

Adaptive Design of Network A/B tests

Feifang Hu

George Washington University
E-mail: feifang@email.gwu.edu

Abstract: Controlled experiments (A/B tests) are currently very popular in many industries. Many controlled experiments have three common features: (i) try to estimate ATE (average treatment effect); (ii) usually sequential; and (iii) depending on important covariates. In many applications (both online experiment and clinical trials), the responses of subjects could be a mixture of treatment effect, network effect, spill-over effect and their covariates. We should consider both covariates and the network connection in both the design and analyze of these experiments. In this talk, we propose new adaptive designs for network A/B tests. We aim to minimize the mean squared error of the estimated difference of treatment effects, which is equivalent to improve network connection balance across treatment groups. Under mild assumption, we prove that the new procedure has smaller mean square error than complete randomization. The advantages of the proposed designs are also demonstrated by numerical studies.