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Predictive power measures for the Poisson regression model

The coefficient of determination, commonly referred to R -squared, is synonymous with linear regression, where it is used as a measure of the absolute predictive power of a linear model. Extending such a measure to generalized linear models however is by no means straightforward, and there are numerous proposals for measures of absolute predictive power in the current literature. One notable example is the work by Zheng and Agresti (2000), who proposed a predictive power measure known as the regression coefficient correlation. The definition is simply defined by a correlation and is obtained as a natural generalization of the coefficient of determination. Inspired by their work, Eshima and Tabata (2007) proposed a new predictive power measure, the Entropy correlation coefficient, which is based on the concept of entropy and can be applied to GLMs except for models with polytomous response variables.

In this talk, we focus on Poisson regression model with the canonical log link function, and consider applying the unstandardized version of the entropy correlation coefficient, which we refer to as the measure of predictive power, m_{pp} . We deduce the population value of m_{pp} and discuss a monotonic property of m_{pp} . Using the population value given the above, we compare some estimators in terms of bias and RMSE. The speaker was supported by a Japan Society for the Promotion of Science Grant JP18K11200, Telecommunications Advancement Foundation in Japan, and funding from the Mathematical Sciences Institute, ANU.

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