Calibrating Ensemble Forecasting Models with Sparse Data in the Social Sciences

Jacob M. Montgomery
Department of Political Science
Washington University in St. Louis
Campus Box 1063, One Brookings Drive
St. Louis, MO, USA, 63130-4899
(314) 935-9106
corresponding author: jacob.montgomery@wustl.edu

Florian M. Hollenbach
Department of Political Science
Duke University
Perkins Hall 326 Box 90204
Durham, NC, USA, 27707-4330

Michael D. Ward
Department of Political Science
Duke University
Perkins Hall 326 Box 90204
Durham, NC, USA, 27707-4330

July 12, 2013

Abstract

We consider ensemble Bayesian model averaging (EBMA) in the context of small-n prediction tasks in the presence of a large number of component models. With a large number of observations to calibrate ensembles, relatively small numbers of component forecasts, and low rates of missingness, the standard approach to calibrating forecasting ensembles introduced by Raftery et al. (2005) performs well. However, data in the social sciences generally do not fulfill these requirements. In these circumstances, EBMA models may miss-weight components, undermining the advantages of the ensemble approach to prediction. In this article, we explore these issues and introduce a "wisdom of the crowds" parameter to the standard EBMA framework, which improves its performance. Specifically, we show that this solution improves the accuracy of EBMA forecasts in predicting the 2012 US presidential election and the US unemployment rate.

Keywords: Bayesian methods, Election forecasting, Labour Market forecasting, Calibration, Ensembles