

Forecasting, Prediction, and Characterization of Electricity Usage within the Smart Grid

This preliminary analysis includes data amongst 3000 households in a disclosed area of Vermont. Electricity usage, meteorological, and demographics data was collected in 15 minute intervals for one contiguous year.

Prediction of future time series was analyzed using Holt-Winters methodology, linear regression, auto-regressive models, and Markov chain analysis. Characterization was investigated by learning about how the Markov chain compresses the data concerning a times series into a compact representable form. It is from this Markov representation of the time series, additional questions may be asked about underlying dynamics.

Future work will involve modeling the non-linear and correlated dynamics to better understand and predict energy usage.