Personalized Dose Discovery Using Outcome Weighted Learning

Abstract

In dose-finding clinical trials, there is a growing recognition of the importance of considering individual level heterogeneity when searching for optimal doses. An optimal individualized dose rule (IDR) should maximize the expected clinical benefit. In this talk, we consider a randomized trial design where candidate dose levels are continuous. To find the optimal IDR under such a design, we propose an outcome weighted learning method which directly maximizes the expected beneficial clinical outcome. A difference of convex functions (DC) algorithm is adopted to efficiently solve the associated non-convex optimization problem. The consistency and convergence rate for the estimated IDR are derived and small-sample performance is evaluated via simulation studies. We demonstrate that the proposed method outperforms competing approaches. Finally, we illustrate the method using data from a cohort study for Warfarin (an anti-thrombotic drug) dosing.

* Refreshments will be served at 9:30 a.m. in HAAS 111