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Forecasting: Methods and Applications

Makridakis, Spyros

John Wiley and Sons

Makridakis, Spyros, Steven C. Wheelwright, and Rob J. Hyndman, *Forecasting: Methods and Applications,* Third edition. John Wiley and Sons, 1998.

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This book covers what the authors call the "full range of major forecasting methods." These comprise of the traditional time series methods of decomposition, exponential smoothing, simple and multiple linear regression and Box-Jenkins' ARIMA models. Further to those, this 3rd edition very wisely includes some more advanced forecasting methods such as dynamic regression, neural networks, state space modeling as well as some "new ideas for combining statistical and judgmental forecasting" amongst others. A modern approach to long-term forecasting based on mega trends, analogies and scenarios is also included.

The authors aim to provide a complete description of the methods' essential characteristics. They have presented the steps needed for the practical application of the methods while avoiding getting bogged down in non essential theoretical details. They have also presented the advantages and drawbacks of the methods with the intention of helping in model selection.

In my opinion, the book is well written and well structured providing a very good literature at both advanced undergraduate and graduate levels. It provides a detailed enough coverage of the classical time series forecasting methods with plenty of examples and real case analyses. It is certainly an advance on the previous editions and on other similar books written by some of the same authors (e.g., Makridakis and Wheelwright, 1989). By including the extra material many important methods are now introduced, albeit at a rather superficial level – though references are provided for those willing to undertake further reading. The wide range of examples and practical applications presented for the classical methods are not as widely available for the advanced ones.

Despite empirical evidence of better performances in terms of post-sample accuracy by methods of combining forecasts (see Chapter 11), the authors do not describe some of the major statistical combination methods such as the "optimal" combination of Bates and Granger (1969), the "outperformance" of Bunn (1975) and the "quasi-Bayes" of Smith and Makov (1978). (For a description and an application of those refer to Faria and Souza (1995)).

On the judgmental forecasting topic I would like to point out the importance of the Bayesian approach (ignored by the authors) which provides a formal and coherent methodology towards the statistical combination of experts" subjective judgments with empirical data. In this regard, the quantification of expert opinion as numerical forecasts is of paramount importance. Issues like expert miscalibration (the judgmental bias described by the authors being one of its causes) and dependence between forecasters and/or forecasting methods can have a dramatic effect on the resulting predictive distribution.

Another issue of importance not explicitly included relates to the use of forecasting to support decision making. This is the presentation of the uncertainty associated with the assessed prediction to the decision maker. In most cases, decision makers are not well prepared to deal with measures of uncertainty associated with predictions.

To conclude, I would like to praise the authors for introducing the advanced methods. I hope this will encourage the readers to go beyond the classical approaches and experiment with more modern methods. I have adopted the book as one of the main references on an MSc in Operational Research course I have recently taught and had generally positive feedback from some of the students.

References

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