Mathematics > Statistics Theory

Combining Predictive Distributions

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Predictive distributions need to be aggregated when probabilistic forecasts are merged, or when expert opinions expressed in terms of probability distributions are fused. We take a prediction space approach that applies to discrete, mixed discrete-continuous and continuous predictive distributions alike, and study combination formulas for cumulative distribution functions from the perspectives of coherence, probabilistic and conditional calibration, and dispersion. Both linear and non-linear aggregation methods are investigated, including generalized, spread-adjusted and beta-transformed linear pools. The effects and techniques are demonstrated theoretically, in simulation examples, and in case studies on density forecasts for S&P 500 returns and daily maximum temperature at Seattle-Tacoma Airport.

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