

Sales And Demand Forecasting



BUSINESS PROBLEM

- For better customer experience and future growth, Company wants Sales and Demand forecast which would help in managing revenue, Inventory and logistics.
- Analyze all the 7 Markets and 3 segments in order to figure out the top two Market-Segment combinations.
- These two Market-Segment combinations should be most profitable and consistently profitable.
- Needs to forecast the Sales and Quantity for the next 6 months for the above classified two combinations.

DATA DESCRIPTION

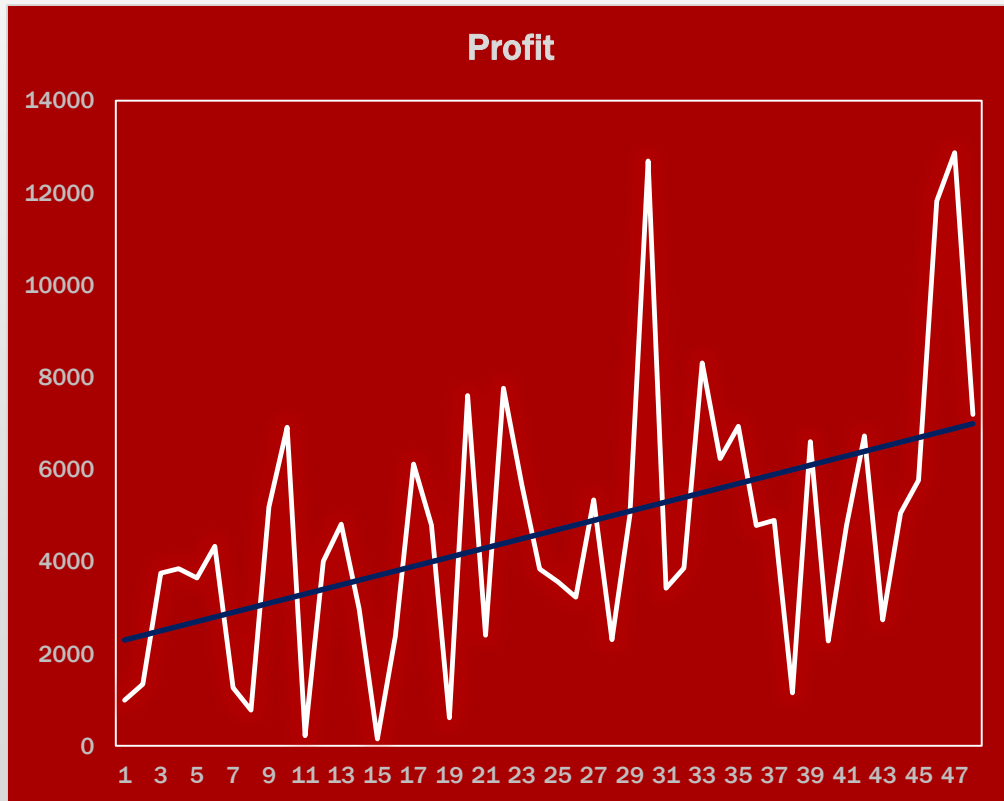
- Superstore data file has the transaction level data, each row represents a particular order made on the online store.
- Variables present in the datasets are descriptive in itself and provides information which we could use to identify the relationships and effect upon the sales.
- Total of 24 attributes related to each such transaction. Important one's are-
 - **Market** : Seven- factor levels representing the geographical market sector
 - **Segment** : Three-segments that customer belongs to – Consumer, Corporate, Home Office
 - **Order Date** : Date on which the order had been placed
 - **Profit** : Profit on each order
 - **Sales** : Sales cost of that particular order placed
 - **Quantity** : Number of quantities ordered or placed
- The above variables needs to be grouped for further analysis.

DATA GROUPING AND SEGMENTATION

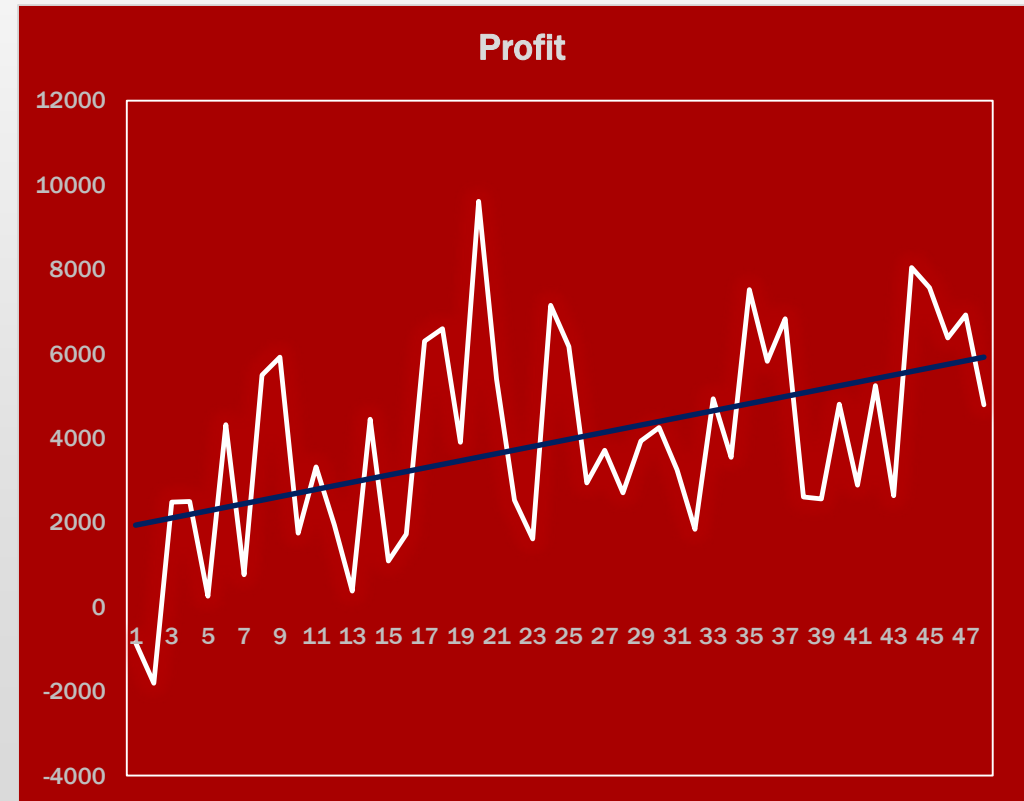
- Grouped the total sales, profit and Quantity by Month and Year.
- Total of 21 segments with monthly Sales, Profit and Quantity.
- Calculated the **coefficient of variation** for all the 21 segments, picked two segments having minimum coefficient of variation.
- Checked for the top two most profitable segments (i.e. maximum of sum of Profit).
- Also, plotted the Months Vs Profit graph and choose the two with consistently profitable.
- **APAC Consumer** and **EU Consumer** are the two most profitable segments.

PROFITABLE SEGMENTS

APAC Consumer

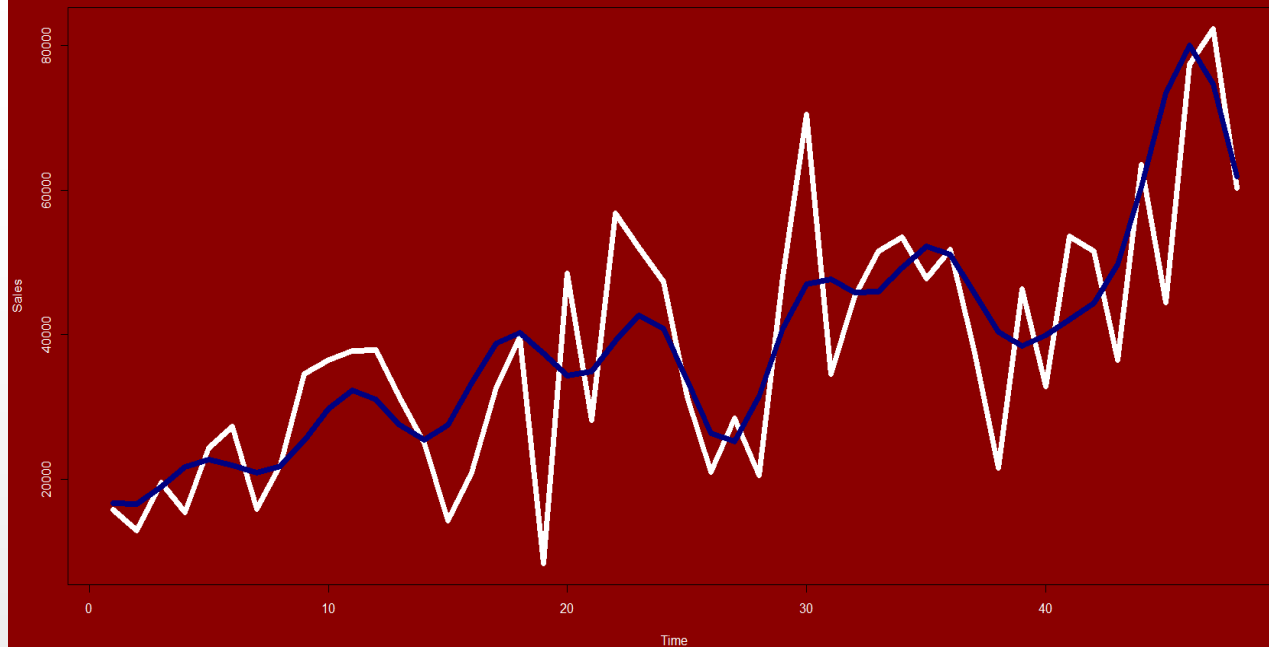


EU Consumer

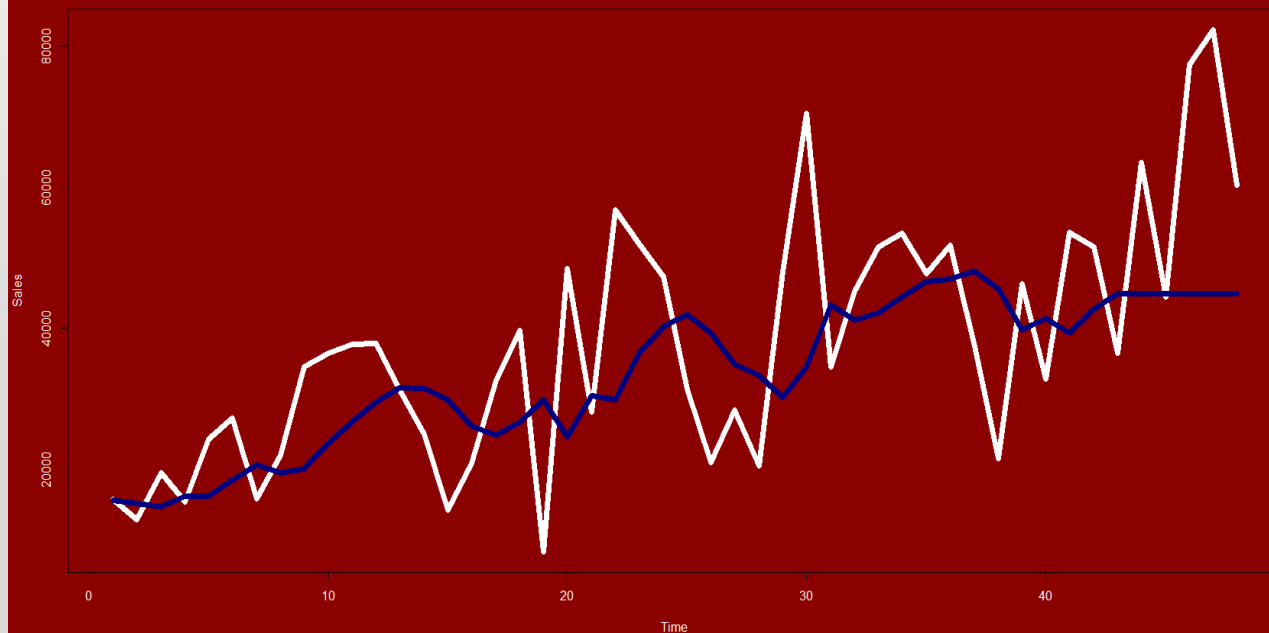


FORECASTING : APAC CONSUMER

Sales Prediction : Decomposition Method



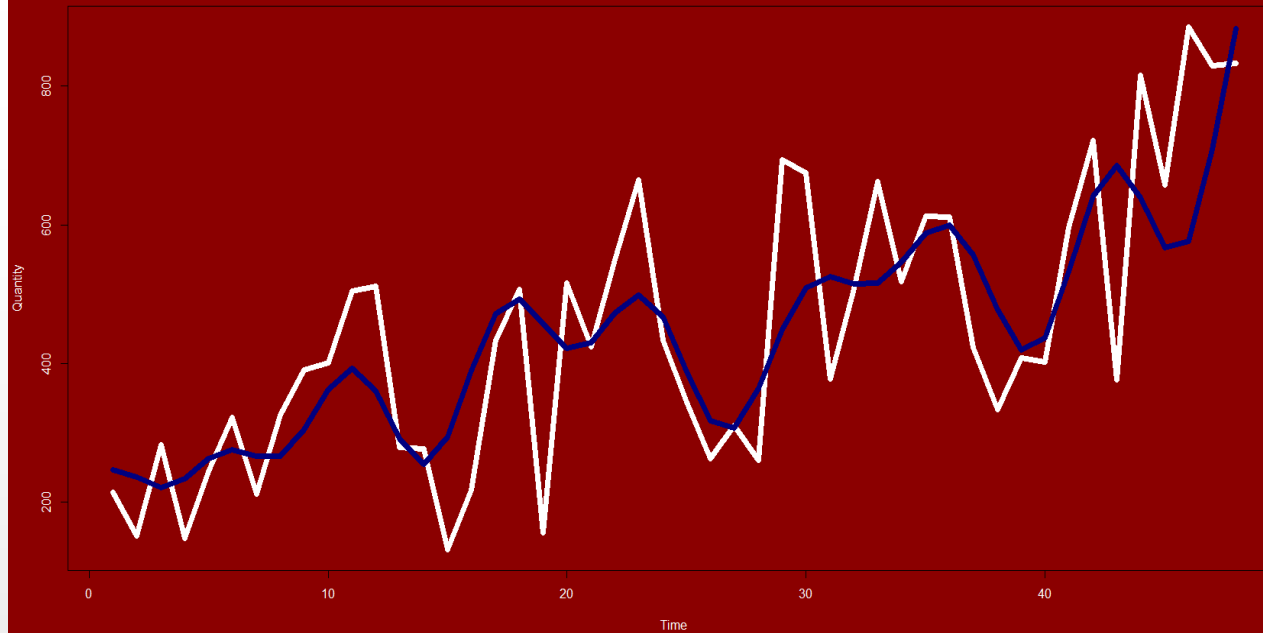
Sales Prediction : ARIMA Method



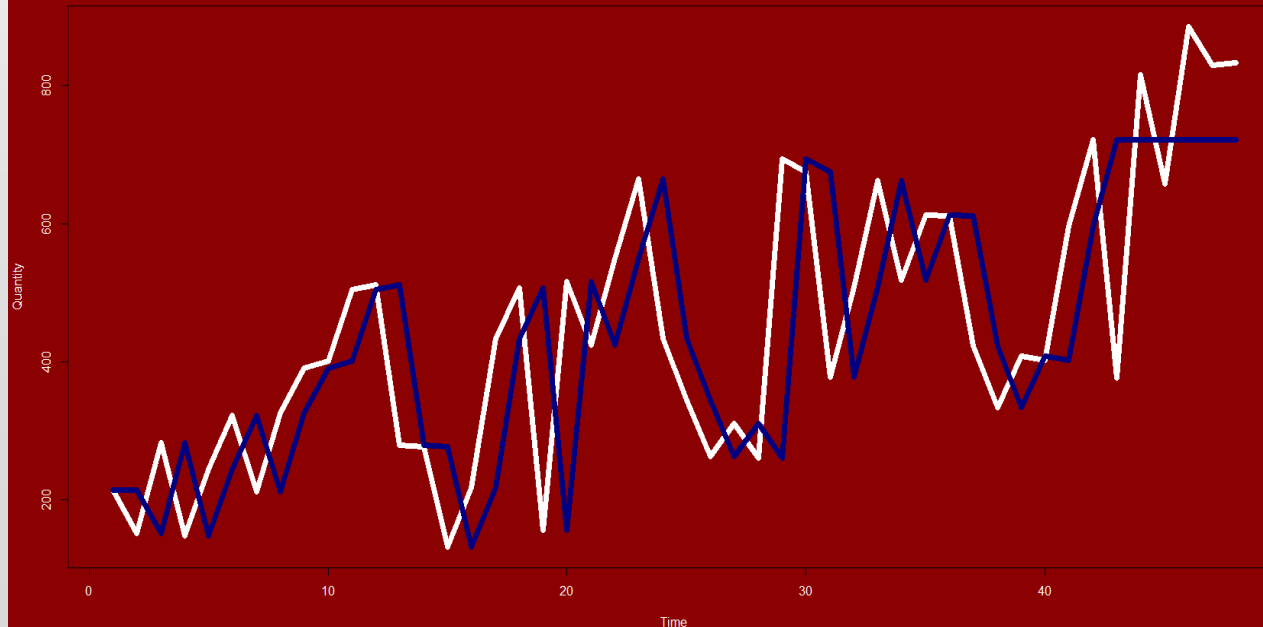
Sales Forecasting

- Forecasted the Future sales for APAC Consumer by Decomposition and ARIMA Methods.
- Decomposition method is more accurate compare to the ARIMA method.
- Also, Percentage Error (i.e. MAPE) is lower for the Decomposition method.
- Graph labels :
 - White line represents the actual sales trend.
 - **Blue line** represents the forecasted sales trend

Quantity Prediction : Decomposition Method



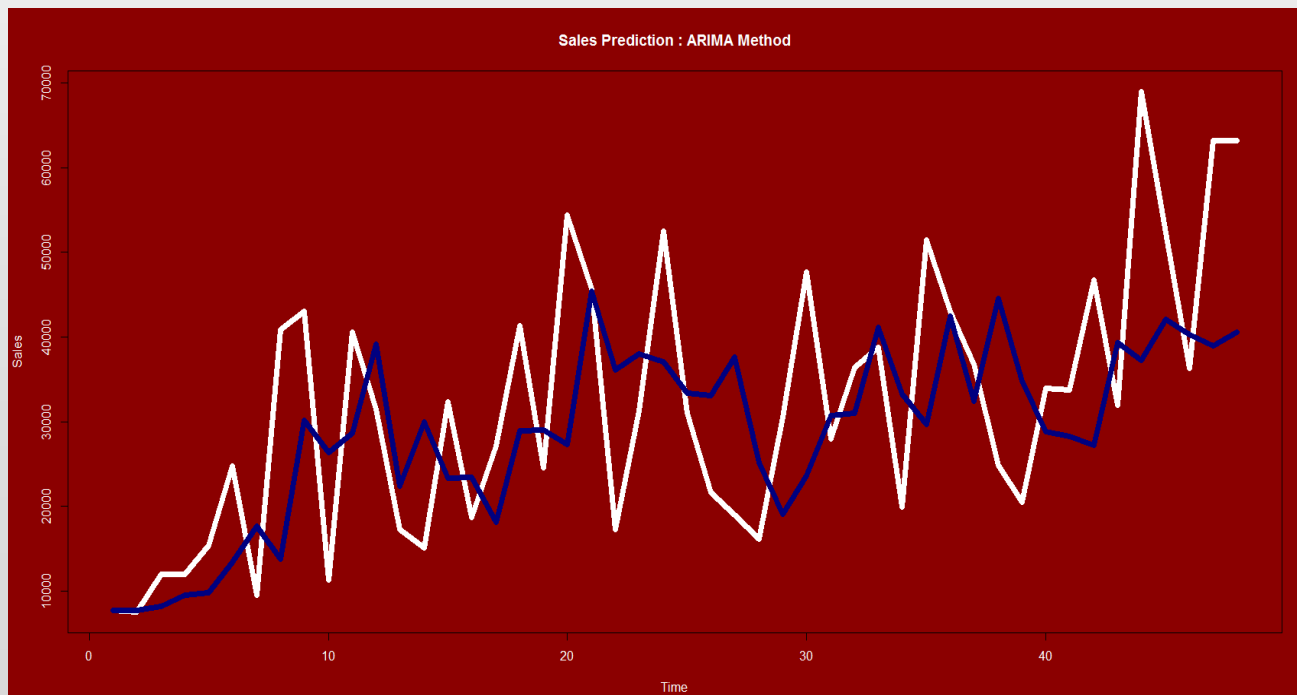
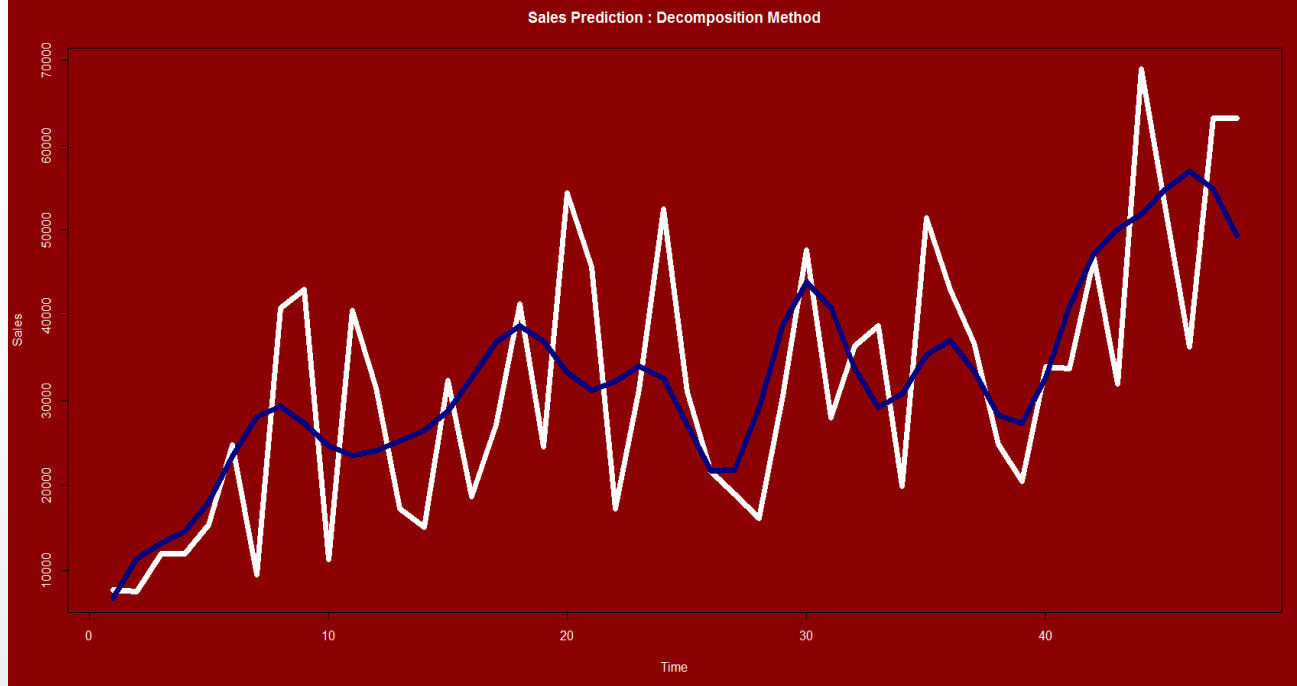
Quantity Prediction : ARIMA Method



Quantity Forecasting

- Forecasted the Future quantity for APAC Consumer by Decomposition and ARIMA Methods.
- Decomposition method is slightly better compare to the ARIMA method.
- Percentage Error (i.e. MAPE) is almost comparable for both the methods.
- Graph labels :
 - White line represents the actual quantity trend.
 - Blue line represents the forecasted quantity trend

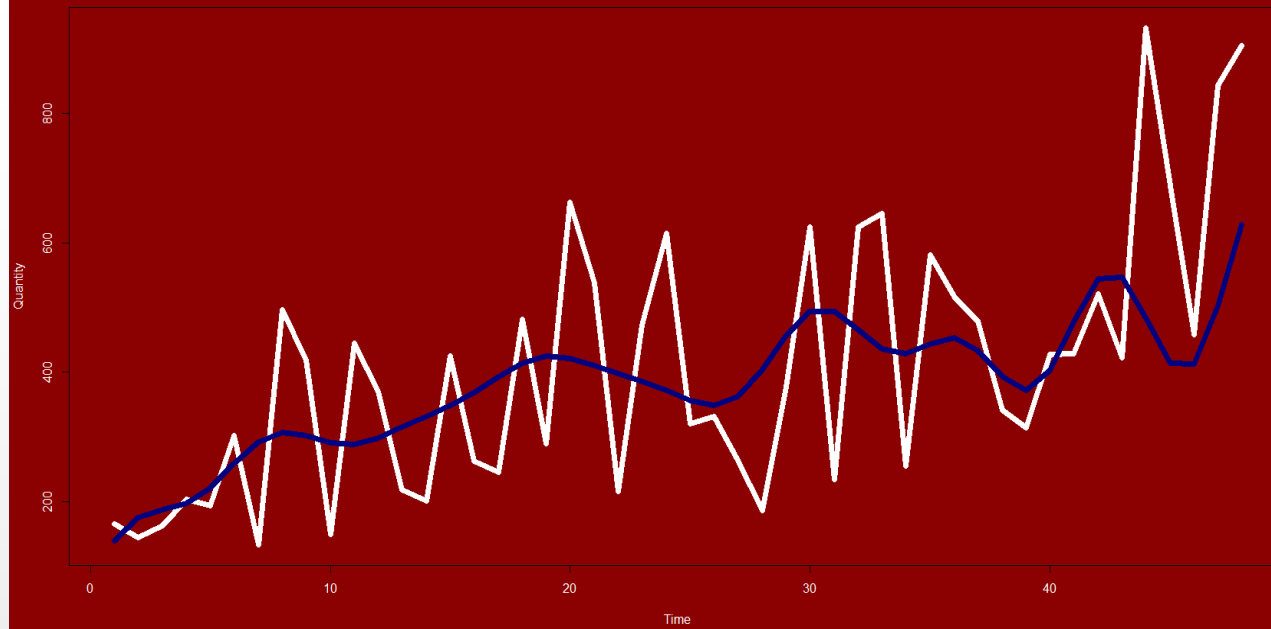
FORECASTING : EU CONSUMER



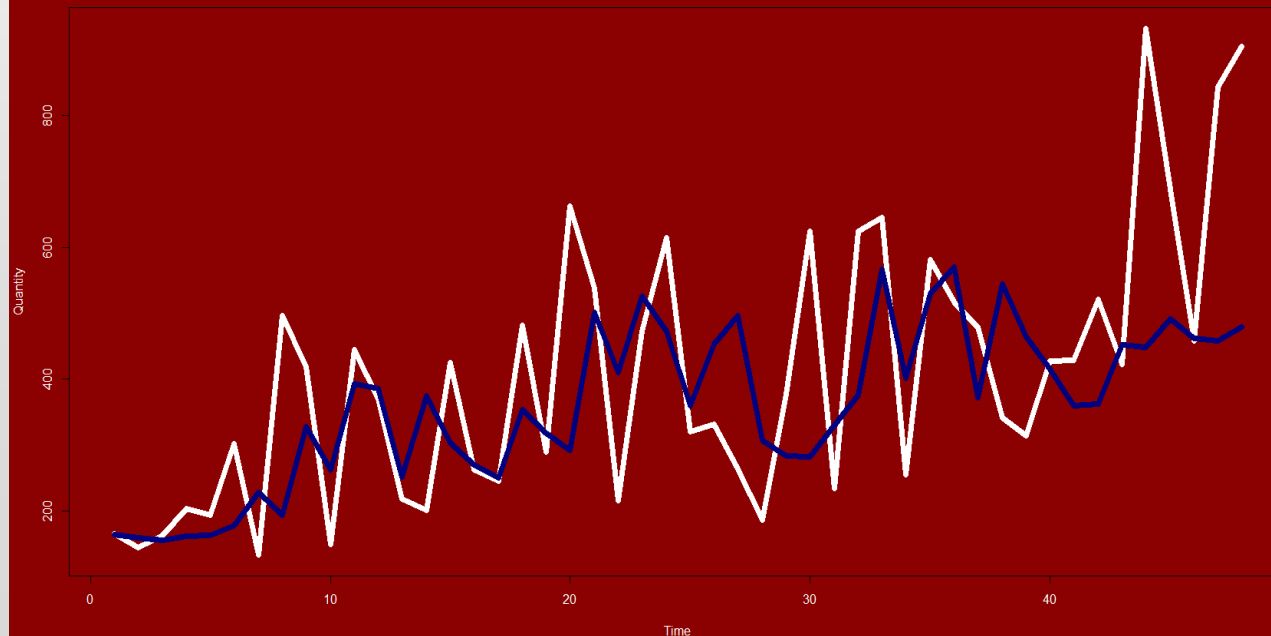
Sales Forecasting

- Forecasted the Future sales for EU Consumer by Decomposition and ARIMA Methods.
- ARIMA method is slightly better compare to the Decomposition method.
- As Percentage Error (i.e. MAPE) is almost comparable but still ARIMA method (or auto method) overshadow Decomposition method.
- Graph labels :
 - White line represents the actual sales trend.
 - Blue line represents the forecasted sales trend

Quantity Prediction : Decomposition Method



Quantity Prediction : ARIMA Method



Quantity Forecasting

- Forecasted the Future quantity for EU Consumer by Decomposition and ARIMA Methods.
- ARIMA method is slightly better compare to the Decomposition method.
- Percentage Error (i.e. MAPE) is slightly higher for the Decomposition method.
- Graph labels :
 - White line represents the actual quantity trend.
 - **Blue line** represents the forecasted quantity trend

SUMMARY

- ARIMA model outperform the Decomposition(or manual method) in most of the forecasting. As Decomposition methods require various parameter to tune for a better forecast.
- Decomposition method is like hit n trail method for fitting the model to capture the trend and seasonality.
- Forecasted values could have been better, if we'd more past data.
- Selecting window size also play a crucial role for deciding the forecasted value.
- Needs to consider local predictor for forecasting, if present (In our cases local component was absent, predicted based on seasonality and trend i.e. through linear regression function).