Book Selection

Edited by U Aickelin

L Willcocks: Social Theory and Philosophy for Information Systems
K-M Chao: Spanning Trees and Optimization Problems
J Drew, B McCallum and S Roggenhofer: Journey to Lean: Making Operational Change Stick
P Glasserman: Monte Carlo Methods in Financial Engineering

Social Theory and Philosophy for Information Systems

L Willcocks

John Wiley and Sons Ltd, 2004. 480pp. £27.99
ISBN: 0470851171

Information systems researchers are well aware how the design and use of information systems for decision making necessarily leads them into the realm of philosophy and social theory, via the consideration of such fundamental questions as the reliability of empirical knowledge, Hume's problem of induction, the basis of statistical inference, the underpinning of Bayesian inference, the nature of social organizations, the interactions between the individual and the organization and so on.

The aim of this book is to show how the most modern of advances of philosophy and social science are as relevant for information systems researchers as the classical problems listed above. The premise of the book is laid out in the introductory chapter, where the editors say that 'Taking an approach informed by philosophy, social theory and information systems to the study of information systems research and information systems researchers can lead to findings that would help the information systems research community do better information systems research. Such an approach would require a philosophical imagination, a social theory imagination and a systems imagination'.

The editors try to achieve this goal of enabling information systems researchers to 'capture the three imaginations' by a set of ten chapters, each written by a specialist in that field, and each of which provides the reader with a capsule of understanding of a modern theory and then suggests how the theory can be applied to information systems research.

The theories considered are Functionalism, Phenomenology with a discussion of the key concepts of the philosophy of Husserl and Heidegger, Hermeneutics, or the theory and philosophy of the interpretation of meaning, Critical Theory, based on the work of Adorno, the Critical Social

Theory of Habermas, Foucault's theories of Power and their relevance for information systems, Anthony Gidden's Structural Theory, theories of the Social Shaping of Technology, the philosophy of science known as Critical Realism, and the relevance of Complexity Theory for information systems.

In a short review, it is not really possible to do justice to the rich material contained in this book, for trying to give even a brief description of each of the theories listed above would occupy a lot of pages. All the authors give convincing reasons why the theories they have explained would be useful for information systems researchers—I use the phrase 'would be' because most of the authors point out that at this stage the relationship between the theories and actual information systems research is one of promise rather than fulfillment. Nevertheless, the arguments they give convince one that information systems would indeed benefit if the potential these authors have so ably revealed is realized through the efforts of advanced research who take this book and its suggestions as starting points for delving deeper into the philosophies and social theories set out in it.

I would highly recommend that all libraries in institutions, where information systems theory is taught should acquire a copy of this book. It would also be a good book for individual researchers who are interested in more philosophical aspects of their field—each chapter provides ample suggestions for further reading.

Colby College R Bharath

Spanning Trees and Optimization Problems

K-M Chao

Chapman & Hall/CRC, 2004. 200pp. £48.99
ISBN: 1584884363

This book provides a valuable collection of theoretical aspects, algorithms and recent research developments on

spanning trees. In particular, the book focuses on the following spanning tree problems: minimum spanning tree, shortest-path spanning tree, minimum routing cost spanning tree, optimal communication spanning tree, and Steiner tree. The main orientation of the book is towards theoretical aspects. However, the authors also attempt to illustrate some practical applications of spanning trees. With respect to the algorithms for solving spanning tree problems, the book gives a good account of classical algorithms, but the coverage of approximation algorithms is rather limited. This book is a must-have resource for postgraduate students, researchers and academics with an interest in spanning trees.

Chapter 1, the introductory part of the book, is short but effective. It would be desirable to have a more detailed presentation on the practical applications of spanning trees apart from network design and computer biology. From chapter 2 to chapter 7, the book follows the same format in presenting the material for a specific type of spanning tree problem. First, a description and formulation of the problem are presented, followed by a clear description of some algorithms to tackle the problem. Also, using sequences of graphical representations, the book nicely illustrates how each algorithm works. This is an excellent feature of the book because it helps the reader to achieve a better understanding of the algorithms described. Each chapter provides proofs of some properties of the given spanning tree problem. Although such proofs are very useful, they could be moved to appendices and instead more descriptions of algorithms included in each chapter.

A brief account of practical applications of the given type of spanning tree problem is also presented in each chapter. The downside is that, throughout the whole book, mainly network design and computational biology are used to illustrate applications of spanning trees. A more comprehensive coverage of other application areas would appeal to a wider audience. Each chapter ends with a summary and a section on bibliographic notes and further reading. This last section in each chapter is of excellent value because it gives a very good account of historical and recent research developments for the given type of spanning tree. The bibliographic notes and further reading section is very effective in helping the reader to obtain a good idea about the most relevant existing literature for the given spanning tree problem.

In summary, this handbook focuses on the theoretical aspects of spanning trees. The book would benefit by an expanded presentation of practical applications and the inclusion of more algorithms, particularly approximation methods. Nevertheless, this book is a very valuable resource for all readers interested in spanning tree problems.

University of Nottingham   D Silva

Journey to Lean: Making Operational Change Stick

J Drew, B McCallum and S Roggenhofer

This book, written by a trio from McKinsey, is an unusual and engaging blend of theory and case study. It addresses what is described as a revolution in manufacturing, which has enabled companies such as Toyota and Dell to operate with very limited stocks of inventory, while becoming flexible enough to meet the rapidly changing requirements of their customers. This is the practice of 'lean', and this description of what is needed to become a lean company won the authors the Best Management Book award at last year's Management Consultancies Association writing awards.

The book divides into two parts. The first is devoted to the theory of lean, while the second is an extended case study which follows the trials and tribulations of a (fictional) company—Arboria, a manufacturer of small kitchen appliances—as they struggle to make the transition to become lean.

In the first part of the book, there are descriptions of the challenges posed by the lean approach, of the requirements in terms of the business operating system needed, and the importance of an integrated approach which includes the adoption of the appropriate mindset and personal behaviours. This part generally reads well, though sometimes the prose is a little awkward, such as when value streams are being defined, and when terms such as 'takt' and 'autonomation' are introduced.

The second part of the book follows the progress of Arboria as they attempt to put into practice the theory recounted in the preceding pages. Having seen their products starting to look vulnerable to changing consumer tastes and stiffer competition, the company's senior management team visit a manufacturing plant, where the lean philosophy has been enthusiastically adopted. Fired up by what they see, the Arboria team make the decision to transform their organization. A change implementation manager is brought in, and the company's UK plant is chosen as the guinea pig. The struggles encountered—organizational, technological and personal—as Arboria makes its first steps along the journey to lean provide the main part of the story. Plentifully illustrated with a mix of dialogue and commentary, it flows well; the characters are believable, and the human foibles displayed and minor incidents encountered add a veneer of realism. With the current crop of television docu-dramas and reality series, at times it feels like this could be 'the book of the TV show', following in the footsteps of Sir John Harvey-Jones's 'Troubleshooter'.

To its credit, the book does not just address the initial stages of the journey, but stresses the importance of follow through. The difficulties that organizations face when confronted with the main paradigm change—how being responsive to changes in customer requirements does not mean holding more stock, but rather reducing it, are well illustrated in the second part of the book.

The morals of the story include the overwhelming importance of engaging the support of senior management—and for them to be seen to be involved and committed to the journey. However, it is not just 'those at the top'—the team leader or shift supervisor on the assembly line may be small fry by comparison with the CEO, but he (or she) is in a position of power and influence for those on the line, those whose commitment to the cause is equally important.

This is a well-conceived, intelligent and rewarding book. With its portrait of a group of men and women operating under significant pressures, the authors have an ability to conjure up a feeling that you are there with the Arboria team.

As a readable and engaging overview of the lean approach and how to make the transition to it from 'the way we have always done things', it is highly recommended.

QinetiQ Consulting   B Spedding

Monte Carlo Methods in Financial Engineering

P Glasserman

Springer-Verlag, 2004. 609pp. £54.00
ISBN: 0387004513

The publication of this book is an important event in computational finance. For many years, Monte Carlo methods have been successfully applied to solve diverse problems in financial mathematics. By publishing this book the author deserves much credit for a very good attempt to lift such applications to a new level. I believe that the author may succeed in this and that the book may well become a major reference in the field of applications of Monte Carlo methods in financial engineering. This is because the book is well structured and well written; additionally, the mathematical level of the book is very reasonable.

The first reviews on the web suggest that most readers consider the book to be extremely good and very useful for practitioners. I agree with this to a certain extent, but feel I have to warn potential readers about overestimating the value of the book. My main concern is that the view of the subject 'Monte Carlo methods' accepted by the author is very limited.

There seems to be a general confusion about the term 'Monte Carlo methods'. In many applied books, including the one under review, this term only refers to generation of random numbers, variables and vectors, to estimation of integrals (including those representing solutions of certain equations) and to straightforward simulation. I would call this part of Monte Carlo 'rudimentary'. There are, however, many other topics developed within the scope of Monte Carlo methods, the most important is estimating functionals of solutions of linear and especially nonlinear equations (algebraic, integral, differential, integro-differential). Note in this respect that the related applications in finance are not considered in the book and therefore it is not as comprehensive as it pretends to be. Additionally, the author's view of even 'rudimentary' Monte Carlo is limited: specifically, there are basically no references to the extensive works of representatives of major Russian schools of Monte Carlo methods (such as the one in Novosibirsk).

The book can roughly be divided into three parts: the first three chapters deal with the fundamentals of 'rudimentary' Monte Carlo; the next three describe ways to improve the simplest Monte Carlo methods; the final four chapters deal with more specialized problems arising in specific applications of Monte Carlo to financial engineering. Each chapter contains many illustrative examples, all with a financial mathematics flavour.

Chapter 1 is introductory and briefly describes the basic principles of Monte Carlo and option pricing. A description of general ideas of random number generation (both uniform and non-uniform) is given in Chapter 2. Mysteriously, several sections devoted to the issue of generation of random variables (for example, Poisson and Gamma) are placed in Chapter 3. The exposition of material in Chapter 2 is good but it is very basic even in the section devoted to generation of normal random variables and vectors (this section is the most detailed in this chapter).

Chapter 3 explains how to generate sample paths for some commonly used stochastic models such as multifactor Gaussian models, square root diffusions, diffusions with Poisson jumps, some Lévy processes and the LIBOR market model. The author considers each example in detail; this approach has its pros and cons. The pro is that the exposition is very clear; the con is that it is sometimes too simple.

Chapter 4 is the longest and perhaps the best chapter in the book; it is devoted to the techniques of variance reduction in estimation of integrals. The description in this chapter is more or less up-to-date; this is the only chapter that I would choose over competitive literature on the related subject. Chapter 5 explains basics of the Quasi-Monte Carlo methods for estimating integrals. Chapter 6 deals with effects and ways to reduce the bias in Monte Carlo estimators arising from discretising time in stochastic differential equations. The techniques described in this chapter can be considered as an elaboration of the simple methods of Chapter 3.

Chapter 7 deals with the computation of sensitivities using finite differences, pathwise derivatives and the likelihood ratio method; some more advanced methods are only briefly mentioned. Chapter 8 deals with the pricing of American options; this is the research area, where the author of the book has made many contributions. Not surprisingly, the exposition in this chapter is broader and deeper than in many other chapters. Simulation of extreme events for value-at-risk computation (when measuring the risk in a portfolio of assets) is another important application of Monte Carlo methods in finance; this is addressed in Chapter 9. Variance reduction techniques for simulating tail probabilities are considered, including the case of heavy-tailed distributions. At the end of the book, a well-written appendix covers basics of stochastic calculus among other topics.

The book is not intended for mathematicians as no properly formulated mathematical statements are given (except in the appendix) and no proofs are provided. Rather, it is written in an explanatory manner with many examples illustrating the main ideas and methods. This is the style which many practitioners and researchers in financial engineering will find most suitable; the book will undoubtedly find many interested readers within these circles. As the book is very clearly written and moderately priced, it can also be recommended as a textbook to be used for undergraduate and PhD courses related to computational finance.

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