

There are multiple variables that we need to consider in order to optimally predict the power usage. I will use Vector Model Regression (VAR) for this multivariant time series for each individual plant. This means that each variable is a linear function of the past value of itself. I have multiple variables, VAR78 - VAR228 but only need to predict one variable, POWER, based on those.

$$X(t) = a_1 + w_1(x(t-1)) + \dots + w_p(x(t-p)) + \epsilon$$

Where X = POWER, t is time or number of the process, w is a coefficient, a is a constant, and an error term ϵ .

The basic methods I will do are researched from these websites and the provided sample report. The above explanation is an attempt to put the information into my own words.

<https://www.analyticsvidhya.com/blog/2018/09/multivariate-time-series-guide-forecasting-modeling-python-codes/>

<https://www.analyticsvidhya.com/blog/2018/09/non-stationary-time-series-python/>

<http://www.cse.msu.edu/~ptan/dmbook/tutorials/tutorial5/tutorial5.html>

With the updated forecast model I can run Mean absolute error (MAE) & Root mean squared error (RMSE) P_t and \hat{P}_t where P_t and \hat{P}_t denote the power generated and predicted power at time t .