

Statistics Seminar
Department of Mathematical Sciences

DATE:	Thursday, December 6, 2018
TIME:	1:15pm - 2:15pm
LOCATION:	WH 100E
SPEAKER:	Haomiao Meng, Binghamton University
TITLE:	Individualized Treatment Rule with Alternative Options

Abstract

Individualized Treatment Rule (ITR) is an important component in personalized medicine. It assigns different patients with proper treatments. From the perspective of machine learning, it can be viewed as a classification problem under the goal that maximizes patients' benefits or minimizes patients' cost. Several methods like Outcome Weighted Learning (OWL) have been developed recently to solve ITR problem in both binary and multi-category cases. However, in practice sometimes people need a more flexible rule so that one or more options could be offered to a certain patient. This motivates us to bring a new rule with alternative options to ITR (ITAR). We first define a desired rule for a patient, which is a map from the patient's physical state to a set of treatments. Then we propose two methods based on OWL framework to estimate the new rule. We show consistency of these methods and obtain an upper bound for the risk between the theoretical rule and the estimated rule. A simulation study and a real data example have shown the usefulness of this new learning method.

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Last update: **2018/11/29 21:43**

