The Hong Kong Polytechnic University
Department of Applied Mathematics

AMA Distinguished Seminar Series in Data Science and Machine Learning

Unit Information Prior and Bayesian Log-Rank Test

By

Prof. Guosheng YIN
The University of Hong Kong

Abstract

In clinical trials, there often exist multiple historical studies for the same treatment investigated in the current trial. Incorporating historical data in the analysis of the current study is of great interest, because it can help to gain more information, improve efficiency, and provide a more comprehensive evaluation of treatment. Through the unit information prior (UIP), we propose a new method to adaptively borrow information from multiple historical datasets. Our UIP is general enough to accommodate various types of outcomes, including continuous, binary and survival data and also can be extended to settings of linear regression and other models. Unlike existing methods that typically require the patient-level data, construction of UIP only requires summary statistics which are commonly available in the literature. We also develop the Bayesian log-rank test and impose UIP for comparison of two survival curves. We draw posterior samples of survival functions and construct a decision rule for hypothesis testing. Under noninformative prior distributions, the Bayesian log-rank test is shown to be asymptotically equivalent to the classical one. Under the UIP using historical data, the Bayesian log-rank test is shown to outperform the classical one in terms of power.

Biography

Guosheng Yin is Patrick S C Poon Endowed Professor and Head of the Department of Statistics and Actuarial Science at University of Hong Kong. He received Ph.D. in Biostatistics from University of North Carolina at Chapel Hill in 2003. In 2003-2009, he worked as Assistant Professor and Associate Professor in Department of Biostatistics at University of Texas M.D. Anderson Cancer Center. He was elected as a Fellow of the American Statistical Association in 2013 and Fellow of the Institute of Mathematical Statistics in 2021. He was Associate Editor for Journal of American Statistical Association, Bayesian Analysis, Contemporary Clinical Trials etc. He has published over 200 peer-reviewed papers and two books on clinical trial designs.

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Date: 25 July 2022 (Monday)
Time: 10:00-11:00 (Hong Kong Standard Time GMT +8)
Venue: HJ304 (Hybrid mode)
Meeting ID: 974 8105 8201 (Passcode: 0725)
Meeting link: https://polyu.zoom.us/j/97481058201?pwd=bjBndjRIYjlvNy8wb2poeHM2Smx2Zz09
Speaker: Prof. Guosheng Yin, The University of Hong Kong
Host: Prof. Jian Huang and Prof. Xingqiu Zhao, The Hong Kong Polytechnic University

* * * ALL ARE WELCOME * * *
For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 24 July 2022