear control theory are reviewed. In Chapter 4, MLC is shown to reproduce known optimal control laws for linear dynamics (LQR, LQG). In Chapter 5, MLC detects and exploits a strongly nonlinear actuation mechanism of a low-dimensional dynamical system when linear control methods are shown to fail. Experimental control demonstrations from a laminar shear-layer to turbulent boundary-layers are reviewed in Chapter 6, followed by general good practices for experiments in Chapter 7. The book concludes with an outlook on the vast future applications of MLC in Chapter 8. Matlab codes are provided for easy reproducibility of the presented results. The book includes interviews with leading researchers in turbulence control (S. Bagheri, B. Batten, M. Glauser, D. Williams) and machine learning (M. Schoenauer) for a broader perspective. All chapters have exercises and supplemental videos will be available through YouTube.

Deep Learning Using Genetic Algorithms May 08 2023 "Deep Learning networks are a new type of neural network that discovers important object features. These networks determine features without supervision, and are adept at learning high level abstractions about their data sets. These networks are useful for a variety of tasks, but are difficult to train. This difficulty is compounded when multiple networks are trained in a layered fashion, which results in increased solution complexity as well as increased training time. This paper examines the use of Genetic Algorithms as a training mechanism for Deep Learning networks, with emphasis on training networks with a large number of layers, each of which is trained independently to reduce the computational burden and increase the overall flexibility of the algorithm. This paper covers the implementation of a multilayer deep learning network using a genetic algorithm, including tuning the genetic algorithm, as well as results of experiments involving data compression and object classification. This paper aims to show that a genetic algorithm can be used to train a non trivial deep learning network in place of existing methodologies for network

training, and that the features extracted can be used for a variety of real world computational problems."--Abstract.

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