TWO-TIER MACHINE LEARNING MODEL-BASED NET LOAD FORECASTING

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Proposed forecasting model

The proposed forecasting model uses a two-tier modeling approach. In the first layer, installed, available resources will be projected. This will be combined with the weather forecast models. In the second tier, actual load forecasting will be performed. The second tier uses the results of first-layer modeling and the historical load data.

The first modeling tier focuses on collecting, processing, and projecting the distributed resources on the grid. Moreover, this modeling is important because the many distributed resources' reliability depends on external factors.

$$r_i(t+\Delta t) = r_i(w,r)(t) + r_i(\Delta w)(\Delta t)$$

In the second tier, the model focuses on training model using historical data, resources availability, etc., as given by

$$m(t) = m(thistorical-\Delta, ri(t), w)$$

Forecasting is given by $m(t+\Delta t) = m(t) + w(t+\Delta t)$

Where $r_i(t)$ is a type of resource installed or available at the point of measurement on the grid, w is the weather in the locality of grid servicing, Δt is the time (1hr, 24 hrs, 48 hr, etc.), m(t) is the model training until time t.