Workshop 4: Forecast combinations: decomposition, ensembles, and reconciliation

Mitchell O'Hara-Wild, Monash University

Combining forecasts from multiple models, time series, or components is a proven strategy for enhancing the accuracy and reliability of time series forecasts. This workshop provides an introduction to three forecast combination techniques: decomposition forecasting, ensembling, and forecast reconciliation. Decomposition forecasting combines independent forecasts of each component (often trend, seasonal, and remainder) enabling simpler models to quickly produce forecasts at scale. Ensemble forecasting leverages the strengths of multiple models to create a more robust and accurate forecast, while forecast reconciliation utilises information across structurally related time series to improve accuracy with coherent forecasting. Learn the theory and practice of combining forecasts with hands-on exercises in R with packages from the tidy time series forecasting ecosystem (featuring tsibble, fable, feasts, and distributional).

Learning Outcomes

1. Decompose time series into trend, seasonal, and remainder components
2. Learn how to probablistically combine forecasts from:
    - A set of components (decomposition forecasting),
    - Multiple models (ensemble), and
    - Related time series (reconciliation)
3. Understand the distributional statistics underpinning forecast combinations