



Variance estimation for Brier Score decomposition

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The Brier Score is a widely-used criterion to assess the quality of probabilistic predictions of binary events. The expectation value of the Brier Score can be decomposed into the sum of three components called reliability, resolution, and uncertainty which characterize different forecast attributes. Given a dataset of forecast probabilities and corresponding binary verifications, these three components can be estimated empirically. Here, propagation of uncertainty is used to derive expressions that approximate the variances of these estimators. Variance estimates are provided for both the traditional estimators, as well as for refined estimators that include a bias correction. Applications of the derived variance estimates to artificial data illustrate their validity, and application to a meteorological prediction problem illustrates a possible use case. The observed increase of variance of the bias-corrected estimators is discussed.

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