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IMS China editorial

To promote the field of statistics and probability and enhance the interaction between Chinese and international scholars, the Institute of Mathematical Statistics launched the IMS China, a sub-division dedicated to IMS members in China in 2008. The inaugural IMS China International Conference on Statistics and Probability was held in Hangzhou, China, in June, 2008. The great success of the inaugural conference led to the 2nd IMS China conference in Weihai, China in July 2009. The IMS China conferences have become a well-recognized forum for researchers in China and those from other parts of the world to discuss their current work and future directions and brainstorm new ideas.

To celebrate the establishment of the IMS China, the co-editors of Statistics and Its Interface (SII) would like to devote this special issue to papers inspired from the conference. Papers were submitted and subjected to the standard review process of SII. The selected papers in this issue cover a range of topics including large scale testing, high dimensional regression and methods for the design and analysis of clinical studies. These methods are generally inspired by and applicable to a variety of important areas ranging from biomedicine to computer science to finance, highlighting the importance of the interface between statistics and other disciplines.

We briefly describe the selected papers in the following paragraphs.

In microarrays data analysis and genome-wide association studies, measurements are often high dimensional. Standard testing tools in the literature usually have low power. Qu et al. explored the variance model selection problem for joint analysis of multiple microarray datasets to improve the detection of differentially expressed genes using gene-wise linear models. Wang et al. proposed a data-driven screening procedure based on hidden Markov models to exploit the linkage disequilibrium information in GWAS data and thus greatly improved conventional single SNP analysis. Zhao studied high dimensional normal mean estimation by shrinking both means and variances and applied it to Affymetrix Control data sets.

The special issue has also attracted several papers on the cutting-edge topic of sparse estimation and machine learning. Choi et al. proposed an L1 penalization method for sparse factor analysis in which factor loadings naturally adopt a sparse representation, hence facilitating the interpretation of the fitted factor model. Ruan and Yuan proposed a penalized least squares estimator that performs simultaneous model selection and estimation for the additive index model. Asymptotic analysis suggests that the proposed method can alleviate the curse of dimensionality. Zhou and Zhu developed a group variable selection method that not only removes unimportant groups effectively, but also keeps the flexibility of selecting variables within a group. Liu et al. proposed a utility-based weighted multi-category support vector machine for the situation where different types of misclassification should be weighted differently. Feng et al. proposed an algorithm that combines quantile regression and neural networks, which outperforms classical procedures in applications to credit portfolio data.

An important application of statistical theory and methods is for the efficient design and analysis of clinical studies. Jiang and Tu proposed the use of empirical likelihood to efficiently construct confidence intervals for the hazard ratio, an important summary measure for survival data. Segmentation is one of the basic problems in magnetic resonance (MR) image analysis. Xu and Liang proposed a Bayesian co-segmentation algorithm, which efficiently utilizes shared information across multiple MR images. Ghosh and Sabel proposed powerful spline-based procedures to assess the predictiveness of biomarkers for risk prediction. Chen et al. developed cost-effective genotyping strategies for the case-control mother-child pair design and demonstrated that it suffices to genotype a majority of children of cases and a small proportion of children of controls in many settings.

Finally we thank all authors for contributing to this exciting special issue to celebrate the establishment of IMS China. We also thank all referees for their hard work to improve the quality of every paper and the Editor-in-Chief Professor Heping Zhang for his generous support.

Co-Editors of the special issue
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