Intelligence Natural Computing Series

Classification And Learning Using Genetic Algorithms Applications In Bioinformatics And Web Intelligence Natural Computing Series | 120122293305252c07f028a2f653da

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A Comparison of Genetic Algorithms and Other Machine Learning Systems of a Complex Classification Task from Common Disease Research

Learning Fuzzy Classification Rules Using Genetic Algorithms Essay from the year 2013 in the subject Computer Science - Programming, grade: A+, University College Dublin, course: Natural Computing, language: English, abstract: Genetic Programming is a biological evolution inspired technique for computer programs to solve problems automatically by evolving iteratively using a fitness function. The advantage of this type programming is that it only defines the basics. As a result of this, it is a flexible solution for broad range of domains. Classification has been one of the most compelling problems in machine learning. In this paper, there is a comparison between genetic programming classifier and conventional classification algorithms like Naïve Bayes, C4.5 decision tree, Random Forest, Support Vector Machines and k-Nearest Neighbour. The experiment is done on several data sets with different sizes, feature sets and attribute properties. There is also an experiment on the time complexity of each classifier method.

Advances in Computing and Data Sciences This book addresses the challenges of data abstraction generation using a least number of database scans, compressing data through novel lossy and non-lossy schemes, and carrying out clustering and classification directly in the compressed domain. Schemes are presented which are shown to be efficient both in terms of space and time, while simultaneously providing the same or better classification accuracy. Features: describes a non-lossy compression scheme based on run-length encoding of patterns with binary valued features; proposes a lossy compression scheme that recognizes a pattern as a sequence of features and identifying subsequences; examines whether the identification of prototypes and features can be achieved simultaneously through lossy compression and efficient clustering; discusses ways to make use of domain knowledge in generating abstraction; reviews optimal prototype selection using genetic algorithms; suggests possible ways of dealing with big data problems using multiagent systems.

Data Mining and Knowledge Discovery Handbook

GNRCS: Hybrid Classification System based on Neutrosophic Logic and Genetic Algorithm Over the last two decades, researchers are looking at imbalanced data learning as a prominent research area. Many critical real-world application areas like finance, health, network, news, online advertisement, social network media, and weather have imbalanced data, which emphasizes the research necessity for real-time implications of precise fraud/defaulter detection, rare disease/reaction prediction, network intrusion detection, fake news detection, fraud advertisement detection, cyber bullying identification, disaster events prediction, and more. Machine learning algorithms are based on the heuristic of equally-distributed balanced data and provide the biased result towards the majority data class, which is not acceptable considering imbalanced data is omnipresent in real-life scenarios and is forcing us to learn from imbalanced data for foolproof application design. Imbalanced data is multifaceted and demands a new perception using the novelty at sampling approach of data preprocessing, an active learning approach, and a cost perceptive approach to resolve data imbalance. Data Preprocessing, Active Learning, and Cost Perceptive Approaches for Resolving Data Imbalance offers new aspects for imbalanced data learning by providing the advancements of the traditional methods, with respect to big data, through case studies and research from experts in academia, engineering, and industry. The chapters provide theoretical frameworks and the latest empirical research findings that help to improve the understanding of the impact of imbalanced data and its resolving techniques based on data preprocessing, active learning, and cost perceptive approaches. This book is ideal for data scientists, data analysts, engineers, practitioners, researchers, academicians, and students looking for more information on imbalanced data characteristics and solutions using varied approaches.

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Data Mining and Knowledge Discovery Handbook

Advances in Natural Computation The biennial International Conference on Case-Based Reasoning (ICCBR) - ries, which began in Sesimbra, Portugal, in 1995, was intended to provide an international forum for the best fundamental and applied research in case-based reasoning (CBR). It was hoped that such a forum would encourage the g- wth and rigor of the eld and overcome the previous tendency toward isolated national CBR communities. The foresight of the original ICCBR organizers has been rewarded by the growth of a vigorous and cosmopolitan CBR community. CBR is now widely recognized as a powerful and important computational technique for a wide range of practical applications. By promoting an exchange of ideas among CBR researchers from across the globe, the ICCBR series has facilitated the broader acceptance and use of CBR. ICCBR-99 has continued this tradition by attracting high-quality research and applications papers from around the world. Researchers from 21 countries submitted 80 papers to ICCBR-99. From these submissions, 17 papers were selected for long oral presentation, 7 were accepted for short oral presentation, and 19 papers were accepted as posters. This volume sets forth these 43 papers, which contain both mature work and innovative new ideas.

A Genetic Programming Approach to Classification Problems Genetic algorithms (GAs) are powerful search techniques based on principles of evolution and widely applied to solve problems in many disciplines. However, most GAs employed in practice nowadays are unable to learn genetic linkage and suffer from the linkage problem. The linkage learning genetic algorithm (LLGA) was proposed to tackle the linkage problem with several specially designed mechanisms. While the LLGA performs much better on badly scaled problems than simple GAs, it does not work well on uniformly scaled problems as other competent GAs. Therefore, we need to understand why it is so and need to know how to design a better LLGA or whether there are certain limits of such a linkage learning process. This book aims to gain better understanding of the LLGA in theory and to improve the LLGA’s performance in practice. It starts with a survey of the existing genetic linkage learning techniques and describes the steps and approaches taken to tackle the research topics, including using promoters, developing the convergence time model, and adopting subchromosomes.

Artificial Neural Nets and Genetic Algorithms This two-volume set (CCIS 905 and CCIS 906) constitutes the refereed proceedings of the Second International Conference on Advances in Computing and Data Sciences, ICACDS 2018, held in Dehradun, India, in April 2018. The 110 full papers were carefully reviewed and selected from 598 submissions. The papers are centered around topics like advanced computing, data sciences, distributed systems organizing principles, development frameworks and environments, software verification and validation, computational complexity and cryptography, machine learning theory, database theory, probabilistic representations.

Artificial Life and Evolutionary Computation Measurements Associated with Learning More Secure Computer Configuration Parameters Genetic programming is a new and evolutionary method that has become a novel area of research within artificial intelligence known for automatically generating high-quality solutions to optimization and search problems. This automatic aspect of the algorithms and the mimicking of natural selection and genetics makes genetic programming an intelligent component of problem solving that is highly regarded for its efficiency and vast capabilities. With the ability to be modified and adapted, easily distributed, and effective in large-scale/wide variety of problems, genetic algorithms and programming can be utilized in many diverse industries. This multi-industry uses vary from finance and economics to business and management all the way to healthcare and the sciences. The use of genetic programming and algorithms goes beyond human capabilities, enhancing the business and processes of various essential industries and improving functionality along the way. The Research Anthology on Multi-Industry Uses of Genetic Programming and Algorithms covers the implementation, tools and technologies, and impact on society that genetic programming and algorithms have had throughout multiple industries. By taking a multi-industry approach, this book covers the fundamentals of genetic programming through its technological benefits and challenges along with the latest advancements and future outlooks for computer science. This book is ideal for academicians, biological engineers, computer programmers, scientists, researchers, and upper-level students seeking the latest research on genetic programming.

Applied Artificial Intelligence Computational models and methods are central to the analysis of economic and financial decisions. Simulation and optimisation are widely used as tools of analysis, modelling and testing. The focus of this book is the development of computational methods and analytical models in financial engineering that rely on computation. The book contains eighteen chapters written by leading researchers in the area on portfolio optimization and option pricing; estimation and classification; banking; risk and macroeconomic modelling. It explores and brings together current research tools and will be of interest to researchers, analysts and practitioners in policy and investment decisions in economics and finance.

Genetic Algorithms, Fuzzy Systems, and Website Classification "Deep Learning networks are a new type of neural network that discovers important object features. These networks
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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.

Feature Selection and Binary Classification Using Microarray Data

Genetic Programming Theory and Practice XIV The book constitutes the refereed proceedings of the 17th European Conference on Genetic Programming, Euro GP 2014, held in Grenada, Spain, in April 2014 co-located with the Evo*2014 events, Evo BIO, Evo COP, Evo MUSART and Evo Applications. The 15 revised full papers presented together with 5 poster papers and 16 short papers were carefully reviewed and selected from 40 submissions. The wide range of topics in this volume reflects the current state of research in the field. Thus, we see topics as diverse as search-based software engineering, image analysis, dynamical systems, evolutionary robotics and operational research to the foundations of search as characterized through semantic variation operators.

Genetic Programming

Agile Artificial Intelligence in Pharo

Using Genetic Algorithms and Artificial Neural Networks for Multisource Geospatial Data Modeling and Classification This book offers a comprehensive overview of ensemble learning in the field of feature selection (FS), which consists of combining the output of multiple methods to obtain better results than any single method. It reviews various techniques for combining partial results, measuring diversity and evaluating ensemble performance. With the advent of Big Data, feature selection (FS) has become more necessary than ever to achieve dimensionality reduction. With so many methods available, it is difficult to choose the most appropriate one for a given setting, thus making the ensemble paradigm an interesting alternative. The authors first focus on the foundations of ensemble learning and classical approaches, before diving into the specific aspects of ensembles for FS, such as combining partial results, measuring diversity and evaluating ensemble performance. Lastly, the book shows examples of successful applications of ensembles for FS and introduces the new challenges that researchers now face. As such, the book offers a valuable guide for all practitioners, researchers and graduate students in the areas of machine learning and data mining.

Classification and Learning Using Genetic Algorithms This book constitutes the refereed proceedings of the 5th International Workshop on Learning Classifier Systems, IWLCS 2003, held in Granada, Spain in September 2003 in conjunction with PPSN VII. The 10 revised full papers presented together with a comprehensive bibliography on learning classifier systems were carefully reviewed and selected during two rounds of refereeing and improvement. All relevant issues in the area are addressed.

Learning Concept Classification Rules Using Genetic Algorithms 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.
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Learning Bayesian Classification Rules with Genetic Algorithms This paper, we present a hybrid intelligent system based on Neutrosophic Logic (NL). In conjunction with Genetic Algorithm (GA) for classification. The neutrosophic logic is adapted for representing different forms of knowledge. GA is used to refine the generated neutrosophic rules.

Nanoelectronics, Circuits and Communication Systems

Hands-On Genetic Algorithms with Python This book and its sister volumes, i.e., LNCS vols. 3610, 3611, and 3612, are the proceedings of the 1st International Conference on Natural Computation (ICNC 2005), jointly held with the 2nd International Conference on Fuzzy Systems and Knowledge Discovery (FSKD 2005, LNAI vols. 3613 and 3614) from 27 to 29 August 2005 in Changsha, Hunan, China.

Evolutionary Computation, Machine Learning and Data Mining in Bioinformatics This new book presents and discusses current research in the study of genetic algorithms, fuzzy systems and website classification. Topics discussed include genetic algorithm for optimal design of fuzzy classifiers; design and analysis of type-2 fuzzy PI controller; selection of supply chain through fuzzy outranking techniques; fast web page classification without accessing the web page using machine learning techniques; classification algorithms in handling noisy training data and meta data generation for automates web page classification.

Case-Based Reasoning and Development This is the only book to apply neural nets, genetic algorithms, and fuzzy set theory to the fast growing field of machine learning. Placing particular emphasis on neural networks, it explores how to integrate them with other technologies to improve their performance. Examples are included for each system discussed.

Hybridization of Genetic Algorithm and K Nearest Neighbor Classifier 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.

Compression Schemes for Mining Large Datasets

Recent Advances in Ensembles for Feature Selection Abstract: "The thesis project is an investigation of some well-known machine learning systems and evaluates their utility when applied to a classification task from the field of human genetics. This common-disease research task, an inquiry into genetic and biochemical factors and their association with a family history of coronary artery disease (CAD), is more complex than many pursued in machine learning research, due to interactions and the inherent noise in the dataset. The task also differs from most pursued in machine learning research because there is a desire to explain the dataset with a small number of rules, even at the expense of accuracy, so that they will be more accessible to medical researchers who are unaccustomed to dealing with disjunctive explanations of data. Furthermore, there is asymmetry in the task in that good explanations of the positive examples is of more importance than good explanations of the negative examples. The primary machine learning approach investigated in this research is genetic algorithms (GA's); decision trees, Autoclass, and Cobweb are also included. The GA performed the best in terms of descriptive ability with the common-disease research task, although decision trees also demonstrated certain strengths. Autoclass and Cobweb were recognized from the onset as being inappropriate for the needs of common-disease researchers (because both systems are unsupervised learners that create probabilistic structures), but were included for their interest in the machine learning community; these systems did not perform as well as GA and decision trees in terms of their ability to describe the data. In terms of predictive accuracy, all systems performed poorly, and the differences between any two of the three best systems is not significant. When positive and negative examples are considered separately, the GA does significantly better than the other systems in predicting positive examples and significantly worse in predicting negative examples. The thesis illustrates that the investigation of "real" problems from researchers in other fields can lead machine learning researchers to challenge their systems in ways they may not otherwise have considered, and may lead these researchers to a symbiotic relationship that benefits multiple research communities."

Applications of Evolutionary Computing This book provides a uniform framework describing how fuzzy rough granular neural network technologies can be formulated and used in building efficient pattern recognition and mining models. It also discusses the formation of granules in the notion of both fuzzy and rough sets. Judicious integration in forming fuzzy-rough information granules based on lower approximate regions enables the network to determine the exactness in class shape as well as to handle the uncertainties arising from overlapping regions, resulting in efficient and speedy learning with enhanced performance. Layered network and self-organizing analysis maps, which have a strong potential in big data, are considered as basic modules. The book is structured according to the major phases of a pattern recognition system (e.g., classification, clustering, and feature selection) with a balanced mixture of theory, algorithm, and application. It covers the latest findings as well as directions for future research, particularly highlighting bioinformatics applications. The book is recommended for both students and practitioners working in computer science, electrical engineering, data science, system design, pattern recognition, image analysis, neural computing, social network analysis, big data analytics, computational biology and soft computing.

Data Preprocessing, Active Learning, and Cost Perceptive Approaches for Resolving Data Imbalance Organizes major concepts, theories, methodologies, trends, challenges and applications of data mining (DM) and knowledge discovery in databases (KDD). This book provides algorithmic descriptions of classic methods, and also suitable for professionals in fields such as computing applications, information systems management, and more.
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Research Anthology on Multi-Industry Uses of Genetic Programming and Algorithms These contributions, written by the foremost international researchers and practitioners of Genetic Programming (GP), explore the synergy between theoretical and empirical results on real-world problems, producing a comprehensive view of the state of the art in GP.

Chapters in this volume include: Similarity-based Analysis of Population Dynamics in GP Performing Symbolic Regression Hybrid Structural and Behavioral Diversity Methods in GP Multi-Population Competitive Coevolution for Anticipation of Tax Evasion Evolving Artificial General Intelligence for Video Game Controllers A Detailed Analysis of a PushGP Run Linear Genomes for Structured Programs Robustness, and Evolvability in GP Local Search in GP PRETSL: Distributed Neutrality, Rule Evolution for Time-Series Classification Relational Structure in Program Synthesis Problems with Analogical Reasoning An Evolutionary Algorithm for Big Data Multi-Class Classification Problems A Generic Framework for Building Dispersion Operators in the Semantic Space Assisting Asset Model Development with Evolutionary Augmentation Building Blocks of Machine Learning Pipelines for Initialization of a Data Science Automation Tool Readers will discover large-scale, real-world applications of GP to a variety of problem domains via in-depth presentations of the latest and most significant results.

Genetic Algorithm Optimized Feature Extraction and Selection for ECG Pattern Classification The world of bioinformatics has two main objectives: the creation and main-nan- of biological databases, and the discovery of knowledge from life sciences data. The enrollments of biological databases, sequences, and structural information in a given dataset in order to generate new knowledge. Computer science methods such as evolutionary computation, machine learning, and data mining all have great deal to offer the world of bioinformatics. The goal of the 8th - ropean Conference on Evolutionary Computation, Machine Learning, and Data Mining in Bioinformatics (EvoBIO 2010) was to bring together researchers in these ?elds in order to discuss new and novel methods for tackling complex biological problems. A session was held in Istanbul, Turkey during April 7–9, 2010 at the Istanbul Technical University. EvoBIO2010washedjointlywiththe13th European Conference on Genetic Programming (EuroGP 2010), the 10th European Conference on Evolutionary Computation in Combinatorial Optimisation (EvoCOP 2010), and the conference on the applications of evolutionary computation, EvoApplications. Collectively, the conferences are organized under the name Evo* (www.evostar.org). EvoBIO, held annually as a workshop since 2003, became a conference in 2007 and it is now the premier European event for those interested in the interface between evolutionary computation, machine learning, data mining, bioinformatics, and computational biology.

Using Genetic Algorithms to Evolve Artificial Neural Networks This volume contains the best papers presented at the 14th East-European Conference on Advances in Databases and Information Systems (ADBIS 2010), held in September 20-24, 2010, in Novi Sad, Serbia. ADBIS 2010 continued the ADBIS series held in St. Petersburg (1997), Poznan (1998), Maribor (1999), Prague (2000), Vilnius (2001), Bratislava (2002), Dresden (2003), Budapest (2004), Tallinn (2005), Thessaloniki (2006), Varna (2007), Pori (2008), and Riga (2009). The main objective of the ADBIS series of conferences is to provide a forum for the dissemination of research papers and to promote interaction and collaboration between the database and information systems research communities from Central and East European countries and the rest of the world. The ADBIS conferences provide an international platform for researchers and practitioners to join forces to identify research opportunities and provide new results. ADBIS 2010 comprises a wide range of topics, covering all major areas related to theory and applications of database technology and information systems. Two different submission lines were considered for ADBIS 2010, one within the classic track and another one within a special track organization. ADBIS comprised 2 conferences: 1. Conceptual Modeling in Systems Engineering (CMSE) 2. Data Mining and Information Extraction (DMIE) 3. Business Processes in E-Commerce Systems (e-commerce) 4. Personal Identifiable Information: Privacy, Ethics, and Security (PIIPES) 5. Granular Neural Networks, Pattern Recognition and Bioinformatics To defend against a cyber attack in which the attacker searches the network for vulnerable machines, most people will install some specific security software that cost some money, or download the newest patches for the softwares to avoid some vulnerabilities. Neither way can be efficient especially when attacks are always updated. Reconnaissance is the essential part of a cyber attack during which the attacker is to learn about vulnerabilities of the targeted machines, including the current state of software or settings. Moving target strategy then can be implemented specifically against this part of an attack. Theoretically, a change in configuration during the construction of an exploit will alter the computer such that the machine no longer contains the same vulnerabilities discovered during reconnaissance, thereby rendering the initial reconnaissance step ineffective. In this thesis, a genetic algorithm is implemented for the moving target strategy to find secure computer configurations over generations. A genetic algorithm is one version of an evolutionary algorithm which is inspired by the process of natural selection. Starting with the current generation, it creates further generations which consist of highly fit candidate solutions to adapt to the environment. In this research, the solutions are machine configurations, and the environment is always updated from the attacks they being faced. For each iteration of the genetic algorithm, a new population of chromosomes (configurations) is evolved from the current population through the processes of selection, crossover, and mutation, and each chromosome in the population is evaluated by a fitness function. Selection chooses single chromosomes with higher fitness for each iteration which is based on a fitness proportional selection known as roulette wheel selection. Crossover selects a high fit parent from the pool of configurations to exchange the genetic information with an existing parent, resulting in the child with high fitness for some crossover points. Mutation is applied to some genes (parameters) of the chromosomes to provide diversity. This thesis also introduces a novel approach, the machine learning strategies of support vector machines (SVMs) and decision tree (DT) classification, to enhance the genetic algorithm. Classification strategy deals with grouping data objects into one of several categories based on their similarity to known examples of each category. Normally, a training data set is provided to the classifier, consisting of a variety of objects with many characteristics and the label of the group to which each belongs. The classifier uses this training data to create a model for the feature space. The classifier is then provided with new unlabeled data points and it returns the label of the group to which each data point belongs based on the generated model. Classification can enhance the genetic algorithm by singling out low fitness parameter combinations and removing them from the population. This will be achieved by correlating a parameter’s setting changes to the chromosome’s fitness changes, or by comparing attacked machines to machines which were not attacked. A classifier can then be trained on this data, and used to classify future settings or chromosomes as either secure or insecure. In this thesis, several
different attack simulation experiments are conducted to evaluate the different strategies discussed above for moving target defense: genetic algorithm or genetic algorithm with Support Vector Machines and Decision Tree classifiers. The goal is to determine how genetic algorithms in general influence the learning behavior for the attacked parameters, and whether genetic algorithm with classifiers can be better and faster to make good configurations for the specific attacked parameters or not, and what level of good configurations can be achieved using genetic algorithm with classifiers or genetic algorithm itself. Furthermore, experiments are conducted to test if resilience exists to reflect the genetic algorithm’s adaptability to new security threats, while not discarding learned security improvements.

**Learning Classifier Systems**

Computational Methods in Financial Engineering This paper demonstrates that neuroevolution is an effective method to determine an optimal neural network topology. I provide an overview of the NeuroEvolution of Augmenting Topologies (NEAT) algorithm, and describe how unique characteristics of this algorithm solve various problem inherent to neuroevolution (namely the competing conventions problem and the challenges associated with protecting topological innovation). Parallelization is shown to greatly speed up efficiency, further reinforcing neuroevolution as a potential alternative to traditional backpropagation. I also demonstrate that appropriate parameter selection is critical in order to efficiently converge to an optimal topology. Lastly, I produce an example solution to a medical classification machine learning problem that further demonstrates some unique advantages of the NEAT algorithm.

Extending the Scalability of Linkage Learning Genetic Algorithms Cover classical algorithms commonly used as artificial intelligence techniques and program agile artificial intelligence applications using Pharo. This book takes a practical approach by presenting the implementation details to illustrate the numerous concepts it explains. Along the way, you’ll learn neural net fundamentals to set you up for practical examples such as the traveling salesman problem and cover genetic algorithms including a fun zoomorphic creature example. Furthermore, Practical Agile AI with Pharo finishes with a data classification application and two game applications including a Pong-like game and a Flappy Bird-like game. This book is informative and fun, giving you source code to play along with. You’ll be able to take this source code and apply it to your own projects. What You Will Learn Use neurons, neural networks, learning theory, and more Work with genetic algorithms Incorporate neural network principles when working towards neuroevolution Include neural network fundamentals when building three Pharo-based applications Who This Book Is For Coders and data scientists who are experienced programmers and have at least some prior experience with AI or deep learning. They may be new to Pharo programming, but some prior experience with it would be helpful.

Machine Learning Machine learning is the study of algorithms that automatically improve their performance with experience. That can provide significant competitive advantages to many organizations by exploiting the potential of large data volume. Intelligently analyzed data is a valuable resource. At the heart of performance is classiﬁcation accuracy in this speciﬁed task. Mostly a crucial problem in machine learning is identifying a representative set of features from which to construct a classiﬁcation model for a particular task. The classiﬁcation of data is based on the set of data feature used. The feature selection can provide optimizing performance by using Genetic Algorithm and strongly effect in classiﬁcation. In making to get improved classiﬁcation accuracy, author has taken advantage with using hybrid of machine learning methods rather than use of only machine learning approach. Author proposed Information based distance metric to overwhelm one of the weak points of k nearest neighbor classiﬁer. Moreover it provide the comparison of the result of Information based distance metric and Euclidean distance metric on both majority voting and similarity score summing.

Deep Learning Using Genetic Algorithms This book constitutes the refereed joint proceedings of six workshops on evolutionary computing, EvoWorkshops 2005, held in Lausanne, Switzerland in March/April 2005. The 56 revised full papers presented were carefully reviewed and selected from a total of 143 submissions. In accordance with the six workshops covered, the papers are organized in topical sections on evolutionary bioinformatics; evolutionary computing in communications, networks, and connected systems; hardware optimization techniques; evolutionary computation in image analysis and signal processing; evolutionary music and art; and evolutionary algorithms in stochastic and dynamic environments.

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