Statistical Analysis: An Interdisciplinary Introduction to Univariate & Multivariate Methods

By Sam Kash Kachigan

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This is an expanded edition of the author's "Multivariate Statistical Analysis." Twice as long, it includes all the material in that edition, but has a more extensive treatment of introductory methods, especially hypothesis testing, parameter estimation, and experimental design. It also introduces time series analysis, decision analysis, and more advanced probability topics (see the accompanying table of contents). It has been used as a textbook at the graduate level at over 300 leading universities, in over a dozen academic disciplines, including education, business, and the social and health sciences. Like its abridged edition, it has been acclaimed for its lucid treatment of difficult statistical concepts.

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Statistical Analysis: An Interdisciplinary Introduction to Univariate & Multivariate Methods By Sam Kash Kachigan Bibliography

- Sales Rank: #348420 in Books
- Brand: Brand: Radius Pr
- Published on: 1986-01
- Original language: English
- Number of items: 1
- Dimensions: 9.50" h x 6.50" w x 1.25" l, 2.20 pounds
- Binding: Hardcover
- 589 pages

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Editorial Review

About the Author
Sam Kash Kachigan is the author of several innovative books in mathematics and psychology, including "Multivariate Statistical Analysis," "Statistical Analysis," "The Sexual Matrix," "The Game," and "Over 100 Traits of Truly Horrible People." His books have been used in graduate programs at over 300 leading universities, in over a dozen different academic disciplines. He is also a prolific photographer and experimental filmmaker. As such, he is one of very few individuals to have made significant contributions to both the arts and sciences. He was born in Wisconsin of immigrant Armenian parents, and received his inter-disciplinary education at the University of Wisconsin, The University of Washington, and Columbia University.

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Preface

This book is designed for a first course in both univariate and multivariate methods of statistical analysis, for research-oriented students with a typical mathematics background.

Overall, the most unique feature of the book is that it recognizes and addresses the needs and abilities of a wider range of students than the conventional introductory statistics textbook, both in approach and content. A fundamental principle of education is that individuals differ in their native aptitudes for various subject matter. While relatively few students have a strong aptitude for manipulating mathematical symbols--the essential audience for many statistics texts--many more sharp students are capable of grasping concepts and arguments that are effectively presented verbally, numerically, geometrically, graphically, and by example, repetition, logic, and analogy, methods which are used extensively in this text. Mathematical symbols are reserved for introducing the basic univariate and bivariate concepts, while multivariate topics are treated conceptually as extensions of the bivariate relation.

The emphasis in the presentation is on the rationales, interpretations, and applications of the most commonly used statistical methods, rather than on their computational aspects. This approach has been dictated by the increasing availability of computing hardware and software, a technological innovation that has had the twofold consequence of (1) increasing the user base for statistical analysis, and (2) increasing the variety and power of readily available analytical techniques. Historically, use of the advanced multivariate methods introduced in the text were time-consuming and were only available to a relatively small handful of researchers with advanced training, but now with the proliferation of computers they are accessible to everyone and are commonplace in contemporary research. As a result, more students must learn more statistical techniques than in the past, and instruction must become more efficient.

Throughout the presentation a building-block approach is used, in which each new concept is shown to be a logical extension, variation, or combination of previously developed ones. Also, the position is taken that the methods of statistical analysis fill one or more of three basic objectives, including data reduction, inference, and the identification of associations among variables. With this and the building-block approach, the student will more easily see statistics as a unified subject area based on a handful of concepts and principles, rather than as a collection of disjointed techniques. This philosophy is reflected in the overall organization of the book's 21 chapters:

Part I: FUNDAMENTAL CONCEPTS 1. The Nature of Statistical Analysis 2. Objects, Variables, and Scales Part II: DATA REDUCTION 3. Frequency Distributions 4. Central Tendency 5. Variation Part III: INFERENCE 6. Basic Probability 7. Sampling Distributions 8. Parameter Estimation 9. Hypothesis Testing Part IV: ASSOCIATION (Multivariate Analysis) 10. Correlation Analysis 11. Regression Analysis 12. Analysis of Variance 13. Analysis of Category Data 14. Discriminant Analysis 15. Factor Analysis 16. Cluster Analysis 17. Multidimensional Scaling Part V: SELECTED SUBJECTS 18. Time Series Analysis 19. Nonparametric Analysis 20. Advanced Probability Topics 21. Decision Analysis

Because of the wide range of topics, the text can fill a wide variety of curriculum needs at both the undergraduate and graduate level. The treatment of the multivariate methods in Part IV is conceptual and practical in nature, requiring no knowledge of computer programming, calculus, or matrix algebra, although the interested instructor can easily introduce these aspects during lectures. In their professional lives, the majority of students will be engaged in the design, interpretation, and application of multivariate research, and that is the focus of the presentation. For the student who will specialize in statistical methods, the text will serve as a springboard for advanced mathematical study and as a communications tool to be used in their eventual consulting capacity with naive users of statistical methods of data analysis.

Since the principles of statistical analysis are perfectly general, cutting across all academic disciplines, students in all curriculums can use the text. The examples are drawn primarily from the behavioral, biological, environmental, and monetary sciences, with each illustration relevant to several disciplines. This approach is aimed at emphasizing the interdisciplinary nature of many research problems and the absolute generality of statistical theory.

Exercises for each chapter are included at the back of the text in the Appendix, their location simulating real life in that the test of our knowledge is typically removed from the point of the learning experience. Aside from assessing basic definitional and computational skills, the exercises test for the conceptual understanding of the techniques, including their interpretations and applications.

The many users of my earlier book Multivariate Statistical Analysis: A Conceptual Introduction (1982)--an abbreviated version of the present text--were instrumental in the development of this expanded volume, both through their acceptance of the overall approach and their desire for wider coverage. I have tried my best to accommodate as many of the often conflicting instructor needs as possible, while still maintaining an evenness of presentation and not losing sight of the primary introductory audience.

S.K.K.

Users Review

From reader reviews:

Jason Hill:

Reading a publication can be one of a lot of action that everyone in the world really likes. Do you like reading book consequently. There are a lot of reasons why people fantastic. First reading a guide will give you a lot of new facts. When you read a publication you will get new information due to the fact book is one of many ways to share the information or maybe their idea. Second, reading through a book will make a person more imaginative. When you looking at a book especially fictional book the author will bring that you imagine the story how the people do it anything. Third, you could share your knowledge to other people. When you read this Statistical Analysis: An Interdisciplinary Introduction to Univariate & Multivariate Methods, it is possible to tells your family, friends and also soon about yours book. Your knowledge can inspire the others, make them reading a guide.

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Melissa Becker:

The book untitled Statistical Analysis: An Interdisciplinary Introduction to Univariate & Multivariate Methods contain a lot of information on the item. The writer explains her idea with easy approach. The language is very straightforward all the people, so do definitely not worry, you can easy to read it. The book was written by famous author. The author will take you in the new era of literary works. You can actually read this book because you can read more your smart phone, or program, so you can read the book with anywhere and anytime. In a situation you wish to purchase the e-book, you can available their official web-site as well as order it. Have a nice go through.

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