

國立中山大學跨領域及數據科學研究中心

國立中山大學應用數學系

學術演講

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講題：A Framework for making better predictions
by directly estimating Variables' Predictivity

時間：2017/01/05（星期四）14:10 ~ 15:00

地點：理學院四樓理 SC 4009-1 室

茶會：16:00 於理 SC 4010 室（系辦公室）

摘要

In our last paper, we showed that significant variables may not necessarily be predictive, and that good predictors may not appear statistically significant. This left us with an important question: how can we find highly predictive variables then, if not through a guideline of statistical significance? In this project, we provide a theoretical framework from which to design good measures of prediction in general. Importantly, we introduce a variable set's predictivity as a new parameter of interest to estimate, and provide the I-score as a candidate statistic to estimate variable set predictivity.

Current approaches to prediction generally include using a significance-based criterion for evaluating variables to use in models and evaluating variables and models simultaneously for prediction using cross-validation or independent test data. Using the I-score prediction framework allows us to define a novel measure of predictivity based on observed data, which in turn enables assessing variable sets for, preferably high, predictivity. We offer simulations and an application of the I-score on real data to demonstrate the statistic's predictive performance on sample data. These show that the I-score can capture highly predictive variable sets, estimates a lower bound for the theoretical correct prediction rate, and correlates well with the out of sample correct rate. We suggest that using the I-score method can aid in finding variable sets with promising prediction rates, however, further research in the avenue of sample-based measures of predictivity is needed.

There are many applications for which using the I-score would be useful, for example in formulating predictions about diseases with high dimensional data, such as gene datasets, in the social sciences for text prediction or financial markets predictions; in terrorism, civil war, elections and financial markets. We're hoping this opens up a new field of work that would focus on designing new statistics that measure predictivity.

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