Maximum Entropy and Bayesian Methods

Fundamental Theories of Physics

An International Book Series on The Fundamental Theories of Physics: Their Clarification, Development and Application

Volume 98

Maximum Entropy and Bayesian Methods

Boise, Idaho, U.S.A., 1997

Proceedings of the 17th International Workshop on Maximum Entropy and Bayesian Methods of Statistical Analysis

edited by

Gary J. Erickson

Joshua T. Rychert

Department of Electronical Engineering,
Boise State University,
Boise, Idaho, U.S.A.

and

C. Ray Smith

Fayetteville, Tennessee, U.S.A.

SPRINGER-SCIENCE+BUSINESS MEDIA, B.V.

A C.I.P. Catalogue record for this book is available from the Library of Congress.

ISBN 978-94-010-6111-7 ISBN 978-94-011-5028-6 (eBook)
DOI 10.1007/978-94-011-5028-6

Printed on acid-free paper

Originally published by Kluwer Academic Publishers in 1998
Softcover reprint of the hardcover 1st edition 1998

CONTENTS

IN MEMORY OF EDWIN T. JAYNES

With the passing of Edwin Thompson Jaynes on April 30, 1998, his many friends in the MAXENT community and beyond must say good-bye to a very special person.

His openness and unselfishness, his independent and original thought, and his uncompromising high standards have made an indelible impact. His written work was so lucid that it was in and of itself a pleasure to read; his speaking style was every bit as penetrating and intelligible as his writing.

Beyond his prodigious scientific contributions and wisdom, much more could be said about those personal qualities which made Ed's friendship over the years a rare privilege. But as anyone who knew him understands, Ed believed that such matters are by their nature private, and would have been uncomfortable with public profession of the grief which naturally accompanies this loss.

He will be keenly missed.

PREFACE

This volume has its origin in the Seventeenth International Workshop on Maximum Entropy and Bayesian Methods, MAXENT 97. The workshop was held at Boise State University in Boise, Idaho, on August 4 - 8, 1997. As in the past, the purpose of the workshop was to bring together researchers in different fields to present papers on applications of Bayesian methods (these include maximum entropy) in science, engineering, medicine, economics, and many other disciplines.

Thanks to significant theoretical advances and the personal computer, much progress has been made since our first Workshop in 1981. As indicated by several papers in these proceedings, the subject has matured to a stage in which computational algorithms are the objects of interest, the thrust being on feasibility, efficiency and innovation. Though applications are proliferating at a staggering rate, some in areas that hardly existed a decade ago, it is pleasing that due attention is still being paid to foundations of the subject. The following list of descriptors, applicable to papers in this volume, gives a sense of its contents: deconvolution, inverse problems, instrument (point-spread) function, model comparison, multisensor data fusion, image processing, tomography, reconstruction, deformable models, pattern recognition, classification and group analysis, segmentation/edge detection, brain shape, marginalization, algorithms, complexity, Ockham's razor as an inference tool, foundations of probability theory, symmetry, history of probability theory and computability.

MAXENT 97 and these proceedings could not have been brought to final form without the support and help of a number of people. In particular, SCP Global Technologies helped with the realization of MAXENT 97 . The editors, Gary Erickson, Josh Rychert, and Ray Smith, express their gratitude to all the speakers and are appreciative for the additional time and effort authors expended in producing a finished manuscript.

This preface must end on a sad note: Professor E. T. Jaynes died on April 30, 1998, in St. Louis, Missouri.