

Integrated Day Ahead and Intra-day Load Forecasting using Incremental Changes in Weather and Load patterns

Motivation: The unpredictable changes in weather conditions are impacting both the energy demand and clean energy generation using renewable sources. As the integration of distributed energy resources (DER) are growing exponentially, the utilities are focusing on more accurate short-term and near real time prediction of loads to manage demand response, maximize clean energy contributions and minimize carbon emission.

Solution: Raniel proposes a responsive load forecasting model that is designed with patented cognitive AI technique to leverage incremental and federated learning in near real-time. The proven AI model is designed to maximize operational intelligence on potential changes in hourly and daily load curves. The unique model:

1. Leverages the changing weather data to correlate the load patterns and improve accuracy in forecasting intraday and day ahead loads. Instead of extrapolating the linear seasonal variance of the historical load trends, the proposed AI based model includes both the historical loads and nonlinear weather parameters as the predictors for the expected hourly and daily loads.
2. The unique AI algorithm is designed to capture the most recent changes in weather and load patterns. It retrains the models rapidly using federated learning and readjusts the predictive insights on the expected load.

Hence the model ensures high degree of adaptability, and accuracy with the changing environmental and demand patterns. While the AI/ ML algorithm promises significant improvement over the standard statistical and timeseries forecasting techniques, the incremental federated learning and situational awareness rapidly adjust / recalibrate the model to adapt the dynamics of environmental conditions and load profiles.