
Energy Demand Forecasting

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Problem Formulation

27555

HOURLY
DEMAND



MODEL



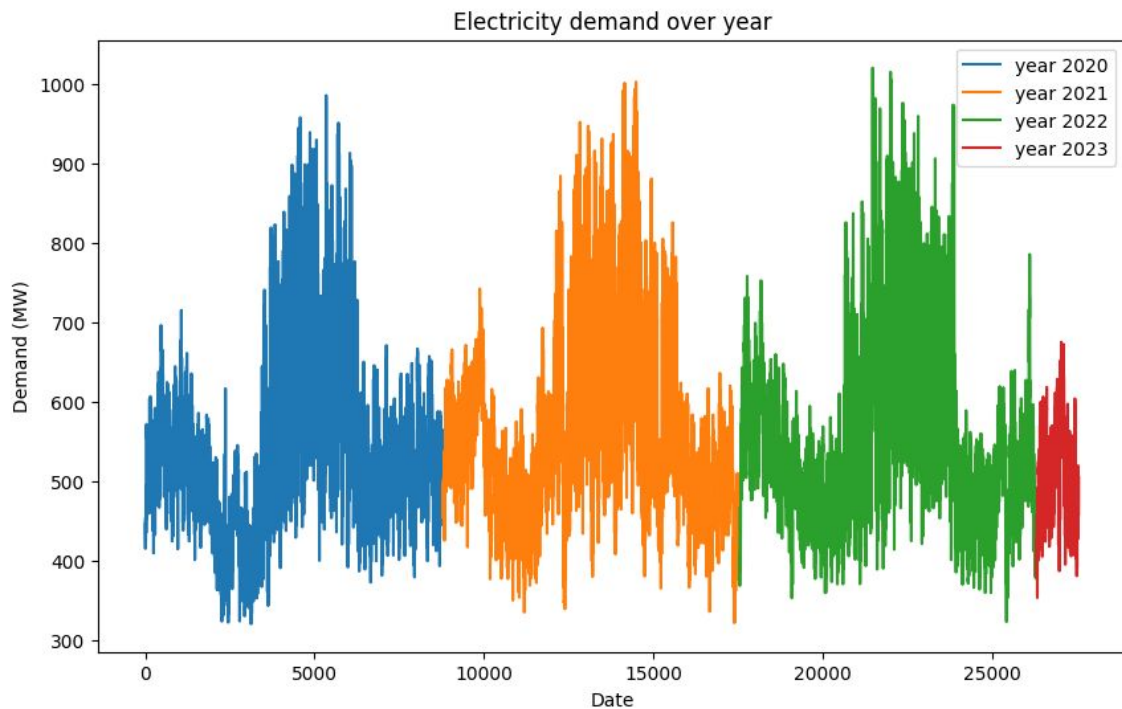
Prediction:

Next Week
Hourly Forecast

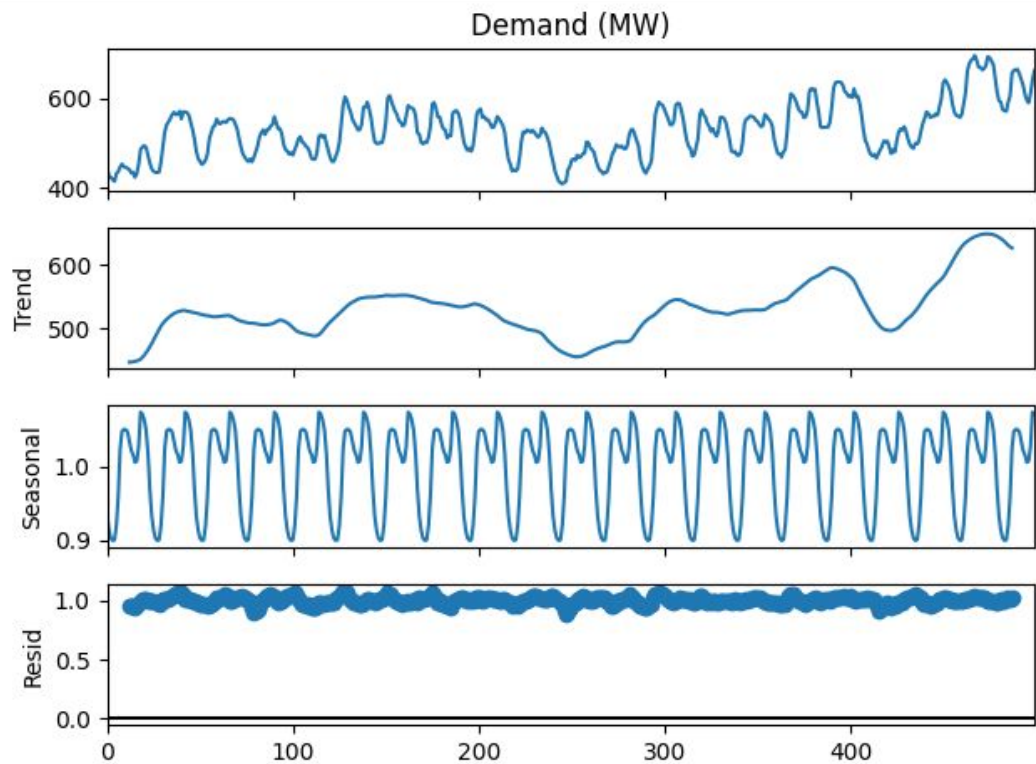
$7 \times 24 = 168$ Hour

	datetime	Demand (MW)
0	2020-01-01 00:00:00	445.8
1	2020-01-01 01:00:00	424.5
2	2020-01-01 02:00:00	423.5
3	2020-01-01 03:00:00	418.8
4	2020-01-01 04:00:00	414.8

Energy Demand Time Series Plot

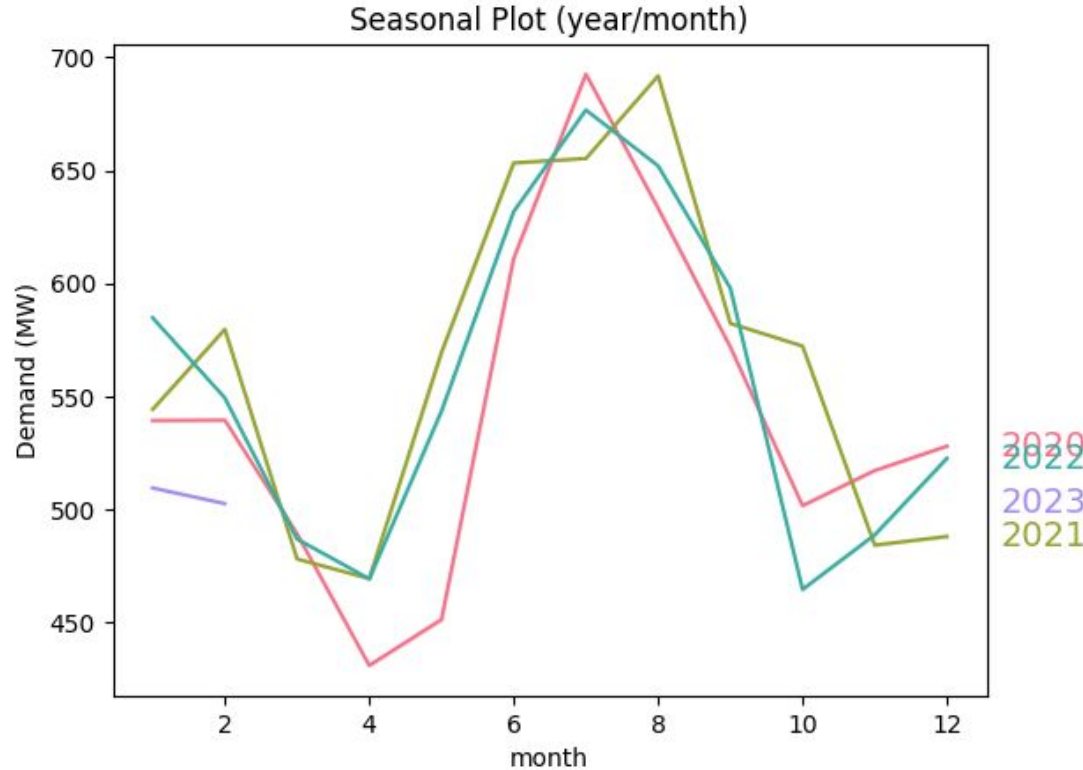


Energy Demand Decomposition



Multiplicative
seasonal
decomposition of
First 500
Data Points

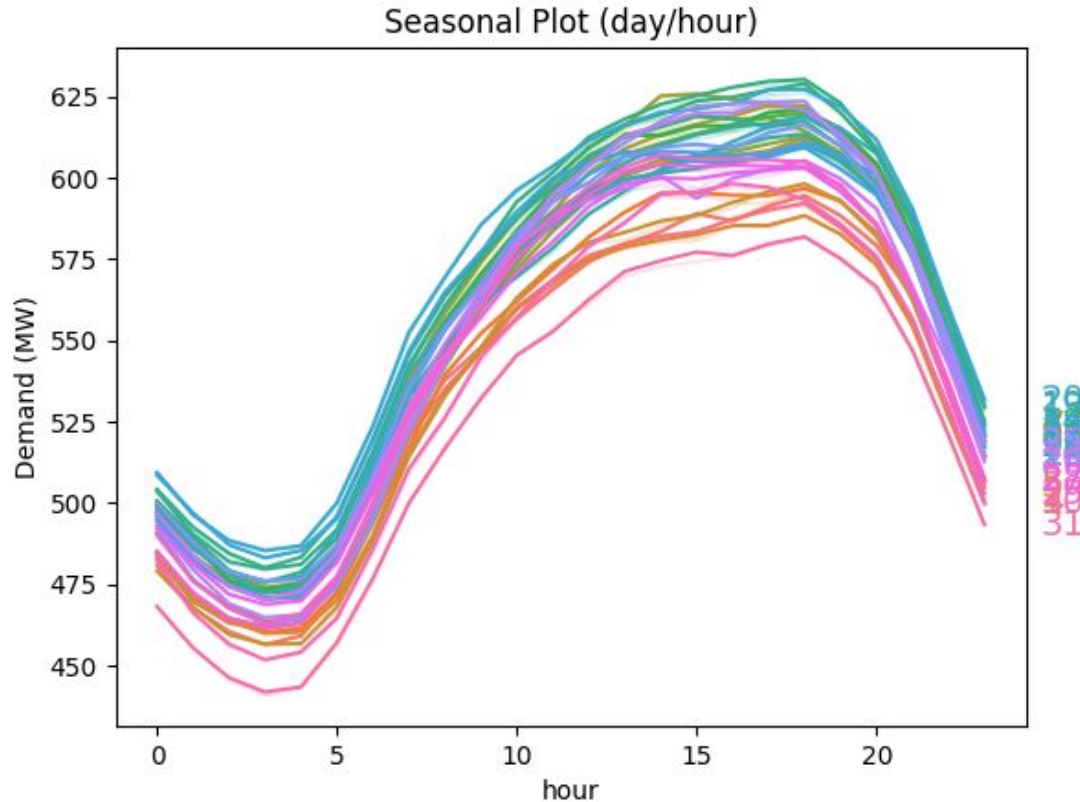
Seasonality in a Year



July (7)
Highest Energy
Demand

April (4) and
October(10)
Relatively Lower
Energy Demand

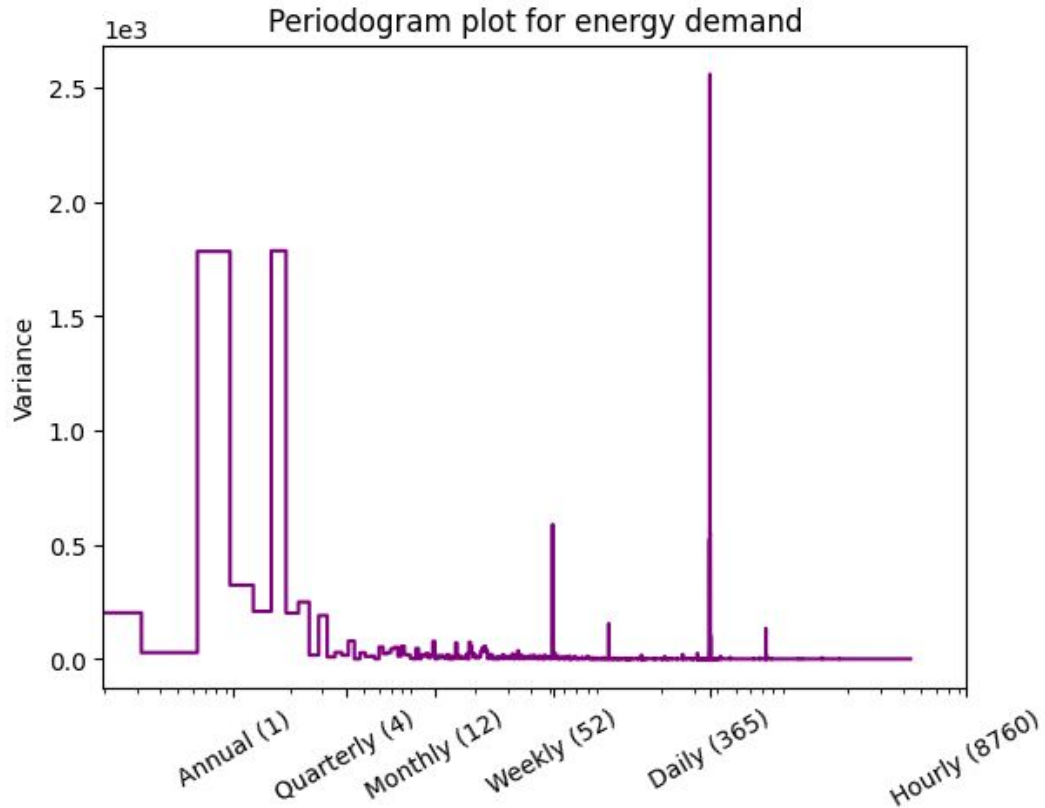
Seasonality in a Day



3pm - 8pm
Highest Energy
Demand

1am - 5am
Relatively Lower
Energy Demand

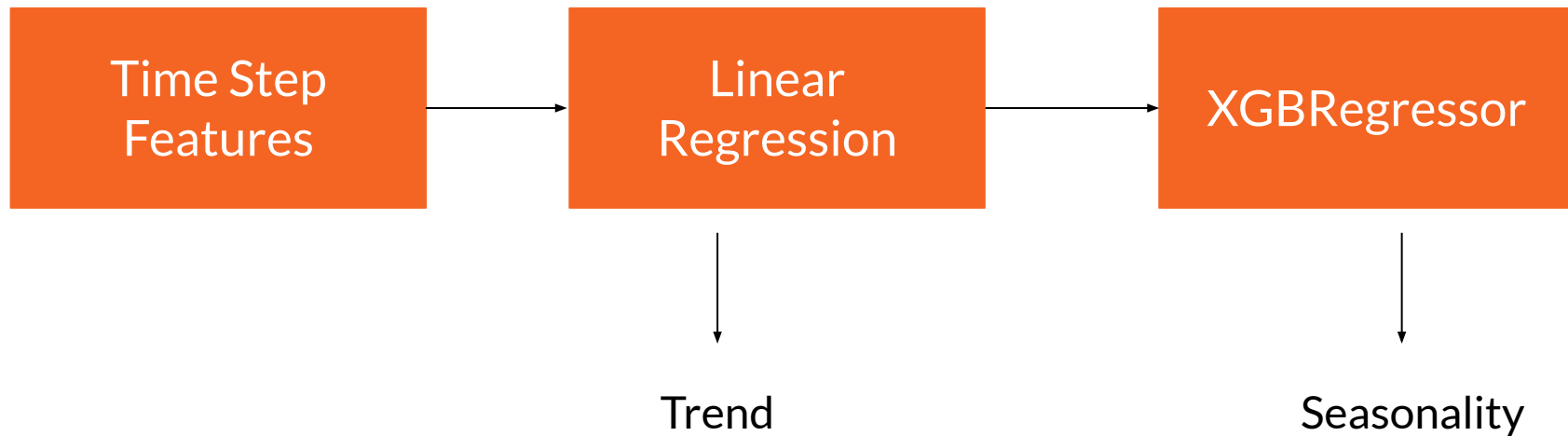
Periodogram



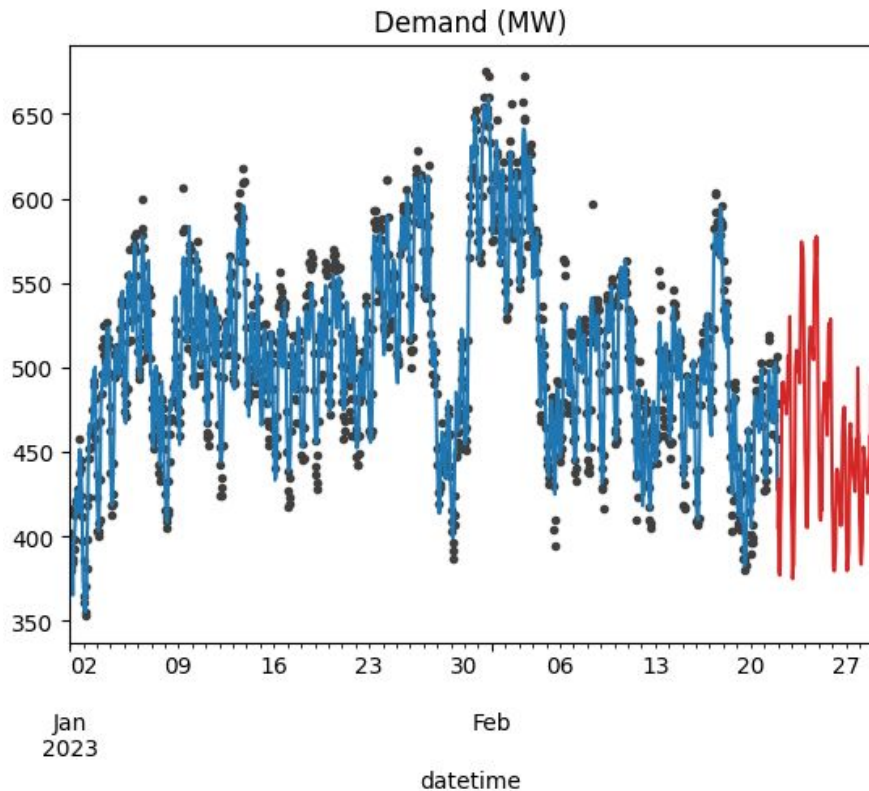
High Variance observed

Daily and
Annual Period

Hybrid Model



1 Week Forecast

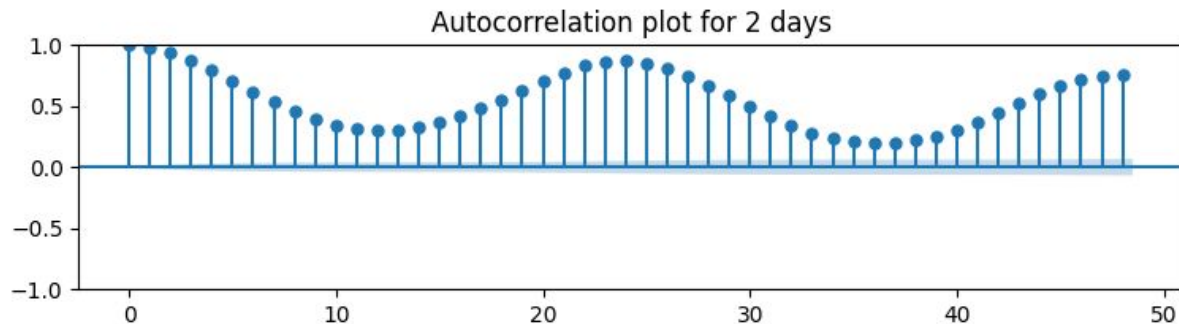


Actual Demand
Predicted Demand
1 week forecast

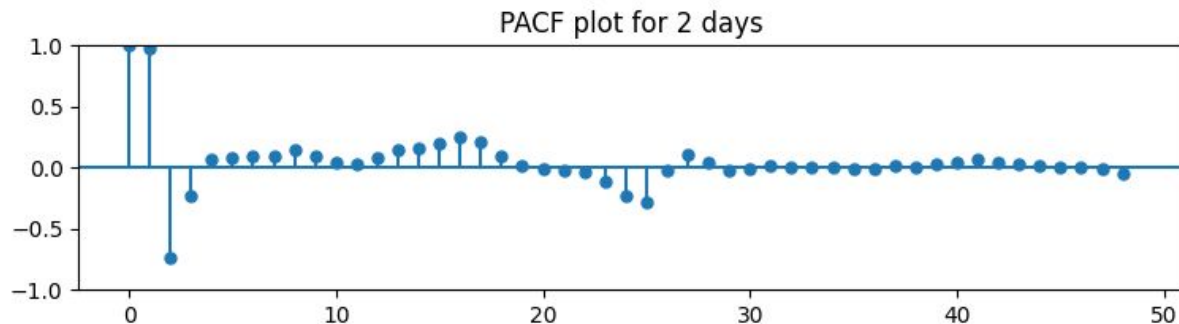
mae	374.23
rmse	19.345

Forecasting Using Lag Features

ACF and PACF

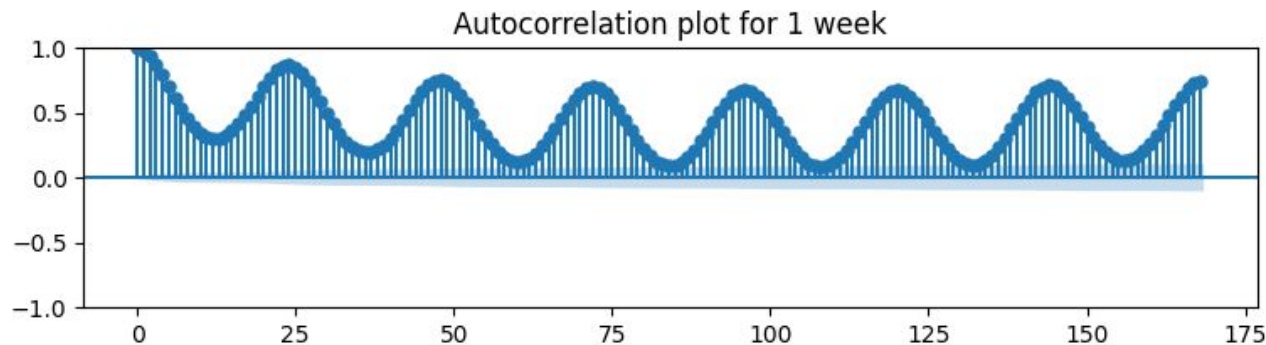


Highly correlated with
lag 24

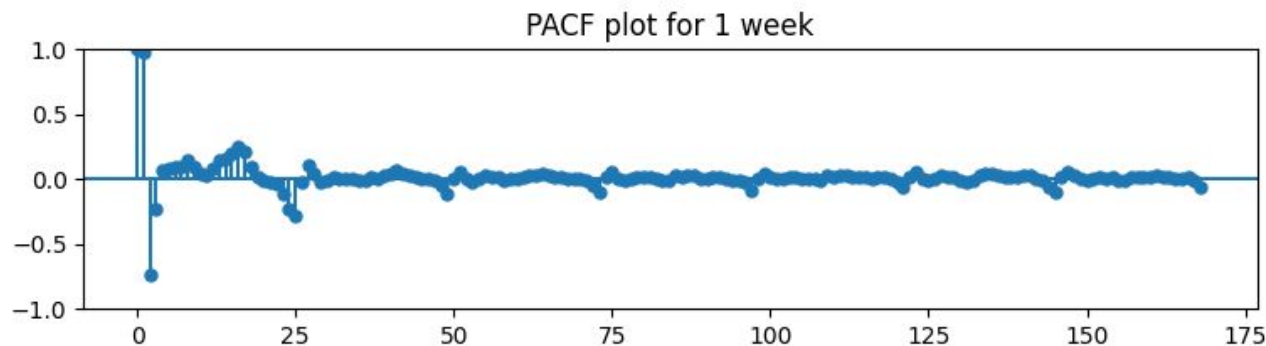


Almost all lags are
significant as they are
outside the confidence
interval

ACF and PACF



Highly correlated with
lag 24



Almost all lags are
significant as they are
outside the confidence
interval

Random Forest Regressor



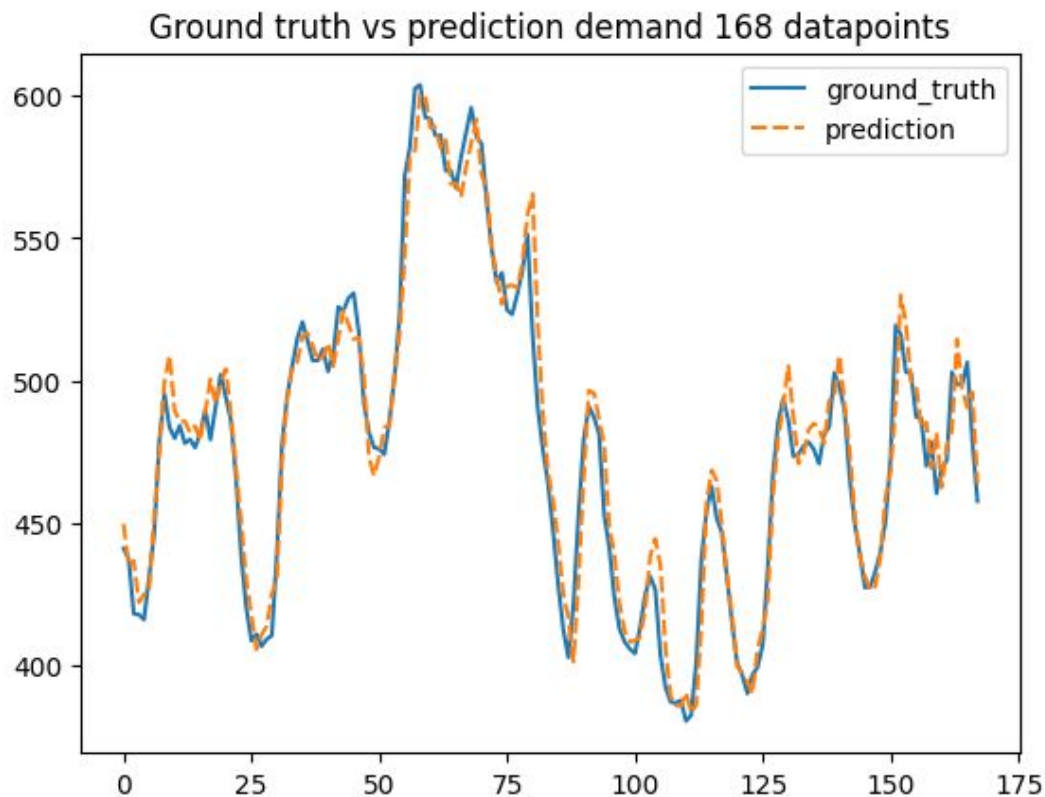
Train Test Split

160 Week
Training

1 Week
Validation

1 Week
Prediction

Validation



train mae

18.53

val_mae

124.63

1 Week Forecast

