Outliers in Statistical Data (3rd edition)

1 author:

Jim Freeman
The University of Manchester
100 PUBLICATIONS **694** CITATIONS

Some of the authors of this publication are also working on these related projects:

simulation applications View project

family history View project

Operations Research Proceedings 1993: Papers of the 22nd Annual Meeting of DGOR in Cooperation with NSOR
H. Dyckhoff, U. Derigs, M. Salomon and H. C. Tijms (Editors)
Springer Verlag, Berlin, 1994. xviii + 57 pp. DM198.00
ISBN 3 540 57862 5

Why should anyone spend £80 on this book? This is not intended as a criticism of either the Dutch or the German Operational Research Societies, of whose 1993 conference these proceedings are a permanent record. No; it is a comment on the academic book publishing industry, which chooses to make a compilation of the papers presented at a conference, sticks a (paperback) cover on them and charges a fancy price to libraries that feel obliged to buy the result. For my money, I should far rather take out a subscription to *Interfaces* or *Operations Research* and receive a stream of refereed papers that covers much the same material. Unfortunately, the *European Journal of Operational Research* has priced itself out of the personal subscription market, so I cannot recommend the natural home of the best of these papers as an alternative to buying this volume.

Having put this volume in context, what more is there to say? Well I think that it actually shows Operational Research to be doing rather better on the Continent than it is in the UK. By that I mean that there is more 'real OR' being done, with real clients paying real money (or spending significant amounts of time with academics) to have their problems tackled. True, there is the same hefty bias among contributors to this volume towards academia as in the UK, but one is not left with the impression that OR is a subject to be practised by consenting adults in the privacy of their own universities. Even so, in his plenary lecture 'The Practice of OR', Gerrit Timmer quotes Alexander Rinnooy Kan:

> It is possible that economics today is following the same path as Operations Research did in the 1960s and 70s, leading to its heavily reduced status in industry. OR started life as a discipline for creative minds ... but within 20 to 30 years the search for mathematical rigour ... was allowed to become an end in itself.

Timmer is not as pessimistic as Rinnooy Kan (who has become Head of The Netherlands equivalent of the CBI). He usefully discusses the need to decompose problems and identify which subproblems to tackle using 'hard' OR techniques such as optimization and which to leave to human judgement. Over all of this must come an appropriate user interface. He sees particular opportunities for OR in distribution and logistics because of the changes occurring in eastern Europe and the fall of national barriers within western Europe.

In his plenary paper, Uday Karmarkar has similar concerns about the tendency to throw algorithms at problems rather than looking at problems 'in the round'. He is concerned particularly with production and distribution problems and emphasizes the need to model existing data flows and processes as well as building OR models. In seeking to relate the OR model to the real world, however, it appears to me that he is doing little more than has been common practice among successful practitioners.

The other plenary paper, by Achim Bachem on vehicle routeing, is represented only by its abstract: not what one is entitled to expect from published proceedings.

Robert Simons Ltd   ROBERT SIMONS

Outliers in Statistical Data (3rd Edition)
Vic Barnett and Toby Lewis
John Wiley and Sons, Chichester, 1994. xvii + 584 pp. £49.95
ISBN 0 471 93094 6

Reviews[1,2] of previous editions of this book have been extremely favourable. The latest edition is no less deserving.

The book reflects comprehensively the state of the 'outlier art' and must surely be considered to be the definitive text in this area. The extensive bibliography (up by about 50%

from the second edition) is a particular strength of the work, as is the 39 tables of critical values on key outlier tests.

To accommodate the many new developments since 1984 (over 1000 new refereed papers), the book has been substantially repackaged. Chapters are now blocked together under generic headings. Part I on 'Basic principles (representing Chapters 1–4) provides a very readable introduction to the subject, starting with what outliers are, where they come from and in what probabilistic context. Chapter 2 details the main aims of outlier analysis and the different analytical approaches available for dealing with discordant observations. Chapters 3 and 4 focus on various technical aspects of outlier test performance, and also theoretical problems such as masking and swamping. Chapters 5 and 6 (making up Part II) are devoted to 'Univariate data' applications. Part III (Chapters 7–8) in contrast, deals with outliers as they occur for 'Multivariate and structured data'–particularly in relation to regression models and designed experiments. The final part (Part IV) of the book, on 'Special topics', covers a number of important issues, including Bayesian methods (Chapter 9), outliers in time series and directional data (Chapters 10 and 11) and contingency tables (Chapter 12). Chapter 13 examines software options relevant to outlier detection and testing. Here, I sympathize with the authors' frustration in finding that most mainstream statistics packages seem to have very little to offer in this respect. However, the programs they refer to in this chapter, e.g. BMDP, MINITAB and SPSS^x (!) appear to date no later than 1989. In the last five years, statistics software has changed beyond all recognition so maybe their pessimism is less justified now than it was (although my hunch is that they still have substantial grounds for complaint). Chapter 14 briefly summarizes recent experience in the area and points (very helpfully) to where future research may prove profitable.

Slight reservations about the software review aside, this has to be judged a first-rate production. The book aims to provide the professional statistician and experimental scientist with 'a thorough modern understanding of how to handle outliers in statistical data'. There is no doubt that it succeeds.

UMIST   JIM FREEMAN

References

1. M. HEALY (1979) Review of '*Outliers in Statistical Data*' by Vic Barnett and Toby Lewis. *J. Royal Stat. Soc. Series A* **142** (1), 64–65.
2. A. KIMBER (1985) Review of '*Outliers in Statistical Data*' by Vic Barnett and Toby Lewis. *J. Royal Stat. Soc. Series A* **148** (1), 165–166.

Shop Floor Control Systems: From Design to Implementation
A. BAUER, R. BOWDEN, J. BROWNE, J. DUGGAN and G. LYONS
Chapman and Hall, London, 1994. xx + 344 pp. £24.95
ISBN 0 412 58150 7

This book is the paperback publication of the first edition published in 1991. Much of the work discussed in the book is the outcome of a study carried out through a CIM (computer integrated manufacturing) project within ESPRIT, entitled COSIMA (Control System for Integrated Manufacturing) with the financial support of the European Community.

The book, as its title suggests, is concerned with the control of the shop floor operation. The overall objective is to reduce the manufacturing lead time, which is typically 10 to 20 times the actual processing time, and bring it close to the processing time.

The book consists of 12 chapters organized in six parts. Part 1, comprising Chapter 1, is a critical review of some of the shop floor approaches like MRP, MRPII, JIT, Kanban, OPT etc. It develops from these discussions the essentials for two major subsystems of shop floor control, namely a Factory Coordination (FC) subsystem and a Production Activity Control (PAC) subsystem.

In Part 2, comprising Chapters 2 and 3, the functionality of the shop floor control system is presented, FC (Factory Coordination) is viewed as a higher level of PAC (Production Activity