The official newsletter of the International Society for Bayesian Analysis.

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The ISBA NEWSLETTER
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ISBA is a newly created International Scientific Society with the objective of interfacing between Bayesian Statistic methods,and scientific areas such as Engineering, Chemistry, Physics, Economics, Business, Astronomy, Earth Sciences, Education, Psychology, Government Policy-Making, Medicine, and Sociology.

ANNOUNCEMENTS

The results of the 1995 ISBA election are:

Pres.: Arnold Zellner, U. of Chicago
V-Pres.: Robert Kass, Carnegie Mellon
Treas.: Gordon Kaufman, MIT
Sec.: Mark Schervish, Carnegie Mellon

International Advisors: M.J. Bayarri, U. of Valencia; James Berger, Purdue U.; Jose Bernardo, U. of Valencia; Semour Geisser, U. of Minnesota; Joseph Kadane, Carnegie Mellon U.; Dennis Lendley, U.K.; Anthony O'Hagan, U. of Nottingham; Dale Poirier, U. of Toronto; James Press, U. of California; Luke Tierney, U. of Minnesota; Herman van Kijk, Erasmus U.; and Michael West, Duke U.

John Geweke, U. of Minnesota, has been appointed Chair of the ISBA Publications Committee (PC). Members of the PC are Jose Bernardo, U. of Valencia, Harold Lewis, U. of California and Luis Pericchi, Simon Bolivar U. The PC will formulate questions for the members' referendum on the ISBA journal issue and consider publication issues and policies.

Joseph Kadane, Carnegie Mellon U. has been appointed Chair of the ISBA Constitutional Committee (CC). Members of the CC are: Susie Bayarri, U. of Valencia; George Casella, Cornell U.; Tom Leonard, U. of Wisconsin; Adrian Smith, Imperial College and Herman van Dijk, Erasmus U. The CC will prepare a draft of a constitution for ISBA to be reviewed by the Members of the Board.

An ISBA Council of Sciences (COS) will be appointed in the near future. Among other activities, the COS will report on developments in Bayesian analysis in many sciences and fields of application. If you are interested in serving on the COS, please contact Arnold Zellner (fac_azellner@gsbavax.uchicago.edu).

Upcoming Meetings

Third Annual Meeting of ISBA

Enrique de Alba, ITAM, Mexico City (dealba@gauss.rhon.itam.mx) has been appointed Local Arrangements Chair for the 3rd World Meeting of ISBA to be held September 29-30, 1995 in Oaxaca, Mexico. Other statistical societies will be meeting in Oaxaca, a beautiful colonial city, just prior to the ISBA 1995 meeting. Please send all papers with proposals for papers to:

Prof. Edward I. George
CBA 5.204
MSIS Department
University of Texas at Austin

Tel: 512-471-5243 Fax: 512-471-0587
Don't miss ISBA95 in Mexico!

A Far-Eastern Regional Meeting of ISBA will be held in Taiwan, December 12-14, 1994. For further information, please contact Jack Lee (jclee@stat.nctu.edu.tw).

FROM OUR MAILBAG

The Newsletter will now appear in 4 issues per year: March 15, June 15, September 15, and December 15.

AWARDS

The Savage Thesis Award for an Outstanding Bayesian Ph.D. dissertation was awarded to Jeremy York, University of Washington. His dissertation was titled "Bayesian Methods for the Analysis of Misclassified or Incomplete Multivariate Discrete Data."

The Mitchell Award for an Outstanding Bayesian Application to the Solution of a Real World Problem was award to Mike West, Director ISDS, Duke University.

RENEWAL REMINDER

INTERNATIONAL SOCIETY FOR BAYESIAN ANALYSIS: 1994 NORTH AMERICAN REGIONAL MEETING, held August 12 and 13 1994 in Toronto, Ontario, Canada

The ISBA meeting held immediately prior to the ASA meeting in Toronto was another success. Thanks to Mike Evans who arranged an outstanding program, and Jerry Brunner who served admirably as local arrangement chair.

John Deely, Head, Department of Statistics, University of Canterbury, Christchurch, NZ, was the Banquet Speaker at the ISBA meeting in Toronto, August 1994. After many sage and witty remarks, he made awards to the following ISBA members for their outstanding contributions to the meeting: John Geweke, Wolfgang Polasek, Kate Cowles, Teddy Seidenfeld, Ed George, Susie Bayarri, Mike Evans, Jim Dickey, and Joe Eaton. After giving each a flower, John Deely added to the festivities with his delightful comments for each award recipient. Here are a few of the gems: "Best first transpancy, making the rest of the talk redundant." "Most perspiring talk in a foreign language." "Speaking the fastest but giving no few information." "Most sensuous talk as indicated by his use of "fractile" statistics." "Had 2000 iterations in a Gibbs Sampler and discarded the first 2500." It was unanimously agreed that Deely Awards would be made at future ISBA meetings.

Session 1: Bayesian Hypothesis Testing

Bayesian Approach to Change Point Problems via Predictive Distribution
Dipak Dey, University of Connecticut

Model Averaging and Accounting for Model Uncertainty in Linear Regression
Jennifer Hoeting, Colorado State Univ.
A. Raftery & D. Madigan, U. of Washington

Bayesian Analysis of Stochastically Ordered Distributions of Categorical Variables
Tim Swartz, Simon Fraser University; M. Evans, U. of Toronto, Z. Gilula, Hebres U. and I. Guttman, SUNY at Buffalo

Session 2: Computational Methods

Comparison of Image Reconstruction Algorithms
Tom Ferryman, U. of California at Riverside

Markov Chain Monte Carlo in Conditionally Gaussian State Space Models
Robert Kohn, and C.K. Carter Australian School of Management

Marginal Likelihood from the Gibbs Output
Siddhartha Chib, Washington University

Session 3: Convergence of Markov Chain Monte Carlo

Bin Yu, University of California-Berkeley

Jun Liu, Harvard University

Evaluation and Comparison of Markov chain Monte Carlo Convergence
Kate Cowles, University of Nebraska

Session 4: Econometrics

Bayesian Comparison of Econometric Models
John Geweke, University of Minnesota

Gibbs Sampling in ARCH Models
Wolfgang Polasek and S. Jin, University of Basel

Bounded Variance Priors in Simultaneous Equations: A Limited Information Approach
Kishore Gawande, University of New Mexico

Session 5: Bayesian Methods in Actuarial Science

Bayesian Methods in Insurance - A Review
Udi Makov, Haifa University

Hierarchical Model Solutions to Insurance Problems
Ed George, University of Texas-Austin

Some Models for Insurance Rate Making
David Schollnik, University of Calgary

Session 6: Linear Models

Variable Selection and Model Comparison in Regression
John Geweke, University of Minnesota

Posterior Distribution for the Number of Factors
Jim Press and K. Shigemasu, University of California-Riverside

Multiperiod-Ahead Densities in Dynamic Linear Models
Chung-Ki Min, George Mason, University

Session 7: Bayesian Inference and Information Theory

Bayesian Method of Moments and Maximum Entropy Analysis
Arnold Zellner, University of Chicago

On the Information in the Likelihood
Ao Yuan and B. Clarke, U. of British Columbia

Session 8: Inference I

Bayesian Inference for Conditionally Specified Models
Barry Arnold, U. of California at Riverside

Small Sample Hierarchical Testing Procedures in Bayesian Statistics
Mike Brimacombe, University of Pittsburgh

What is Statistical Inference in De Finetti's Coherent Assessment Paradigm?
James Dickey, University of Minnesota

Session 9: Coherence and Finite Additivity

Coherence and Incoherence of Certain Formal Posteriors in a Multivariate Normal Setting
Morris L. Eaton, University of Minnesota

Coherence for Translation Families
Nate Wetzel, State University of New York at Binghamton

Finite Additivity and the Value of New Information
Teddy, Seidenfeld, M.J. Schervish and J.B. Kadane, Carnegie Mellon U.

Session 10: Robustness, Diagnostics

Bounding Posterior Means by Model Criticism
Shigerau Iwata, University of Kansas

Local Sensitivity, Functional Derivatives and Nonlinear Posterior Quantities
Sanjib Basu, University of Arkansas

Some Algebra and Geometry for Hierarchical Models, Applied to Diagnostics
Jim Hodges, University of Minnesota

Session 11: Inference II

Bayesian Stopping Procedures Using Further Assurance
John Deely, University of Canterbury

Bayesian Solutions to a Class of Selection Problems
Lawrence Marsh, University of Notre Dame and Arnold Zellner, University of Chicago

Bayesian Sample Size Determination via HPD Regions
Lawrence Joseph, D. Wolfson and R. du Berger, McGill University

Session 12: Semiparametric Bayesian Models

Robust Error Structures with Dirichlet Processes
Jerry Brunner and M. Escobar, University of Toronto

TBA
Steve MacEachern, Ohion State University

On a Simple Vague-Prior Limit of the Posterior

for Binary Regression with Unknown Link
Mike Newton, University of Wisconsin

Session 13: Inference III

The Conditional Frequentist Interpretation of Bayesian Testing Procedures; the Composite Hypothesis Case
Yinping Wang, J.O. Berger, and B. Boukai, Indiana U - Purdue University at Indianapolis

Bayes and Empirical Bayes Procedures for Simultaneous Selection of Multinomial Populations Based on Entropy Functions
Shanti S. Gupta, L.Y. Leu and T.C. Liang, Purdue University

Bayesian Hypothesis Testing Procedures Derived via the Concept of Surprise
Mike Evans, University of Toronto

Session 14: Time Series and Econometrics

Bayesian Analysis of ARFIMA Processes
Nalini Ravishankar and J. Pai, University of Connecticut

Measurement Error or Endogeneity: Sorting Out Sources of Simultaneity
Charles Romeo and J. Sun, Rutgers University

Bayesian Inference of Threshold Autoregressive Models
Cathy Chen, Feng-Chia University

PROBABILITY ASSESSMENT AND BAYESIAN INFERENCE

Romano Scozzafava

In the final part of Issue No.1 of "ISBA Newsletter", Tom Leonard invites comments on his article "BAYESIAN ANALYSIS, AN OVERVIEW".

My comments will concern the only part of this excellent survey which shows some partial disagreement with my view: the second paragraph on p.11, where Tom Leonard states "While most axiom systems for subjective probability comprise useful descriptions of Bayesian behavior, they are generally at least as strong as the Kolmogorov axioms of probability, e.g. the countable additivity property, and therefore cannot be fairly used to compel a reluctant scientist to satisfy the laws of probability, or to brand him as irrational or incoherent. For example, if the sampling distribution P is unspecified, any inductive, intuitive, or ad hoc process should be permissible in order to discover either an appropriate P, or a finite set of possible hypotheses for P. While some of us have attempted a more formal approach, it stretches credulity to expect every scientist to develop a prior distribution across the space of all sampling distributions, or to expect a judge to be able to specify a probability distribution across the space of all possible truths, in a complex legal case."

In fact, the situation that usually occurs is the following: the statistician is not actually able to give reliable numerical evaluations of the degrees of uncertainty related to all relevant statements concerning a given problem. In some cases it is possible to get from the expert some degrees of belief referring to only a few uncertain situations strictly related to the problem and known to him.
Moreover, it is clearly very significant, from the point of view of applications, not assuming any specific structure for the set of events on which probability should be assessed.

A nontraditional but flexible way of dealing with the treatment of uncertainty is through de Finetti's theory of coherent extensions. This allows starting from a few conditional events (possibly just one) of interest, going on by a step-by-step assessment, which leads in general to assignments of probability values in suitable closed intervals (see de Finetti, 1974, p.112), possibly reducing to a single point. For extensions and concrete numerical applications of this procedure, see Lad, Dickey, Rahman (1992).

On the contrary, the probabilistic management of uncertainty in Bayesian inference is usually based on some well established "myths", such as (a) the need of a beforehand given "algebraic" structure (e.g. a Boolean ring, a sigma-field etc.) on the set of all possible events (conditional or unconditional) representing the envisaged situation; (b) an overall probability assessment on the aforementioned family of events; (c) suitable assumptions aiming at getting a unique probability value.

(Not to mention the frequentist interpretation of probability, that often unnecessarily restricts its domain of applicability: whereas the most general approach to probability, i.e. the subjective one, which includes "combinatorial" and "frequentist" methods of evaluation as particular cases, is based on the view that "probability is a measure of the degree of belief in a proposition in a given context," the latter corresponding to some particular information).

The main role of coherence is that of a consistency condition in presence of many probability evaluations. Essentially, the situation is the following: while requiring coherence of a function P on an arbitrary set C of conditional events entails that P is a (finitely additive) conditional probability distribution (in the sense that P is the restriction on C of a conditional probability defined on the Cartesian product of a field by an additive class), the converse in general is not true. Sufficient conditions for the coherence of a function P satisfying the axioms of a conditional probability on an arbitrary class C concern the structure of C itself. In other words, a direct check of coherence can be done with reference to an arbitrary set C of conditional events (with no underlying structure), and so it is possible to assess P only on a set of events of interest. Moreover, since the assessment of conditional probabilities is bounded to satisfy only the requirement of coherence, there is no need, as in Kolmorogov's approach (where the conditional probability of E given H is introduced by definition as the ratio P(EH)/P(H)), neither of assuming positive probability for the conditioning event H, nor (in the continuous case) of knowing the whole conditioning distribution, as required by the usual Radon-Nikodym framework, rather than just the conditioning event itself (a situation which is clearly unsound from a Bayesian inferential point of view): see Hill (1980), p.63, and, for a thorough critical comparison of de Finetti's and Kolmogorov's approaches, Scozzafava (1990).

In conclusion, conditional probability can be assessed on the ground of coherence only, and makes sense for any pair of events E.H. Furthermore, given an arbitrary class of conditional events containing the initial class C, then there exists a (possibly not unique) coherent extension of P to the larger class if and only if P is coherent: see Williams (1975), Holzer (1985).

On the other hand, since coherence of P is "essentially" (in the usual framework) equivalent to P satisfying the axioms of probability, assuming coherence is nothing but assuming the axioms of probability, which in de Finetti's approach are the weakest.

The main advantages with respect to Kolmogorov's approach are: (i) no need of a pre-given structure on the family C: but it is not forbidden (in the sense that coherence is not violated) to put on C a structure if the relevant problem requires it; (ii) assuming countable additivity as an axiom may be avoided (but, again, it is not forbidden if one needs it): what is essential is that this property be seen as a specific feature of the information embodied in a given particular situation and not as a characteristic of every distribution): different aspects are deepened, e.g., in Hill (1980), Regazzini (1987), Wakker (1993); (iii) conditioning events may have zero probability: this and (ii) allow, for example, a rigorous approach and treatment of improper distributions by deepening and making operational this concept through the exploitation of ideas that go back to B. de Finetti (1936), i.e. suitable comparison between events of null probability (see Scozzafava, e.g. 1984, 1993).

Similar results can be achieved by the use of comparative (or qualitative) probability, since the main purpose of many methods for handling uncertainty is that of ordering some given hypotheses (see, e.g., Coletti, Gilio & Scozzafava, 1993).

This is not a technical paper, and so it is not possible to give more details on the above ideas: so the short bibliography (by no means complete) which follows should help the reader to become acquainted with this approach.

In conclusion, promotion of further research on the foundational and mathematical aspects of conditional probability, which is the natural tool for a proper framework of Bayesian statistics, should be among the major objectives of ISBA in the future. I would not like to see Bayesian Analysis reduced to a bunch of (well founded) techniques, emphasizing only models and relationships between prior and posterior. The role played by probability in Bayesian statistics is so vital that I feel that ISBAP (International Society for Bayesian Analysis and Probability) would be a better name than ISBA ...

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