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World Scientific Series in Information Studies

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Aims and Scope

This book series will include expository books, research monographs, textbooks, handbooks and authoritative reviews concerning the latest developments in the theory and practice of information, information processing, information storage and communication.

Readership

The volumes will be of interest to scientists, engineers, programmers and other professionals who primarily work with information, as well as for the general audience interested in the most important phenomenon of the 21st century — information. Graduate and undergraduate students in many fields will also find the series valuable.

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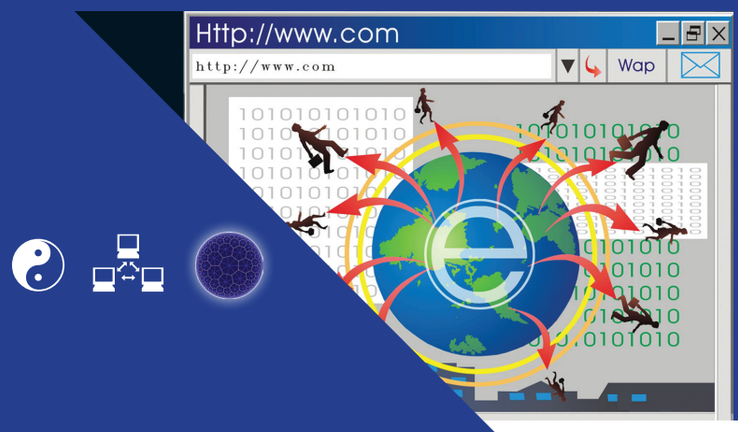


World Scientific Series in Information Studies — **Vol. 1**

THEORY OF INFORMATION

Fundamentality, Diversity and Unification

688pp Dec 2009
978-981-283-548-2 US$159 / £132

by **Mark Burgin**
University of California, Los Angeles, USA

This unique volume presents a new approach — the *general theory of information* — to scientific understanding of information phenomena. Based on a thorough analysis of information processes in nature, technology, and society, as well as on the main directions in information theory, this theory synthesizes existing directions into a unified system. The book explains how this theory opens new kinds of possibilities for information technology, information sciences, computer science, knowledge engineering, psychology, linguistics, social sciences, and education.

The book also gives a broad introduction to the main mathematically-based directions in information theory. The general theory of information provides a unified context for existing directions in information studies, making it possible to elaborate on a comprehensive definition of information; explain relations between information, data, and knowledge; and demonstrate how different mathematical models of information and information processes are related.

Explanation of information essence and functioning is given, as well as answers to the following questions:

- how information is related to knowledge and data;
- how information is modeled by mathematical structures;
- how these models are used to better understand computers and the Internet, cognition and education, communication and computation.

Key Features:

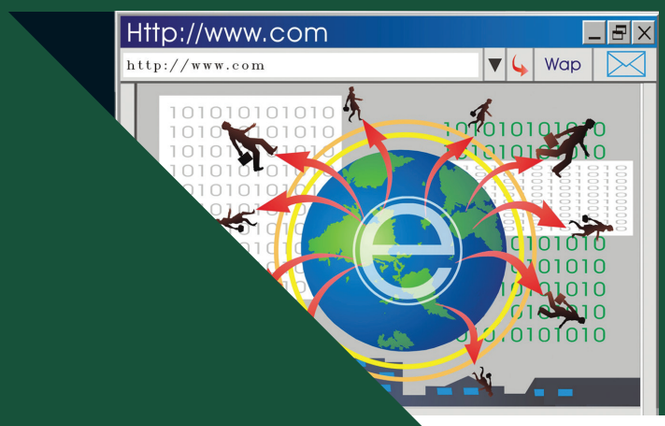
- Provides a comprehensive and unified presentation of the general theory of information
- Suitable for students and professionals who wish to delve further into the subject and explore the research literature, and also for non-experts in information theory who wish to understand what information is and how it is modeled in science

Contents: General Theory of Information; Statistical Information Theory; Semantic Information Theory; Algorithm Information Theory; Pragmatic Information Theory; Dynamics of Information.

Readership: Professionals in information processing, and general readers interested in information and information processes.

"This book is well written. It is very useful to researchers, graduate and undergraduate students from almost all fields of knowledge. It is full of illustrations, examples, discussions, investigations, comparisons, and conclusions. The appendices make the book self-contained."
Mathematical Reviews

"Researchers and advanced students of information theory and practice will find this book an essential resource for a large variety of methods, techniques and theories in information studies. It is suitable as a textbook in information theory for students of technical, scientific, and mathematical subjects, as well as a supplementary textbook in traditional courses on information theory. Burgin's GTI reveals fascinating relations between matter, knowledge, energy, and information and makes it possible to discuss new types of information such as affective information and effective information in an organized fashion. Both the expert and the general reader will get an essential new ideas and tools with which to understand and use the concept of information."
Joseph E. Brenner
International Center for Transdisciplinary Research, Paris



World Scientific Series in Information Studies – **Vol. 2**

INFORMATION AND COMPUTATION

Essays on Scientific and Philosophical Understanding of Foundations of Information and Computation

528pp Jun 2011
978-981-4295-47-5 US$168 / £139

edited by

Gordana Dodig-Crnkovic
Mälardalen University, Sweden

Mark Burgin
University of California, Los Angeles, USA

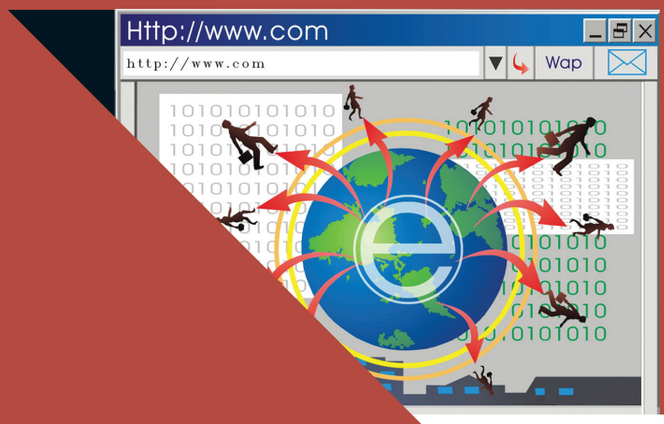
Information is a basic structure of the world, while computation is a process of the dynamic change of information. This book provides a cutting-edge view of world's leading authorities in fields where information and computation play a central role. It sketches the contours of the future landscape for the development of our understanding of information and computation, their mutual relationship and the role in cognition, informatics, biology, artificial intelligence, and information technology.

This book is an utterly enjoyable and engaging read which gives readers an opportunity to understand and relate phenomena seemingly unrelated in a completely new light — especially the connections between information, computation, cognition and life.

Key Features:

- Contains the newest and most original contributions from leading researchers in the field
- Presents the milestones for the future developments in two important areas: information studies and computation

Readership: Students and professionals in information and computation.



World Scientific Series in Information Studies – **Vol. 3**

EMERGENT INFORMATION

A Unified Theory of Information Framework

292pp Dec 2012
978-981-4313-48-3 US$98 / £81

by **Wolfgang Hofkirchner**
Vienna University of Technology, Austria

Contents: Reductionism; Projectivism; Disjunctivism; Integrativism; ***Evolutionary Systems:*** Dissipative Systems; Autopoietic Systems; Re-Creative Systems; ***Information Generation:*** Cognisability; Communicability; Cooperability; Pattern Formation; Code-Making; Sense-Making; Reflectivity; Coherency; Cohesiveness; Psyche; Signalability; Organicity; Consciousness; Languageability; Sociability.

Readership: Advanced undergraduates and graduates in computer science, bioinformatics, systems biology, cognitive science, communication studies, information science. Experts in the same fields as well as non-experts interested in the information concept.

At the dawn of the information age, a proper understanding of information and how it relates to matter and energy is of utmost importance for the survival of civilisation. Yet, attempts to reconcile information concepts underlying science and technology with those en vogue in social science, humanities, and arts are rather rare. This book offers a new approach, departing from fragmented information concepts.

Many academics refrain from undergoing unifications, as most undertakings are reductionistic. This book contends that it is the noble task of an as-yet-to-be-developed science of information to go one step in the direction of a unified theory of information without falling back into neither reduction nor anthropomorphisation.

To be able to succeed in an ambitious task like this, the book advocates the application of complex systems theory and its philosophical underpinnings. Information needs to be interpreted in terms of self-organisation to do justice to the richness of its manifestations. The way the book does so will provide the reader with a deep insight into a basic feature of our world.

The following are discussed in the volume: A Science of Information; A New Way of Thinking; Praxio-Onto-Epistemology; Evolutionary Systems Design; Evolutionary Systems Ontology; Evolutionary Systems Methodology; Capurro's Information Concept Trilemma; A Multi-Stage Model of Evolutionary Types of Information: Pattern Formation, Code-Making, and Constituting Sense; A Triple-C Model of Systemic Functions of Information: Cognising, Communicating, and Co-Operating; Nine Categories of Information Capabilities: Reflectivity (physical), Psyche (biotic), Consciousness (human); Connectivity (physical), Signalability (biotic), Languageability (human); Cohesiveness (physical), Coherency (biotic), Communitarity (human); Nine Categories of Information: Response (physical), Flexible Response (biotic), Reflexion (human); Correspondences (physical), Signals (biotic), Symbolic Acts (human); Assemblage (physical), Assignment (biotic), Association (human); A Unified Theory of Information for, about, and by means of the Information Society.

World Scientific Series in Information Studies – **Vol. 4**

An Information Approach to Mitochondrial Dysfunction

Extending Swerdlow's Hypothesis

by **Rodrick Wallace**
Columbia University, USA

164pp Feb 2015
978-981-4663-50-2 US$70 / £58

Key Feature: Significantly extends current thinking on Alzheimer's and related chronic diseases

Contents: Mathematical Preliminaries; A Symmetry-Breaking Model; A Data Rate Theorem Model; A Mutual Information Model; A Fragment Size Model; Extending the Perspective; Embodiment and Environment; Chronic Inflammation; What is to be Done?; Mathematical Appendix.

Readership: Graduate students and researchers interested in biological applications of information theory.

The monograph applies sophisticated topological symmetry tools to biological applications of information theory, along with a Black–Scholes model invocation of the Data Rate Theorem which links information and control theories. The focus is on statistical mechanics and other models that explore pathological phase transitions — driven by changes in available rates of mitochondrial free energy — in physiological functions, a cutting-edge topic in the study of chronic disease. One of the key focuses is Alzheimer's disease — a relatively simple canonical example.

World Scientific Series in Information Studies – **Vol. 5**

Theory of Knowledge

Structures and Processes

by **Mark Burgin**
University of California, Los Angeles, USA

964pp Oct 2016
978-981-4522-67-0 US$198 / £164

Key Features:

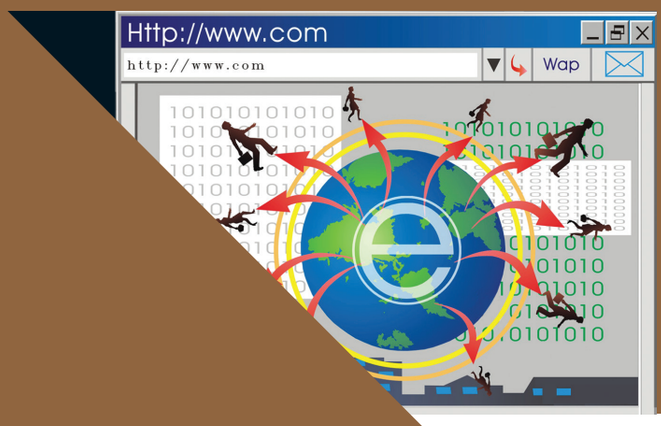
- It integrates different directions in knowledge studies into a unified theory of knowledge
- It studies knowledge on different levels
- It provides the reader with understanding of the essence and structure of knowledge, explicating operations and process that are based on knowledge and vital for society

Contents: Introduction; Knowledge Characteristics and Typology; Knowledge Evaluation and Validation in the Context of Epistemic Structures; Knowledge Structure and Functioning: Microlevel or Quantum Theory of Knowledge; Knowledge Structure and Functioning: Macrolevel or Theory of Average Knowledge; Knowledge Structure and Functioning: Megalevel or Global Theory of Knowledge; Knowledge Production, Acquisition, Engineering, and Application; Knowledge, Data, and Information; Conclusion.

This book aims to synthesize different directions in knowledge studies into a unified theory of knowledge and knowledge processes. It explicates important relations between knowledge and information. It provides the readers with understanding of the essence and structure of knowledge, explicating operations and process that are based on knowledge and vital for society.

The book also highlights how the theory of knowledge paves the way for more advanced design and utilization of computers and networks.

Readership: Graduate students and researchers in artificial intelligence and knowledge management.



World Scientific Series in Information Studies – **Vol. 6**

Information and Complexity

412pp Nov 2016
978-981-3109-02-5 US$154 / £128

edited by

Mark Burgin
University of California, Los Angeles, USA

Cristian S Calude
University of Auckland, New Zealand

The book is a collection of papers of experts in the fields of information and complexity. Information is a basic structure of the world, while complexity is a fundamental property of systems and processes. There are intrinsic relations between information and complexity.

The research in information theory, the theory of complexity and their interrelations is very active. The book will expand knowledge on information, complexity and their relations representing the most recent and advanced studies and achievements in this area.

The goal of the book is to present the topic from different perspectives — mathematical, informational, philosophical, methodological, etc.

Key Features:

- The book represents the most recent achievements in information theory, computer science and the theory of complexity
- The book represents advanced ideas and approaches in information theory, computer science and the theory of complexity
- The book is written by the leading experts in information theory, computer science and the theory of complexity

Readership: Graduate students, researchers in the fields of information and complexity.

World Scientific Series in Information Studies – **Vol. 7**

Information Theory Models of Instabilities in Critical Systems

by **Rodrick Wallace**
Columbia University, USA

244pp Aug 2016
978-981-3147-28-7 US$98 / £81

Contents: Mathematical Preliminaries; Animal Consciousness: A Primer; Psychiatric Disorders; Models of Machine Cognition; Coevolutionary Machines; Epigenetic Programming; Psychopathia Automatorum; Case History: The Rand Fire Service Models; Autonomous vehicles; Into the Swamp: Molecular Components; Caveat Emptor; Mathematical Appendix; Bibliography; Index;

Readership: Students, researchers, industrial and governmental administrators facing the design, operation, and maintenance of real time critical systems ranging across manufacturing facilities, transportation, finance, and military operations.

The book is a unique exploration of a spectrum of unexpected analogs to psychopathologies likely to afflict real-time critical systems, written by a specialist in the epidemiology of mental disorders. The purpose of this book is to develop a set of information-theoretic statistical tools for analyzing the instabilities of real-time cognitive systems at those varying scales and levels of organization, with special focus on high level machine function.

The book should be of particular interest to both industry and academic scientists, and government regulators, concerned with driverless cars on intelligent roads. Many of the same concerns also afflict high-end automated weapons systems. The book should appeal to students, researchers, and industrial and governmental administrators facing the design, operation, and maintenance of real time critical systems ranging across manufacturing facilities, transportation, finance, and military operations.

World Scientific Series in Information Studies – **Vol. 8**

The Future Information Society

Social and Technological Problems

edited by
Wolfgang Hofkirchner
Vienna University of Technology, Austria
Mark Burgin
University of California, Los Angeles, USA

540pp Jan 2017
978-981-3108-96-7 US$168 / £139

This book is the first volume of a two-volume edition based on the International Society for Information Studies Summit Vienna 2015 on "The Information Society at the Crossroads. Response and Responsibility of the Sciences of Information" (see summit.is4is.org).

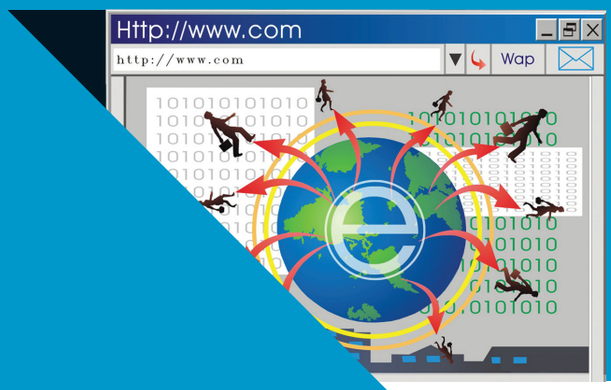
The book represents a trans-disciplinary endeavor of the leading experts in the field of information studies posing the question for a better society, in which social and technological innovations help make information key to the flourishing of humanity and dispense with the bleak view of the dark side of information society.

It is aimed at readers that conduct research into any aspect of information, information society and information technology, who develop or implement social or technological applications. It is also for those who have an interest in participating in setting the goals for sciences of information and social applications of technological achievements and scientific results.

Readership: Researchers in aspects of information.

Key Features:

- The book represents the most recent achievements in information studies related to social problems and development of society
- The book represents advanced ideas and approaches to utilization of information technology and science for the benefit of separate individuals and society as whole
- The book is written by the leading experts in information theory, computer science and the theory of complexity



560pp Mar 2017
978-981-3108-99-8 US$188 / £156

World Scientific Series in Information Studies – **Vol. 9**

Information Studies and the Quest for Transdisciplinarity

Unity through Diversity

edited by

Mark Burgin
University of California, Los Angeles, USA

Wolfgang Hofkirchner
Vienna University of Technology, Austria

This book is the second volume of a two-volume edition based on the International Society for Information Studies Summit Vienna 2015 on "The Information Society at the Crossroads. Response and Responsibility of the Sciences of Information" (see summit.is4is.org).

The book gives an up-to-date multiaspect exposition of contemporary studies in the field of information and related areas. It presents most recent achievements, ideas and opinions of leading researchers in this domain reflecting their quest for advancing information science and technology. With the goal of building a better society, in which social and technological innovations help make information key to the flourishing of humanity, we dispense with the bleak view of the dark side of information society.

It is aimed at readers that conduct research into any aspect of information, information society and information technology, who develop or implement social or technological applications. It is also for those who have an interest in participating in setting the goals for the sciences of information and the social applications of technological achievements and the scientific results.

Key Features:

- The book represents the most recent achievements in information studies related to social problems and the development of society
- The book represents advanced ideas and approaches to utilization of information technology and science for the benefit of separate individuals and society as whole
- The book is written by the leading experts in information theory, computer science and the theory of complexity

Readership: Researchers in aspects of information.

Printed in June 2017 *New Jersey • London • Singapore • Beijing • Shanghai • Tianjin • Hong Kong • Taipei • Chennai • Tokyo • Munich* SP JO 05 17 20 E

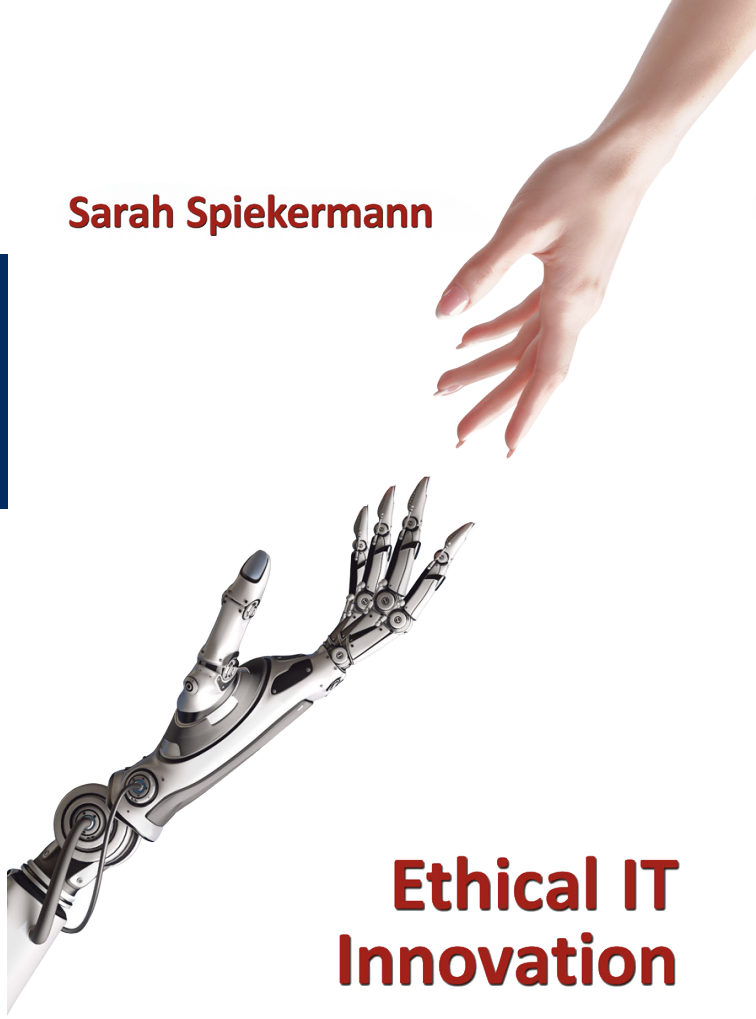
„I deeply hope that this book will change the mindset of IT innovators and create IT designs with sustainable value for society."

Univ. Prof. Dr. Sarah Spiekermann

ABOUT THE AUTHOR

Sarah chairs the Institute for Management Information Systems at Vienna University of Economics and Business. She has published over eighty scientific articles on social and ethical implications of IT, especially in the field of electronic privacy, disclosure behavior and ethical computing. This is her first book wrapping up her journey of insights in computer ethics and value sensitive IT design.

Sarah Spiekermann



Ethical IT Innovation

A Value-Based System Design Approach

CRC Press
Taylor & Francis Group
AN AUERBACH BOOK

WU
WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

WHAT THIS BOOK IS ABOUT

- Shows how we can build human values into IT systems
- Introduces the *Ethical* System Development Life Cycle for IT
- Contains chapters on many major values relevant in IT (including privacy, trust, accountability, transparency, autonomy, control, trust, friendship, etc.)
- Integrates IT system design approaches with management theory, innovation theory and philosphy
- Explains normative theories of computer ethics
- Explores the ethical accountability of IT managers and IT innovation teams, software engineers and system designers
- Includes teaching questions at the end of each chapter that explore the ethical dimensions of IT development activities
- Includes a detailed case study of the ethical design of a system using RFID

WHAT EXPERTS SAY ABOUT THIS BOOK

"A fascinating, remarkable journey about the importance of ethics in the design and application of modern information technologies. Deeply researched and engrossing – a book all innovators should read."

Professor Alessandro Acquisti
Carnegie Mellon University

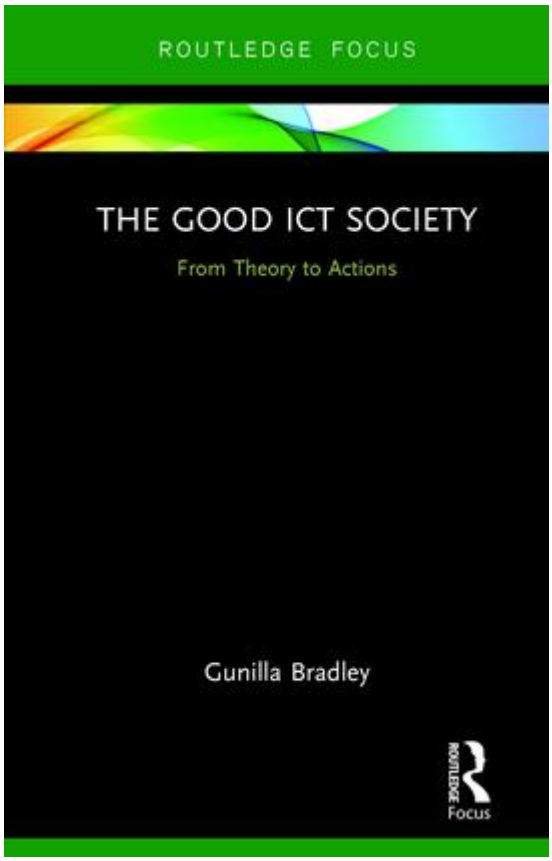
"... a breakthrough volume: it will stand as essential reading and a primary reference in the further development of ethics and IT design, most especially as informed by virtue ethics approaches."

Professor Charles Ess
University of Oslo

"Full of clear and compelling examples, this book is an excellent guide for students, professional engineers, and for managers who want to ensure ethics and values are among the concerns teams account for during design."

Professor Katie Shilton
University of Maryland

NEW BOOK RELEASE 2017



The Good ICT Society - From Theory to Actions

By Gunilla Bradley

www.routledge.com/9781138294295

About the book

What is Quality of Life in a society that has embraced information and communication technology (ICT)? What is Wisdom in this kind of society? And what things are helping or hindering us from having both wisdom and a good quality of life in ICT societies?

Hardback – 2017-06-01 Also available as e-book!

138 pages | 27 B/W Illus.

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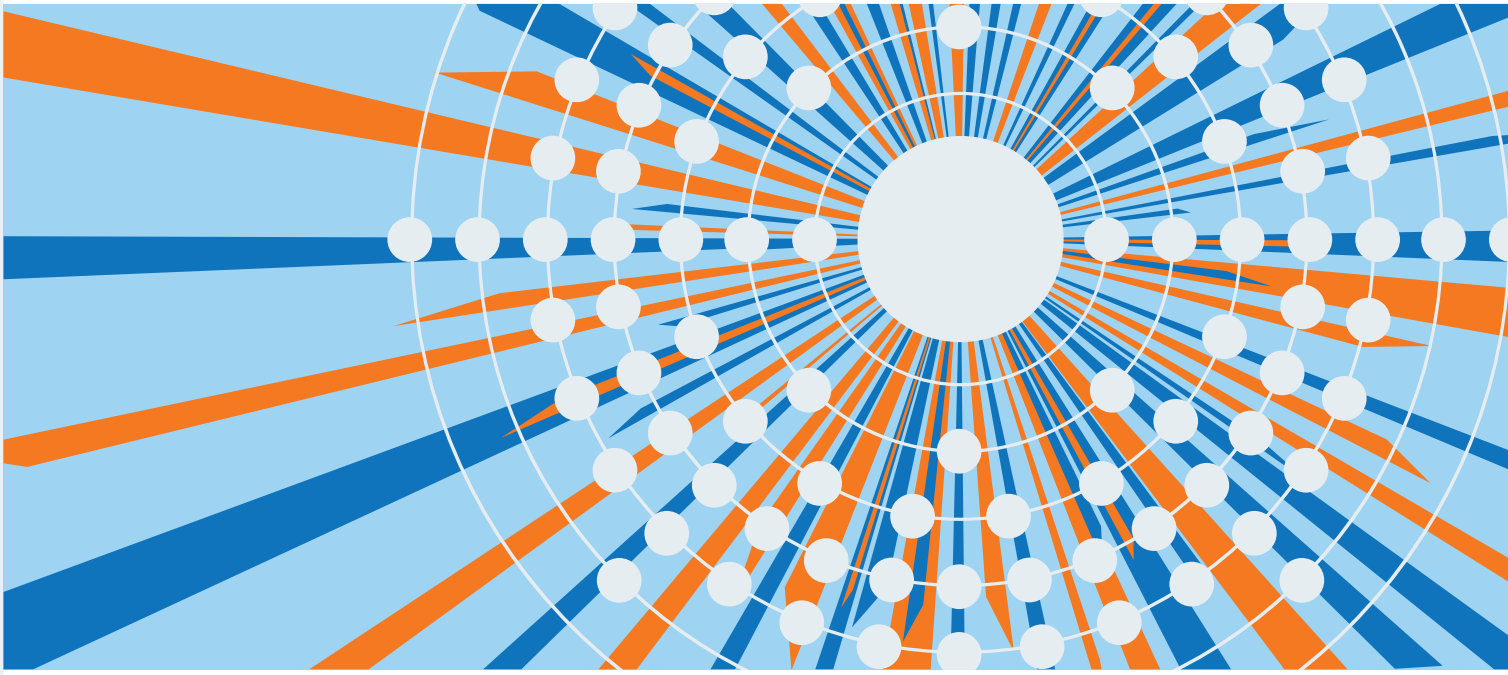

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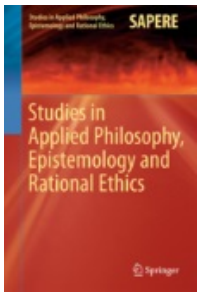
Alfred Nobel (1833–1896)

Alfred Nobel was a Swedish chemist, engineer and inventor of dynamite. Dynamite made him very wealthy but partly in response to concerns about its negative uses, he decided to give the vast majority of his estate to establish the five Nobel Prizes including the Nobel Peace Prize for those who promote peace around the world.
This illustration was created by one of the talented team of designers at Springer Nature.

Representation and Reality in Humans, Other Living Organisms and Intelligent Machines



Gordana Dodig-Crnkovic, Mälardalen University, Chalmers University of Technology and University of Gothenburg]

Raffaela Giovagnoli, Pontifical Lateran University (Eds.)

Ca. 300 pp., ISBN 978-3-319-43782-8, publication planned 2017

Series: Studies in Applied Philosophy, Epistemology and Rational Ethics (SAPERE)

Overview

This book enriches our views on representation and deepens our understanding of its different aspects. It arises out of several years of dialog between the editors and the authors, an interdisciplinary team of highly experienced researchers, and it reflects the best contemporary view of representation and reality in humans, other living beings, and intelligent machines.

Structured into parts on the cognitive, computational, natural sciences, philosophical, logical, and machine perspectives, a theme of the field and the book is building and presenting networks, and the editors hope that the contributed chapters will spur understanding and collaboration between researchers in domains such as computer science, philosophy, logic, systems theory, engineering, psychology, sociology, anthropology, neuroscience, linguistics, and synthetic biology.

Features

- Reflects received view in empirical science that there is something we can call 'reality' for an agent, and that agents use 'representations' in their interactions with the environment
- Examines what capacities can be plausibly computed and discusses the most promising approaches
- Looks for a common link between reality-constructing agents, such as humans, and other living organisms

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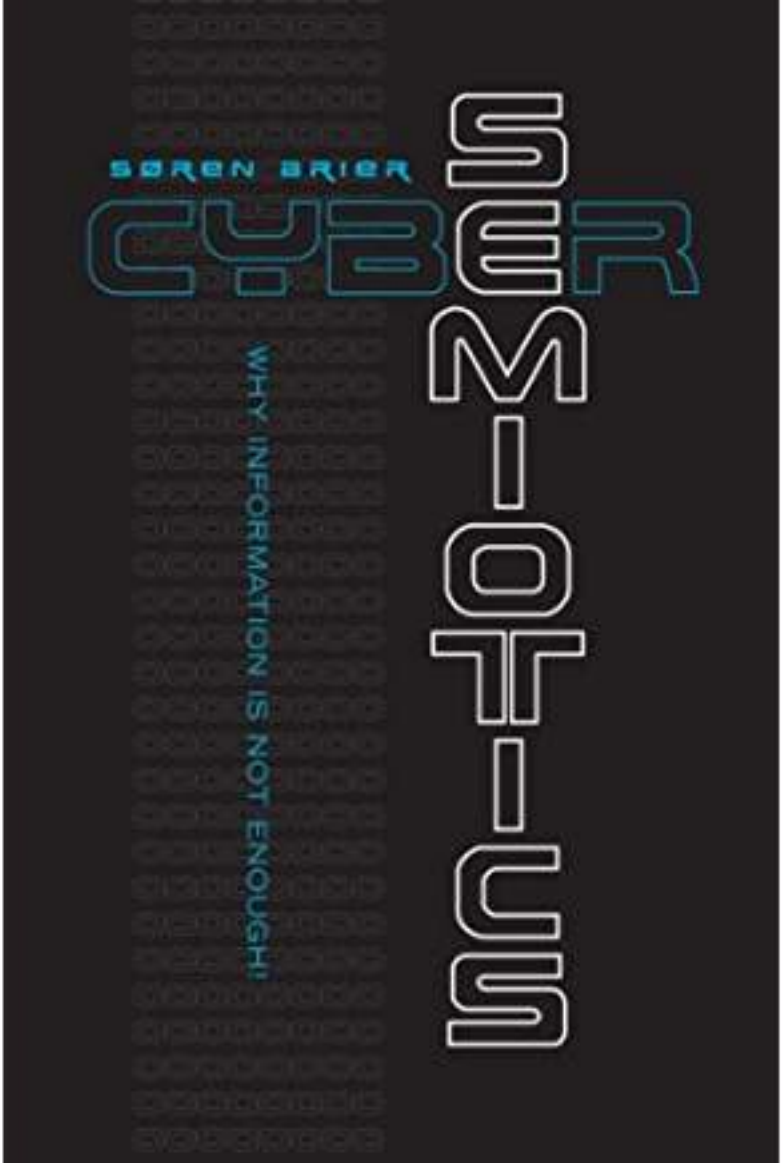
SØREN BRIER
CYBER SEMIOTICS
WHY INFORMATION IS NOT ENOUGH!

CYBERNETICS & HUMAN KNOWING

a journal of second-order cybernetics
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Volume 23, No. 4, 2016

Cybersemiotics and Technology-Based Arts

ISSN 1477-996X
Volume 14 Number 4 2016

Journal of

Information, Communication and Ethics in Society

The impact of smart technology on users and society

Guest Editors: Tomayess Issa and Piet Kommers

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Information in Physics and Beyond

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In this topical collection (11 articles)