Risk Prediction with Complex Studies

Tianxi Cai[*], Harvard University

Jennifer Sinnott, Harvard University

Yingye Zheng, Fred Hutchinson Cancer Research Center

Abstract

The rapid emergence of new biological and genetic markers holds great promise for improving the prediction of disease risk and prognosis over time. To evaluate their utility in a clinical setting, a crucial step is to identifying important markers and measure their predictive accuracy with prospective studies. In this talk, I will discuss several challenges associated with developing and evaluating risk prediction models including (i) high dimensionality; and (ii) complex study designs. Efficient testing and kernel machine modeling building procedures will be discussed to incorporate high dimensionality. For the complexity due to outcome dependent sampling, we propose inverse probability weighted estimators for model parameters as well as accuracy measures.

Keywords: Risk prediction; Two-phase study; Kernel machine regression; Predictive accuracy.

---

[*] Presenting author