Editorial

Jun Shao (Editor-in-Chief), Dongchu Sun (Editor) & Danyu Lin (Editor)

Published online: 25 Jul 2017.

Submit your article to this journal ⬀

Article views: 358

View related articles ⬀

View Crossmark data ⬀

Taylor & Francis
Taylor & Francis Group

Editorial

Thanks to the efforts of many people, we are so delighted to see that the first issue of *Statistical Theory and Related Fields* (STARF) is published! At this moment, we would like to express our sincere gratitude to the East China Normal University (ECNU), the Chinese Association for Applied Statistics (CAAS), and Taylor & Francis (T&F), for their thoughtfully sponsoring and publishing jointly the STARF; to the authors of the 13 excellent articles in the first issue of STARF for their great supports; to the members of our editorial board for their efforts in handling papers in a short time period; to the staffs from the Department of Serial Publication at ECNU, from the School of Statistics at ECNU, and from T&F, for their efficient administrative and coordination work to make the new journal running well.

STARF will publish significant and original articles in modern statistical theory and related fields in natural, economical, medical and social sciences. The emphasis is to meet the needs of statistical application and methodology development in a rapidly changing world, and to promote the use of statistics in quantitative studies and interdisciplinary investigations. We hope it will serve as a distinct platform for international academic communications among scholars, research fellows, actuaries and engineers in related fields, and also a unique academic bridge between Mainland China and abroad.

This issue includes 13 articles covering a wide range of statistical methodology and application. The first article by Su and Wu provides a systematic framework for design and analysis of conversation funnel in Internet experiments, with interesting motivation examples. This has a potential for a general methodology development in a new area with the traditional experimental design and analysis methodology. The second paper by Chen provides a comprehensive and deep overview on testing the order of finite mixture models, reveals historically how the ideas and approaches at each stage were motivated and developed, and their pros and cons, and points out promising future research directions. Because of advances in technology, high-dimensional covariate is often encountered these days and various penalised least square estimators with non-convex penalties are shown to have good theoretical properties, such as the oracle property. However, finding a numerical solution that has good properties is challenging

because of the non-convexity, and the third article by Xiong, Dai and Qian develops an orthogonalising EM algorithm that can indeed find a local solution with the oracle property.

The high-dimensional covariate issue is also dealt with in the next two papers. The fourth paper by Liu, Shao and Yu is in the area of personalised medicine, where the goal is to make a medical treatment recommendation for each individual patient with a given set of covariates to maximise the treatment benefit measured by patient's response to the treatment. Based on sample training data, this paper constructs a treatment assignment rule by minimising a convex risk with a smooth hinge loss function, which is approximately the same as maximising directly the effectiveness of treatment assignments. The fifth paper by Zheng, Tsui, Kang and Deng proposes a Cholesky-based model averaging method for high-dimensional covariance matrix estimation, which not only guarantees the positive definiteness of the covariance matrix estimate, but also is applicable in general situations without the order of variables being pre-specified. The availability of big data because of powerful computer hardware and high-speed network introduces a unique computational challenge on scalability and storage of statistical methods. The sixth article by Zhao and Wang considers the lack-of-fit test of parametric regression models under the framework of big data and develops a computationally feasible testing approach via integrating the divide-and-conquer algorithm into a powerful nonparametric test statistic. Contrary to the high-dimensional covariate problem where there may be too much not so useful information, in missing data problems, one has to deal with lack of information due to various types of nonresponse.

The seventh paper by Chen and Kim studies a semiparametric fractional imputation method using empirical likelihood to handle item nonresponse in survey sampling. The next three articles are in the growing area of finance statistics. The eighth paper by Song and Wang develops a new quasi-Monte–Carlo method to simulate Brownian sheet in an option pricing problem for a class of interest rate models whose instantaneous forward rate is driven by a different stochastic shock through Brownian sheet, and shows some advantages of the new method over the simple Monte–Carlo method. The ninth paper by Idowu and Zhang models tail dependence of financial time series using a sparse

maxima of moving maxima process with random effects and hidden Frechet-type shocks. The authors use a Bayesian inference approach under the proposed model, and apply it to simulated data as well as real data. The tenth article by Yin and Xu considers portfolio optimisation in financial research. The authors propose an innovative Bayesian method that induces priors directly on optimal portfolio weights and imposes constraints a priori in a hierarchical Bayes model, and show that such constructed portfolios are well diversified with superior out-of-sample performance.

The next two articles are in another important area with a lot of statistical applications, the clinical trials. The eleventh paper by Wang, Zhang and Ahn deals with the sample size in stratified cluster randomisation trial where the cluster sizes have random variability. A new closed-form sample size formula is proposed to accommodate arbitrary randomisation ratio and varying numbers of clusters across strata, which prevents underestimated sample size and underpowered clinical trials. The twelfth paper by Xu and Zhou investigates causes of failure (competing risks) in survival or reliability analysis, where causes of failure may depend on each other. Using a Marshall–Olkin bivariate Weibull distribution, the authors derive reference priors

and Bayesian estimates computed by Gibbs sampling combined with the rejection sampling algorithm and Metropolis–Hastings algorithm. Finally, the last article by Li, Fine and Pencina is a review paper for the statistical analysis of diagnostic accuracy in a multi-category classification task. The paper reviews important statistical concepts for multi-category classification accuracy and their utilities, demonstrated with real medical examples and problem-based R code.

We hope that these 13 articles provide interesting, deep and diversified results to the readers, and the same will continue in the future issues of this journal. We welcome submissions of high-quality articles in statistical theory and related fields. Together, we hope to build this new journal to be a great platform for statisticians and scientists analysing various types of data.

Jun Shao (Editor-in-Chief)
University of Wisconsin Statistics, Madison, WI, USA
✉ shao@stat.wisc.edu

Dongchu Sun (Editor)
University of Missouri, Columbia, MO, USA
✉ sund@missouri.edu

Danyu Lin (Editor)
University of North Carolina, Chapel Hill, NC, USA
✉ lin@bios.unc.edu