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Choice Theory: A Very Short Introduction
Decision Theory

MUHAMMAD JACOBS

Statistical Decision Theory Cambridge University Press
The book also contains a major new discussion of what it means to suppose that some event occurs or that some proposition is true.
Choices Springer Science & Business Media
The concept of rationality is a common thread through the human and social sciences — from political science to

philosophy, from economics to sociology, and from management science to decision analysis. But what counts as rational action and rational behavior? José Luis Bermúdez explores decision theory as a theory of rationality. Decision theory is the mathematical theory of choice and for many social scientists it makes the concept of rationality mathematically tractable and scientifically legitimate. Yet rationality is a concept with several dimensions and the theory of rationality has different roles to play. It plays an action-guiding role (prescribing what counts as a rational solution of a given decision problem). It plays a normative role (giving us the tools to pass judgment not just on how a decision problem was solved, but also on how it was set up in the first place). And it plays a predictive/explanatory role (telling us how rational agents will behave, or why they did what they did). This controversial but accessible book shows that decision theory cannot play all of these roles simultaneously. And yet, it argues, no theory of rationality can play one role without playing the other two. The conclusion is that there is no hope of taking decision theory as a theory of rationality.

Rational Decisions

Springer Science & Business Media

Decision Theory An

Introduction to Dynamic Programming and Sequential Decisions John Bather University of Sussex, UK Mathematical induction, and its use in solving optimization problems, is a topic of great interest with many applications. It enables us to study multistage decision problems by proceeding backwards in time, using a method called dynamic programming. All the techniques needed to solve the various problems are explained, and the author's fluent style will leave the reader with an avid interest in the subject. * Tailored to the needs of students of optimization and decision theory * Written in a lucid style with numerous examples and applications * Coverage of deterministic models: maximizing utilities, directed networks, shortest paths, critical path analysis, scheduling and convexity * Coverage of stochastic models: stochastic dynamic programming, optimal stopping problems and other special topics * Coverage of advanced topics: Markov decision processes, minimizing expected costs, policy improvements and problems with unknown statistical parameters * Contains exercises at the end of each chapter, with hints in an appendix Aimed primarily at students of mathematics and statistics, the lucid text will also appeal to engineering and

science students and those working in the areas of optimization and operations research.

Recent Developments in the Foundations of Utility and Risk Theory Prentice Hall This well-respected introduction to statistics and statistical theory covers data processing, probability and random variables, utility and descriptive statistics, computation of Bayes strategies, models, testing hypotheses, and much more. 1959 edition.

Introduction to Statistical Decision Theory Courier Corporation Explores how decision-makers can manage uncertainty that varies in both kind and severity by extending and supplementing Bayesian decision theory.

A Science of Decision Making Princeton University Press Introduction to Statistical Decision Theory: Utility Theory and Causal Analysis provides the theoretical background to approach decision theory from a statistical perspective. It covers both traditional approaches, in terms of value theory and expected utility theory, and recent developments, in terms of causal inference. The book is specifically designed to appeal to students and researchers that intend to acquire a knowledge of statistical science based on decision theory. Features Covers approaches for making decisions

under certainty, risk, and uncertainty Illustrates expected utility theory and its extensions Describes approaches to elicit the utility function Reviews classical and Bayesian approaches to statistical inference based on decision theory Discusses the role of causal analysis in statistical decision theory

Elements for a Theory of Decision in Uncertainty Cambridge University Press

It is widely held that Bayesian decision theory is the final word on how a rational person should make decisions. However, Leonard Savage--the inventor of Bayesian decision theory--argued that it would be ridiculous to use his theory outside the kind of small world in which it is always possible to "look before you leap." If taken seriously, this view makes Bayesian decision theory inappropriate for the large worlds of scientific discovery and macroeconomic enterprise. When is it correct to use Bayesian decision theory--and when does it need to be modified? Using a minimum of mathematics, Rational Decisions clearly explains the foundations of Bayesian decision theory and shows why Savage restricted the theory's application to small worlds. The book is a wide-ranging exploration of standard theories of choice and belief under risk and uncertainty. Ken Binmore discusses the various philosophical attitudes related to the

nature of probability and offers resolutions to paradoxes believed to hinder further progress. In arguing that the Bayesian approach to knowledge is inadequate in a large world, Binmore proposes an extension to Bayesian decision theory--allowing the idea of a mixed strategy in game theory to be expanded to a larger set of what Binmore refers to as "muddled" strategies. Written by one of the world's leading game theorists, Rational Decisions is the touchstone for anyone needing a concise, accessible, and expert view on Bayesian decision making.

Decision Theory and Decision Behaviour MIT Press

Making Better Decisions introduces readers to some of the principal aspects of decision theory, and examines how these might lead us to make better decisions. Introduces readers to key aspects of decision theory and examines how they might help us make better decisions Presentation of material encourages readers to imagine a situation and make a decision or a judgment Offers a broad coverage of the subject including major insights from several sub-disciplines: microeconomic theory, decision theory, game theory, social choice, statistics, psychology, and philosophy Explains these insights informally in a language that has minimal mathematical notation or jargon, even when describing

and interpreting mathematical theorems Critically assesses the theory presented within the text, as well as some of its critiques Includes a web resource for teachers and students

Foundations and Applications of Decision Theory John Wiley & Sons

An introduction to decision making under uncertainty from a computational perspective, covering both theory and applications ranging from speech recognition to airborne collision avoidance. Many important problems involve decision making under uncertainty—that is, choosing actions based on often imperfect observations, with unknown outcomes. Designers of automated decision support systems must take into account the various sources of uncertainty while balancing the multiple objectives of the system. This book provides an introduction to the challenges of decision making under uncertainty from a computational perspective. It presents both the theory behind decision making models and algorithms and a collection of example applications that range from speech recognition to aircraft collision avoidance. Focusing on two methods for designing decision agents, planning and reinforcement learning, the book covers probabilistic models, introducing Bayesian networks as a

graphical model that captures probabilistic relationships between variables; utility theory as a framework for understanding optimal decision making under uncertainty; Markov decision processes as a method for modeling sequential problems; model uncertainty; state uncertainty; and cooperative decision making involving multiple interacting agents. A series of applications shows how the theoretical concepts can be applied to systems for attribute-based person search, speech applications, collision avoidance, and unmanned aircraft persistent surveillance. Decision Making Under Uncertainty unifies research from different communities using consistent notation, and is accessible to students and researchers across engineering disciplines who have some prior exposure to probability theory and calculus. It can be used as a text for advanced undergraduate and graduate students in fields including computer science, aerospace and electrical engineering, and management science. It will also be a valuable professional reference for researchers in a variety of disciplines.

Decision Theory and Rationality Springer Science & Business Media

We make choices all the time - about trivial matters, about how to spend our money, about how to spend our time, about what to do with our lives. And

we are also constantly judging the decisions other people make as rational or irrational. But what kind of criteria are we applying when we say that a choice is rational? What guides our own choices, especially in cases where we don't have complete information about the outcomes? What strategies should be applied in making decisions which affect a lot of people, as in the case of government policy? This book explores what it means to be rational in all these contexts. It introduces ideas from economics, philosophy, and other areas, showing how the theory applies to decisions in everyday life, and to particular situations such as gambling and the allocation of resources.
ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.
Theory of Decision Under Uncertainty
Springer
Ward Edwards is well known as the father of behavioral decision making. In his 1954 Psychological Bulletin paper on decision making, he brought psychological ideas into what had been the

province of economists. His influence in this realm is so pervasive that the Nobel committee was able to trace a direct path from Edwards's work to Daniel Kahneman's 2002 Prize for prospect theory. In a 1963 Psychological Review paper, Edwards brought Bayesian statistics to the attention of psychologists, who have continued to proliferate Bayesian ideas, underscoring the importance of the perspective. In a 1962 IEEE paper, Edwards foresaw how the world of intelligence gathering and analysis could by transformed by systems in which humans provided (subjective) probabilities and machines provided computational power. He also showed, in a 1986 book written with Detlof von Winterfeldt, how multiattribute utility analysis could help real-world decision makers generate satisfactory solutions to complex problems. In this book, 29 of Ward Edwards's most important published papers are reprinted, a selection that spans six decades, allowing the reader to see how this strikingly creative thinker generated many of the ideas that are now core beliefs among current researchers. It is perhaps less well known that Edwards continued to make substantial contributions during the years after his retirement. Illness reduced his public appearances, but he continued his incisive

thinking behind the scenes. At the time of his passing, he was involved in several projects, and seven new papers from these projects were completed for this book by his last set of collaborators. Edwards's papers are a treat to read. His prose is the model of elegant simplicity, yet full of style and wit. With each paper, the editors have included a short introduction that presents Edwards's reflections on the content or impact of the older papers, or describes the creation of the new ones. Obituaries written by former students and colleagues flesh out the human side of this remarkable scholar.

Decision Theory

Cambridge University Press

Decision theory provides a formal framework for making logical choices in the face of uncertainty. Given a set of alternatives, a set of consequences, and a correspondence between those sets, decision theory offers conceptually simple procedures for choice. This book presents an overview of the fundamental concepts and outcomes of rational decision making under uncertainty, highlighting the implications for statistical practice. The authors have developed a series of self contained chapters focusing on bridging the gaps between the different fields that have contributed to rational decision making and presenting

ideas in a unified framework and notation while respecting and highlighting the different and sometimes conflicting perspectives. This book: * Provides a rich collection of techniques and procedures. * Discusses the foundational aspects and modern day practice. * Links foundations to practical applications in biostatistics, computer science, engineering and economics. * Presents different perspectives and controversies to encourage readers to form their own opinion of decision making and statistics. Decision Theory is fundamental to all scientific disciplines, including biostatistics, computer science, economics and engineering. Anyone interested in the whys and wherefores of statistical science will find much to enjoy in this book.

Decision Theory as Philosophy OUP Oxford

Game theory is a key element in most decision-making processes involving two or more people or organisations. This book explains how game theory can predict the outcome of complex decision-making processes, and how it can help you to improve your own negotiation and decision-making skills. It is grounded in well-established theory, yet the wide-ranging international examples used to illustrate its application offer a fresh approach to an

essential weapon in the armoury of the informed manager. The book is accessibly written, explaining in simple terms the underlying mathematics behind games of skill, before moving on to more sophisticated topics such as zero-sum games, mixed-motive games, and multi-person games, coalitions and power. Clear examples and helpful diagrams are used throughout, and the mathematics is kept to a minimum. It is written for managers, students and decision makers in any field.

Decision Making Using Game Theory

Springer Science & Business Media

In this new edition the author has added substantial material on Bayesian analysis, including lengthy new sections on such important topics as empirical and hierarchical Bayes analysis, Bayesian calculation, Bayesian communication, and group decision making. With these changes, the book can be used as a self-contained introduction to Bayesian analysis. In addition, much of the decision-theoretic portion of the text was updated, including new sections covering such modern topics as minimax multivariate (Stein) estimation.

Evidence, Decision and Causality

Springer

This book provides tools for making decisions in an environment of uncertainty. In Chapter 1 the author explains

the most important aspects of the concept of relation. From this start arise the other three concepts that cover practically all processes from which decisions stem. These three concepts are: attribution from which the concept of assignment arises; and grouping, which includes the concept of an original function. The techniques presented, as well as the models and algorithms developed, constitute an invaluable aid for those who must make decisions. Audience: Researchers and graduate students interested in mathematics applied to economics and management.

Introduction to Formal Philosophy

Courier Corporation

This book is the second edition of Behavioral Decision Theory, published in 2014. The main approach and structure of this book have been retained in the new edition. However, this second edition provides a fresh overview of the idea of behavioral decision theory and related research findings such as theoretical and empirical discoveries of preference formation, time discounting, social interaction, and social decision making. The book covers a wide range from classical to relatively recent major studies concerning behavioral decision theory, which, in brief, is a general term for descriptive theories to explain the psychological knowledge related to people’s decision-

making behavior. It is called a theory but is actually a combination of various psychological theories, for which no axiomatic systems—such as those associated with the utility theory widely used in economics—have been established. The utility theory is often limited to qualitative knowledge; however, as the studies of Nobel laureates H. A. Simon, D. Kahneman, and R. Thaler have suggested, the psychological methodology and knowledge of behavioral decision theory have been applied widely in such fields as economics, business administration, and engineering and are expected to become even more useful in the future. Research into people's decision making represents an important part in those fields, various aspects of which overlap with the scope of behavioral decision theory. This theory is closely related to behavioral economics and behavioral finance, which have come into greater use in recent years. This book will appeal especially to graduate students, advanced undergraduate students, and researchers who are interested in decision-making phenomena.

Decision Making John Wiley & Sons

The Second International Conference on Foundations of Utility and Risk Theory was held in Venice, June 1984. This volume presents some of the

papers delivered at FUR-84. (The First International Conference, FUR-82, was held in Oslo and some of the papers presented on that occasion were published by Reidel in the volume Foundations of Utility and Risk Theory with Applications, edited by Bernt P. Stigum and Fred Wenst~p). The theory of choice under uncertainty involves a vast range of controversial issues in many fields like economics, philosophy, psychology, mathematics and statistics. The idea of discussing these problems in international conferences has been successful: two conferences have been held and others will follow. The climate of the debate has changed in the meantime, partly as a result of these conferences. It is no more only a question of attacking or defending the neo-Bernoullian assumptions, but also of proposing wider generalizations and including new elements in the analysis of the decision process. For instance Amartya Sen - comparing the two current notions of rationality, internal consistency and self-interest pursuit introduces the concept of reasoning and considers the irrationality which may result from the failure of a positive correspondence between reasoning and choice or from a limited capacity of

reasoning. Rationality is also considered with respect to the controversial axiom of strong independence. John C. Harsanyi introduces the concept of practical certainty, i. e.

Behavioral Decision Theory Cambridge University Press

This book presents the content of a year's course in decision processes for third and fourth year students given at the University of Toronto. A principal theme of the book is the relationship between normative and descriptive decision theory. The distinction between the two approaches is not clear to everyone, yet it is of great importance. Normative decision theory addresses itself to the question of how people ought to make decisions in various types of situations, if they wish to be regarded (or to regard themselves) as 'rational'. Descriptive decision theory purports to describe how people actually make decisions in a variety of situations. Normative decision theory is much more formalized than descriptive theory. Especially in its advanced branches, normative theory makes use of mathematicallanguage , mode of discourse, and concepts. For this reason, the definitions of terms encountered in normative decision theory are precise, and its deductions are rigorous. Like the terms and assertions of other branches of mathematics, those of

mathematically formalized decision theory need not refer to anything in the 'real', i. e. the observable, world. The terms and assertions can be interpreted in the context of models of real li fe situations, but the verisimilitude of the models is not important. They are meant to capture only the essentials of adecision situation, which in reallife may be obscured by complex details and ambiguities. It is these details and ambiguities, however, that may be crucial in determining the outcomes of the decisions.

Elementary Decision Theory Cambridge University Press

This book offers an overview on the main modern important topics in random variables, random processes, and decision theory for solving real-world problems. After an introduction to concepts of statistics and signals, the book introduces many essential applications to signal processing like denoising, texture classification, histogram equalization, deep learning, or feature extraction. The book uses MATLAB algorithms to demonstrate the implementation of the theory to real systems. This makes the contents of the book relevant to students and professionals who need a quick introduction but practical introduction how to deal with random signals and processes

Choices Cambridge University Press 1. INTRODUCTION In the Spring of 1975 we held an international workshop on the Foundations and Application of Decision Theory at the University of Western Ontario. To help structure the workshop into ordered and manageable sessions we distri buted the following statement of our goals to all invited participants. They in turn responded with useful revisions and suggested their own areas of interest. Since this procedure provided the eventual format of the sessions, we include it here as the most appropriate introduction to these collected papers result ing from the workshop. The reader can readily gauge the approximation to our mutual goals. 2. STATEMENT OF OBJECTIVES AND RATIONALE (Attached to this statement is a bibliography; names of persons cited in the statement and writing in this century will be found referenced in the biblio graphy-certain 'classics' aside.) 2 . 1. Preamble We understand in the following the Theory of Decisions in a broader sense than is presently customary, construing it to embrace a general theory of decision-making, including social, political and economic theory and applica tions. Thus, we subsume the Theory of Games under the head of Decision Theory, regarding it as a particularly clearly formulated version of part of the general

theory of decision-making.

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