Mini Bootstrap / Ensemble

Ensembles are in general a very straightforward method to derive prediction intervals. They can be described as follows: “An ensemble is a collection of a (finite) number of neural networks or other types of predictors that are trained for the same task. A combination of many different predictors can often improve predictions […]” (58PI) When one has enough models fitted and therefore enough point predictions, one can construct naïve prediction intervals (45PI) or calculate mean and variance, assume a (normal) distribution and derive PIs by calculating the respective z-values for desired quantile. 57PI suggest a special form of this approach without referring to ensembles which is conducted as follows.

1. Fit 1 model that has several parameters
2. Derive the covariance matrix of this fitted model
3. Derive a large number of parameter combinations that have the characteristics described in the covariance matrix (one has to make assumptions about the distribution)
4. Treat these parameter combinations as independent models and make predictions with these models for each record
5. Take the naïve prediction intervals for each record

This approach has significant similarity with the previously described bootstrap approach and therefore, similar performance is to expect, while only fitting 1 model and from this derive all other models what makes it computationally more attractive.