

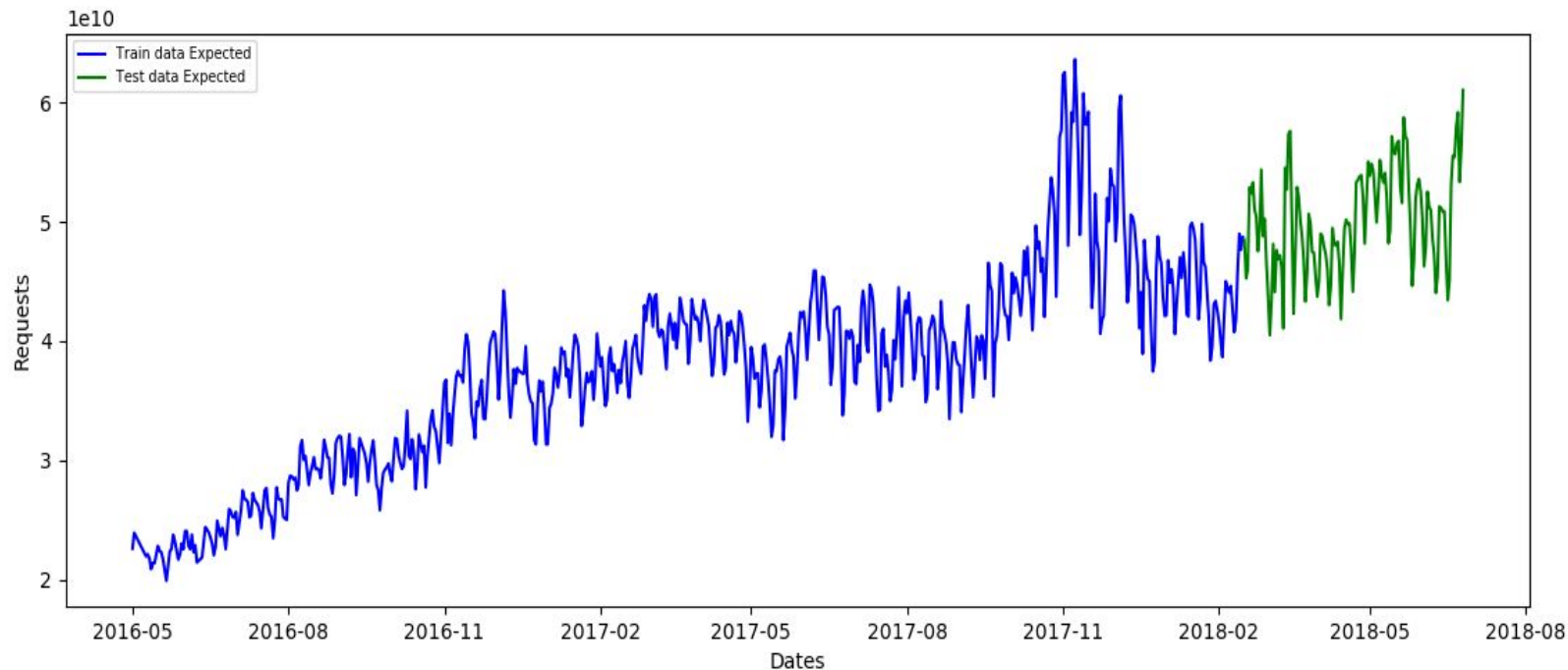
Inventory Forecasting

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Contents

- Data Analysis
- Data Pre-processing
- Model Selection and Evaluation
- Accuracy Matrix
- Models Finalized
- Parameter Tuning
- Forecasted Results

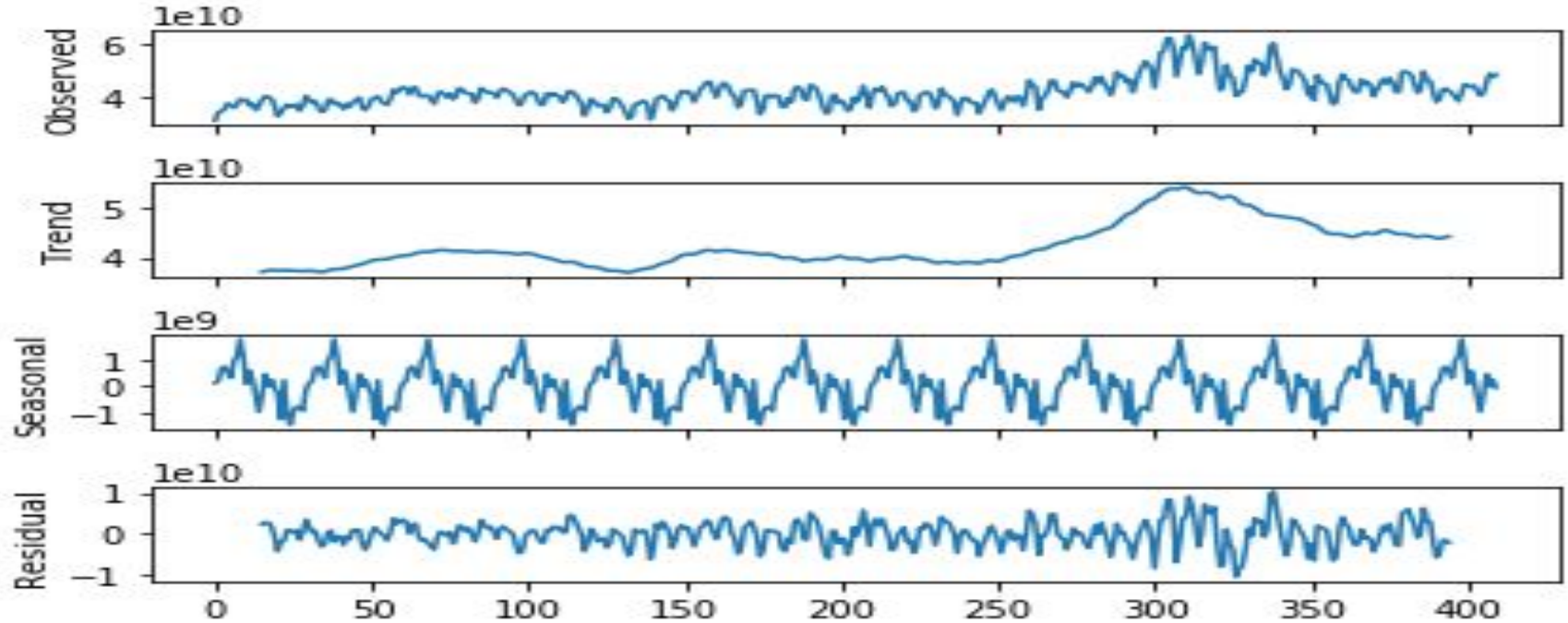
Data Analysis



Training Data: 645

Test Data: 130

Trend & Seasonality in Data



Data Pre-Processing(Linear Regression)

- Extracted the following information from the date field as a input to the Linear Model. Eg: For **1/5/16** and accordingly others. **Weekday** and **quarter** are the features extracted from the date itself.

<u>day</u>	<u>month</u>	<u>year</u>	<u>weekday</u>	<u>quarter</u>
1	5	2016	6	2
2	5	2016	0	2
9	5	2016	0	2
10	5	2016	1	2

ML Model Selection

- **Conventional Forecasting Methods**

1. Naive Method
2. Simple Average
3. Moving Average (MA)
4. Weighted Moving Average
5. Simple Exponential Smoothing
6. Holt Linear Method
7. Holt Winters Method
8. Autoregression (AR)
9. ARIMA (AutoRegressive Integrated Moving Average)
10. SARIMA (Seasonal ARIMA)

ML Model Selection

- **Unconventional Methods**

1. Linear Regression (LR)
2. Facebook's Prophet
3. Neural Networks (MLP)

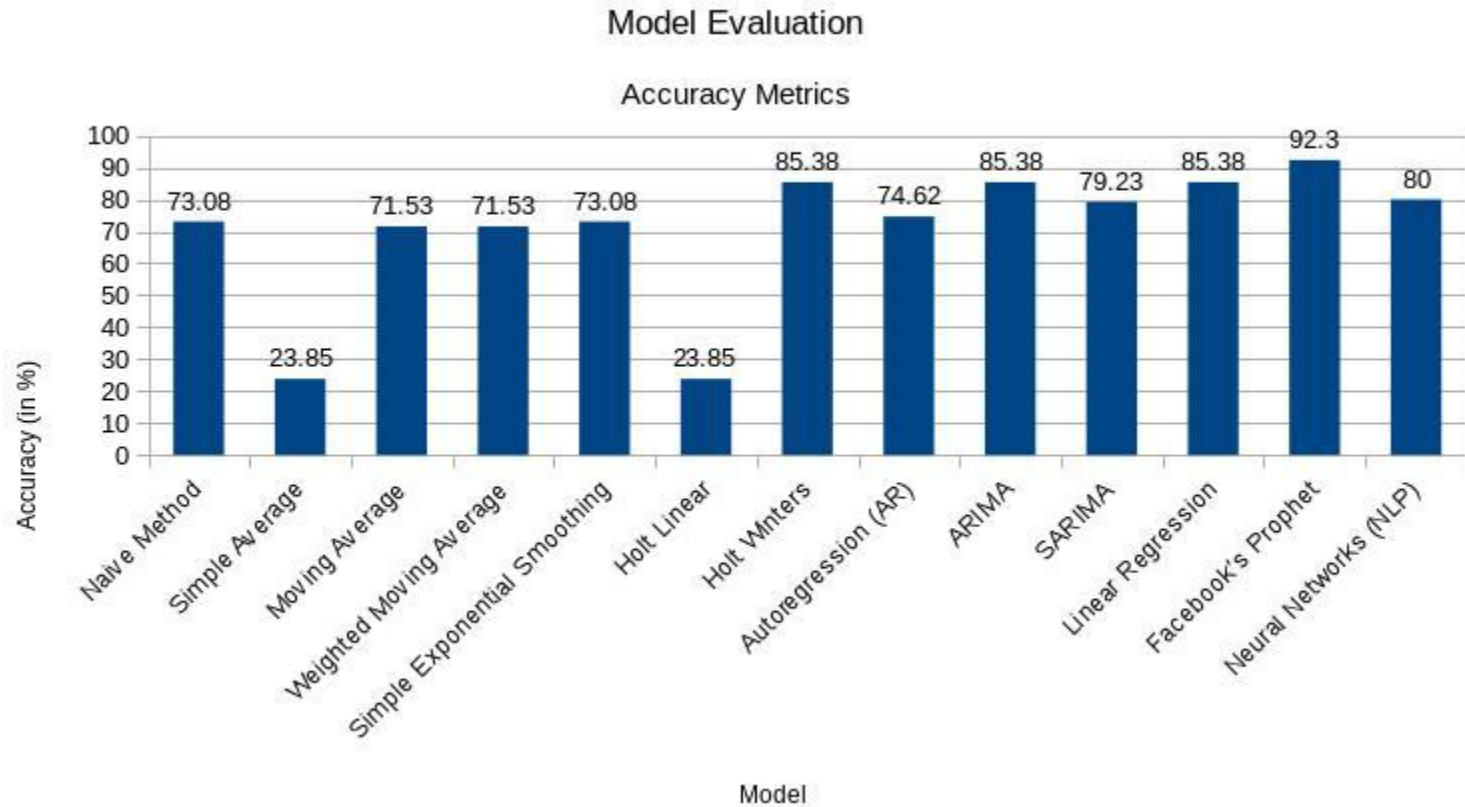
Model Evaluation Matrix

Sr No.	ML Methods	Accuracy (%)
1.	Naive Method	73.08
2.	Simple Average	23.85
3.	Moving Average	71.53
4.	Weighted Moving Average	71.53
5.	Simple Exponential Smoothing	73.08
6.	Holt Linear	23.85
7.	Holt Winters	85.38
8.	Autoregression (AR)	74.62
9.	ARIMA	85.38
10.	SARIMA	79.23

Model Evaluation Matrix

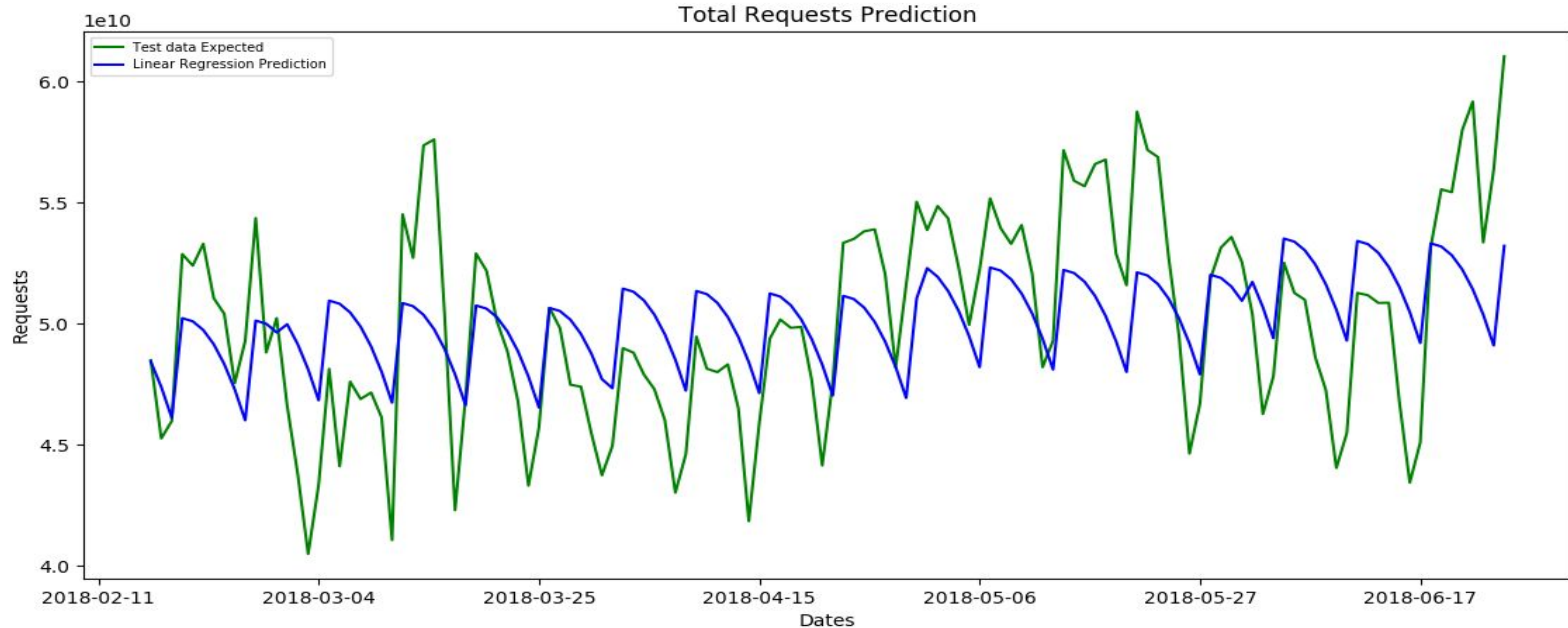
Sr. No.	ML Methods	Accuracy (%)
11.	Linear Regression	85.38
12.	Facebook's Prophet	92.30
13	Neural Networks (MLP)	80

Accuracy



Models Finalized

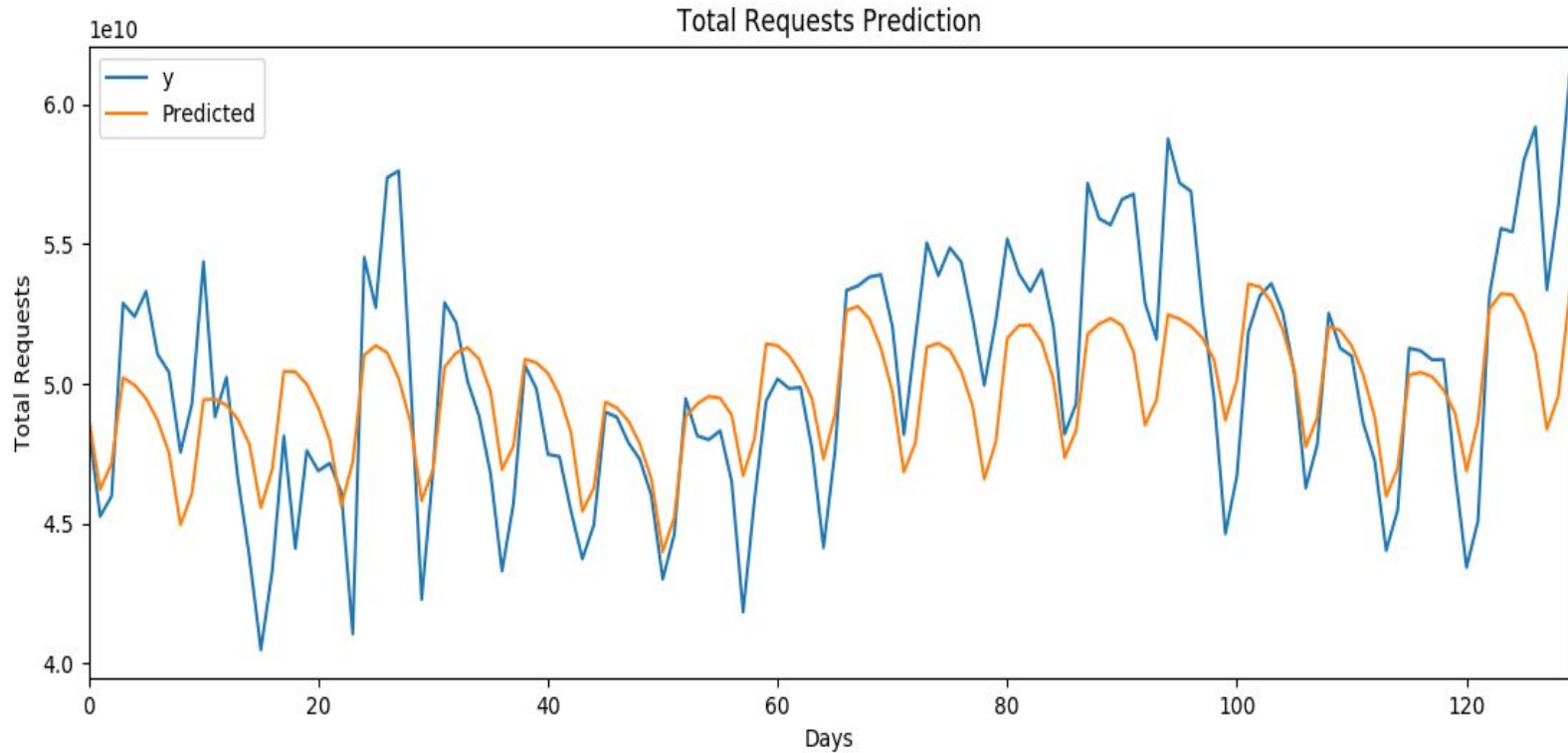
- **Linear Regression (Accuracy=85.38 %)**



Fit Time: 0.001s

Predict Time: 0.0003s

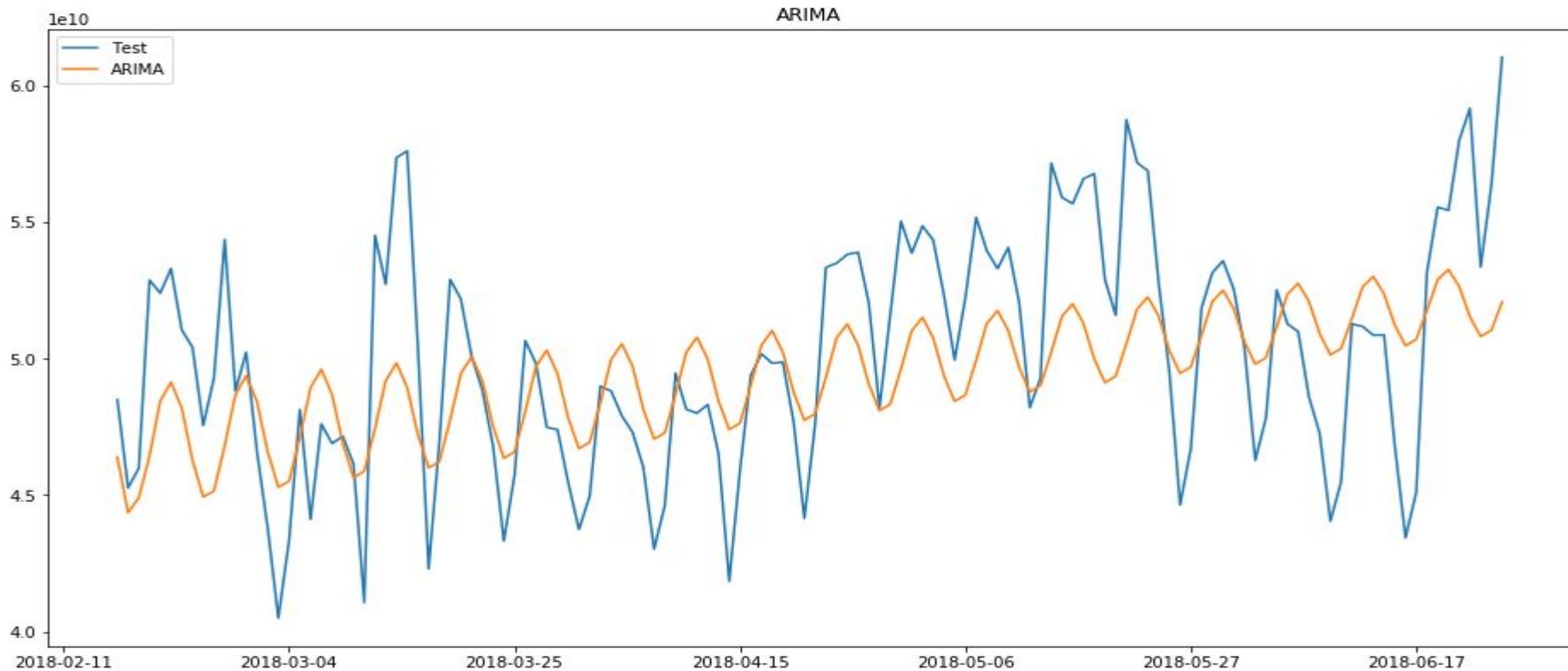
- **Prophet Model (Accuracy=92.3 %)**



Fit Time: 0.0756s

Predict Time: 2.20s

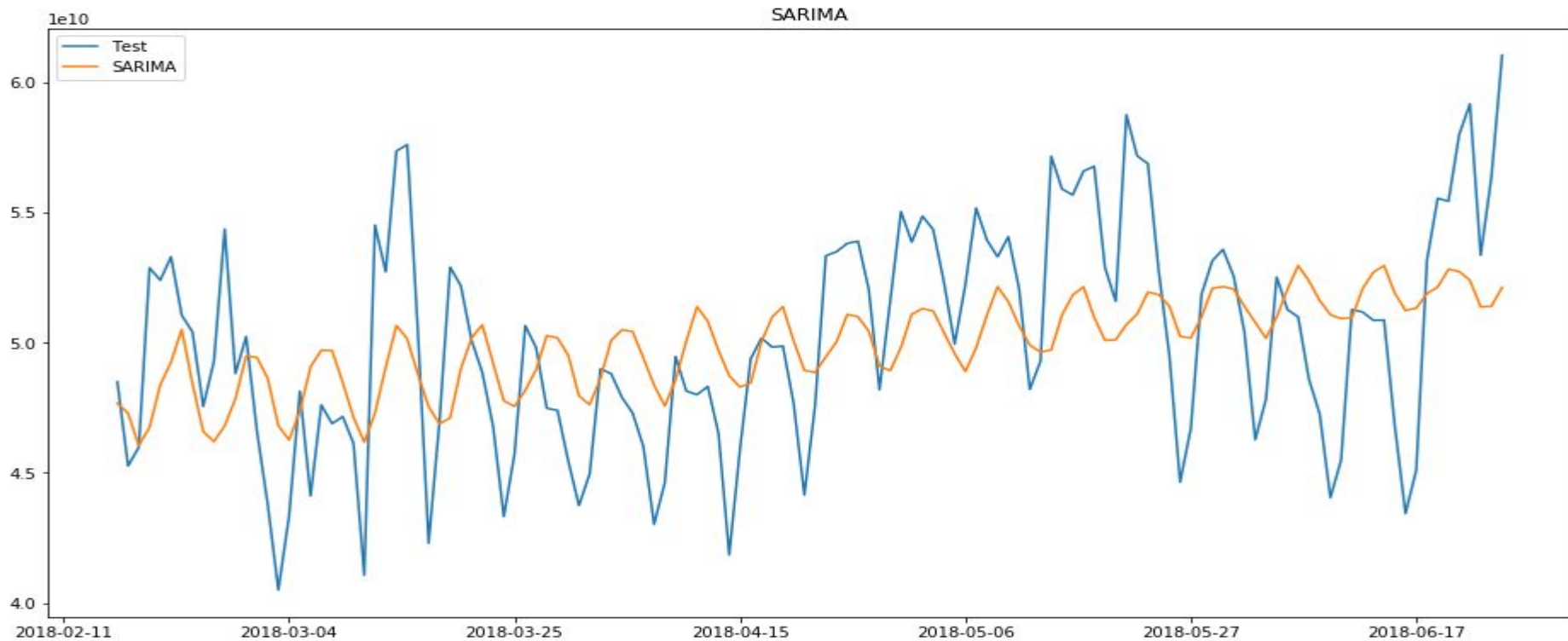
- **ARIMA (Accuracy=85.38 %)**



Fit Time: 0.92s

Predict Time: 0.0032s

- **SARIMA (Accuracy=79.23 %)**

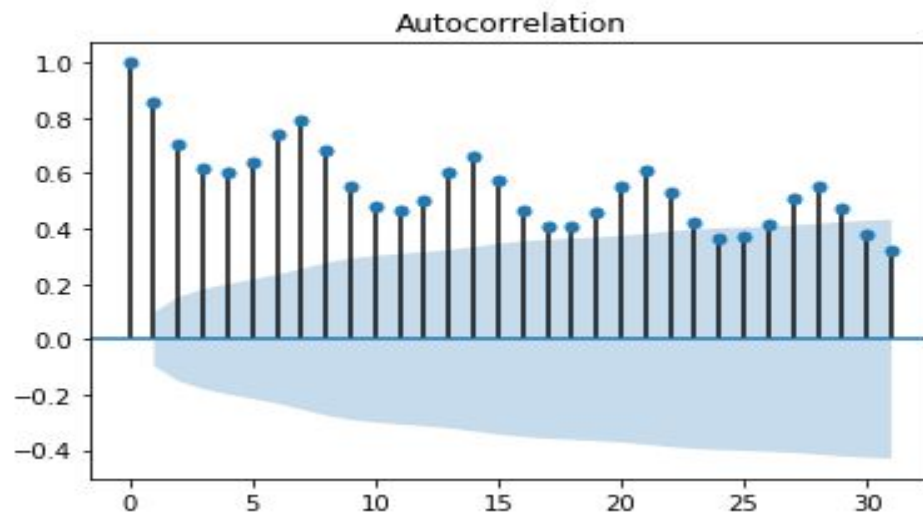


Fit Time: 4.924s

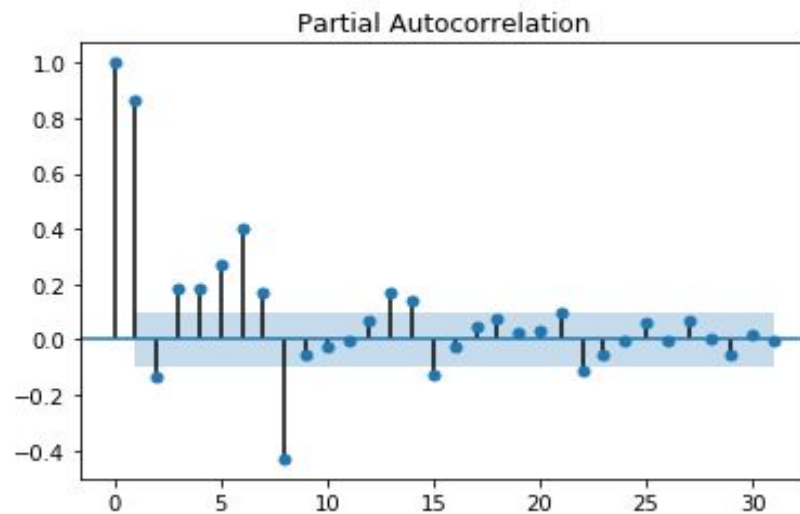
Predict Time: 0.0171s

Parameter Tuning

- Autocorrelation Function (ACF)



- Partial Autocorrelation Function (PACF)



Models Performing Order

Facebook's Prophet Model > Linear Regression = ARIMA=Holt Winters

Forecasted Results

Date	Actual	Predicted
2/16/18	4.850004e+10	4.878478e+10
2/17/18	4.526684e+10	4.622818e+10
2/18/18	4.598501e+10	4.716618e+10

Thank You