Time Series Modelling

In assignment we developed models to predict the demand of a certain product using time series modelling. We defined some features that might be relevant for modelling, such as day of the week, month, year, hour and quarter of the year. Through exploratory data analyses, we tried to observe how the target variable (the demand itself) interact with those features.

We develop two models for demand prediction:

* XGBoost
* Facebook Prophet

XGBoost belongs to the category of decision tree ensembles. The tree ensemble model consists of a set of classification and regression trees. An intuitive explanation of how XGBoost works can be found in <https://xgboost.readthedocs.io/en/latest/tutorials/model.html#decision-tree-ensembles>. An interesting fact is that XGBoost is largely applied in Kaggle competitions (<https://www.quora.com/What-machine-learning-approaches-have-won-most-Kaggle-competitions>). It is interesting to note that XGBoost it’s not a time series model, but, with feature engineering, it has can be used for such purpose.

Facebook Prophet is a recent model (2017) developed by Facebook for forecast time series data. According to its documentation:

Prophet is a procedure for forecasting time series data based on an additive model where non-linear trends are fit with yearly, weekly, and daily seasonality, plus holiday effects. It works best with time series that have strong seasonal effects and several seasons of historical data. Prophet is robust to missing data and shifts in the trend, and typically handles outliers well.