RETAIL GIANT SALES FORECASTING

BY – AKANKSHA GADIA

MARKET SEGMENTS

There are 21 market segments:

- Consumer – US
- Corporate – APAC
- Consumer – APAC
- Home Office – EU
- Consumer – Africa
- Corporate – US
- Consumer – EMEA
- Home Office – LATAM
- Corporate – EU
- Corporate – EMEA
- Consumer – LATAM
- Consumer – EU
- Home Office – US
- Corporate – LATAM
- Corporate – Africa
- Home Office – APAC
- Home Office – EMEA
- Home Office – Africa
- Corporate – Canada
- Home Office – Canada
- Consumer - Canada

COEFFICIENT OF VARIATION

0	(APAC, Consumer)	0.522725
1	(APAC, Corporate)	0.530051
2	(APAC, Home Office)	1.008219
3	(Africa, Consumer)	1.310351
4	(Africa, Corporate)	1.891744
5	(Africa, Home Office)	2.012937
6	(Canada, Consumer)	1.250315
7	(Canada, Corporate)	1.786025
8	(Canada, Home Office)	2.369695
9	(EMEA, Consumer)	2.652495
10	(EMEA, Corporate)	6.355024
11	(EMEA, Home Office)	7.732073
12	(EU, Consumer)	0.595215
13	(EU, Corporate)	0.722076
14	(EU, Home Office)	0.938072
15	(LATAM, Consumer)	0.683770
16	(LATAM, Corporate)	0.882177
17	(LATAM, Home Office)	1.169693
18	(US, Consumer)	1.010530
19	(US, Corporate)	1.071829
20	(US, Home Office)	1.124030

Coefficient of Variation(CoV) is the ratio of standard deviation to mean. Lesser CoV shows that the data is more consistent and less scattered from the mean.

In order to identify the market segment persisting most consistent profit, we look for the one with lowest CoV. Therefore, most stable and profitable market-segment is APAC-Consumer.
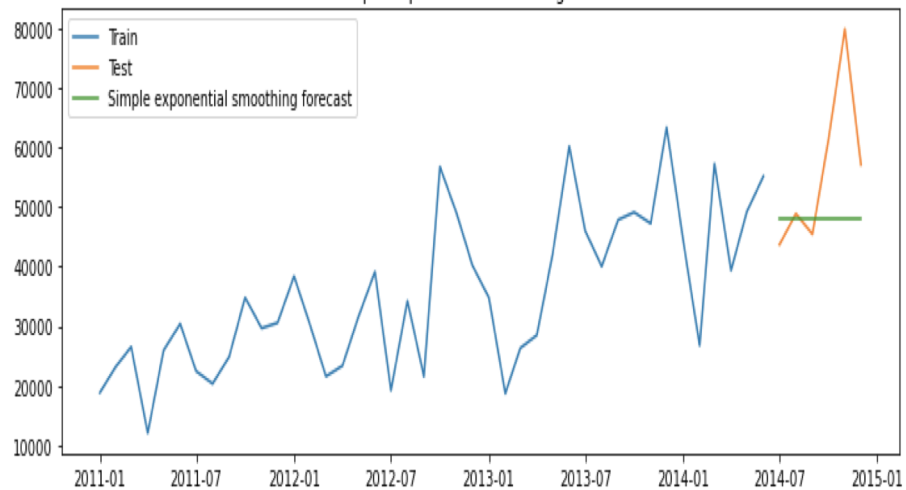
Choosing the Right Time Series Method
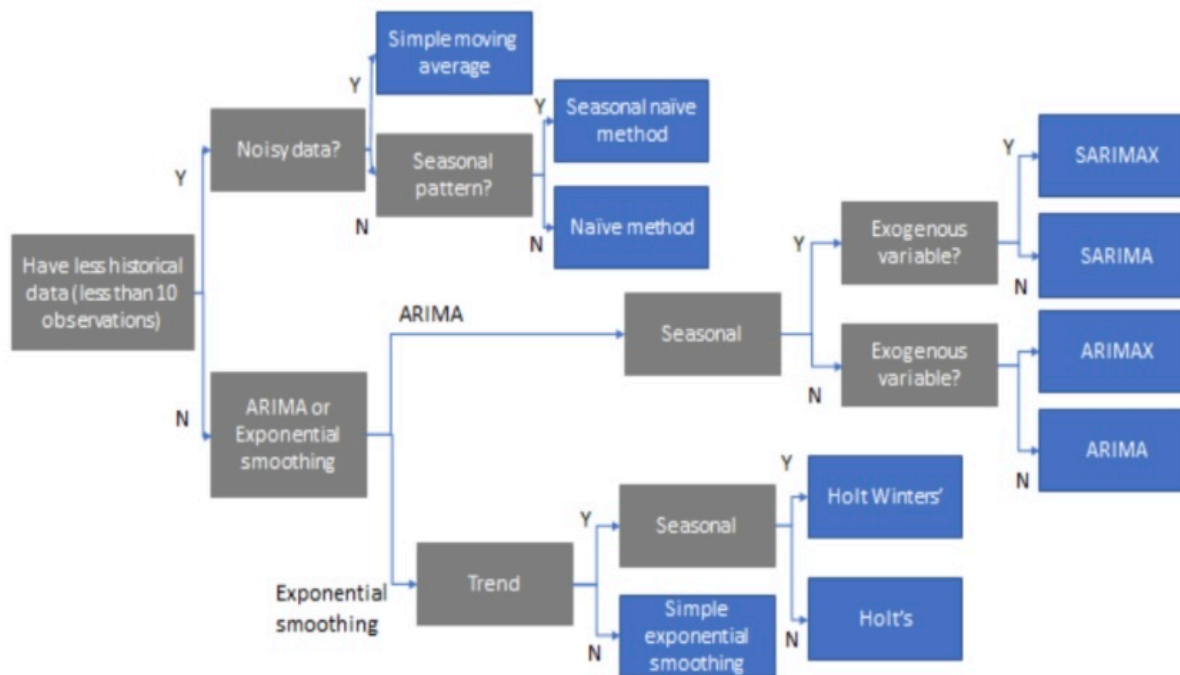
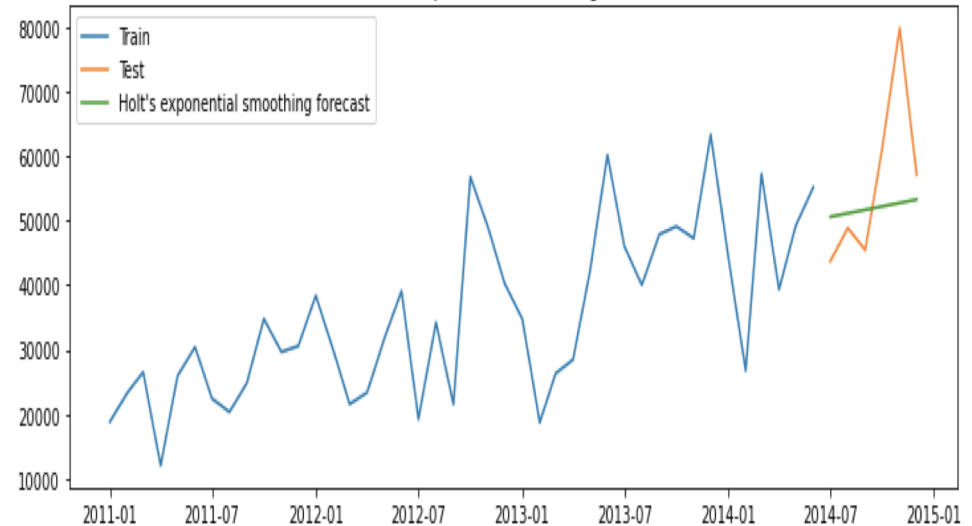According to the flowchart, the right methods to use in this situation are:

- Smoothing – Holt Winters'
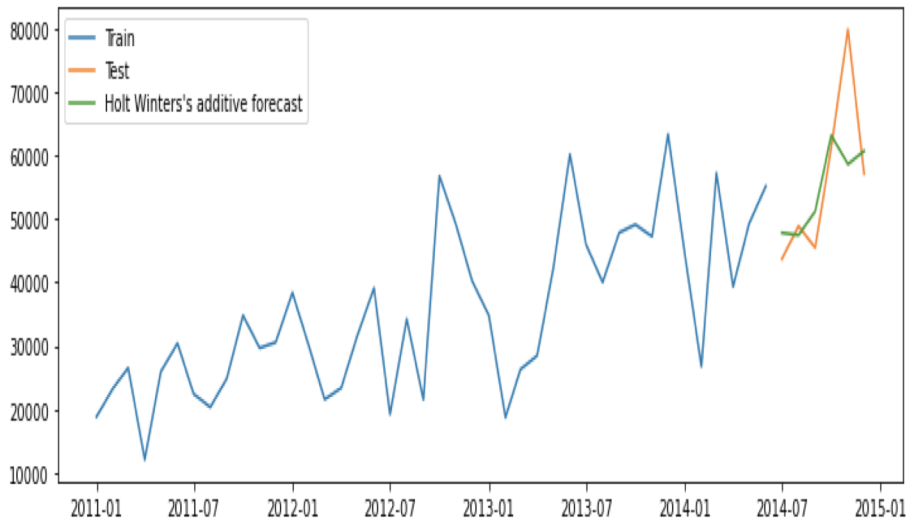- ARIMA methods - ARIMA

SMOOTHING TECHNIQUES

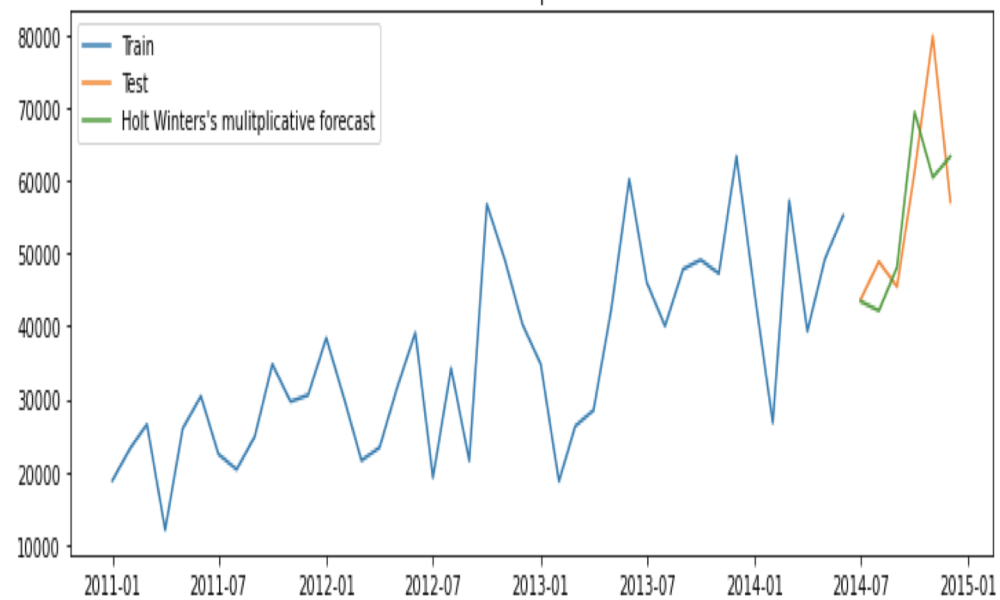# SMOOTHING TECHNIQUES

Holt Winters' Additive Method

Holt Winters' Mulitplicative Method

SMOOTHING TECHNIQUES
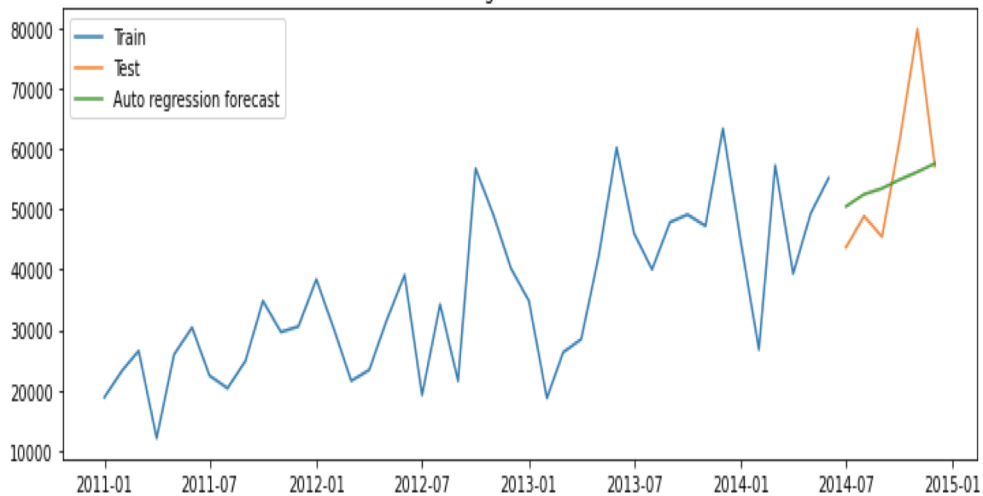
Method	MAPE
Simple exponential smoothing forecast	15.74
Holt's exponential smoothing method	14.93
Holt Winters' additive method	10.17
Holt Winters' multiplicative method	11.43

Visually, the Holt Winters' multiplicative method seems more accurate compared to other smoothing methods. However, MAPE for Holt Winters' additive method is lower amongst all.
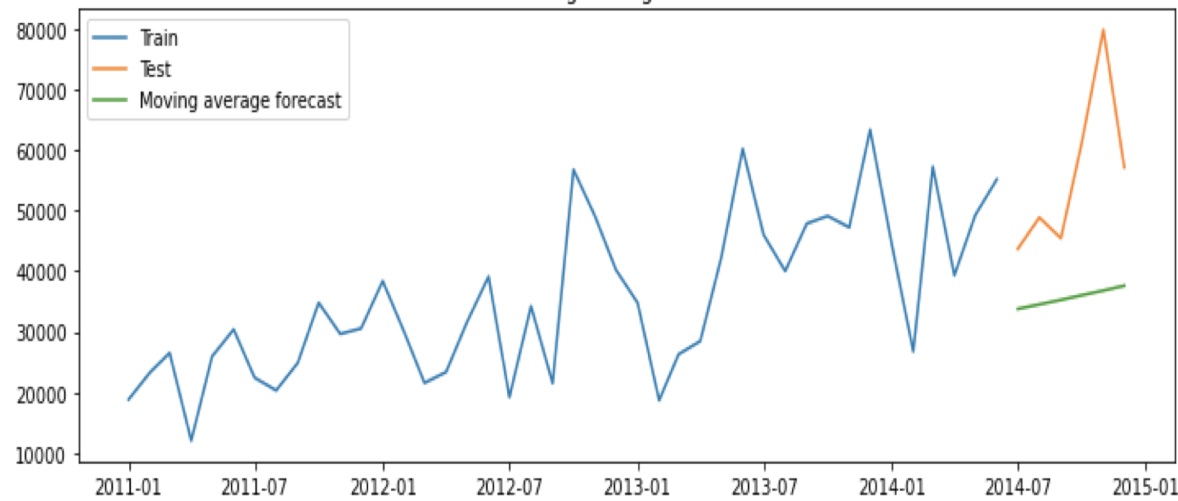
Simple exponential smoothing forecast and Holt's exponential smoothing method are less accurate in forecasting and have higher MAPE values.

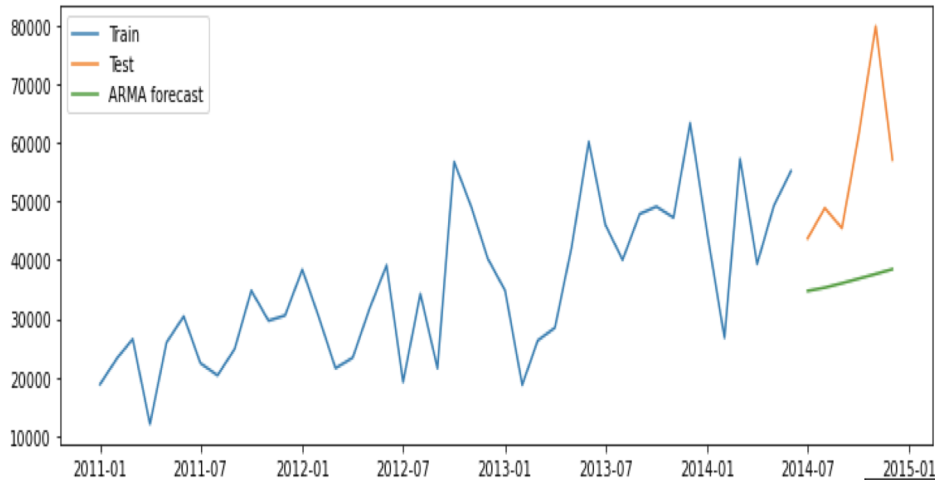# ARIMA TECHNIQUES

Auto Regression Method
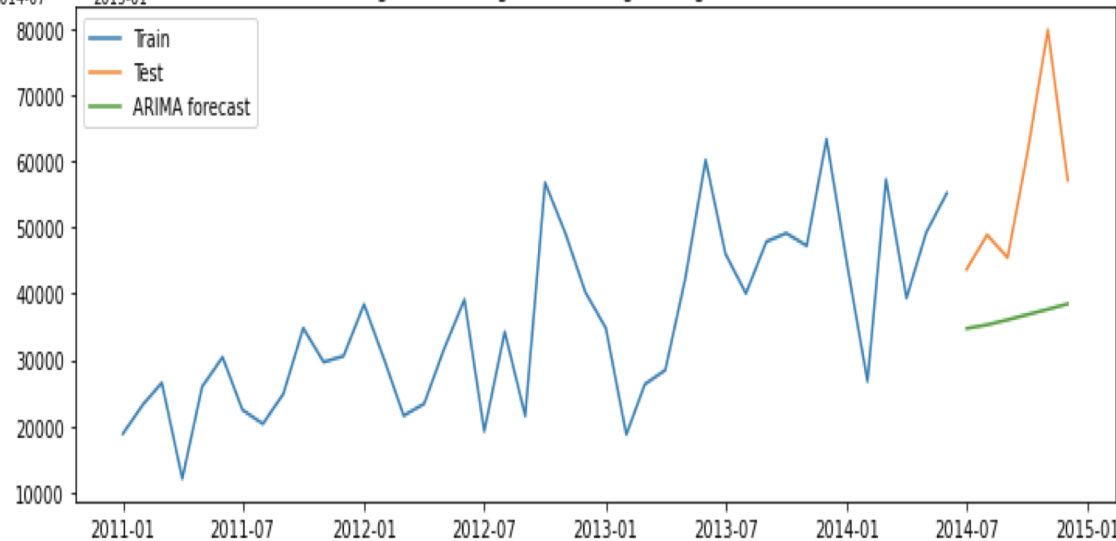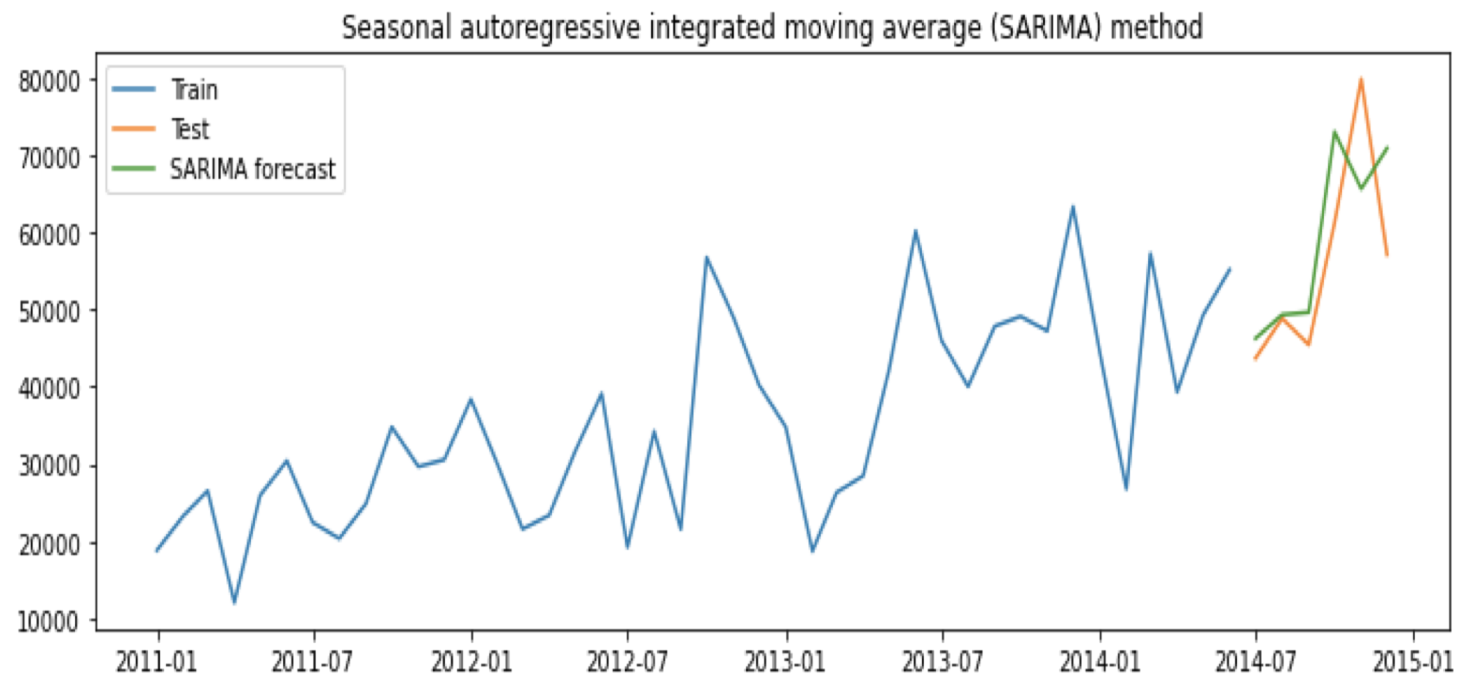

Moving Average Method

ARIMA TECHNIQUES

ARMA Method

Autoregressive integrated moving average (ARIMA) method

ARIMA TECHNIQUES

Seasonal autoregressive integrated moving average (SARIMA) method

ARIMA TECHNIQUES

Method	MAPE
Autoregressive (AR) method	13.56
Moving Average (MA) method	33.93
Autoregressive moving average (ARMA) method	32.40
Autoregressive integrated moving average (ARIMA) method	32.40
Seasonal autoregressive integrated moving average (SARIMA) method	12.87

Visually, SARIMA method is more accurate compared to other ARIMA methods. MAPE value for SARIMA is lowest among all.

AR,MA,ARMA and ARIMA fail to capture seasonality. MAPE values for these methods are also comparatively high.

Therefore, SARIMA is the best forecasting model for this data.

CONCLUSION

Holt Winters' additive method and SARIMA work the best for sales forecasting. Plots of these techniques show certain accuracy in capturing the trend and seasonality.

MAPE values for both are lower but Holt Winters' additive method shows the lowest Mean absolute percentage error.

Therefore, amongst all, Holt Winters' additive method is the best technique for sales forecasting.

Method	MAPE
Holt Winters' additive method	10.17
Seasonal autoregressive integrated moving average (SARIMA) method	12.87