

中央研究院統計科學研究所

學術演講

講題： Prediction with Confidence – General Framework for Predictive Inference

演講人： Prof. Regina Liu

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時間： 2019年12月18日（星期三）上午11:00-12:00

地點： 中央研究院統計科學研究所6005會議室(環境變遷研究大樓A棟)

Abstract

We propose a general framework for prediction in which a prediction is in the form of a distribution function, called ‘predictive distribution function’. This predictive distribution function is well suited for prescribing the notion of confidence under the frequentist interpretation and providing meaningful answers for prediction-related questions. Its very form of a distribution function also lends itself as a useful tool for quantifying uncertainty in prediction. A general approach under this framework is formulated and illustrated using the so-called confidence distributions (CDs). This CD-based prediction approach inherits many desirable properties of CD, including its capacity to serve as a common platform for directly connecting the existing procedures of predictive inference in Bayesian, fiducial and frequentist paradigms. We discuss the theory underlying the CD-based predictive distribution and related efficiency and optimality. We also propose a simple yet broadly applicable Monte-Carlo algorithm for implementing the proposed approach. This concrete algorithm together with the proposed definition and associated theoretical development provide a comprehensive statistical inference framework for prediction. Finally, the approach is demonstrated by simulation studies and a real project on predicting the volume of application submissions to a government agency. The latter shows the applicability of the proposed approach to even dependent data settings.

This is joint work with Jieli Shen (Goldman Sachs) and Minge Xie (Rutgers University).

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