

Colloquium
Michigan State University
Department of Statistics and Probability

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Variable Selection for the Proportional Odds Model

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10:20 a.m. - 11:10 am
Refreshments 10:00 am
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Abstract

Variable selection via a penalized likelihood approach has been used for generalized linear models, and corresponding estimates enjoy an oracle property (Fan and Li, 2001). In this talk, I will discuss the problem of variable selection for the proportional odds model, which is an alternative to Cox's proportional hazard model and fits better in many survival settings. Since it is a semi-parametric model, the penalized profile likelihood is maximized to estimate parameters and select variables simultaneously. Under certain regularity conditions, the estimates for nonzero coefficients are proved to be normally distributed while those for zero coefficients are nearly n -consistent. These results are derived by an expansion for the profile likelihood function by Murphy and Van der Vaart (2000), and can be easily generalized to a much broader range of semi-parametric models. Further conditions on the smoothness of the profile likelihood function are also introduced, in order to get sparse estimates.

In addition, an algorithm to maximize the penalized likelihood is proposed based on a combination of a majorization-minimization (MM) algorithm and an Iterative Conditional Maximization algorithm (ICM) algorithm. Tests on simulated and real data set demonstrate that the newly proposed algorithm performs well in practice.

Key words: penalized profile likelihood, oracle property, MM algorithm, ICM algorithm

References

Fan, J. and R. Li (2001), "Variable selection via nonconcave penalized likelihood and its oracle properties." *Journal of the American Statistical Association*, 96, 1348-1360.

Murphy, S.A. and AW Van der Vaart (2000), "On profile likelihood." *Journal of the American Statistical Association*, 95, 449-465.

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