

The Applications of Intelligent Optimization Algorithms in Sentiment Analysis: A Deep and Systematic Study

Sangkeum Lee^{1*}, Li Ping Yan², Maryam Sanatifar³, Lingyi Feng⁴, Seyedalireza Jazayerifar⁵ and Atieh Nouralishahi⁶

¹Environment ICT Research Section, Electronics and Telecommunications Research Institute (ETRI), 218 Gajeong-ro, Yuseong-gu, Daejeon 34129, Korea

²Department of Resources and Environment, Yangtze University, Wuhan, China

³Department of Computer Engineering, Kermanshah Science and Research Branch, Islamic Azad University, Kermanshah, Iran

⁴Department of Information Hub, Hong Kong University of Science and Technology (GZ), Hong Kong, China

⁵Department of Marketing, Walton College of Business, University of Arkansas, Fayetteville, Arkansas, USA

⁶Department of Business Analytics, University of Exeter, Ex4 4PX, UK

Abstract

It has been demonstrated that optimization algorithms is a method that can handle a variety of NP-hard (Non-deterministic Polynomial time) computational issues. It is becoming more and more popular for resolving various optimization issues. Today there is growing interest in intelligence methods for sentiment analysis to provide a quantifiable assessment of "positivity" or "negativity" about thoughts or social comments as a result of the World Wide Web's rapid expansion and the prevalence of online collaborative platforms. But the procedure of sentiment analysis and evaluation faces several difficulties. These issues are addressed by intelligent sentiment analysis, which automatically distinguishes between positive and negative user reviews. Hence, nature-inspired intelligent sentiment analysis algorithms are recently becoming an emerging research topic for developing new systems, as nature is an excellent source of inspiration. But as far as we know, there is no attempt to investigate the applications of nature-inspired intelligent sentiment analysis algorithms in the literature. In order to cover this research gap, this study presents a comprehensive literature evaluation. It gathers, explores, understands, and analyses the efforts and trends in a well-structured manner. We review a wide range of articles from various journals, conferences, book chapters, etc., to explain the current state of the art on these important algorithms as well as a comparative analysis of these algorithms. In contrast to previous reviews, we take a systematic strategy to locate, collect empirical data, interpret findings, critically assess, and integrate all relevant and excellent studies to address particular research issues about the specified research domain. The results showed that intelligent optimization algorithms bring significant accuracy gains. Also, these algorithms can converge quickly and produce better results in terms of complexity.

Keywords: Evolutionary algorithms • Entropy • Sentiment analysis • Entropy • Intelligent computing • Particle swarm optimization • Multi-objective optimization • Metaheuristic optimization algorithms

Introduction

Metaheuristic-based optimization algorithms utilize an easy and powerful approach to tackle issues related to optimization [1,2]. With a set of problem-independent techniques and the ability to comprehend higher-level algorithmic frameworks, meta-heuristics can be used to create optimized approaches [3,4]. Metaheuristic can be defined as a method to get a "good enough" solution in "small enough" computing time. Meta-heuristic algorithms give a better trade-off between exploration (global optima) as well as exploitation (local optima), along with solution quality and computing time [5,6]. Meta-heuristic algorithms are more dependable and effective than precise approaches because they can be adjusted to the demands of real-time optimization problems, produce better solutions with less computation time, and are not problem-specific, approximate, or deterministic [7,8]. Swarm intelligence, as a well-known subset of metaheuristics, is a wide range of techniques that

work based on artificial intelligence inspired by the cooperative behavior of basic organisms found in the wild. Its idea came from observations of the group behavior of various species, including birds, fish, bees, bacteria, ants, squimels, and more [9]. Swarm intelligence algorithms are frequently employed in optimization issues. Optimization techniques could be applied to the feature selection problem to create the best possible feature set. Swarm intelligence techniques are employed in feature subset selection to decrease the feature subsets' computational complexity and dimensionality, improving classification accuracy [10]. However, population diversity is quickly lost when a standard swarm intelligence algorithm encounter challenging multi-peak problems, which causes the algorithm to prematurely converge. Dimension entropy is used to address this issue as a measure of population diversity. Entropy is a concept in thermodynamics. In 1948, Shannon put forward the concept [11]. The concept is that one can gauge how uncertain an information system is by calculating the probabilities of numerous separate, random discrete events. In an information system, information entropy is at its least when only one event occurs and at its maximum when the chance of occurring several discrete events is the same [12].

The World Wide Web (www) has recently become a great source of user-generated content. Twitter, Facebook, Google Plus, and many social media are available where people freely share their thoughts and feelings [13,14]. They do this through messaging or emojis, pictures, and videos. Undoubtedly, any decision-making process may benefit greatly from this constantly expanding subjective knowledge. Intelligent sentiment analysis was established to automate such data processing [15,16]. The systematic detection, extraction, quantification, and analysis of affective states and subjective data is known as intelligent sentiment analysis. It uses biometrics, computational linguistics, natural language processing, and text analysis. It is a method of expressing an individual's feelings or ideas in text form, which may be categorized as

*Address for Correspondence: Sangkeum Lee, Environment ICT Research Section, Electronics and Telecommunications Research Institute (ETRI), 218 Gajeong-ro, Yuseong-gu, Daejeon 34129, Korea, E-mail: sangkeum@etri.re.kr

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Journal Of Algorithms And Optimization

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Algorithms for Optimization Mykel J. Kochenderfer, Tim A. Wheeler, 2019-03-26 A comprehensive introduction to optimization with a focus on practical algorithms for the design of engineering systems This book offers a comprehensive introduction to optimization with a focus on practical algorithms The book approaches optimization from an engineering perspective where the objective is to design a system that optimizes a set of metrics subject to constraints Readers will learn about computational approaches for a range of challenges including searching high dimensional spaces handling problems where there are multiple competing objectives and accommodating uncertainty in the metrics Figures examples and exercises convey the intuition behind the mathematical approaches The text provides concrete implementations in the Julia programming language Topics covered include derivatives and their generalization to multiple dimensions local descent and first and second order methods that inform local descent stochastic methods which introduce randomness into the optimization process linear constrained optimization when both the objective function and the constraints are linear surrogate models probabilistic surrogate models and using probabilistic surrogate models to guide optimization optimization under uncertainty uncertainty propagation expression optimization and multidisciplinary design optimization Appendixes offer an introduction to the Julia language test functions for evaluating algorithm performance and mathematical concepts used in the derivation and analysis of the optimization methods discussed in the text The book can be used by advanced undergraduates and graduate students in mathematics statistics computer science any engineering field including electrical engineering and aerospace engineering and operations research and as a reference for professionals Advanced Computational Methods for Knowledge Engineering Tien Do, Hoai An Le Thi, Ngoc Thanh Nguyen, 2014-04-11 The proceedings consists of 30 papers which have been selected and invited from the submissions to the 2nd International Conference on Computer Science Applied Mathematics and Applications ICCSAMA 2014 held on 8 9 May 2014 in Budapest Hungary The conference is organized into 7 sessions Advanced Optimization Methods and Their Applications Queueing Models and Performance Evaluation Software Development and Testing Computational Methods for Mobile and Wireless Networks Computational Methods for Knowledge Engineering Logic Based Methods for Decision Making and Data Mining and Nonlinear Systems and Applications respectively All chapters in the book discuss theoretical and practical issues connected with computational methods and optimization methods for knowledge engineering The editors hope that this volume can be useful for graduate and Ph D students and researchers in Computer Science and Applied Mathematics It is the hope of the editors that readers of this volume can find many inspiring ideas and use them to their research Many such challenges are suggested by particular approaches and models presented in individual chapters of this book *Treatise on Geomorphology*, 2013-02-27 The changing focus and approach of geomorphic research suggests that the time is opportune for a summary of the state of discipline The number of peer reviewed papers published in geomorphic journals has grown

steadily for more than two decades and more importantly the diversity of authors with respect to geographic location and disciplinary background geography geology ecology civil engineering computer science geographic information science and others has expanded dramatically As more good minds are drawn to geomorphology and the breadth of the peer reviewed literature grows an effective summary of contemporary geomorphic knowledge becomes increasingly difficult The fourteen volumes of this Treatise on Geomorphology will provide an important reference for users from undergraduate students looking for term paper topics to graduate students starting a literature review for their thesis work and professionals seeking a concise summary of a particular topic Information on the historical development of diverse topics within geomorphology provides context for ongoing research discussion of research strategies equipment and field methods laboratory experiments and numerical simulations reflect the multiple approaches to understanding Earth s surfaces and summaries of outstanding research questions highlight future challenges and suggest productive new avenues for research Our future ability to adapt to geomorphic changes in the critical zone very much hinges upon how well landform scientists comprehend the dynamics of Earth s diverse surfaces This Treatise on Geomorphology provides a useful synthesis of the state of the discipline as well as highlighting productive research directions that Educators and students researchers will find useful Geomorphology has advanced greatly in the last 10 years to become a very interdisciplinary field Undergraduate students looking for term paper topics to graduate students starting a literature review for their thesis work and professionals seeking a concise summary of a particular topic will find the answers they need in this broad reference work which has been designed and written to accommodate their diverse backgrounds and levels of understanding Editor in Chief Prof J F Shroder of the University of Nebraska at Omaha is past president of the QG G section of the Geological Society of America and present Trustee of the GSA Foundation while being well respected in the geomorphology research community and having won numerous awards in the field A host of noted international geomorphologists have contributed state of the art chapters to the work Readers can be guaranteed that every chapter in this extensive work has been critically reviewed for consistency and accuracy by the World expert Volume Editors and by the Editor in Chief himself No other reference work exists in the area of Geomorphology that offers the breadth and depth of information contained in this 14 volume masterpiece From the foundations and history of geomorphology through to geomorphological innovations and computer modelling and the past and future states of landform science no stone has been left unturned

Handbook of Research on AI and Machine Learning Applications in Customer Support and Analytics Hossain, Md Shamim, Ho, Ree Chan, Trajkovski, Goran, 2023-05-02 In the modern data driven era artificial intelligence AI and machine learning ML technologies that allow a computer to mimic intelligent human behavior are essential for organizations to achieve business excellence and assist organizations in extracting useful information from raw data AI and ML have existed for decades but in the age of big data this sort of analysis is in higher demand than ever especially for customer support and analytics The Handbook of Research on AI and Machine Learning

Applications in Customer Support and Analytics investigates the applications of AI and ML and how they can be implemented to enhance customer support and analytics at various levels of organizations This book is ideal for marketing professionals managers business owners researchers practitioners academicians instructors university libraries and students and covers topics such as artificial intelligence machine learning supervised learning deep learning customer sentiment analysis data mining neural networks and business analytics Smart Agriculture Govind Singh Patel,Amrita Rai,Nripendra Narayan Das,R.P. Singh,2021-02-10 This book endeavours to highlight the untapped potential of Smart Agriculture for the innovation and expansion of the agriculture sector The sector shall make incremental progress as it learns from associations between data over time through Artificial Intelligence deep learning and Internet of Things applications The farming industry and Smart agriculture develop from the stringent limits imposed by a farm s location which in turn has a series of related effects with respect to supply chain management food availability biodiversity farmers decision making and insurance and environmental concerns among others All of the above mentioned aspects will derive substantial benefits from the implementation of a data driven approach under the condition that the systems tools and techniques to be used have been designed to handle the volume and variety of the data to be gathered Contributions to this book have been solicited with the goal of uncovering the possibilities of engaging agriculture with equipped and effective profound learning algorithms Most agricultural research centres are already adopting Internet of Things for the monitoring of a wide range of farm services and there are significant opportunities for agriculture administration through the effective implementation of Machine Learning Deep Learning Big Data and IoT structures *Applied Mechanics Reviews* ,1979 **Global Optimization** Marco Locatelli,Fabio Schoen,2013-10-16 This volume contains a thorough overview of the rapidly growing field of global optimization with chapters on key topics such as complexity heuristic methods derivation of lower bounds for minimization problems and branch and bound methods and convergence The final chapter offers both benchmark test problems and applications of global optimization such as finding the conformation of a molecule or planning an optimal trajectory for interplanetary space travel An appendix provides fundamental information on convex and concave functions Intended for Ph D students researchers and practitioners looking for advanced solution methods to difficult optimization problems It can be used as a supplementary text in an advanced graduate level seminar **Encyclopedia of Renewable Energy, Sustainability and the Environment** ,2024-08-09 Encyclopedia of Renewable Energy Sustainability and the Environment Four Volume Set comprehensively covers all renewable energy resources including wind solar hydro biomass geothermal energy and nuclear power to name a few In addition to covering the breadth of renewable energy resources at a fundamental level this encyclopedia delves into the utilization and ideal applications of each resource and assesses them from environmental economic and policy standpoints This book will serve as an ideal introduction to any renewable energy source for students while also allowing them to learn about a topic in more depth and explore related topics all in a single resource

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Optimization for Machine Learning Suvrit Sra, Sebastian Nowozin, Stephen J. Wright, 2011-09-30 An up to date account of the interplay between optimization and machine learning accessible to students and researchers in both communities The interplay between optimization and machine learning is one of the most important developments in modern computational science Optimization formulations and methods are proving to be vital in designing algorithms to extract essential knowledge from huge volumes of data Machine learning however is not simply a consumer of optimization technology but a rapidly evolving field that is itself generating new optimization ideas This book captures the state of the art of the interaction between optimization and machine learning in a way that is accessible to researchers in both fields Optimization approaches have enjoyed prominence in machine learning because of their wide applicability and attractive theoretical properties The increasing complexity size and variety of today s machine learning models call for the reassessment of existing assumptions This book starts the process of reassessment It describes the resurgence in novel contexts of established frameworks such as first order methods stochastic approximations convex relaxations interior point methods and proximal methods It also devotes attention to newer themes such as regularized optimization robust optimization gradient and subgradient methods splitting techniques and second order methods Many of these techniques draw inspiration from other fields including operations research theoretical computer science and subfields of optimization The book will enrich the ongoing cross fertilization between the machine learning community and these other fields and within the broader optimization community

Handbook of Research on Modern Optimization Algorithms and Applications in Engineering and Economics Vasant, Pandian, Weber, Gerhard-Wilhelm, Dieu, Vo Ngoc, 2016-03-08 Modern optimization approaches have attracted many research scientists decision makers and practicing researchers in recent years as powerful intelligent computational techniques for solving several complex real world problems The Handbook of Research on Modern Optimization Algorithms and Applications in Engineering and Economics highlights the latest research innovations and applications of algorithms designed for optimization applications within the fields of engineering IT and economics Focusing on a variety of methods and systems as well as practical examples this book is a significant resource for graduate level students decision makers and researchers in both public and private sectors who are seeking research based methods for modeling uncertain real world problems

Business and Consumer Analytics: New Ideas Pablo Moscato, Natalie Jane de Vries, 2019-05-30 This two volume handbook presents a collection of novel methodologies with applications and illustrative examples in the areas of data driven

computational social sciences Throughout this handbook the focus is kept specifically on business and consumer oriented applications with interesting sections ranging from clustering and network analysis meta analytics memetic algorithms machine learning recommender systems methodologies parallel pattern mining and data mining to specific applications in market segmentation travel fashion or entertainment analytics A must read for anyone in data analytics marketing behavior modelling and computational social science interested in the latest applications of new computer science methodologies The chapters are contributed by leading experts in the associated fields The chapters cover technical aspects at different levels some of which are introductory and could be used for teaching Some chapters aim at building a common understanding of the methodologies and recent application areas including the introduction of new theoretical results in the complexity of core problems Business and marketing professionals may use the book to familiarize themselves with some important foundations of data science The work is a good starting point to establish an open dialogue of communication between professionals and researchers from different fields Together the two volumes present a number of different new directions in Business and Customer Analytics with an emphasis in personalization of services the development of new mathematical models and new algorithms heuristics and metaheuristics applied to the challenging problems in the field Sections of the book have introductory material to more specific and advanced themes in some of the chapters allowing the volumes to be used as an advanced textbook Clustering Proximity Graphs Pattern Mining Frequent Itemset Mining Feature Engineering Network and Community Detection Network based Recommending Systems and Visualization are some of the topics in the first volume Techniques on Memetic Algorithms and their applications to Business Analytics and Data Science are surveyed in the second volume applications in Team Orienteering Competitive Facility location and Visualization of Products and Consumers are also discussed The second volume also includes an introduction to Meta Analytics and to the application areas of Fashion and Travel Analytics Overall the two volume set helps to describe some fundamentals acts as a bridge between different disciplines and presents important results in a rapidly moving field combining powerful optimization techniques allied to new mathematical models critical for personalization of services Academics and professionals working in the area of business analytics data science operations research and marketing will find this handbook valuable as a reference Students studying these fields will find this handbook useful and helpful as a secondary textbook

Numerical Optimization Joseph-Frédéric Bonnans, Jean Charles Gilbert, Claude Lemarechal, Claudia A. Sagastizábal, 2006-10-06 This book starts with illustrations of the ubiquitous character of optimization and describes numerical algorithms in a tutorial way It covers fundamental algorithms as well as more specialized and advanced topics for unconstrained and constrained problems This new edition of Numerical Optimization contains computational exercises in the form of case studies which help understanding optimization methods beyond their theoretical description when coming to actual implementation Journal of the ACM, 2002

Handbook of Research on Emergent Applications of Optimization Algorithms Vasant, Pandian, Alparslan-Gok,

Sirma Zeynep, Weber, Gerhard-Wilhelm, 2017-10-31 Modern optimization approaches have attracted an increasing number of scientists decision makers and researchers As new issues in this field emerge different optimization methodologies must be developed and implemented The Handbook of Research on Emergent Applications of Optimization Algorithms is an authoritative reference source for the latest scholarly research on modern optimization techniques for solving complex problems of global optimization and their applications in economics and engineering Featuring coverage on a broad range of topics and perspectives such as hybrid systems non cooperative games and cryptography this publication is ideally designed for students researchers and engineers interested in emerging developments in optimization algorithms *AIAA Journal* American Institute of Aeronautics and Astronautics, 2001 Proceedings of the ... IEEE Conference on Evolutionary Computation, 1996 Proceedings of the ... IEEE Conference on Evolutionary Computation, 1997 *Sustainable Development and Social Responsibility—Volume 2* Ahmed N. Al-Masri, Yousef Al-Assaf, 2020-01-13 This book gathers high quality research papers presented at the 2nd AUE international research conference AUEIRC 2018 which was organized by the American University in the Emirates Dubai and held on November 13th 15th 2018 The book is broadly divided into two main sections Sustainability and Smart Business and Sustainability and Creative Industries The broad range of topics covered under these sections includes risk assessment in agriculture corporate social responsibility and the role of intermediaries the impact of privatizing health insurance political events and their effect on foreign currency exchange the effect of sustainable HR practices on financial performance sustainability integration in the supply chain and logistics gender inequality in the MENA economies the panel data model the model of sustainable marketing in the era of Industry 4.0 micro enterprises as a tool for combating unemployment the impact of financial education and control on financial behavior measuring financial and asset performance in agricultural firms a comprehensive strategic approach to sustainability in the UAE sustainability and project finance HR analytics Fashion for organizational sustainability a conceptual framework of sustainable competitive advantages psychology of organizational sustainability Blockchain technology and sustainability veganism and sustainability institution building from an emotional intelligence perspective sustainable concrete production using CWP occupants behavior and energy usage in Emirati houses the effect of shop lighting on consumer behavior multimedia applications in digital transformation art integrating biomimicry principles in sustainable architecture experimental sustainable practices in fashion education technology assisted student centered learning for civil engineering and a 10 step design process for architectural design studios All contributions present high quality original research work findings and lessons learned in practical development *SIAM Journal on Computing* Society for Industrial and Applied Mathematics, 2006 *Algorithms for Continuous Optimization* E. Spedicato, 2012-12-06 The NATO Advanced Study Institute on Algorithms for continuous optimization the state of the art was held September 5-18 1993 at Il Ciocco Barga Italy It was attended by 75 students among them many well known specialists in optimization from the following countries Belgium Brasil Canada China Czech

Republic France Germany Greece Hungary Italy Poland Portugal Rumania Spain Turkey UK USA Venezuela The lectures were given by 17 well known specialists in the field from Brasil China Germany Italy Portugal Russia Sweden UK USA Solving continuous optimization problems is a fundamental task in computational mathematics for applications in areas of engineering economics chemistry biology and so on Most real problems are nonlinear and can be of quite large size Developing efficient algorithms for continuous optimization has been an important field of research in the last 30 years with much additional impetus provided in the last decade by the availability of very fast and parallel computers Techniques like the simplex method that were already considered fully developed thirty years ago have been thoroughly revised and enormously improved The aim of this ASI was to present the state of the art in this field While not all important aspects could be covered in the fifty hours of lectures for instance multiobjective optimization had to be skipped we believe that most important topics were presented many of them by scientists who greatly contributed to their development

Journal Of Algorithms And Optimization Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has be more apparent than ever. Its capability to stir emotions, provoke thought, and instigate transformation is truly remarkable. This extraordinary book, aptly titled "**Journal Of Algorithms And Optimization**," written by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound impact on our existence. Throughout this critique, we will delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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