Speaker: Rebecca Lewis (University of Oxford)

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Title: High-dimensional logistic regression with separated data

Abstract:
In a logistic regression model with separated data, the log-likelihood function asymptotes and the maximum likelihood estimator does not exist. We show that an exact analysis for each regression coefficient always produces half-infinite confidence sets for some parameters when the data are separable. Such conclusions are not vacuous, but an honest portrayal of the limitations of the data. Finite confidence sets are only achievable when additional, perhaps implicit, assumptions are made. In a high-dimensional regime, we consider the implications of enforcing a natural constraint on the vector of logistic-transformed probabilities. We derive a consistent estimator of the unknown logistic regression parameter that exists even when the data are separable.