Interpreting Incremental Value Offered by New Predictors

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Abstract

Various measures have been proposed to quantify the improvement in model performance achieved by new risk factors. Change in area under the ROC curve, continuous net reclassification improvement (NRI) and integrated discrimination improvement are intended to measure gains in discrimination between two models. The category-based NRI quantifies the amount of correct reclassification among events and non-events in settings were meaningful risk categories exist. In this presentation we argue that the primary focus should be on the magnitude of the observed improvement rather than on its statistical significance. In the case of nested models, statistical significance needs to be established first, using powerful, likelihood ratio-based inference. Statistically significant risk factors should be evaluated further, focusing on their impact on the performance of risk models. To facilitate a more meaningful interpretation of this impact, we propose simple comparative benchmarks derived from the relationships between measures of incremental value and the concept of effect size. We also highlight important distinctions in behavior of the aforementioned metrics which depend on the strength of baseline models.

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