Empirical Studies of Programmers - Fourth Workshop

Digital Microfluidic Biochips - Design Automation and Optimization

Microfluidics-based biochips combine electronics with biochemistry, providing access to new application areas in a wide variety of fields. Continued technological innovations are essential to assuring the future role of these chips in functional diversification in biotech, pharmaceuticals, and other industries. Revolutionary guidance on design, optimization, and testing of low-cost, disposable biochips Microfluidic Biochips: Design Automation and Optimization comprehensively covers the appropriate design tools and in-system automation methods that will help users adapt to new technology and progress in chip design and manufacturing. Based on results from several Duke University research projects on design automation for biochips, this book uses real-life bioassays as examples to lay out an automated design flow for creating microfluidic biochips. It also develops solutions to the unique problems associated with that process. Highlights the design of the protein crystallization chip to illustrate the benefits of automated design flow. In addition to covering automated design, the authors provide a detailed methodology for the testing, use, and optimization of robust, cost-efficient, manufacturable digital microfluidic systems used in protein crystallization and other areas. The invaluable tools and practices presented here will help readers to: Address optimization problems related to layout, synthesis, droplet routing, and testing for digital microfluidic biochips Make routing-aware, architectural-level design choices and defect-tolerant physical design decisions simultaneously Achieve the optimization goal, which includes minimizing time-to-response, chip area, and test complexity Effectively deal with practical issues such as defects, fabrication cost, physical constraints, and application-driven design. The authors present specialized pin-constrained design techniques for making biochips with a focus on cost and disposability. They also discuss chip testing to ensure dependability, which is key to optimizing safety-critical applications such as point-of-care medical diagnostics, on-chip DNA analysis, automated drug discovery, air-quality monitoring, and food-safety testing. This book is an optimal reference for academic and industrial researchers in the areas of digital microfluidic biochips and electronic design automation.

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Offers information on past and future conferences of the Empirical Studies of Programmers (ESP), provided by the ESP Design Team at the University of Nebraska at Lincoln. Includes indexes of papers and lists of participants, as well as photographs. Links to related sites.

This book constitutes the refereed proceedings of the 11th International Conference on Evolutionary Multi-Criterion Optimization, EMO 2021 held in Shenzhen, China, in March 2021. The 47 full papers and 14 short papers were carefully reviewed and selected from 120 submissions. The papers are divided into the following topical sections: theory; algorithms; dynamic multi-objective optimization; constrained multi-objective optimization; multi-modal optimization; many-objective optimization; performance evaluations and empirical studies; EMO and machine learning; surrogate modeling and expensive optimization; MCDM and interactive EMO; and applications.

**Evolutionary Learning: Advances in Theories and Algorithms**

Many machine learning tasks involve solving complex optimization problems, such as working on non-differentiable, non-continuous, and non-unique objective functions; in some cases it can prove difficult to even define an explicit objective function. Evolutionary learning applies evolutionary algorithms to address optimization problems in machine learning, and has yielded encouraging outcomes in many applications. However, due to the heuristic nature of evolutionary optimization, most outcomes to date have been empirical and lack theoretical support. This shortcoming has kept evolutionary learning from being well received in the machine learning community, which favors solid theoretical approaches. Recently there have been considerable efforts to address this issue. This book presents a range of those efforts, divided into four parts. Part I briefly introduces readers to evolutionary learning and provides some preliminaries, while Part II presents general theoretical tools for the analysis of running time and approximation performance in evolutionary algorithms. Based on these general tools, Part III presents a number of theoretical findings on major factors in evolutionary optimization, such as recombination, representation, inaccurate fitness evaluation, and population. In closing, Part IV addresses the development of evolutionary learning algorithms with provable theoretical guarantees for several representative tasks, in which evolutionary learning offers excellent performance.

**Artificial Intelligence and Symbolic Mathematical Computing - International Conference AISMC-1, Karlsruhe, Germany, August 3-6, 1992, Proceedings**

This volume contains the papers, updated in some cases, presented at the first AISMC (Artificial Intelligence and Symbolic Mathematical Computations) conference, held in Karlsruhe, August 3-6, 1992. This was the first conference to be devoted to such a topic after a long period when SMC made no appearance in AI conferences, though it used to be welcome in the early days of AI. Some conferences were held recently on mathematics and AI, but none was directly comparable in scope to this conference. Because of the novelty of the domain, authors were given longer allocations of time than usual in which to present their work. As a result, extended and fruitful discussions followed each paper. The introductory chapter in this book, which was not presented during the conference, reflects in many ways the flavor of these discussions and aims to set out the framework for future activities in this domain of research. In addition to the introduction, the volume contains 20 papers.
Cyberspace Mimic Defense - Generalized Robust Control and Endogenous Security

This book discusses uncertain threats, which are caused by unknown attacks based on unknown vulnerabilities or backdoors in the information system or control devices and software/hardware. Generalized robustness control architecture and the mimic defense mechanisms are presented in this book, which could change "the easy-to-attack and difficult-to-defend game" in cyberspace. The endogenous uncertain effects from the targets of the software/hardware based on this architecture can produce magic “mimic defense fog”, and suppress in a normalized mode random disturbances caused by physical or logic elements, as well as effects of non-probability disturbances brought by uncertain security threats. Although progress has been made in the current security defense theories in cyberspace and various types of security technologies have come into being, the effectiveness of such theories and technologies often depends on the scale of the prior knowledge of the attackers, on the part of the defender and on the acquired real-timing and accuracy regarding the attackers’ behavior features and other information. Hence, there lacks an efficient active defense means to deal with uncertain security threats from the unknown. Even if the bottom-line defense technologies such as encrypted verification are adopted, the security of hardware/software products cannot be quantitatively designed, verified or measured. Due to the “loose coupling” relationship and border defense modes between the defender and the protected target, there exist insurmountable theoretical and technological challenges in the protection of the defender and the target against the utilization of internal vulnerabilities or backdoors, as well as in dealing with attack scenarios based on backdoor-activated collaboration from both inside and outside, no matter how augmented or accumulated protective measures are adopted. Therefore, it is urgent to jump out of the stereotyped thinking based on conventional defense theories and technologies, find new theories and methods to effectively reduce the utilization of vulnerabilities and backdoors of the targets without relying on the priori knowledge and feature information, and to develop new technological means to offset uncertain threats based on unknown vulnerabilities and backdoors from an innovative perspective. This book provides a solution both in theory and engineering implementation to the difficult problem of how to avoid the uncontrollability of product security caused by globalized marketing, COTS and non-trustworthy software/hardware sources. It has been proved that this revolutionary enabling technology has endowed software/hardware products in IT/ICT/CPS with endogenous security functions and has overturned the attack theories and methods based on hardware/software design defects or resident malicious codes. This book is designed for educators, theoretical and technological researchers in cyber security and autonomous control and for business technicians who are engaged in the research on developing a new generation of software/hardware products by using endogenous security enabling technologies and for other product users. Postgraduates in IT/ICT/CPS/ICS will discover that (as long as the law of “structure determines the nature and architecture determines the security is properly used), the problem of software/hardware design defects or malicious code embedding will become the swelling of Achilles in the process of informationization and will no longer haunt Pandora’s box in cyberspace. Security and opening-up, advanced progressiveness and controllability seem to be contradictory, but there can be theoretically and technologically unified solutions to the problem.

This book constitutes the refereed proceedings of the 4th Asian Computing Science Conference, ASIAN'98, held in Manila, The Philippines, in December 1998. The 17 revised full papers presented were carefully reviewed and selected from a total of 43 submissions. Also included are a few invited contributions. Among the topics covered are automated deduction, proof theory, rewriting systems, program semantics, distributed processing, algorithms, and graph-theoretical aspects.

The Telecommunications Handbook

A panel of renowned experts from around the world contributed to this authoritative handbook that covers the essential aspects of this most dynamic field of communications and networking activity. Edited by Dr. Kornel Terplan and Patricia Morreale - well known authorities in telecommunications- this important new handbook provides basic principles and definitions, details the tremendous advances in technology, outlines implementation techniques, and discusses the outstanding issues and key challenges faced by communications and networking specialists. The telecommunications topics addressed include: o Basic principles o Services on broadband networks o Signal processing and coding schemes o Mobile and wireless networks o DSL technologies o Digital video and multimedia o Quality of service o Regulation o Standards o Emerging technologies Exhaustive in scope and packed with diagrams, tables, and illustrations, The Telecommunications Handbook is an indispensable, detailed reference for engineers, analysts, managers, and students involved in a wide range of telecommunication and networking activities.

FY-15 Progress Report on Cleanup of Irradiated SHINE Target Solutions Containing 140g-U/L Uranyl Sulfate

During FY 2012 and 2013, a process was developed to convert the SHINE Target Solution (STS) of irradiated uranyl sulfate (140 g U/L) to uranyl nitrate. This process is necessary so that the uranium solution can be processed by the UREX (Uranium Extraction) separation process, which will remove impurities from the uranium so that it can be recycled. The uranyl sulfate solution must contain...
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Rich Miron started working with TargetSolutions in April of 2010. He serves as the company’s marketing manager. Before joining TargetSolutions, Rich worked as a journalist and editor for several ...