Heuristics The Foundations Of Adaptive Behavior

Adaptation in Natural and Artificial SystemsSelf-Adaptive Heuristics for Evolutionary ComputationThinking, Fast and SlowTheory of Randomized Search HeuristicsHandbook of Constraint ProgrammingStochastic Local SearchUnderstanding Human DevelopmentDeliberate IgnoranceBiomimicry for Optimization, Control, and AutomationDecision Science and TechnologySimple Heuristics that Make Us SmartElements of Causal InferenceAdaptive Supply Chain ManagementReinforcement Learning and Approximate Dynamic Programming for Feedback ControlHeuristicsSimple Adaptive StrategiesNeural and Adaptive SystemsFoundations of Ecological ResilienceRisk SavvySocial Judgment and Decision MakingThe Practice of Adaptive LeadershipMultiobjective Heuristic SearchRationality for MortalsFoundations of Mobile Radio EngineeringEcological RationalityFoundations of Augmented Cognition. Advancing Human Performance and Decision-Making through Adaptive SystemsAdaptive Query ProcessingTaming UncertaintyCalculated RisksThe Biological Foundations of Organizational BehaviorThe Oxford Handbook of Psychological SituationsSimple Heuristics in a Social WorldSimply RationalFoundations and Applications of Sensor ManagementHybrid MetaheuristicsBounded RationalityProviding Sound Foundations for CryptographyAdaptive MarketsAdaptive ThinkingPervasive Information Architecture

Adaptation in Natural and Artificial Systems

The Practice of Adaptive Leadership will help you think more clearly and execute better in a constantly shifting environment. It offers a comprehensive and systematic approach to candidly assessing the situation and yourself, and then taking action. Its wisdom and advice are drawn from the experiences of people like you, committed to advancing what you care about most. The book is anchored in the framework of adaptive leadership, but goes beyond the theory to provide a practical set of stories, diagrams, techniques, and activities that will help you both assess and address the toughest challenges that lie ahead. Dozens of tools and tactics are presented in an exciting, clear, and reader-friendly design.

Self-Adaptive Heuristics for Evolutionary Computation

How do people make decisions when time is limited, information unreliable, and the future uncertain? Based on the work of Nobel laureate Herbert Simon and with the help of colleagues around the world, the Adaptive Behavior and Cognition (ABC) Group at the Max Planck Institute for Human Development in Berlin has developed a research program on simple heuristics, also known as fast and frugal heuristics. In the social sciences, heuristics have been believed to be generally inferior to complex methods for inference, or even irrational. Although this may be true in "small worlds" where everything is known

for certain, we show that in the actual world in which we live, full of uncertainties and surprises, heuristics are indispensable and often more accurate than complex methods. Contrary to a deeply entrenched belief, complex problems do not necessitate complex computations. Less can be more. Simple heuristics exploit the information structure of the environment, and thus embody ecological rather than logical rationality. Simon (1999) applauded this new program as a "revolution in cognitive science, striking a great blow for sanity in the approach to human rationality." By providing a fresh look at how the mind works as well as the nature of rationality, the simple heuristics program has stimulated a large body of research, led to fascinating applications in diverse fields from law to medicine to business to sports, and instigated controversial debates in psychology, philosophy, and economics. In a single volume, the present reader compiles key articles that have been published in journals across many disciplines. These articles present theory, real-world applications, and a sample of the large number of existing experimental studies that provide evidence for people's adaptive use of heuristics.

Thinking, Fast and Slow

Solutions to most real-world optimization problems involve a trade-off between multiple conflicting and non-commensurate objectives. Some of the most challenging ones are area-delay trade-off in VLSI synthesis and design space exploration, time-space trade-off in computation, and multi-strategy games. Conventional search techniques are not equipped to handle the partial order state spaces of multiobjective problems since they inherently assume a single scalar objective function. Multiobjective heuristic search techniques have been developed to specifically address multicriteria combinatorial optimization problems. This text describes the multiobjective search model and develops the theoretical foundations of the subject, including complexity results . The fundamental algorithms for three major problem formulation schemes, namely state-space formulations, problem-reduction formulations, and game-tree formulations are developed with the support of illustrative examples. Applications of multiobjective search techniques to synthesis problems in VLSI, and operations research are considered. This text provides a complete picture on contemporary research on multiobjective search, most of which is the contribution of the authors.

Theory of Randomized Search Heuristics

Simple Heuristics That Make Us Smart invites readers to embark on a new journey into a land of rationality that differs from the familiar territory of cognitive science and economics. Traditional views of rationality tend to see decision makers as possessing superhuman powers of reason, limitless knowledge, and all of eternity in which to ponder choices. To understand decisions in the real world, we need a different, more psychologically plausible notion of rationality, and this book provides it. It is about fast and frugal heuristics--simple rules for making decisions when time is pressing and deep

thought an unaffordable luxury. These heuristics can enable both living organisms and artificial systems to make smart choices, classifications, and predictions by employing bounded rationality. But when and how can such fast and frugal heuristics work? Can judgments based simply on one good reason be as accurate as those based on many reasons? Could less knowledge even lead to systematically better predictions than more knowledge? Simple Heuristics explores these questions, developing computational models of heuristics and testing them through experiments and analyses. It shows how fast and frugal heuristics can produce adaptive decisions in situations as varied as choosing a mate, dividing resources among offspring, predicting high school drop out rates, and playing the stock market. As an interdisciplinary work that is both useful and engaging, this book will appeal to a wide audience. It is ideal for researchers in cognitive psychology, evolutionary psychology, and cognitive science, as well as in economics and artificial intelligence. It will also inspire anyone interested in simply making good decisions.

Handbook of Constraint Programming

"First published in United States of America by Viking Penguin, a member of Penguin Group (USA) LLC, 2014."--Title page verso.

Stochastic Local Search

This book promotes bounded rationality as the key to understanding how real people make decisions.

Understanding Human Development

Stochastic local search (SLS) algorithms are among the most prominent and successful techniques for solving computationally difficult problems. Offering a systematic treatment of SLS algorithms, this book examines the general concepts and specific instances of SLS algorithms and considers their development, analysis and application.

Deliberate Ignorance

Cryptography is concerned with the construction of schemes that withstand any abuse. A cryptographic scheme is constructed so as to maintain a desired functionality, even under malicious attempts aimed at making it deviate from its prescribed behavior. The design of cryptographic systems must be based on firm foundations, whereas ad hoc approaches and heuristics are a very dangerous way to go. These foundations were developed mostly in the 1980s, in works that are all co-authored by Shafi Goldwasser and/or Silvio Micali. These works have transformed cryptography from an engineering

discipline, lacking sound theoretical foundations, into a scientific field possessing a well-founded theory, which influences practice as well as contributes to other areas of theoretical computer science. This book celebrates these works, which were the basis for bestowing the 2012 A.M. Turing Award upon Shafi Goldwasser and Silvio Micali. A significant portion of this book reproduces some of these works, and another portion consists of scientific perspectives by some of their former students. The highlight of the book is provided by a few chapters that allow the readers to meet Shafi and Silvio in person. These include interviews with them, their biographies and their Turing Award lectures.

Biomimicry for Optimization, Control, and Automation

This volume collects almost two decades of joint work of Sergiu Hart and Andreu Mas-Colell on game dynamics and equilibria. The starting point was the introduction of the adaptive strategy called regret-matching, which on the one hand is simple and natural, and on the other is shown to lead to correlated equilibria. This initial finding — boundedly rational behavior that yields fully rational outcomes in the long run — generated a large body of work on the dynamics of simple adaptive strategies. In particular, a natural condition on dynamics was identified: uncoupledness, whereby decision-makers do not know each other's payoffs and utilities (so, while chosen actions may be observable, the motivations are not). This condition turns out to severely limit the equilibria that can be reached. Interestingly, there are connections to the behavioral and neurobiological sciences and also to computer science and engineering (e.g., via notions of "regret"). Simple Adaptive Strategies is self-contained and unified in its presentation. Together with the formal treatment of concepts, theorems, and proofs, significant space is devoted to informal explanations and illuminating examples. It may be used for advanced graduate courses — in game theory, economics, mathematics, computer science, engineering — and for further research. Contents:Correlated Equilibria:Existence of Correlated Equilibria (Sergiu Hart and David Schmeidler)Regret Matching:A Simple Adaptive Procedure Leading to Correlated Equilibrium (Sergiu Hart and Andreu Mas-Colell)A General Class of Adaptive Strategies (Sergiu Hart and Andreu Mas-Colell)A Reinforcement Procedure Leading to Correlated Equilibrium (Sergiu Hart and Andreu Mas-Colell)Regret-Based Continuous-Time Dynamics (Sergiu Hart and Andreu Mas-Colell)General Procedures Leading to Correlated Equilibria (Amotz Cahn)Uncoupled Dynamics:Uncoupled Dynamics Do Not Lead to Nash Equilibrium (Sergiu Hart and Andreu Mas-Colell)Stochastic Uncoupled Dynamics and Nash Equilibrium (Sergiu Hart and Andreu Mas-Colell)Uncoupled Automata and Pure Nash Equilibria (Yakov Babichenko)How Long to Equilibrium? The Communication Complexity of Uncoupled Equilibrium Procedures (Sergiu Hart and Yishay Mansour)Dynamics and Equilibria:Adaptive Heuristics (Sergiu Hart)Nash Equilibrium and Dynamics (Sergiu Hart) Readership: Graduate students and researchers in game theory, economic theory, econometrics, computer science and engineering. Keywords:Game Theory;Dynamics;Equilibrium;Nash Equilibrium;Correlated Equilibrium;Adaptive Dynamics;Simple Strategies;Regret-Based Strategies;Uncoupled Dynamics;Bounded RationalityKey Features:Prominent authors (two world-leading game theorists)Significant cutting-edge body of researchNovel ideas and insights that are useful and applicable in many

areasReviews: "A fundamental issue with any concept of equilibrium, including Nash and correlated equilibria, is to define the process by which equilibrium is attained. The work of Professors Hart and Mas-Colell has been the deepest in this area, especially in defining conditions ('uncoupled dynamics') which reflect naturally the information available in real economic interactions. Their body of results is essential to study of these fundamental problems."; Kenneth J Arrow Stanford University, USA "In social as well as physical systems, equilibrium is of fundamental importance. Reaching equilibrium is at least as important as being there. In the last quarter century, research that investigates how social or game-theoretic equilibrium is reached has been spearheaded bySergiu Hart and Andreu Mas-Colell. The most outstanding works in this area are gathered in the book before us — a must for anyone interested in this dynamic area of emerging economic research." Robert J Aumann Hebrew University of Jerusalem, Israel "The question of learning and convergence to equilibrium is of critical importance to the foundations and applications of game theory. But after half a century of research there are no universally accepted answers: different assumptions about players' information and learning dynamics lead to different conclusions. The Hart and Mas-Colell book describes fascinating directions of research on this subject developed by two distinguished authors and their collaborators over the last dozen years." Ehud Kalai Northwestern University, USA "In this collection two leading game theorists show that various forms of equilibrium can be learned by simple and natural learning strategies that put minimal demands on the players' knowledge and level of rationality. It represents a major contribution to one of the most important topics in modern game theory."; Peyton Young Oxford University, UK

Decision Science and Technology

Situations matter. They let people express their personalities and values; provoke motivations, emotions, and behaviors; and are the contexts in which people reason and act. The psychological assessment of situations is a new and rapidly developing area of research, particularly within the fields of personality and social psychology. This volume compiles state-of-the-art knowledge on psychological situations in chapters written by experts in their respective research areas. Bringing together historical reviews, theoretical pieces, methodological descriptions, and empirical applications, this volume is the definitive, go-to source for a psychology of situations.

Simple Heuristics that Make Us Smart

Major New York Times bestseller Winner of the National Academy of Sciences Best Book Award in 2012 Selected by the New York Times Book Review as one of the ten best books of 2011 A Globe and Mail Best Books of the Year 2011 Title One of The Economist's 2011 Books of the Year One of The Wall Street Journal's Best Nonfiction Books of the Year 2011 2013 Presidential Medal of Freedom Recipient Kahneman's work with Amos Tversky is the subject of Michael Lewis's The Undoing Project: A Friendship That Changed Our Minds In the international bestseller, Thinking, Fast and Slow, Daniel Kahneman, the

renowned psychologist and winner of the Nobel Prize in Economics, takes us on a groundbreaking tour of the mind and explains the two systems that drive the way we think. System 1 is fast, intuitive, and emotional; System 2 is slower, more deliberative, and more logical. The impact of overconfidence on corporate strategies, the difficulties of predicting what will make us happy in the future, the profound effect of cognitive biases on everything from playing the stock market to planning our next vacation—each of these can be understood only by knowing how the two systems shape our judgments and decisions. Engaging the reader in a lively conversation about how we think, Kahneman reveals where we can and cannot trust our intuitions and how we can tap into the benefits of slow thinking. He offers practical and enlightening insights into how choices are made in both our business and our personal lives—and how we can use different techniques to guard against the mental glitches that often get us into trouble. Winner of the National Academy of Sciences Best Book Award and the Los Angeles Times Book Prize and selected by The New York Times Book Review as one of the ten best books of 2011, Thinking, Fast and Slow is destined to be a classic.

Elements of Causal Inference

When biological theories were used to understand behavior in the early 20th century, they were often poorly understood. Ideas about race, ethnicity, and IQ, and notions of social Darwinism, were based on a misunderstanding and an incomplete understanding of genetics and Darwin's theory of evolution by natural selection. Now, however, a biological understanding of social behavior is an integral part of modern science, and increasingly used in the study of behavior in organizations. Yet, compared with other explanatory paradigms in organizational behavior, biological and evolutionary approaches are still relatively rare. The Biological Foundations of Organizational Behavior provides accessible insights for scholars and practitioners in management and organizational behavior into what biology can offer their fields. Chapters contain enough background to orient readers who may have little knowledge of biology, and provide substantive contributions to advancing understanding of specific areas of biology and human behavior in organizations. They also show how the addition of biological theory and research to organizational-behavior scholarship will increase its explanatory and predictive power and contribute to its scientific foundations.

Adaptive Supply Chain Management

The mathematization of causality is a relatively recent development, and has become increasingly important in data science and machine learning. This book offers a self-contained and concise introduction to causal models and how to learn them from data. After explaining the need for causal models and discussing some of the principles underlying causal inference, the book teaches readers how to use causal models: how to compute intervention distributions, how to infer causal models from observational and interventional data, and how causal ideas could be exploited for classical machine

learning problems. All of these topics are discussed first in terms of two variables and then in the more general multivariate case. The bivariate case turns out to be a particularly hard problem for causal learning because there are no conditional independences as used by classical methods for solving multivariate cases. The authors consider analyzing statistical asymmetries between cause and effect to be highly instructive, and they report on their decade of intensive research into this problem. The book is accessible to readers with a background in machine learning or statistics, and can be used in graduate courses or as a reference for researchers. The text includes code snippets that can be copied and pasted, exercises, and an appendix with a summary of the most important technical concepts.

Reinforcement Learning and Approximate Dynamic Programming for Feedback Control

Pervasive Information Architecture explains the 'why' and 'how' of pervasive information architecture (IA) through detailed examples and real-world stories. It offers insights about trade-offs that can be made and techniques for even the most unique design challenges. The book will help readers master agile information structures while meeting their unique needs on such devices as smart phones, GPS systems, and tablets. The book provides examples showing how to: model and shape information to adapt itself to users' needs, goals, and seeking strategies; reduce disorientation and increase legibility and way-finding in digital and physical spaces; and alleviate the frustration associated with choosing from an ever-growing set of information, services, and goods. It also describes relevant connections between pieces of information, services and goods to help users achieve their goals. This book will be of value to practitioners, researchers, academics, andstudents in user experience design, usability, information architecture, interaction design, HCI, web interaction/interface designer, mobile application design/development, and information design. Architects and industrial designers moving into the digital realm will also find this book helpful. Master agile information structures while meeting the unique user needs on such devices as smart phones, GPS systems, and tablets Find out the 'why' and 'how' of pervasive information architecture (IA) through detailed examples and real-world stories Learn about trade-offs that can be made and techniques for even the most unique design challenges

Heuristics

Constraint programming is a powerful paradigm for solving combinatorial search problems that draws on a wide range of techniques from artificial intelligence, computer science, databases, programming languages, and operations research. Constraint programming is currently applied with success to many domains, such as scheduling, planning, vehicle routing, configuration, networks, and bioinformatics. The aim of this handbook is to capture the full breadth and depth of the constraint programming field and to be encyclopedic in its scope and coverage. While there are several excellent books on constraint programming, such books necessarily focus on the main notions and techniques and cannot cover also

extensions, applications, and languages. The handbook gives a reasonably complete coverage of all these lines of work, based on constraint programming, so that a reader can have a rather precise idea of the whole field and its potential. Of course each line of work is dealt with in a survey-like style, where some details may be neglected in favor of coverage. However, the extensive bibliography of each chapter will help the interested readers to find suitable sources for the missing details. Each chapter of the handbook is intended to be a self-contained survey of a topic, and is written by one or more authors who are leading researchers in the area. The intended audience of the handbook is researchers, graduate students, higher-year undergraduates and practitioners who wish to learn about the state-of-the-art in constraint programming. No prior knowledge about the field is necessary to be able to read the chapters and gather useful knowledge. Researchers from other fields should find in this handbook an effective way to learn about constraint programming and to possibly use some of the constraint programming concepts and techniques in their work, thus providing a means for a fruitful cross-fertilization among different research areas. The handbook is organized in two parts. The first part covers the basic foundations of constraint programming, including the history, the notion of constraint propagation, basic search methods, global constraints, tractability and computational complexity, and important issues in modeling a problem as a constraint problem. The second part covers constraint languages and solver, several useful extensions to the basic framework (such as interval constraints, structured domains, and distributed CSPs), and successful application areas for constraint programming. - Covers the whole field of constraint programming - Survey-style chapters - Five chapters on applications

Simple Adaptive Strategies

A new, evolutionary explanation of markets and investor behavior Half of all Americans have money in the stock market, yet economists can't agree on whether investors and markets are rational and efficient, as modern financial theory assumes, or irrational and inefficient, as behavioral economists believe. The debate is one of the biggest in economics, and the value or futility of investment management and financial regulation hangs on the answer. In this groundbreaking book, Andrew Lo transforms the debate with a powerful new framework in which rationality and irrationality coexist—the Adaptive Markets Hypothesis. Drawing on psychology, evolutionary biology, neuroscience, artificial intelligence, and other fields, Adaptive Markets shows that the theory of market efficiency is incomplete. When markets are unstable, investors react instinctively, creating inefficiencies for others to exploit. Lo's new paradigm explains how financial evolution shapes behavior and markets at the speed of thought—a fact revealed by swings between stability and crisis, profit and loss, and innovation and regulation. An ambitious new answer to fundamental questions about economics and investing, Adaptive Markets is essential reading for anyone who wants to understand how markets really work.

Neural and Adaptive Systems

Ecological resilience provides a theoretical foundation for understanding how complex systems adapt to and recover from localized disturbances like hurricanes, fires, pest outbreaks, and floods, as well as large-scale perturbations such as climate change. Ecologists have developed resilience theory over the past three decades in an effort to explain surprising and nonlinear dynamics of complex adaptive systems. Resilience theory is especially important to environmental scientists for its role in underpinning adaptive management approaches to ecosystem and resource management. Foundations of Ecological Resilience is a collection of the most important articles on the subject of ecological resilience—those writings that have defined and developed basic concepts in the field and help explain its importance and meaning for scientists and researchers. The book's three sections cover articles that have shaped or defined the concepts and theories of resilience, including key papers that broke new conceptual ground and contributed novel ideas to the field; examples that demonstrate ecological resilience in a range of ecosystems; and articles that present practical methods for understanding and managing nonlinear ecosystem dynamics. Foundations of Ecological Resilience is an important contribution to our collective understanding of resilience and an invaluable resource for students and scholars in ecology, wildlife ecology, conservation biology, sustainability, environmental science, public policy, and related fields.

Foundations of Ecological Resilience

Reinforcement learning (RL) and adaptive dynamic programming (ADP) has been one of the most critical research fields in science and engineering for modern complex systems. This book describes the latest RL and ADP techniques for decision and control in human engineered systems, covering both single player decision and control and multi-player games. Edited by the pioneers of RL and ADP research, the book brings together ideas and methods from many fields and provides an important and timely guidance on controlling a wide variety of systems, such as robots, industrial processes, and economic decision-making.

Risk Savvy

Gerd Gigerenzer's influential work examines the rationality of individuals not from the perspective of logic or probability, but from the point of view of adaptation to the real world of human behavior and interaction with the environment. Seen from this perspective, human behavior is more rational than it might otherwise appear. This work is extremely influential and has spawned an entire research program. This volume (which follows on a previous collection, Adaptive Thinking, also published by OUP) collects his most recent articles, looking at how people use "fast and frugal heuristics" to calculate probability and risk and make decisions. It includes a newly writen, substantial introduction, and the articles have been revised and updated where appropriate. This volume should appeal, like the earlier volumes, to a broad mixture of cognitive psychologists, philosophers, economists, and others who study decision making.

Social Judgment and Decision Making

An examination of the cognitive tools that the mind uses to grapple with uncertainty in the real world. How do humans navigate uncertainty, continuously making near-effortless decisions and predictions even under conditions of imperfect knowledge, high complexity, and extreme time pressure? Taming Uncertainty argues that the human mind has developed tools to grapple with uncertainty. Unlike much previous scholarship in psychology and economics, this approach is rooted in what is known about what real minds can do. Rather than reducing the human response to uncertainty to an act of juggling probabilities, the authors propose that the human cognitive system has specific tools for dealing with different forms of uncertainty. They identify three types of tools: simple heuristics, tools for information search, and tools for harnessing the wisdom of others. This set of strategies for making predictions, inferences, and decisions constitute the mind's adaptive toolbox. The authors show how these three dimensions of human decision making are integrated and they argue that the toolbox, its cognitive foundation, and the environment are in constant flux and subject to developmental change. They demonstrate that each cognitive tool can be analyzed through the concept of ecological rationality—that is, the fit between specific tools and specific environments. Chapters deal with such specific instances of decision making as food choice architecture, intertemporal choice, financial uncertainty, pedestrian navigation, and adolescent behavior.

The Practice of Adaptive Leadership

"More information is always better, and full information is best. More computation is always better, and optimization is best." More-is-better ideals such as these have long shaped our vision of rationality. Yet humans and other animals typically rely on simple heuristics to solve adaptive problems, focusing on one or a few important cues and ignoring the rest, and shortcutting computation rather than striving for as much as possible. In this book, we argue that in an uncertain world, more information and computation are not always better, and we ask when, and why, less can be more. The answers to these questions constitute the idea of ecological rationality: how we are able to achieve intelligence in the world by using simple heuristics matched to the environments we face, exploiting the structures inherent in our physical, biological, social, and cultural surroundings.

Multiobjective Heuristic Search

This is a collection of Gigerenzer's most important papers on rationality, heuristics, and rituals. Although the papers were originally addressed to distinct scientific communities, they have since been rewritten, updated, and shortened to convey the impressive contiguity and range of work. This volume affords readers the first opportunity to see how his different scholarly endeavours combine to demonstrate a coherent and unified theoretical structure.

Rationality for Mortals

Evolutionary algorithms are successful biologically inspired meta-heuristics. Their success depends on adequate parameter settings. The question arises: how can evolutionary algorithms learn parameters automatically during the optimization? Evolution strategies gave an answer decades ago: self-adaptation. Their self-adaptive mutation control turned out to be exceptionally successful. But nevertheless self-adaptation has not achieved the attention it deserves. This book introduces various types of self-adaptive parameters for evolutionary computation. Biased mutation for evolution strategies is useful for constrained search spaces. Self-adaptive inversion mutation accelerates the search on combinatorial TSP-like problems. After the analysis of self-adaptive crossover operators the book concentrates on premature convergence of self-adaptive mutation control at the constraint boundary. Besides extensive experiments, statistical tests and some theoretical investigations enrich the analysis of the proposed concepts.

Foundations of Mobile Radio Engineering

K. Warner Schaie I am pleased to write a foreword for this interesting volume, particularly as over many years, I have had the privilege of interacting with the editors and a majority of the con tributors in various professional roles as a colleague, mentor, or research collaborator. The editors begin their introduction by asking why one would want to read yet another book on human development. They immediately answer their question by pointing out that many developmentally oriented texts and other treatises neglect the theoretical foundations of human development and fail to embed psychological constructs within the multidisciplinary context so essential to understanding development. This volume provides a positive remedy to past deficiencies in volumes on hu man development with a well-organized structure that leads the reader from a general introduction through the basic processes to methodological issues and the relation of developmental constructs to social context and biological infrastructure. This approach does not surprise. After all, the editors and most of the contributors at one time or an other had a connection to the Max Planck Institute of Human Development in Berlin, whether as students, junior scientists, or senior visitors. That institute, under the leader ship of Paul Baltes, has been instrumental in pursuing a systematic lifespan approach to the study of cognition and personality. Over the past two decades, it has influenced the careers of a generation of scientists who have advocated long-term studies of human development in an interdisciplinary context.

Ecological Rationality

Adaptive Query Processing surveys the fundamental issues, techniques, costs, and benefits of adaptive query processing. It begins with a broad overview of the field, identifying the dimensions of adaptive techniques. It then looks at the spectrum

of approaches available to adapt query execution at runtime - primarily in a non-streaming context. The emphasis is on simplifying and abstracting the key concepts of each technique, rather than reproducing the full details available in the papers. The authors identify the strengths and limitations of the different techniques, demonstrate when they are most useful, and suggest possible avenues of future research. Adaptive Query Processing serves as a valuable reference for students of databases, providing a thorough survey of the area. Database researchers will benefit from a more complete point of view, including a number of approaches which they may not have focused on within the scope of their own research.

Foundations of Augmented Cognition. Advancing Human Performance and Decision-Making through Adaptive Systems

At the beginning of the twentieth century, H. G. Wells predicted that statistical thinking would be as necessary for citizenship in a technological world as the ability to read and write. But in the twenty-first century, we are often overwhelmed by a baffling array of percentages and probabilities as we try to navigate in a world dominated by statistics. Cognitive scientist Gerd Gigerenzer says that because we haven't learned statistical thinking, we don't understand risk and uncertainty. In order to assess risk -- everything from the risk of an automobile accident to the certainty or uncertainty of some common medical screening tests -- we need a basic understanding of statistics. Astonishingly, doctors and lawyers don't understand risk any better than anyone else. Gigerenzer reports a study in which doctors were told the results of breast cancer screenings and then were asked to explain the risks of contracting breast cancer to a woman who received a positive result from a screening. The actual risk was small because the test gives many false positives. But nearly every physician in the study overstated the risk. Yet many people will have to make important health decisions based on such information and the interpretation of that information by their doctors. Gigerenzer explains that a major obstacle to our understanding of numbers is that we live with an illusion of certainty. Many of us believe that HIV tests, DNA fingerprinting, and the growing number of genetic tests are absolutely certain. But even DNA evidence can produce spurious matches. We cling to our illusion of certainty because the medical industry, insurance companies, investment advisers, and election campaigns have become purveyors of certainty, marketing it like a commodity. To avoid confusion, says Gigerenzer, we should rely on more understandable representations of risk, such as absolute risks. For example, it is said that a mammography screening reduces the risk of breast cancer by 25 percent. But in absolute risks, that means that out of every 1,000 women who do not participate in screening, 4 will die; while out of 1,000 women who do, 3 will die. A 25 percent risk reduction sounds much more significant than a benefit that 1 out of 1,000 women will reap. This eye-opening book explains how we can overcome our ignorance of numbers and better understand the risks we may be taking with our money, our health, and our lives.

Adaptive Query Processing

This book constitutes the proceedings of the 8th International Conference on the Foundations of Augmented Cognition, AC 2014, held as part of HCI International 2014 which took place in Heraklion, Crete, Greece, in June 2014 and incorporated 14 conferences which similar thematic areas. HCII 2014 received a total of 4766 submissions, of which 1476 papers and 220 posters were accepted for publication after a careful reviewing process. These papers address the latest research and development efforts and highlight the human aspects of design and use of computing systems. The papers thoroughly cover the entire field of Human-Computer Interaction, addressing major advances in knowledge and effective use of computers in a variety of application areas. The 34 papers presented in the AC 2014 proceedings are organized in topical sections named: emotional and cognitive issues in augmented cognition; machine learning for augmented cognition; augmented cognition for learning and training and augmented cognition for health and rehabilitation.

Taming Uncertainty

This book covers control theory signal processing and relevant applications in a unified manner. It introduces the area, takes stock of advances, and describes open problems and challenges in order to advance the field. The editors and contributors to this book are pioneers in the area of active sensing and sensor management, and represent the diverse communities that are targeted.

Calculated Risks

Develop New Insight into the Behavior of Adaptive Systems This one-of-a-kind interactive book and CD-ROM will help you develop a better understanding of the behavior of adaptive systems. Developed as part of a project aimed at innovating the teaching of adaptive systems in science and engineering, it unifies the concepts of neural networks and adaptive filters into a common framework. It begins by explaining the fundamentals of adaptive linear regression and builds on these concepts to explore pattern classification, function approximation, feature extraction, and time-series modeling/prediction. The text is integrated with the industry standard neural network/adaptive system simulator NeuroSolutions. This allows the authors to demonstrate and reinforce key concepts using over 200 interactive examples. Each of these examples is 'live,' allowing the user to change parameters and experiment first-hand with real-world adaptive systems. This creates a powerful environment for learning through both visualization and experimentation. Key Features of the Text * The text and CD combine to become an interactive learning tool. * Emphasis is on understanding the behavior of adaptive systems rather than mathematical derivations. * Each key concept is followed by an interactive example. * Over 200 fully functional simulations of adaptive systems are included. * The text and CD offer a unified view of neural networks, adaptive filters,

pattern recognition, and support vector machines. * Hyperlinks allow instant access to keyword definitions, bibliographic references, equations, and advanced discussions of concepts. The CD-ROM Contains: * A complete, electronic version of the text in hypertext format * NeuroSolutions, an industry standard, icon-based neural network/adaptive system simulator * A tutorial on how to use NeuroSolutions * Additional data files to use with the simulator "An innovative approach to describing neurocomputing and adaptive learning systems from a perspective which unifies classical linear adaptive systems approaches with the modern advances in neural networks. It is rich in examples and practical insight." -James Zeidler, University of California, San Diego

The Biological Foundations of Organizational Behavior

This book explains the most prominent and some promising new, general techniques that combine metaheuristics with other optimization methods. A first introductory chapter reviews the basic principles of local search, prominent metaheuristics, and tree search, dynamic programming, mixed integer linear programming, and constraint programming for combinatorial optimization purposes. The chapters that follow present five generally applicable hybridization strategies, with exemplary case studies on selected problems: incomplete solution representations and decoders; problem instance reduction; large neighborhood search; parallel non-independent construction of solutions within metaheuristics; and hybridization based on complete solution archives. The authors are among the leading researchers in the hybridization of metaheuristics with other techniques for optimization, and their work reflects the broad shift to problem-oriented rather than algorithm-oriented approaches, enabling faster and more effective implementation in real-life applications. This hybridization is not restricted to different variants of metaheuristics but includes, for example, the combination of mathematical programming, dynamic programming, or constraint programming with metaheuristics, reflecting cross-fertilization in fields such as optimization, algorithmics, mathematical modeling, operations research, statistics, and simulation. The book is a valuable introduction and reference for researchers and graduate students in these domains.

The Oxford Handbook of Psychological Situations

Adaptive Supply Chain Management develops new viewpoints on the SCM goal paradigm, problem semantics, and decision-making support. Drawing upon years of research and practical experience, and using numerous examples, the authors unite conceptual considerations of supply chains with a constructive level of engineering and solutions to real-world problems. Adaptive Supply Chain Management provides advanced insights into dynamics, complexity, and uncertainty in supply chains from the perspectives of systems analysis, control theory, and operations research. It also considers supply chain adaptability, stability, and crisis-resistance. Providing readers with a comprehensive view of advanced SCM concepts, constructive mathematical techniques and models, Adaptive Supply Chain Management is an invaluable text for

practitioners and researchers who specialize in SCM and operations.

Simple Heuristics in a Social World

This is the only comprehensive textbook on this topic. The complete treatment will be attractive for classes and for researchers.

Simply Rational

This volume brings together the latest research in judgment and decision making as it relates to social psychology. The contributors are internationally renowned researchers in the field, and chapters cover the latest empirical, theoretical and practical issues in this area, including common mistakes and biases, metrics and measures, and psychological mechanisms and statistical necessities. The book also offers a partial acquittal of the social judge and decision maker. It provides a definitive summary and integration of the diverse perspectives that inform research in this area of social psychology, and is intended as an essential resource for senior undergraduates, postgraduates, researchers and practitioners

Foundations and Applications of Sensor Management

Decision Science and Technology is a compilation of chapters written in honor of a remarkable man, Ward Edwards. Among Ward's many contributions are two significant accomplishments, either of which would have been enough for a very distinguished career. First, Ward is the founder of behavioral decision theory. This interdisciplinary discipline addresses the question of how people actually confront decisions, as opposed to the question of how they should make decisions. Second, Ward laid the groundwork for sound normative systems by noticing which tasks humans can do well and which tasks computers should perform. This volume, organized into five parts, reflects those accomplishments and more. The book is divided into four sections: `Behavioral Decision Theory' examines theoretical descriptions and empirical findings about human decision making. `Decision Analysis' examines topics in decision analysis.`Decision in Society' explores issues in societal decision making. The final section, `Historical Notes', provides some historical perspectives on the development of the decision theory. Within these sections, major, multi-disciplinary scholars in decision theory have written chapters exploring some very bold themes in the field, as an examination of the book's contents will show. The main reason for the health of the Decision Analysis field is its close links between theory and applications that have characterized it over the years. In this volume, the chapters by Barron and Barrett; Fishburn; Fryback; Keeney; Moreno, Pericchi, and Kadane; Howard; Phillips; Slovic and Gregory; Winkler; and, above all, von Winterfeldt focus on those links. Decision science originally developed out of concern with real decision problems; and applied work, such as is represented in this volume,

will help the field to remain strong.

Hybrid Metaheuristics

Bounded Rationality

Foundations of Mobile Radio Engineering is a comprehensive survey covering the main topics of mobile radio systems. Concepts considered include the theory of patterns and symmetry and how it impacts hexagonal cell tessellation, long-term fading and log-normal distribution, short-term fading and Rayleigh distribution, indoor propagation and Rice dis

Providing Sound Foundations for Cryptography

List of figures. Preface to the 1992 edition. Preface. The general setting. A formal framework. lustrations. Schemata. The optimal allocation of trials. Reproductive plans and genetic operators. The robustness of genetic plans. Adaptation of codings and representations. An overview. Interim and prospectus. Glossary of important symbols.

Adaptive Markets

This volume of collected papers brings together applied and theoretical research on risks and decision making in the fields of medicine, psychology, and economics.

Adaptive Thinking

This title invites readers to discover the simple heuristics that people use to navigate the complexities and surprises of environments populated with others.

Pervasive Information Architecture

"Psychologists, economists, historians, computer scientists, sociologists, philosophers, and legal scholars discuss when is deliberate ignorance a virtue, and what type of environment does it require"--

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION