The Traveling Salesman Problem (TSP) has already been solved in the semi-optimal manners using the numbers of different methods. Among them, genetic algorithms (GA) are pre-dominating. This paper presents a new approach to solve this problem using the Simplified Bi-directional Associative Memory (sBAM), a type of Artificial Neural Network. To get a comparative idea of its performance, the same problem has been solved using a genetic algorithm. In this paper, performance has been analyzed of a TSP by Genetic Algorithm (GA) and sBAM. Finally we proved that sBAM provide real time highly faster nearly optimal solutions than the genetic algorithm.
Sustainable Development Architecture The book provides a significant point of reference for academics, researchers and students in many fields who need deeper research.

A unified view of metaheuristics This book provides a complete background on metaheuristics and shows readers how to design and implement efficient algorithms to solve complex optimization problems across a diverse range of applications, from networking and bioinformatics to engineering design, routing, and scheduling. It presents the main design questions for all families of metaheuristics and clearly illustrates how to implement the algorithms under a software framework to reuse both the design and code. Throughout the book, the key search components of metaheuristics are considered as a toolbox for: Designing efficient metaheuristics (e.g. local search, tabu search, simulated annealing, evolutionary algorithms, particle swarm optimization, scatter search, ant colonies, bee colonies, artificial immune systems) for optimization problems Designing efficient metaheuristics for multi-objective optimization problems Designing hybrid, parallel, and distributed metaheuristics Implementing metaheuristics on sequential and parallel machines Using many case studies and treating design and implementation independently, this book gives readers the skills necessary to solve large-scale optimization problems quickly and efficiently. It is a valuable reference for practicing engineers and researchers from diverse areas dealing with optimization or machine learning; and graduate students in computer science, operations research, control, engineering, business and management, and applied mathematics.

The scope of this book is limited to heuristics, metaheuristics, and approximate methods and algorithms as applied to planning and scheduling problems. While it is not possible to give a comprehensive treatment of this topic in one book, the aim of this work is to provide the reader with a diverse set of planning and scheduling problems and different heuristic approaches to solve them. The problems range from traditional single stage and parallel machine problems to more modern settings such as robotic cells and flexible job shop networks. Furthermore, some chapters deal with deterministic problems while some others treat stochastic versions of the problems. Unlike most of the literature that deals with planning and scheduling problems in the manufacturing and production environments, in this book the environments were extended to nontraditional applications such as spatial scheduling (optimizing space over time), runway scheduling, and surgical scheduling. The solution methods used in the different chapters of the book also spread from well-established heuristics and metaheuristics such as Genetic Algorithms and Ant Colony Optimization to more recent ones such as Meta-RaPS.

This two-volume book presents outcomes of the 7th International Conference on Soft Computing for Problem Solving, SocProS 2017. This conference is a joint technical collaboration between the Soft Computing Research Society, Liverpool Hope University (UK), the Indian Institute of Technology Roorkee, the South Asian University New Delhi and the National Institute of Technology Silchar, and brings together researchers, engineers and practitioners to discuss thought-provoking developments and challenges in order to select potential future directions The book presents the latest advances and innovations in the interdisciplinary areas of soft computing, including original research papers in the areas including, but not limited to, algorithms (artificial immune systems, artificial neural networks, genetic algorithms, genetic programming, and particle swarm optimization) and applications (control systems, data mining and clustering, finance, weather forecasting, game theory, business and forecasting applications). It is a valuable resource for both young and experienced researchers dealing with complex and intricate real-world problems for which finding a solution by traditional methods is a difficult task.
A brilliant treatment of a knotty problem in computing. This volume contains chapters written by reputable researchers and provides the state of the art in theory and algorithms for the traveling salesman problem (TSP). The book covers all important areas of study on TSP, including polyhedral theory for symmetric and asymmetric TSP, branch and bound, and branch and cut algorithms, probabilistic aspects of TSP, and includes a thorough computational analysis of heuristic and metaheuristic algorithms.

This edited book contains articles accepted for presentation during the conference 'Intelligent Information Systems 2005 (IIS 2005) - New Trends in Intelligent Information Processing and Web Mining’ held in Gdansk, Poland, on June 13-16, 2005. Special attention is devoted to the newest developments in the areas of Artificial Immune Systems, Search engines, Computational Linguistics and Knowledge Discovery. The focus of this book is also on new computing paradigms including biologically motivated methods, quantum computing, DNA computing, advanced data analysis, new machine learning paradigms, reasoning technologies, natural language processing and new optimization techniques.

The idea behind TSP was conceived by Austrian mathematician Karl Menger in mid 1930s who invited the research community to consider a problem from the everyday life from a mathematical point of view. A traveling salesman has to visit exactly once each one of a list of m cities and then return to the home city. He knows the cost of traveling from any city i to any other city j. Thus, which is the tour of least possible cost the salesman can take? In this book the problem of finding algorithmic technique leading to good/optimal solutions for TSP (or for some other strictly related problems) is considered. TSP is a very attractive problem for the research community because it arises as a natural subproblem in many applications concerning the every day life. Indeed, each application, in which an optimal ordering of a number of items has to be chosen in a way that the total cost of a solution is determined by adding up the costs arising from two successively items, can be modelled as a TSP instance. Thus, studying TSP can never be considered as an abstract research with no real importance.

The two-volume set LNCS 6593 and 6594 constitutes the refereed proceedings of the 10th International Conference on Adaptive and Natural Computing Algorithms, ICANNGA 2010, held in Ljubljana, Slovenia, in April 2010. The 83 revised full papers presented were carefully reviewed and selected from a total of 144 submissions. The first volume includes 42 papers and a plenary lecture and is organized in topical sections on neural networks and evolutionary computation.

The Traveling Salesman Problem (TSP) is widely considered one of the most intensively studied problems in computational mathematics and operations research. Since its inception, it has become the poster child for computational complexity research. A number of problems have been transformed to a TSP problem and its application base now extends into scheduling, manufacturing, routing, and logistics. With the advent of high-performance computing and advanced metaheuristics such as GPU programming and swarm-based algorithms, the TSP problem is positioned firmly as the go-to problem for the development of the next generation of high-performance intelligent heuristics. This book looks to leverage some of these new paradigms for both students and researchers in this field.
This book constitutes the thoroughly refereed proceedings of the 10th International Symposium, ISICA 2018, held in Jiujiang, China, in October 2018. The 32 full papers presented were carefully reviewed and selected from 83 submissions. The papers are organized in topical sections on nature-inspired computing; bio-inspired computing; novel operators in evolutionary algorithms; automatic object segmentation and detection; and image colorization; multilingual automatic document classification and translation; knowledge-based artificial intelligence; predictive data mining.

This book is a collection of current research in the application of evolutionary algorithms and other optimal algorithms to solving the TSP problem. It brings together researchers with applications in Artificial Immune Systems, Genetic Algorithms, Neural Networks and Differential Evolution Algorithm. Hybrid systems, like Fuzzy Maps, Chaotic Maps and Parallelized TSP are also presented. Most importantly, this book presents both theoretical as well as practical applications of TSP, which will be a vital tool for researchers and graduate entry students in the field of applied Mathematics, Computing Science and Engineering.

Computational Intelligence (CI) is a term corresponding to a new generation of algorithmic methodologies in artificial intelligence, which combines elements of learning, adaptation, evolution and approximate (fuzzy) reasoning to create programs that can be considered intelligent. Supply Chain Optimization, Design, and Management: Advances and Intelligent Methods presents computational intelligence methods for addressing supply chain issues. Emphasis is given to techniques that provide effective solutions to complex supply chain problems and exhibit superior performance to other methods of operations research.

This book constitutes the refereed proceedings of the International Conference on Intelligent Computing, ICIC 2006, held in Kunming, China, in August 2006. The book presents 165 revised full papers, carefully reviewed. Topics covered include ant colony optimization, particle swarm optimization, swarm intelligence, autonomy-oriented computing, quantum and molecular computations, biological and DNA computing, intelligent computing in bioinformatics, intelligent computing in computational biology and drug design, computational genomics and proteomics, and more.

The Traveling Salesman Problem is central to the area of Combinatorial Optimization, and it is through this problem that many of the most important developments in the area have been made. This book focuses on essential ideas; through them it illustrates all the concepts and techniques of combinatorial optimization concisely but comprehensively. The extensive reference list and numerous exercises direct the reader towards related fields, and give results. Each of the twelve chapters in this volume is concerned with a specific aspect of the Traveling Salesman Problem, and is written by an authority on that aspect. It is hoped, that the book will serve as a state-of-the-art survey of the Traveling Salesman problem which will encourage further investigations, and that it will also be useful for its comprehensive coverage of the techniques of combinatorial optimization.

This book presents the proceedings from the International Symposium for Production Research 2020. The cross-disciplinary papers presented draw on research from academics and practitioners from industrial engineering, management engineering, operational research, and production/operational management. It explores topics including: computer-aided manufacturing; Industry 4.0 applications; simulation and modeling big data and analytics; flexible manufacturing systems; decision analysis quality management industrial robotics in production systems information technologies in production management; and optimization techniques. Presenting real-life applications, case studies, and mathematical models, this book is of interest to researchers, academics, and practitioners in the field of production and operation engineering.
"This book is devoted to the famous traveling salesman problem (TSP), which is the task of finding a route of shortest possible length through a given set of cities. The TSP attracts interest from several scientific communities and from numerous application areas. First the theoretical prerequisites are summarized. Then the emphasis shifts to computational solutions for practical TSP applications. Detailed computational experiments are used to show how to find good or acceptable routes for large problem instances in reasonable time. In total, this book meets a tremendous professional need for effective algorithms; it is the most comprehensive and up-to-date survey available on heuristic approaches to TSP solving."-- PUBLISHER'S WEBSITE.

One of the simplest, but still NP-hard, routing problems is the Traveling Salesman Problem (TSP). In the TSP, one is given a set of cities and a way of measuring the distance between cities. One has to find the shortest tour that visits all cities exactly once and returns back to the starting city. Though seemingly modest, this exercise has inspired studies by mathematicians, chemists, and physicists. Teachers use it in the classroom. It has practical applications in genetics, telecommunications, and neuroscience. The authors of this book are the same pioneers who for nearly
two decades have led the investigation into the traveling salesman problem. They have derived solutions to almost eighty-six thousand cities, yet a general solution to the problem has yet to be discovered. Here they describe the method and computer code they used to solve a broad range of large-scale problems, and along the way they demonstrate the interplay of applied mathematics with increasingly powerful computing platforms. They also give the fascinating history of the problem--how it developed, and why it continues to intrigue us.

The two volume set, CCIS 288 and 289, constitutes the thoroughly refereed post-conference proceedings of the First International Conference on Communications and Information Processing, ICCIP 2012, held in Aveiro, Portugal, in March 2012. The 168 revised full papers of both volumes were carefully reviewed and selected from numerous submissions. The papers present the state-of-the-art in communications and information processing and feature current research on the theory, analysis, design, test and deployment related to communications and information processing systems.

Evolutionary computation has been widely used in computer science for decades. Even though it started as far back as the 1960s with simulated evolution, the subject is still evolving. During this time, new metaheuristic optimization approaches, like evolutionary algorithms, genetic algorithms, swarm intelligence, etc., were being developed and new fields of usage in artificial intelligence, machine learning, combinatorial and numerical optimization, etc., were being explored. However, even with so much work done, novel research into new techniques and new areas of usage is far from over. This book presents some new theoretical as well as practical aspects of evolutionary computation. This book will be of great value to undergraduates, graduate students, researchers in computer science, and anyone else with an interest in learning about the latest developments in evolutionary computation.

Smart Delivery Systems: Solving Complex Vehicle Routing Problems examines both exact and approximate methods for delivering optimal solutions to rich vehicle routing problems, showing both the advantages and disadvantages of each approach. It shows how to apply machine learning and advanced data analysis techniques to improve routing systems, familiarizing readers with the concepts and technologies used in successfully implemented delivery systems. The book explains both the latest theoretical and practical advances in intelligent delivery and scheduling systems and presents practical applications for designing new algorithms for real-life scenarios. Emphasizes both sequential and parallel algorithms Uniquely combines methods and algorithms, real-life applications, and parallel computing Includes recommendations on how to choose between different methods for solving applications Provides learning aids, end of chapter references, bibliography, worked examples and exercises

The three-volume set LNAI 3213, LNAI 3214, and LNAI 3215 constitutes the refereed proceedings of the 8th International Conference on Knowledge-Based Intelligent Information and Engineering Systems, KES 2004, held in Wellington, New Zealand in September 2004. The over 450 papers presented were carefully reviewed and selected from numerous submissions. The papers present a wealth of original research results from the field of intelligent information processing in the broadest sense; among the areas covered are artificial intelligence, computational intelligence, cognitive technologies, soft computing, data mining, knowledge processing, various new paradigms in biologically inspired computing, and applications in various domains like bioinformatics, finance, signal processing etc.

This book constitutes the proceedings of the International Conference on Adaptive and Intelligent Systems, ICAIS 2011, held in Klagenfurt, Austria, in September 2011. The 36 full papers included in these proceedings together with the abstracts of 4 invited talks, were carefully reviewed and selected from 72 submissions.
The contributions are organized under the following topical sections: incremental learning; adaptive system architecture; intelligent system engineering; data mining and pattern recognition; intelligent agents; and computational intelligence.

This book addresses many-criteria decision-making (MCDM), a process used to find a solution in an environment with several criteria. In many real-world problems, there are several different objectives that need to be taken into account. Solving these problems is a challenging task and requires careful consideration. In real applications, often simple and easy to understand methods are used; as a result, the solutions accepted by decision makers are not always optimal solutions. On the other hand, algorithms that would provide better outcomes are very time consuming. The greatest challenge facing researchers is how to create effective algorithms that will yield optimal solutions with low time complexity. Accordingly, many current research efforts are focused on the implementation of biologically inspired algorithms (BIAs), which are well suited to solving uni-objective problems. This book introduces readers to state-of-the-art developments in biologically inspired techniques and their applications, with a major emphasis on the MCDM process. To do so, it presents a wide range of contributions on e.g. BIAs, MCDM, nature-inspired algorithms, multi-criteria optimization, machine learning and soft computing.

Evolutionary algorithms are becoming increasingly attractive across various disciplines, such as operations research, computer science, industrial engineering, electrical engineering, social science and economics. Introduction to Evolutionary Algorithms presents an insightful, comprehensive, and up-to-date treatment of evolutionary algorithms. It covers such hot topics as: • genetic algorithms, • differential evolution, • swarm intelligence, and • artificial immune systems. The reader is introduced to a range of applications, as Introduction to Evolutionary Algorithms demonstrates how to model real world problems, how to encode and decode individuals, and how to design effective search operators according to the chromosome structures with examples of constraint optimization, multiobjective optimization, combinatorial optimization, and supervised/unsupervised learning. This emphasis on practical applications will benefit all students, whether they choose to continue their academic career or to enter a particular industry. Introduction to Evolutionary Algorithms is intended as a textbook or self-study material for both advanced undergraduates and graduate students. Additional features such as recommended further reading and ideas for research projects combine to form an accessible and interesting pedagogical approach to this widely used discipline.

This easy-to-follow guide provides academics and industrial engineers with a state-of-the-art numerical approach to the most frequent technical and economical optimization methods. In an engaging manner, it provides the reader with not only a systematic and comprehensive study, but also with necessary and directly implementable code written in the versatile and readily available platform Matlab. The book offers optimization methods for univariate and multivariate constrained or unconstrained functions, general optimization methods and multicriteria optimization methods; provides intuitively, step-by-step explained sample Matlab code, that can be easily adjusted to meet individual requirements; and uses a clear, concise presentation style, which will be suited to readers even without a programming background, as well as to students preparing for examinations in optimization methods.

The International Conference on Intelligent Computing (ICIC) was formed to provide an annual forum dedicated to the emerging and challenging topics in artificial intelligence, machine learning, bioinformatics, and computational biology, etc. It aims to bring together researchers and practitioners from both academia and industry to share ideas, problems and solutions related to the multifaceted aspects of intelligent computing. ICIC 2008, held in Shanghai, China, September 15–18, 2008, constituted the 4th International Conference on Intelligent Computing. It built upon the success of ICIC 2007, ICIC 2006 and ICIC 2005 held in Qingdao, Kunming and Hefei, China, 2007, 2006 and 2005, respectively. This year, the conference concentrated mainly on the theories and
methodologies as well as the emerging applications of intelligent computing. Its aim was to unify the picture of contemporary intelligent computing techniques as an integral concept that highlights the trends in advanced computational intelligence and bridges theoretical research with applications. Therefore, the theme for this conference was “Emerging Intelligent Computing Technology and Applications”. Papers focusing on this theme were solicited, addressing theories, methodologies, and applications in science and technology.

This graduate-level text considers the Soviet ellipsoid algorithm for linear programming; efficient algorithms for network flow, matching, spanning trees, and matroids; the theory of NP-complete problems; local search heuristics for NP-complete problems, more. 1982 edition.

This book presents the state of the art of computational intelligence ion engineering. It offers challenging problems for efficient modeling of intelligent systems and details different methodologies of computational intelligence with real life applications.

Copyright code: 62ed869a3de9779c681c8dbda67196a1