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Article

Application of Neurocomputing for Data Approximation and Classification in Wireless Sensor Networks

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Abstract: A new application of neurocomputing for data approximation and classification is introduced to process data in a wireless sensor network. For this purpose, a simplified dynamic sliding backpropagation algorithm is implemented on a wireless sensor network for transportation applications. It is able to approximate temperature and humidity in sensor nodes. In addition, two architectures of "radial basis function" (RBF) classifiers are introduced with probabilistic features for data classification in sensor nodes. The applied approximation and classification algorithms could be used in similar applications for data processing in embedded systems.

Keywords: Radial basis function; back propagation; wireless sensor network; distributed Data approximation and classification.

1. Introduction

There are different means of transporting products between cities and countries worldwide. According to the type and importance of the transported products, certain requirements are considered in the selection and supervision of transportation systems [1]. The use of wireless sensor networks to record environmental conditions such as temperature and humidity during the transport of sensitive goods and products has increased considerably [2,3]. After measuring environmental conditions, data are sent for processing and decision-making; in advanced transportation systems, key decisions are made in measurement systems in a distributed manner [4]. The use of distributed data processing

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Multimedia, Communication and Computing Application Ally Leung,2015-07-28 2014 International Conference on Multimedia Communication and Computing Application MCCA2014 Xiamen China Oct 16 17 2014 provided a forum for experts and scholars of excellence from all over the world to present their latest work in the area of multimedia communication and computing applications In recent years the multimedia techno **Applications of Artificial Intelligence and Data Science** Mufti Mahmud,Nelishia Pillay,M Shamim Kaiser,2025-09-30 This CCIS post conference volume constitutes the proceedings of First Global Conference on Applications of Artificial Intelligence and Data Science AAIDS 2024 in London UK April 2024 The 30 full papers presented were carefully reviewed and selected from 147 submissions They were focused on topical sections as follows Advanced Computing and Statistics Data Science and Hybrid AI Systems **Tensor Computation for Data Analysis** Yipeng Liu,Jiani Liu,Zhen Long,Ce Zhu,2021-08-31 Tensor is a natural representation for multi dimensional data and tensor computation can avoid possible multi linear data structure loss in classical matrix computation based data analysis This book is intended to provide non specialists an overall understanding of tensor computation and its applications in data analysis and benefits researchers engineers and students with theoretical computational technical and experimental details It presents a systematic and up to date overview of tensor decompositions from the engineer s point of view and comprehensive coverage of tensor computation based data analysis techniques In addition some practical examples in machine learning signal processing data mining computer vision remote sensing and biomedical engineering are also presented for easy understanding and implementation These data analysis techniques may be further applied in other applications on neuroscience communication psychometrics chemometrics biometrics quantum physics quantum chemistry etc The discussion begins with basic coverage of notations preliminary operations in tensor computations main tensor decompositions and their properties Based on them a series of tensor based data analysis techniques are presented as the tensor extensions of their classical matrix counterparts including tensor dictionary learning low rank tensor recovery tensor completion coupled tensor analysis robust principal tensor component analysis tensor regression logistical tensor regression support tensor machine multilinear discriminate analysis tensor subspace clustering tensor based deep learning tensor graphical model and tensor sketch The discussion also includes a number of typical applications with experimental results such as image reconstruction image enhancement data fusion signal recovery recommendation system knowledge graph acquisition traffic flow prediction link prediction environmental prediction weather forecasting background extraction human pose estimation cognitive state classification from fMRI infrared small target detection heterogeneous information networks clustering multi view image clustering and deep neural network compression **Data-Driven Prediction for Industrial Processes and Their Applications** Jun Zhao,Wei Wang,Chunyang Sheng,2018-08-20 This book presents modeling methods and algorithms for data driven prediction and

forecasting of practical industrial process by employing machine learning and statistics methodologies Related case studies especially on energy systems in the steel industry are also addressed and analyzed The case studies in this volume are entirely rooted in both classical data driven prediction problems and industrial practice requirements Detailed figures and tables demonstrate the effectiveness and generalization of the methods addressed and the classifications of the addressed prediction problems come from practical industrial demands rather than from academic categories As such readers will learn the corresponding approaches for resolving their industrial technical problems Although the contents of this book and its case studies come from the steel industry these techniques can be also used for other process industries This book appeals to students researchers and professionals within the machine learning and data analysis and mining communities *Data Mining Methods for Knowledge Discovery* Krzysztof J. Cios,Witold Pedrycz,Roman W. Swiniarski,2012-12-06 Data Mining Methods for Knowledge Discovery provides an introduction to the data mining methods that are frequently used in the process of knowledge discovery This book first elaborates on the fundamentals of each of the data mining methods rough sets Bayesian analysis fuzzy sets genetic algorithms machine learning neural networks and preprocessing techniques The book then goes on to thoroughly discuss these methods in the setting of the overall process of knowledge discovery Numerous illustrative examples and experimental findings are also included Each chapter comes with an extensive bibliography Data Mining Methods for Knowledge Discovery is intended for senior undergraduate and graduate students as well as a broad audience of professionals in computer and information sciences medical informatics and business information systems

Fuzzy System and Data Mining G. Chen,F. Liu,M. Shojafar,2016-04-14 Fuzzy logic is widely used in machine control The term fuzzy refers to the fact that the logic involved can deal with concepts that cannot be expressed as either true or false but rather as partially true Fuzzy set theory is very suitable for modeling the uncertain duration in process simulation as well as defining the fuzzy goals and fuzzy constraints of decision making It has many applications in industry engineering and social sciences This book presents the proceedings of the 2015 International Conference on Fuzzy Systems and Data Mining FSDM2015 held in Shanghai China in December 2015 The application domain covers geography biology economics medicine the energy industry social science logistics transport industrial and production engineering and computer science The papers presented at the conference focus on topics such as system diagnosis rule induction process simulation control and decision making They include papers on solving practical problems with intelligent algorithms statistical analysis classification and clustering and association rule learning They also reflect the frontier in data mining research and address the challenges posed to data analytics research by the increasingly large datasets yielded by many application domains together with new types of unstructured data The book provides an overview of the ways in which fuzzy theory and data mining principles are applied in various fields and will be of interest to all those who work in either the theory or practice of fuzzy systems and data mining Advanced Computing Applications, Databases and Networks S.A Begum,2011-05-13 ADVANCED

COMPUTING APPLICATIONS DATABASES AND NETWORKS focuses on new developments and advances in three major areas of Computer Science The first part presents some significant contributions and surveys major research areas of Advanced Computing Applications viz Natural Language Processing Medical Imaging Soft Computing Methodologies and a wide variety of its application domains The second part explains different approaches towards development of Unified Theoretical Model for Database Mining Dimension Reduction of higher dimensional data and the applicability of Soft Computing Methodologies in Data Mining and Clustering The third part provides the approaches taken to address the challenging problems in the areas of Wired and Wireless Networks The chapters in this volume are representative of recent research efforts and advances in the area of Advanced Computing Applications Databases and Networks covering both theoretical and application issues *Proceedings of ELM-2015 Volume 1* Jiuwen Cao,Kezhi Mao,Jonathan Wu,Amaury Lendasse,2015-12-31 This book contains some selected papers from the International Conference on Extreme Learning Machine 2015 which was held in Hangzhou China December 15 17 2015 This conference brought together researchers and engineers to share and exchange R D experience on both theoretical studies and practical applications of the Extreme Learning Machine ELM technique and brain learning This book covers theories algorithms ad applications of ELM It gives readers a glance of the most recent advances of ELM **Advances in Big Data Analytics** Yong Shi,2022-01-13 Today big data affects countless aspects of our daily lives This book provides a comprehensive and cutting edge study on big data analytics based on the research findings and applications developed by the author and his colleagues in related areas It addresses the concepts of big data analytics and or data science multi criteria optimization for learning expert and rule based data analysis support vector machines for classification feature selection data stream analysis learning analysis sentiment analysis link analysis and evaluation analysis The book also explores lessons learned in applying big data to business engineering and healthcare Lastly it addresses the advanced topic of intelligence quotient IQ tests for artificial intelligence divSince each aspect mentioned above concerns a specific domain of application taken together the algorithms procedures analysis and empirical studies presented here offer a general picture of big data developments Accordingly the book can not only serve as a textbook for graduates with a fundamental grasp of training in big data analytics but can also show practitioners how to use the proposed techniques to deal with real world big data problems **Computational Mechanics for the Twenty-first Century** B. H. V. Topping,2000 Includes invited lectures presented at The Fifth International Conference on Computational Structures Technology and The Second International Conference on Engineering Computational Technology held in Belgium September 2000 It includes contributions from KJ Bathe JL Chenot D Chapelle C Cinquini M Cross G De Roeck and many others **36th Aerospace Sciences Meeting & Exhibit** ,1998 *Photonics Applications in Industry and Research IV* ,2005 **Applications and Science of Computational Intelligence** ,1999 **Optimization with Data Perturbations II** Doug E. Ward,2001 Digital Signal Processing Applications ,1997

26th Annual International Computer Software and Applications Conference IEEE Computer Society,2002 Collects the 172 papers presented during the August 2002 conference with the theme of Prolonging software life development and redevelopment The main subjects of the 38 sessions are component based software development software process quality control testing software evolution web based sy The 1989 Neuro-computing Bibliography Casimir C. Klimasauskas,1989 This comprehensive bibliography provides a functional flexible tool for researchers and engineers in neurocomputing Application of Computers and Operations Research in the Mineral Industry ,1995 *Applications and Science of Artificial Neural Networks* ,1997 Volumes consist of the proceedings of the International Conference on Applications and Science of Artificial Neural Networks Conference Proceedings ,1989

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