Retail Giant Sales Forecasting Assignment

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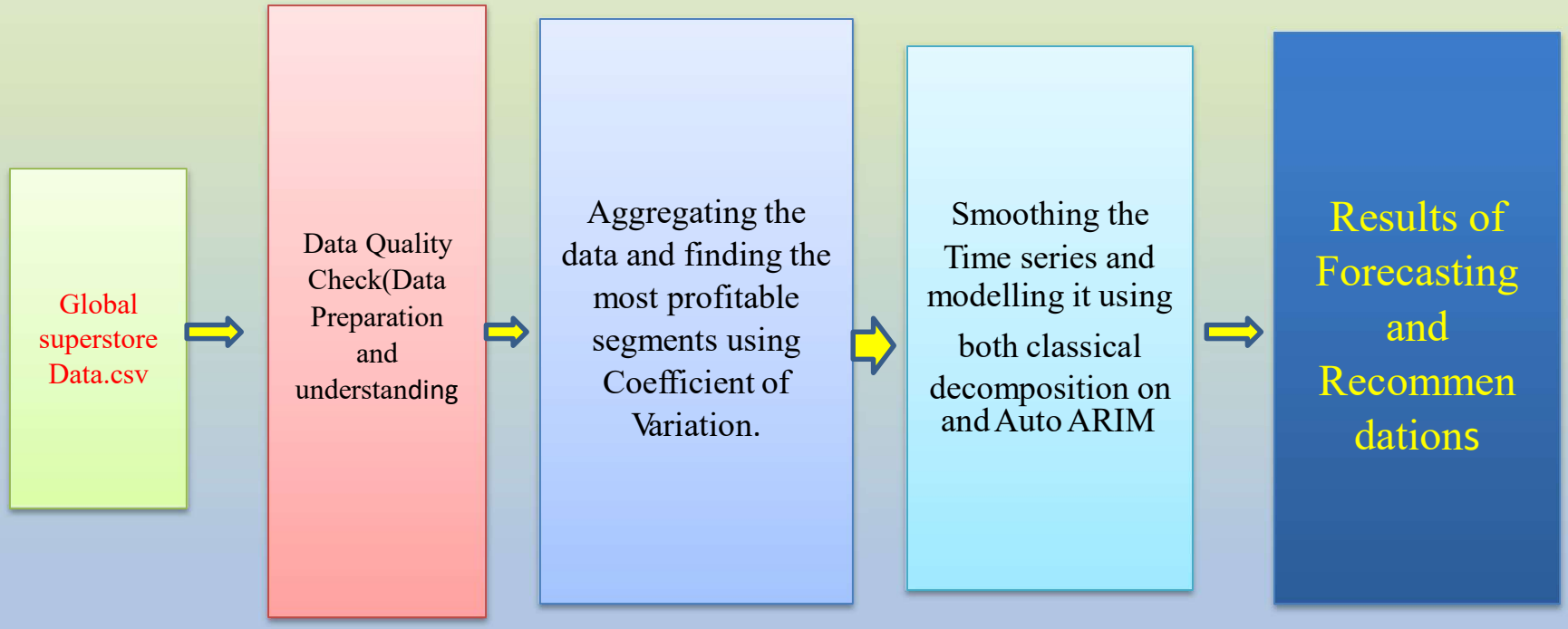
BUSINESS OBJECTIVE:

- 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 & home office.
- As a sales manager for this store, we 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

PROBLEM SOLVING METHODOLOGY



TASKS PERFORMED ON DATASET

- **Data Understanding**
- Data contain 51290 columns and 5 rows transactions from 2011 – 2014 .
- creating a new column of "market_segment“
- Aggregating the total values of profit for 21 market segments by its ordered month and year using pivot table

- **The Train-Test Split take the 42 months as the train data and the 6 months as the test data**.

Calculate the coefficient of variation-CoV on the profit for each of the 21 market segments on the train data

1.From Original Data set , filter out only rows which have the lowest COV market segment

2.Drop all other columns except the order date and sales

3.Group by order date and use aggregate function sum

4.Set Order date as index

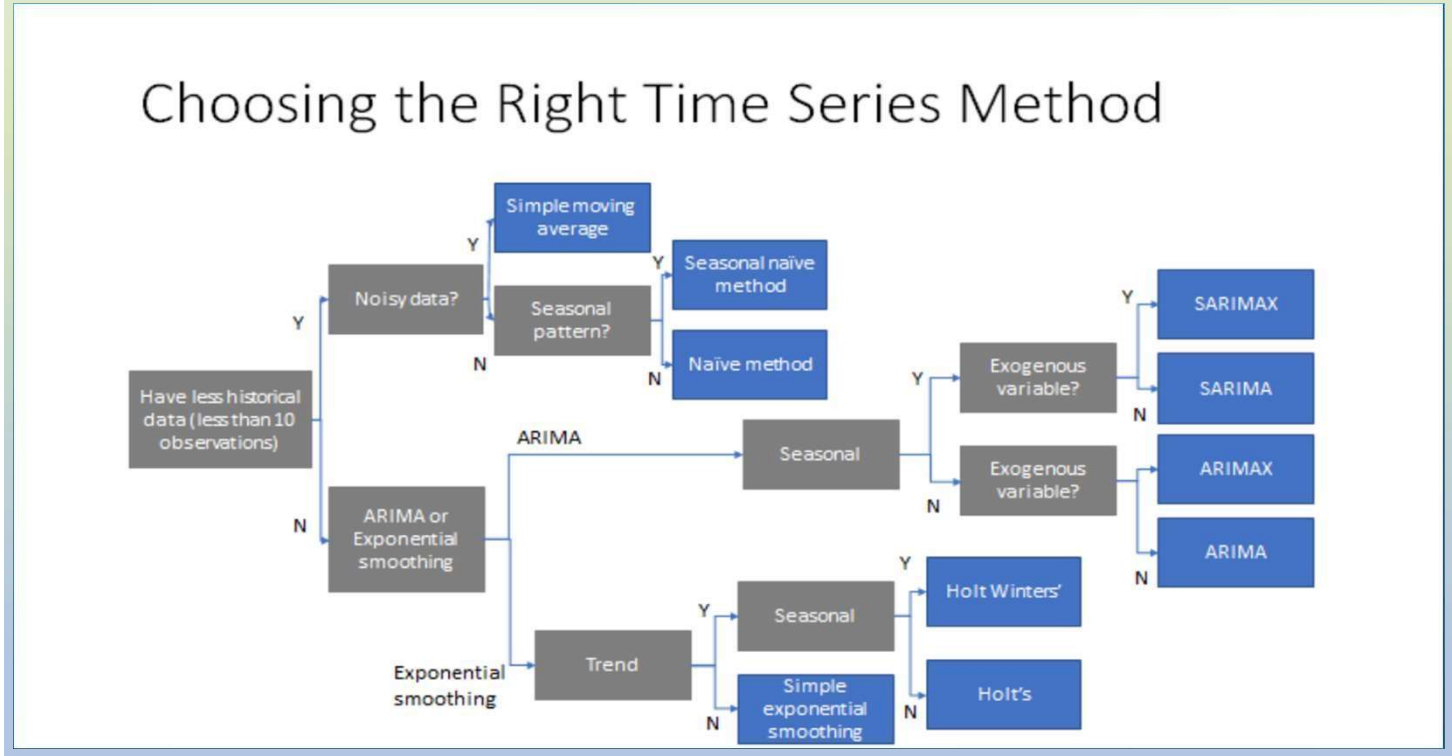
5.Convert the order date to to date time stamp

6.Peform seasonal, trend and residual analysis

7.now split the data set to train and test

8.Continue with your model building

- From the CoV table we observed that CONSUMER_APAC has the least value. So we forecasted on this segment for next six months.



From the flow chart we found out that Holt Winter Smoothing technique may work best with our time series as our Series has Trend, Seasonality and number of Data points are more than 10.

CONCLUSIONS AND RECOMMENDATIONS

- Based on given data "Global Superstore Data" the most profitable and consistent market segment is APAC Consumer, since it has very low COV value among all other segments

APAC Consumer Sales is rise in next 6 months .

	Market_Segment	Most Consistent
0	APAC Consumer	0.596404
12	EU Consumer	0.647485
15	LATAM Consumer	0.680684
13	EU Corporate	0.689346
1	APAC Corporate	0.731926
16	LATAM Corporate	0.880260
19	US Corporate	1.027209
2	APAC Home Office	1.048817
18	US Consumer	1.095295
14	EU Home Office	1.114681
7	Canada Corporate	1.197220
20	US Home Office	1.217133
17	LATAM Home Office	1.343696
3	Africa Consumer	1.429335
6	Canada Consumer	1.476093
4	Africa Corporate	1.664827
5	Africa Home Office	1.989866
8	Canada Home Office	2.188300
9	EMEA Consumer	2.716992

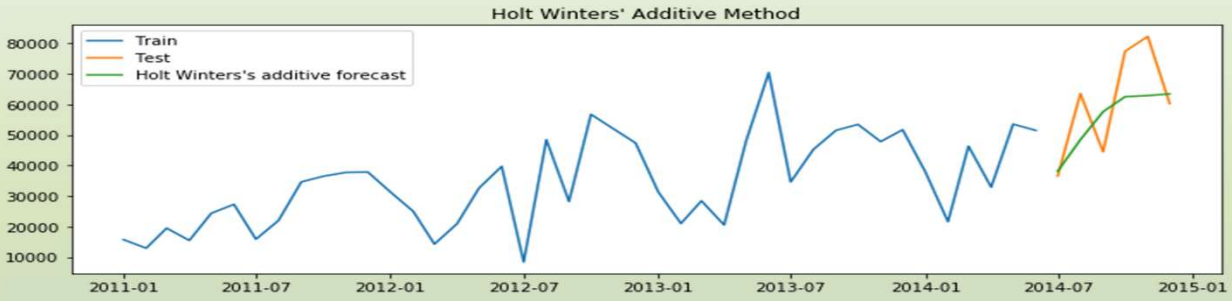
Best Technique:

After comparing both Smoothing and ARIMA techniques we observed that Holt Winter's Smoothing Technique(Additive) is the best technique for forecasting.

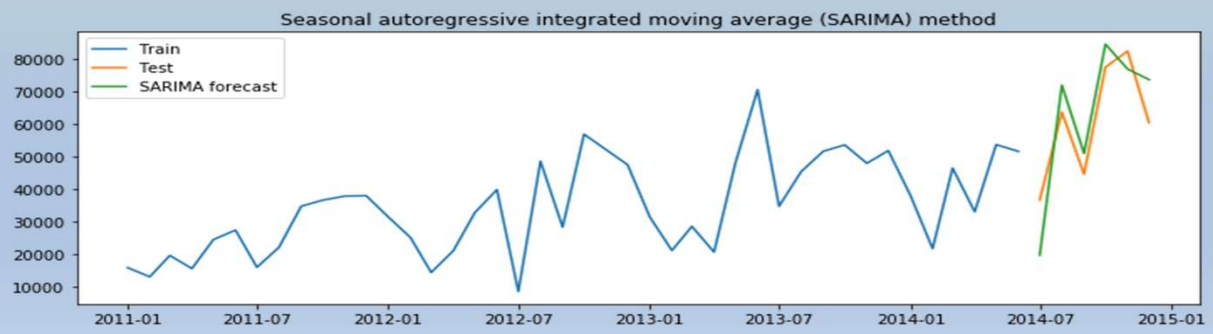
Our Time Series has trend , seasonality and data points are more than 10. Under these conditions SARIMA and Holt Winter's Usually work best. In this analysis we observed that according to MAPE value Holt Winter's work the best. From the Plotting we observed that SARIMA model is also forecasting well as it appropriately captures the peaks.

Model recommendations :

Based on MAPE ""=17.61"" value best technique for sales forecast is "Holt Winters' additive method".



Based on RMSE""10430.05"" value best technique for sales forecast is "Seasonal auto regressive integrated moving average (SARIMA) method“



	Method	RMSE	MAPE
0	Naive method	18774.05	26.86
0	Simple average method	30846.00	38.18
0	Simple moving average forecast	22019.48	27.55
0	Simple exponential smoothing forecast	23112.16	27.82
0	Holt's exponential smoothing method	19025.97	25.60
0	Holt Winters' additive method	12971.01	17.61
0	Holt Winters' multiplicative method	11753.42	19.62
0	Autoregressive (AR) method	15505.02	27.27
0	Moving Average (MA) method	52903.35	81.64
0	Autoregressive moving average (ARMA) method	50757.92	77.66
0	Autoregressive integrated moving average (ARIM...	50757.92	77.66
0	Seasonal autoregressive integrated moving aver...	10430.05	18.60

THANK YOU