A Novel Kalman Filter Bank Methodology For Time Series Prediction In Forecasting Applications

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This paper presents a novel Kalman Filter Bank (KFB) method for generalised time series prediction. This method relies on a sliding single time step forecast projection to accurately acquire the anticipated schedule for a range of time dependent parameters in supposedly "stochastic" phenomena that have inherent embedded cyclical patterns. This innovative approach consists of a novel bank of hourly adjacent Kalman Filter estimators, operating in synchronism, for accurate parameter prediction over a selected horizon.

It's shown that, from consideration of the size *(n)* of the (KFB_n) framework (KFB*n*) the predictive performance necessary for the algorithm can be greatly increased. For phenomena exhibiting a diurnal pattern a KFB_{24} was employed with $n \in [1, 24]$. For phenomena displaying an underlying weekly pattern a KFB_{168} was employed. Key results, along with Statistical Hypothesis testing, are presented to validate the proposed KFB strategies and the accuracy of prediction outputs when benchmarked against a persistence model.