Retail Giant sales Forecasting Assignment

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Problem Statement and Aim

- Global Mart is an online supergiant store that has worldwide operations. This store takes orders and delivers across the globe and deals with all the major product categories — consumer, corporate and home office.

- As a sales manager for this store, you have to forecast the sales of the products for the next 6 months, so that you have a proper estimate and can plan your inventory and business processes accordingly.

- Let's First find highest profitable Market segment as per the Lowest CoV values

- Identify best suitable Time Series forecasting model by building models in Smoothing Techniques and ARIMA Techniques. Use below Methods.

Method
Simple exponential smoothing method
Holt's exponential smoothing method
Holt Winters' additive method
Holt Winters' multiplicative method
Autoregressive (AR) method
Moving Average (MA) method
Autoregressive moving average (ARMA) method
ARIMA method
SARIMA Method

1. What are the 21 market Segments?

- Please find Total 21 Market segments that we got after concatenating both Market and Segment columns and aggregating the same.

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

2. Comparison showing the table of values for the coefficient of variation calculated on the profit for the 21 market segments

- Mentioned table has the values of CoV for respective Market Segment.

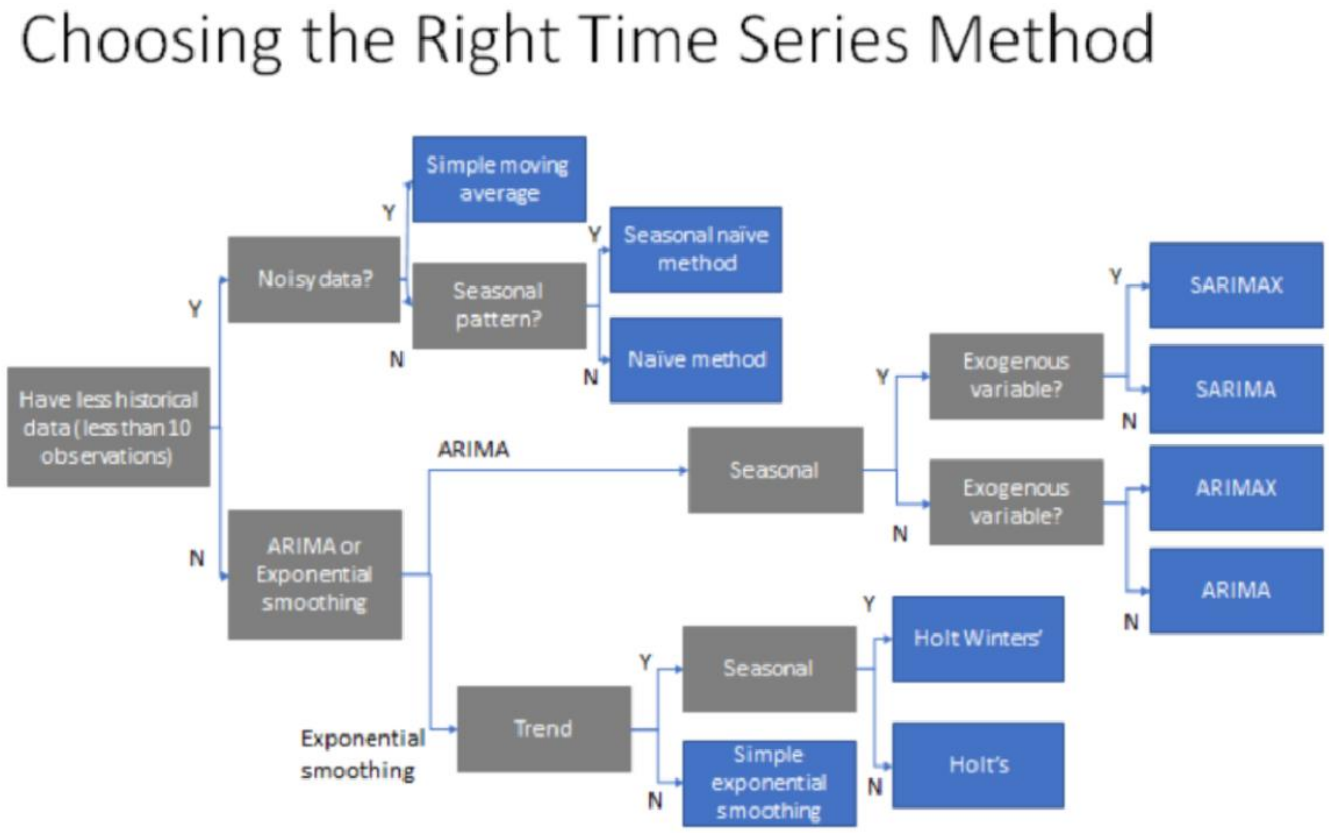
3. The reason why a market segment “ABC” is the most profitable market segment

- Market Segment ‘**APAC-Consumer**’ has lowest CoV value hence it has highest Profitability

Market-Segment	CoV	profit
APAC-Consumer	0.522725	4400.894243
APAC-Corporate	0.530051	2574.919807
EU-Consumer	0.595215	3699.977143
LATAM-Consumer	0.683770	2295.555697
EU-Corporate	0.722076	2216.299429
LATAM-Corporate	0.882177	1122.633016
EU-Home Office	0.938072	1224.456536
APAC-Home Office	1.008219	1511.088314
US-Consumer	1.010530	2686.740912
US-Corporate	1.071829	1754.199083
US-Home Office	1.124030	1132.065762
LATAM-Home Office	1.169693	818.398941
Canada-Consumer	1.250315	225.987632
Africa-Consumer	1.310351	957.707000
Canada-Corporate	1.786025	90.980294
Africa-Corporate	1.891744	412.617571
Africa-Home Office	2.012937	377.221071
Canada-Home Office	2.369695	118.003750
EMEA-Consumer	2.652495	423.960286
EMEA-Corporate	6.355024	182.642643
EMEA-Home Office	7.732073	84.231366

4. Concluding the optimum technique from the flow chart that might work best for the sales forecast.

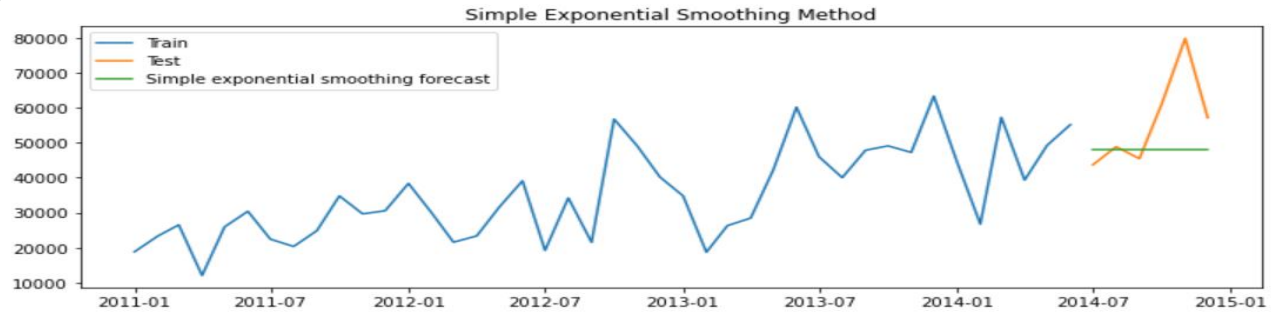
- There are more than 10 data points so we need to go with ARIMA or Exponential smoothing Methods
- If we see from smoothing technique point of view, the data shows some Trend and Seasonality hence we can conclude **Holt's Winter Method** can be the best Method to be used
- From ARIMA set of methods, since it has seasonality component and there is no involvement of Exogeneous variable we can use **SARIMA method**

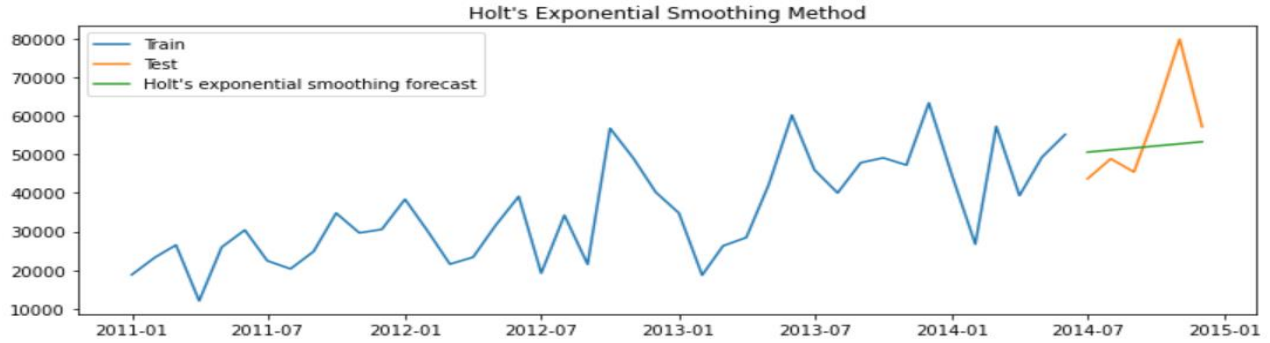


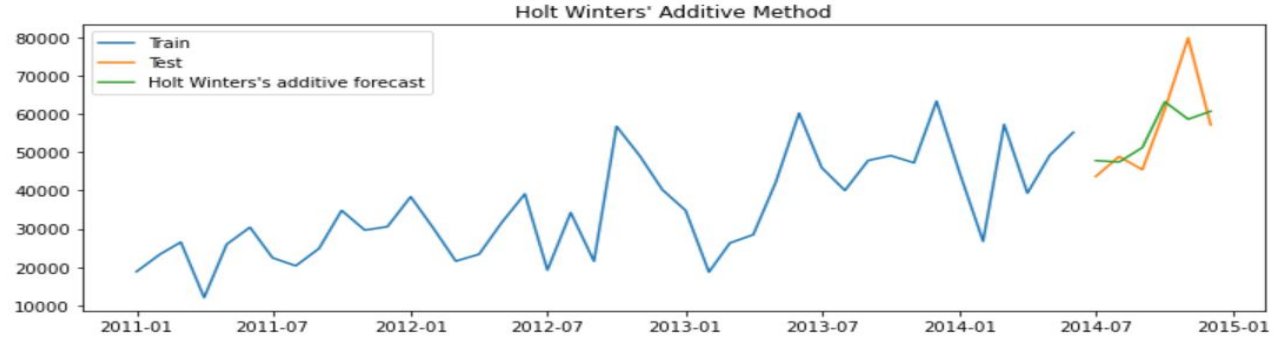
5. Comparing the sales forecast plots for all the smoothing techniques and their MAPE values

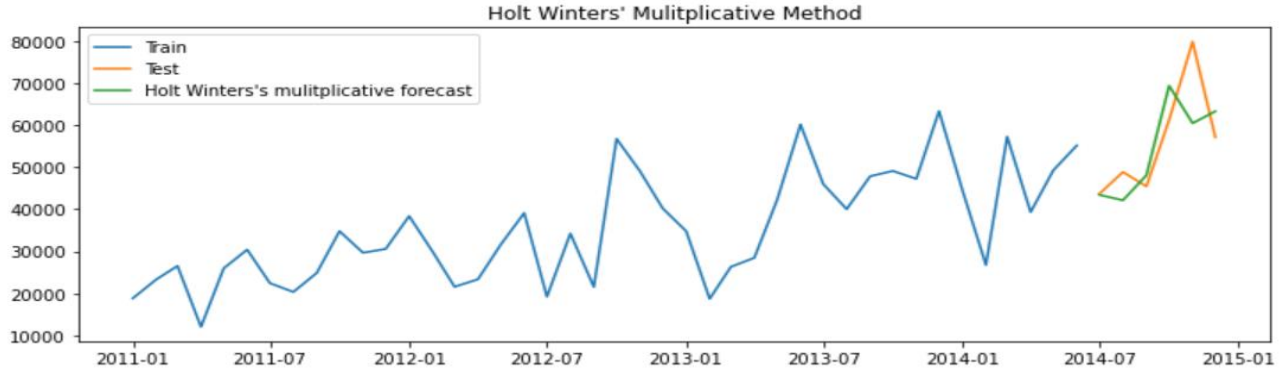
	Method	MAPE
0	Simple exponential smoothing method	15.74
0	Holt's exponential smoothing method	14.93
0	Holt Winters' additive method	10.17
0	Holt Winters' multiplicative method	11.43

- From graphs and MAPE values, we can see that Holt's winter additive and multiplicative method has close match in forecasting.
- As per the MAPE value, we can conclude that **Holt's Winter Additive Method** is best suit for this forecast with MAPE value as 10.17.





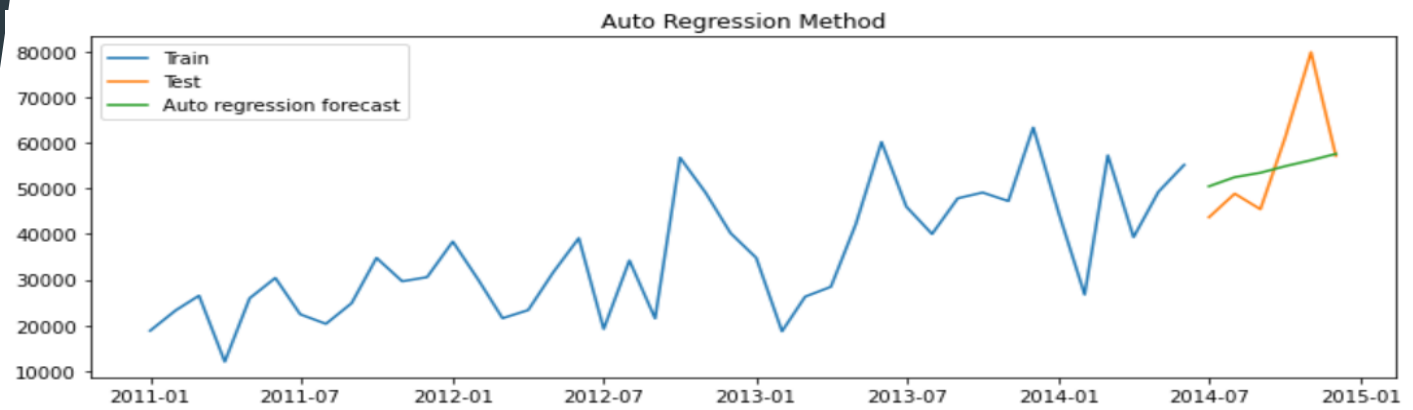


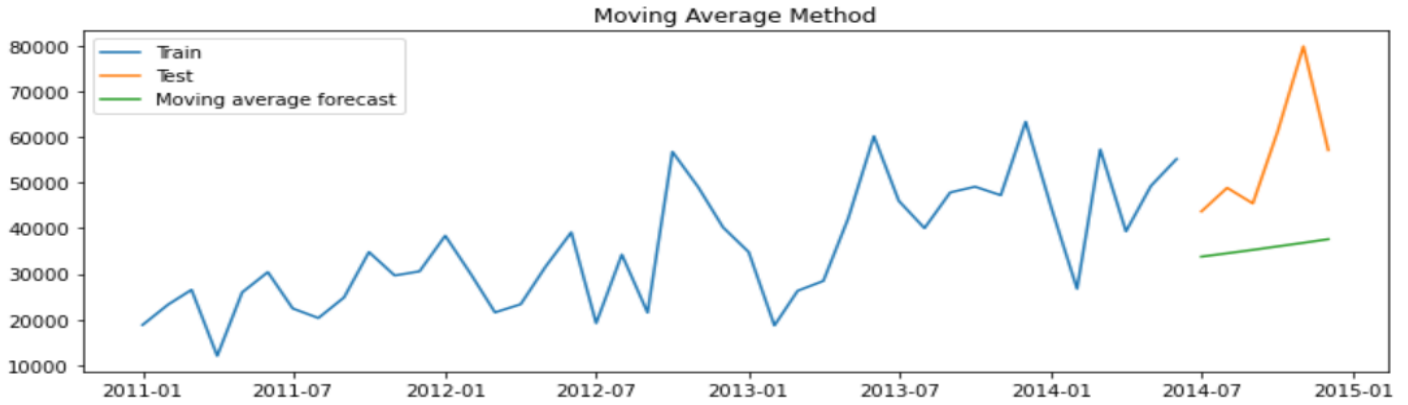


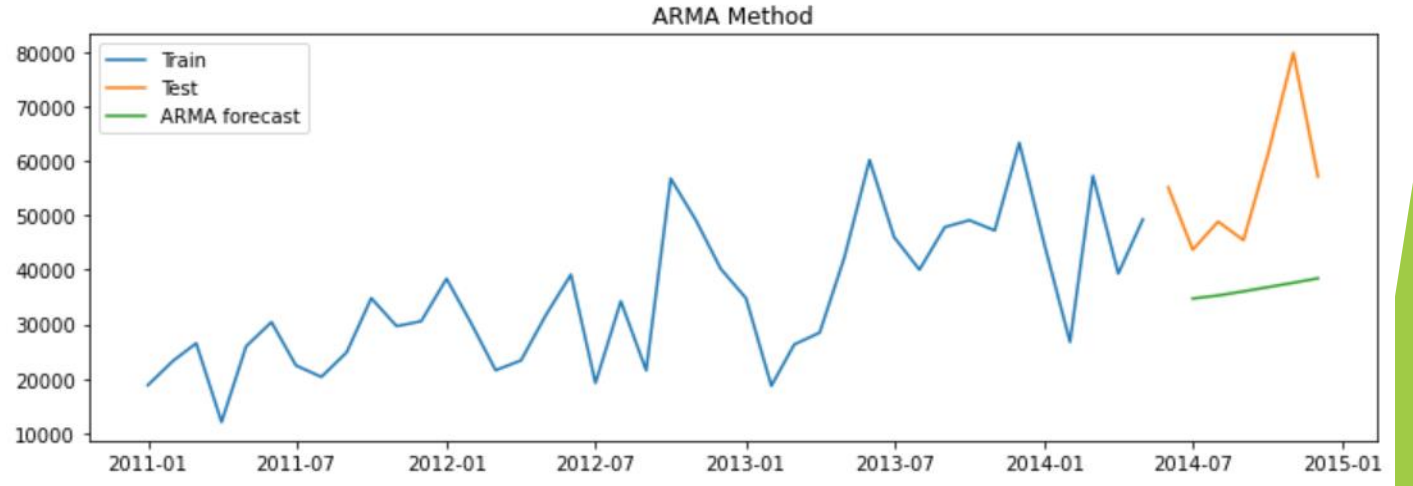
6. Comparing the sales forecast plots for all the ARIMA techniques and their MAPE values. .....continue

Method	MAPE
Autoregressive (AR) method	13.56
Moving Average (MA) method	33.93
Autoregressive moving average (ARMA) method	32.40
ARIMA method	32.40
SARIMA Method	12.88

- From graphs and MAPE values, we can see that AR method has better forecast but while comparing with ARIMA and SARIMA, SARIMA is the best method we can have forecast with. Please check next slide.







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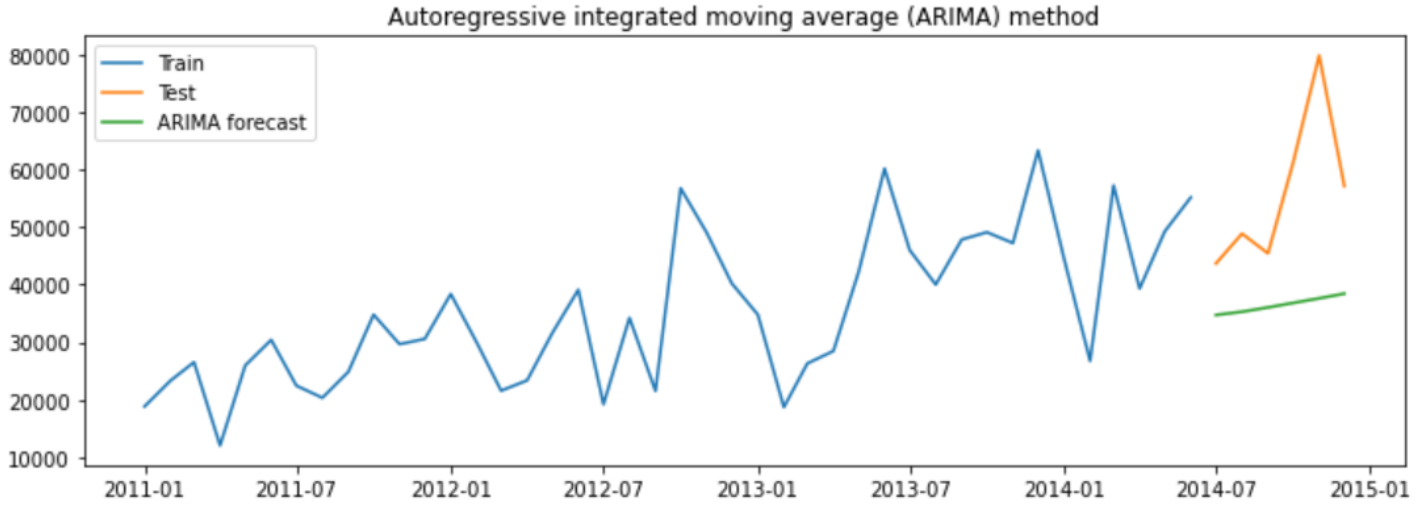
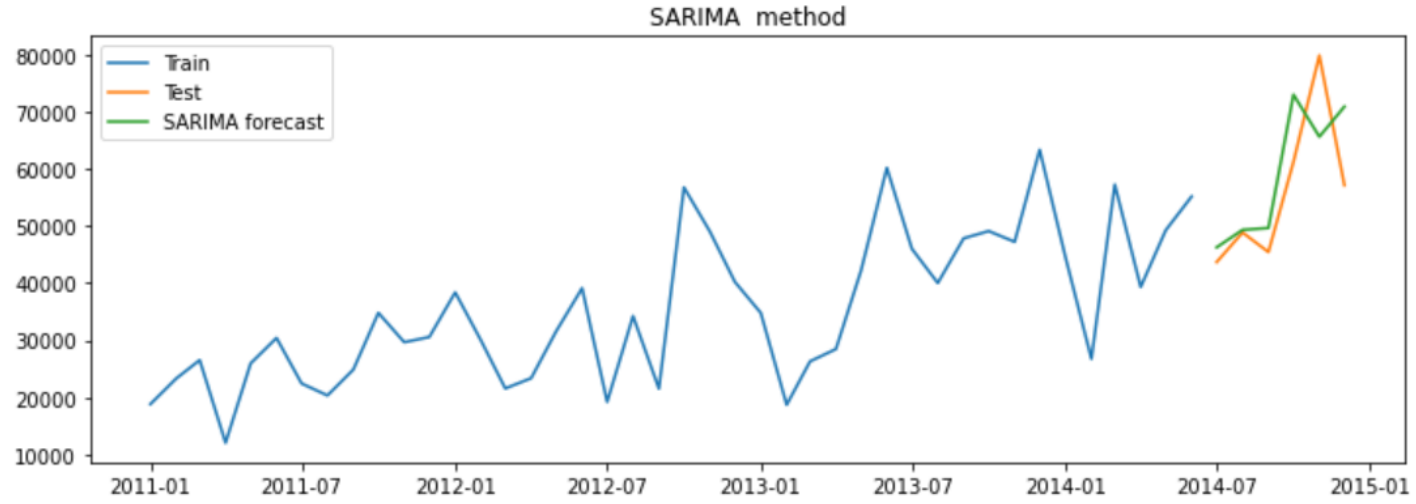
- From graphs and MAPE values, we can conclude **SARIMA** is the best forecasting method with MAPE 12.88 in ARIMA Techniques.





7. Conclusions on which technique works the best for the sales forecast and why? Then reason this using the forecast plot and the MAPE values both

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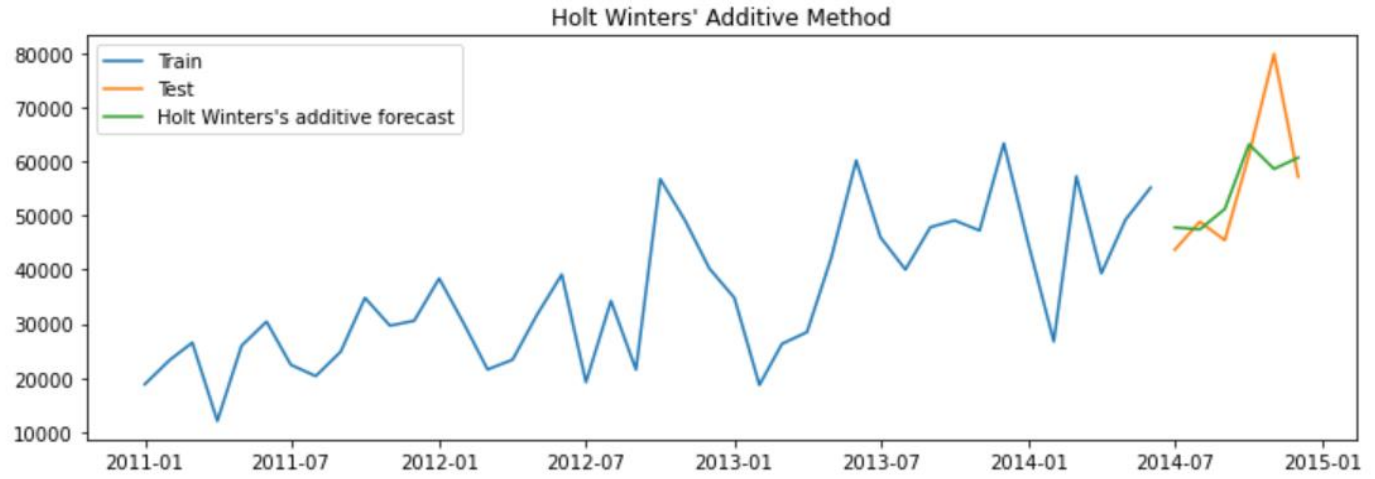

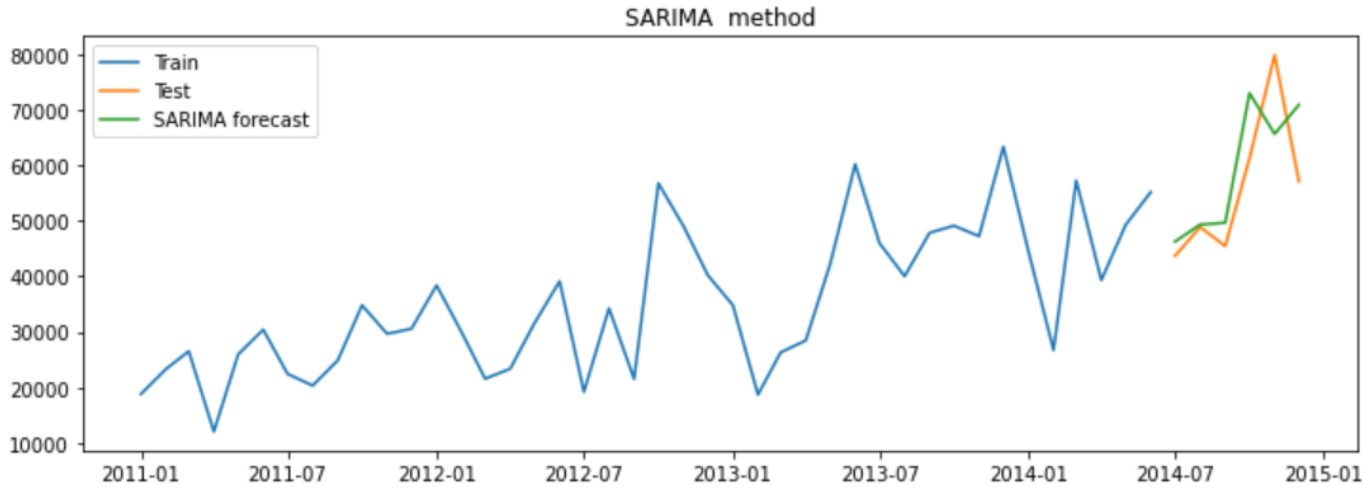

- From graphs and MAPE values, Best Technique is **Holt's Winter Additive Method** for the sales forecast. It has lowest MAPE value comparative to other Forecast Methods.

Thank You