Retail Sales Forcasting CASE STUDY

SUBMISSION

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Abstract

Business objective:

- Forecast the sales and demand for the next 6 months in order to manage inventory and revenue accordingly.

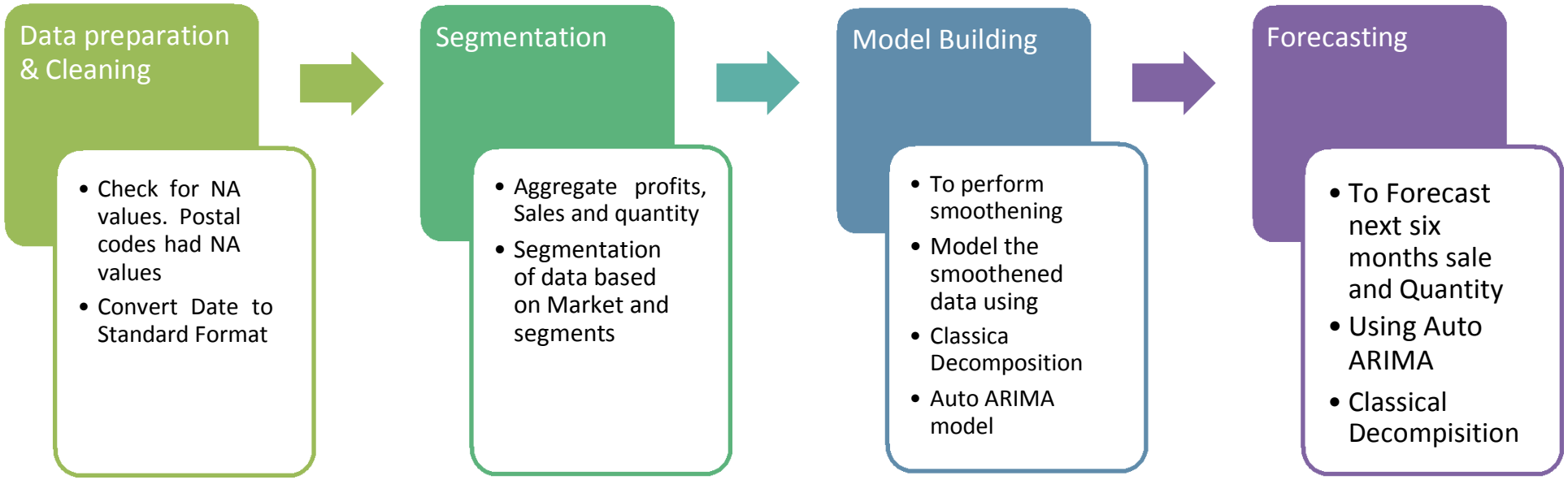
Data Source:

- Data set of 51290 observations/orders(Transactions) which includes transaction data of 7 different market segments in three major segment categories.
- Each observation has 24 variables/attributes.

Strategy:

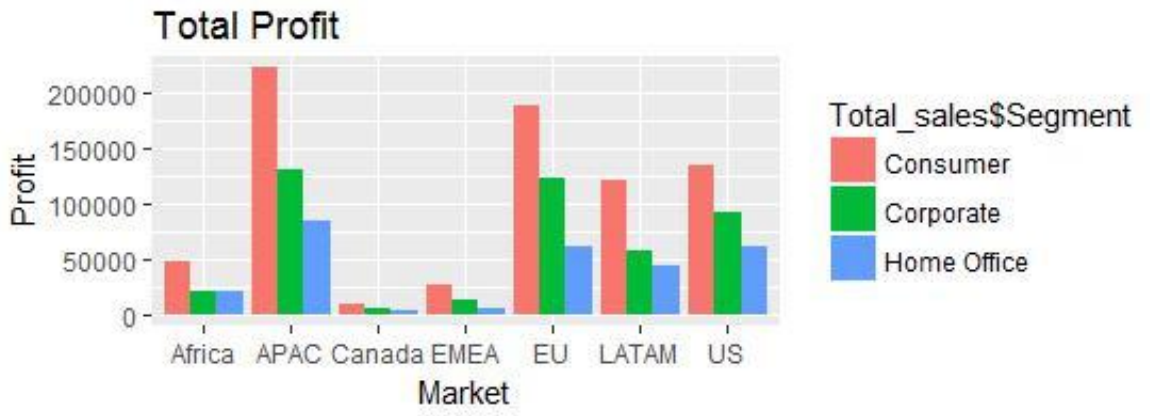
- To identify the most profitable segments in the seven market area
- To forecast the sale and quantity for next six months using classical decomposition and ARIMA forecasting.

Problem solving methodology



Market Segment Identification

- The data consist of 7 regions and 3 segments. In order to analyse the profits, the dataset was divided into 21 Market Segments.
- One of the business requirement was to forecast the profits and sales for top 2 market segments with high Profits and consistent sales.
- As seen from the graphs, the segment ‘Consumers’ earns the highest profit in ‘APAC’ and ‘EU’ region. Further, these Market Segment comparatively deviates less from its average profits every month.



Model Building and Forecast Approach

Problem Statement

- To Forecast the sales/qunatity for next six months

Approach

- To use smoothening before performing any model forecasting
- To use classical decomposition mode to forecast sale & quantity
- To use Auto Arima mode for forecasting

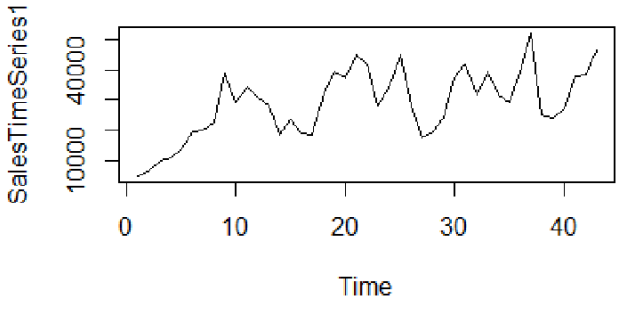
Final Result

- Demand and Forecast models EU and APAC consumer segment

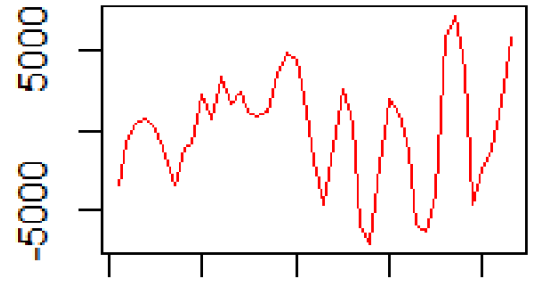
APAC Consumer Segment Sales Forecast

1. Fig a represent the actual graph.

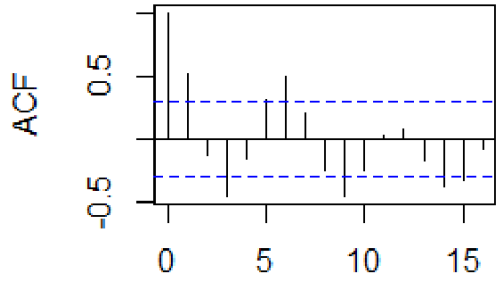
2. It is seen from graph c that ACF is decreasing and increasing seasonally with serial correlation
3. Graph d, PACF has 3 spikes compared to 6 in ACF and hence displays a sharp cut-off .
4. Figure e represents the white noise, part of series that shows no trend neither seasonality



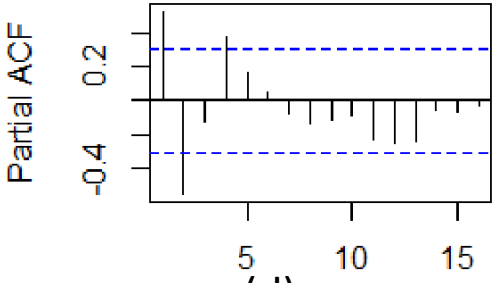
(a)



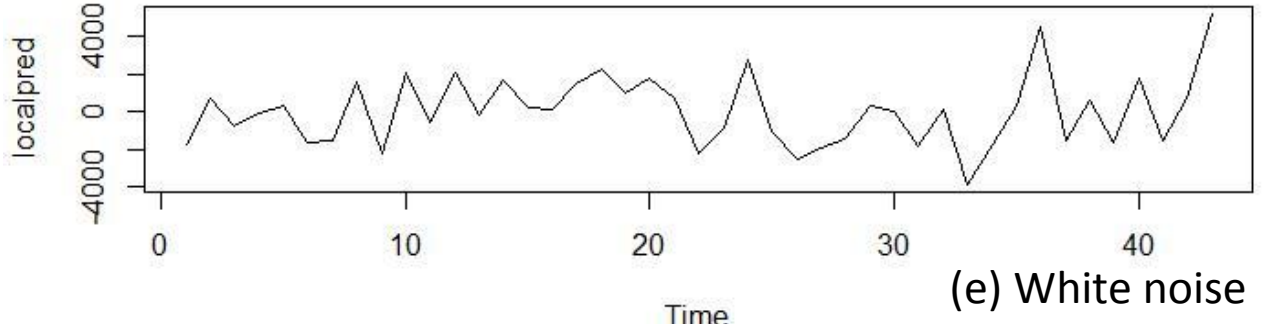
(b) Series After Removing the Trend



(c)



(d)

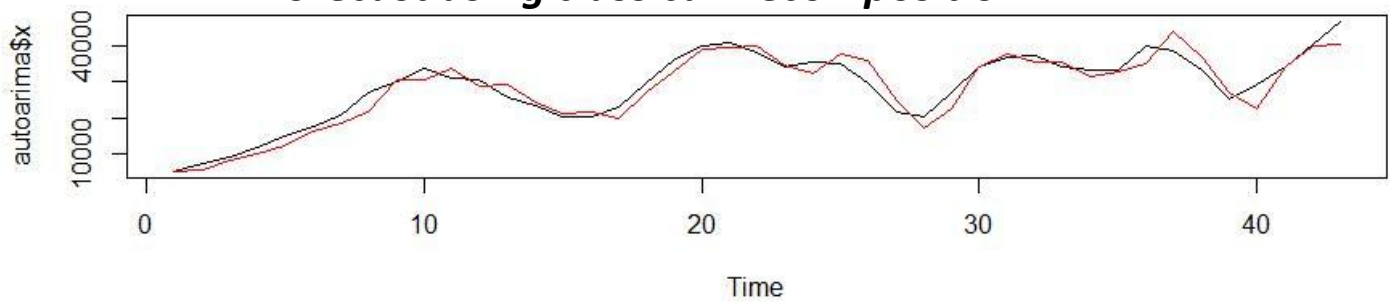


(e) White noise

APAC Consumer Segment Sales Forecast

Forecasted Method	% of Error
Classical decomposition	27 %
Auto Arima	37 %

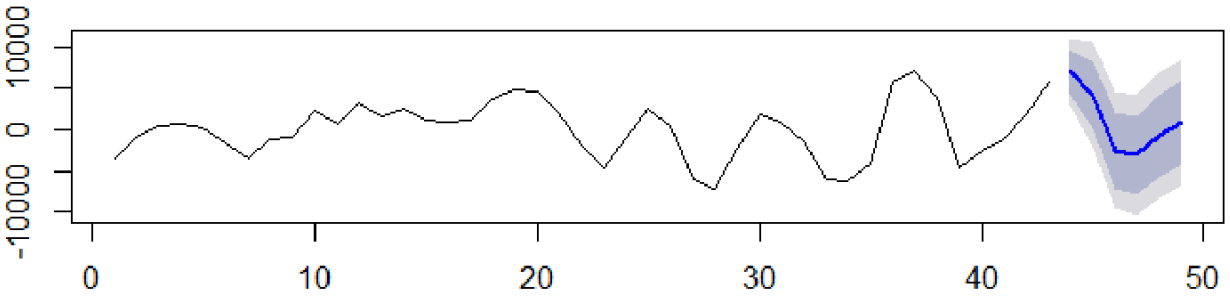
Forecast using classical Decomposition



Forecast using auto Arima Method

Forecasted sales for Apac in next 6 Months

1	2	3	4	5	6
25423.97	26484.93	34279.03	47392.23	62694.03	76069.63



EU Consumer Segment Sales Forecast

1. Fig a represent the actual graph and fig b shows the seasonality
2. It is seen from graph c that ACF is decreasing and increasing seasonally with serial correlation
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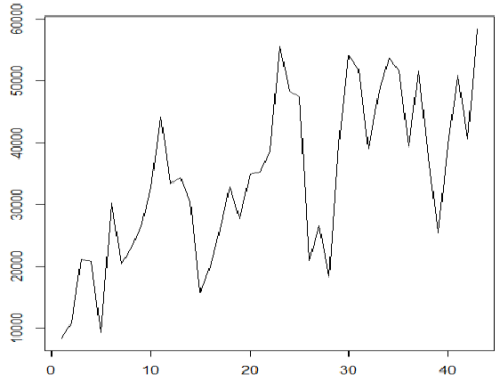
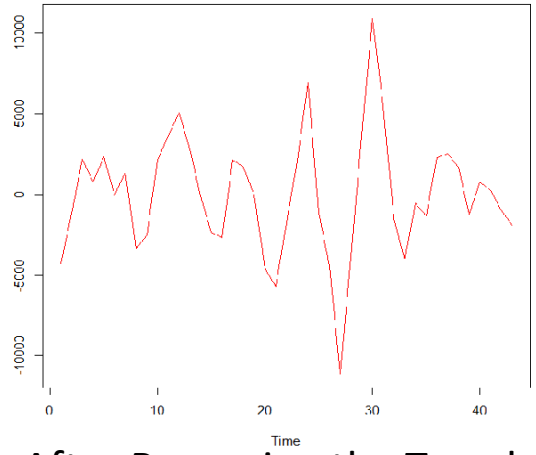
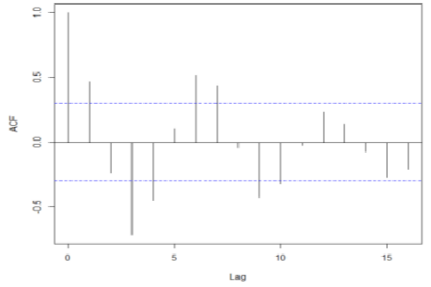
4. Figure e represents the white noise, part of series that shows no trend neither seasonality



(a) Actual Series



(b)
Series After Removing the Trend



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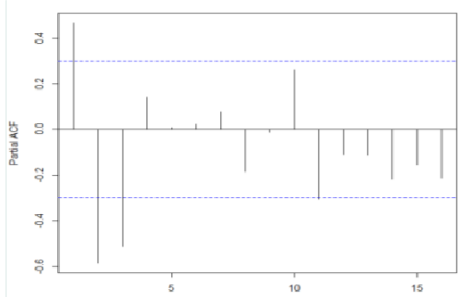

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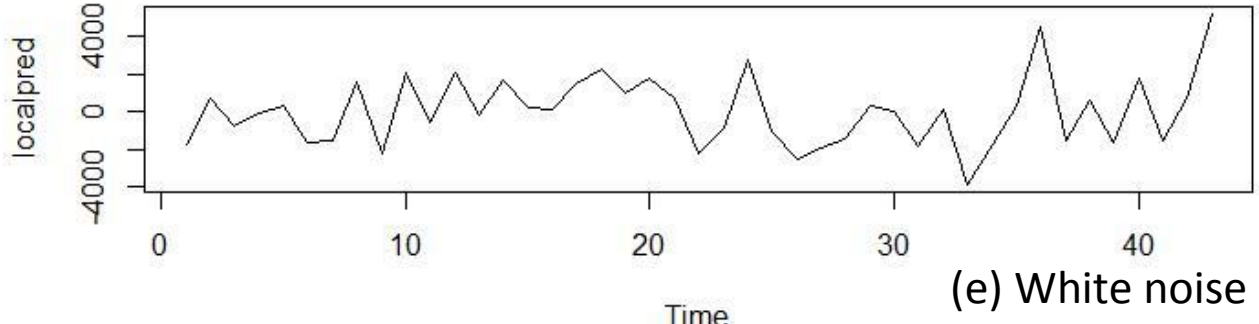
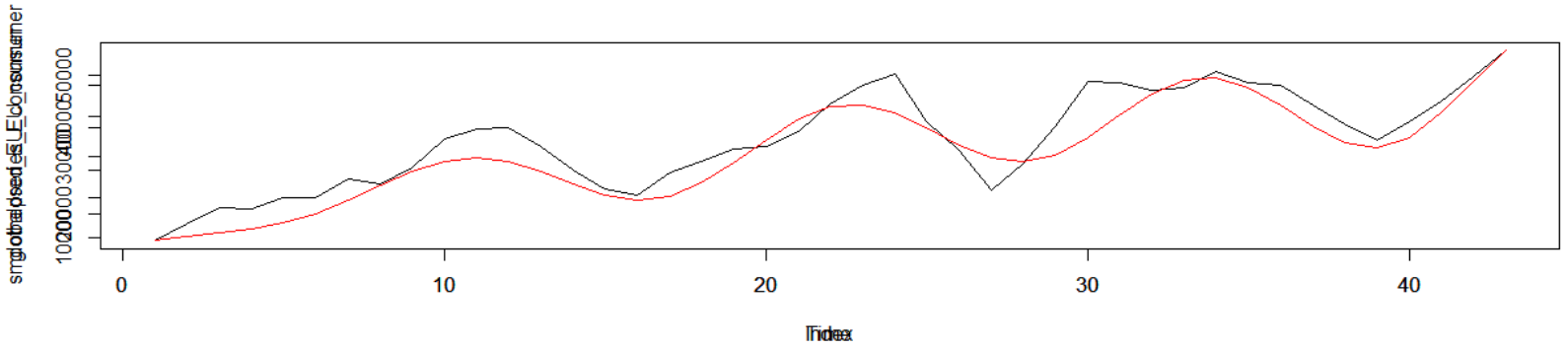


(e) White noise

EU Consumer Segment Sales Forecast

Forecasted Method	% of Error
Classical 26 % decomposition	
Auto Arima	37.30768

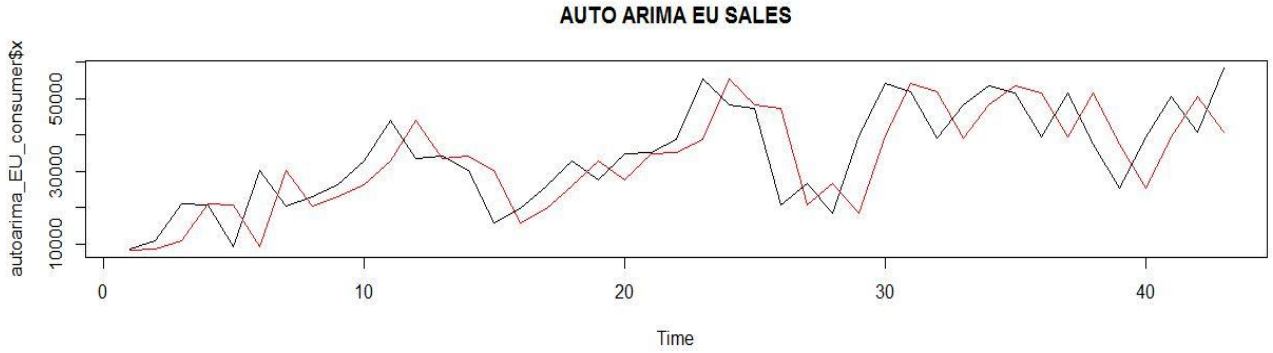
Forecast using classical Decomposition



Forecast using auto Arima Method

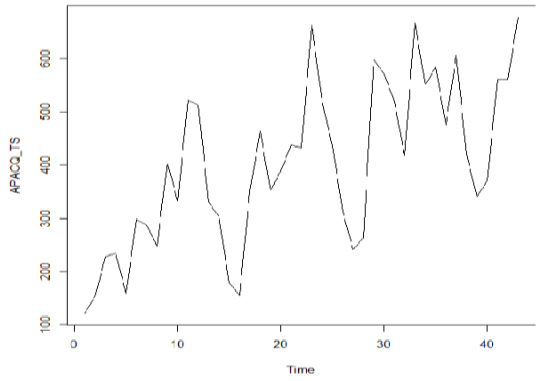
Forecasted sales for EU in next 6 Months

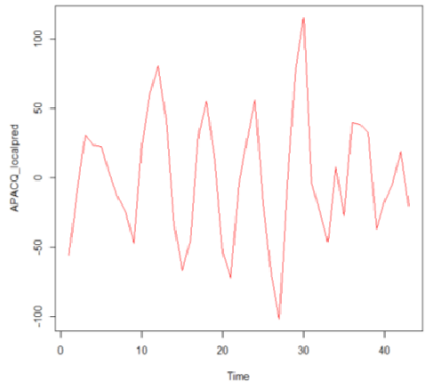
1	2	3	4	5	6
24580.31	26367.66	34872.70	48117.86	62973.47	75764.59

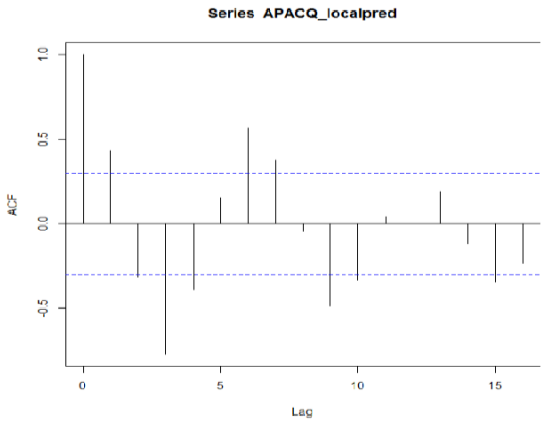


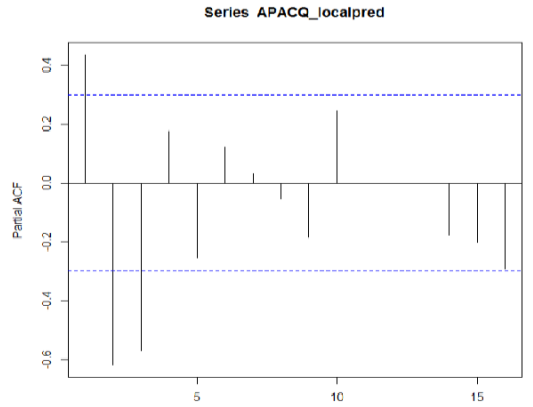
APAC Consumer Segment Quantity Forecast

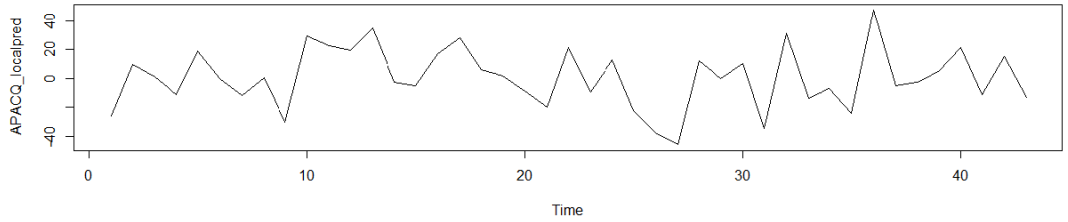
1. Fig a represent the actual graph and fig b shows the seasonality
2. It is seen from graph c that ACF is decreasing and increasing seasonally with serial correlation
3. Graph d, PACF has 2 spikes compared to 7 in ACF and hence displays a sharp cut-off .
4. Figure e represents the white noise, part of series that shows no trend neither seasonality









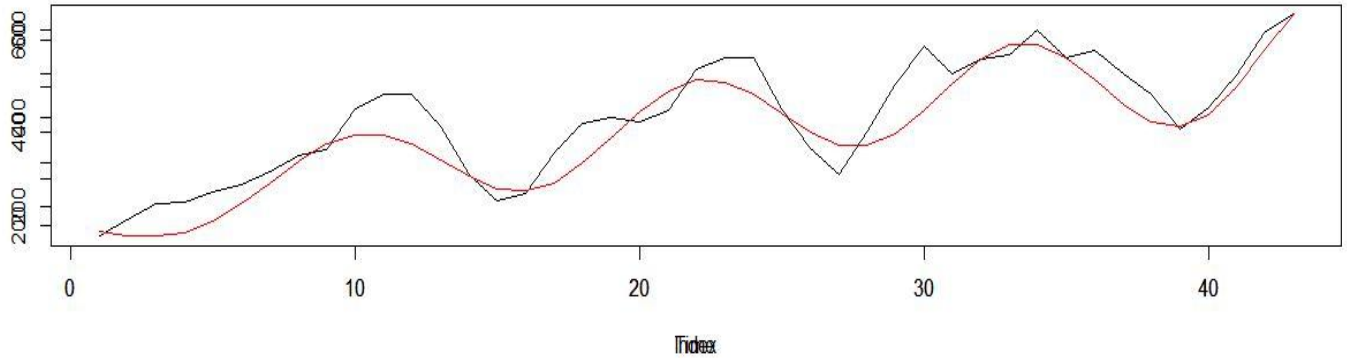


APAC Consumer Segment Quantity Forecast

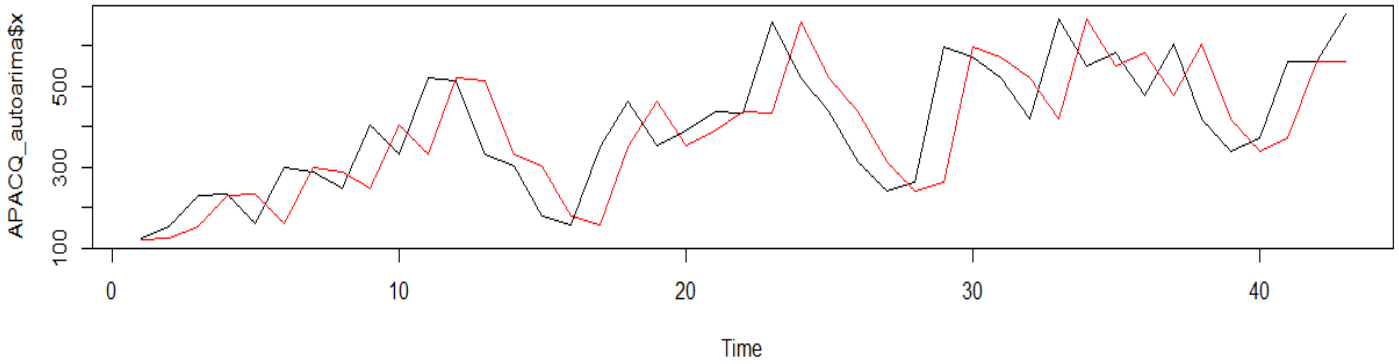
Forecasted Method	% of Error
Classical decomposition	18 %
Auto Arima	24 %

Forecasted Quantity for Apac in next 6 Months

1	2	3	4	5	6
346	355	429	552	697	826



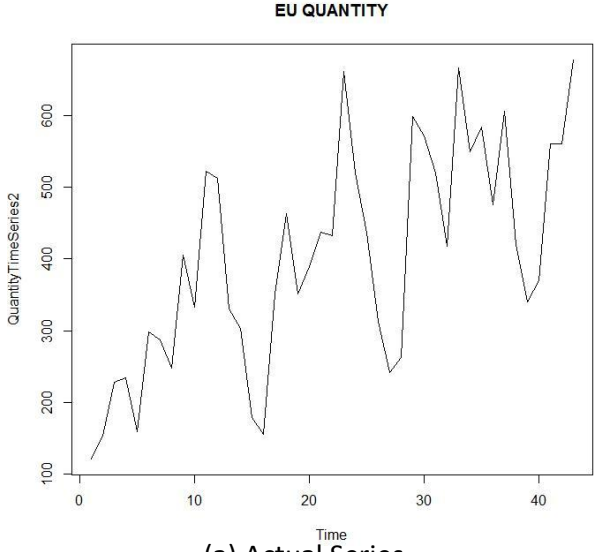
Forecast using classical Decomposition



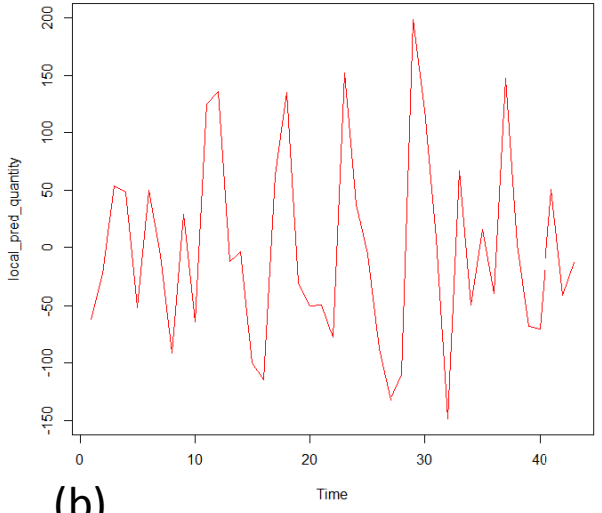
Forecast using auto Arima Method

EU Consumer Segment- Quantity Forecast

1. Fig a represent the actual graph and fig b shows the seasonality
2. It is seen from graph c that ACF is decreasing and increasing seasonally with serial correlation
3. Graph d, PACF has 2 spikes compared to 4 in ACF and hence displays a sharp cut-off .

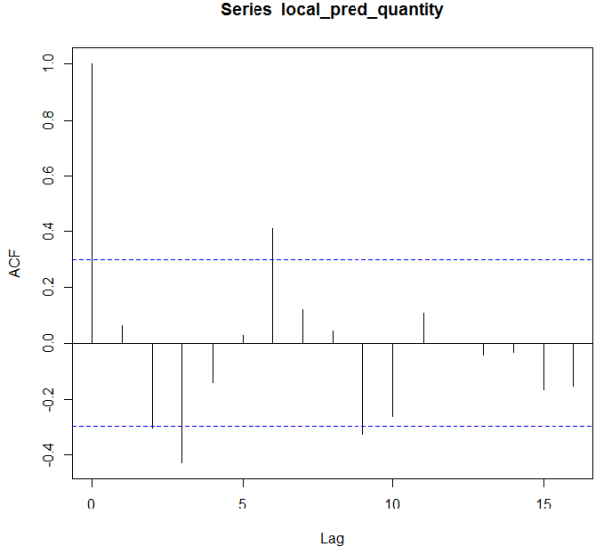


(a) Actual Series

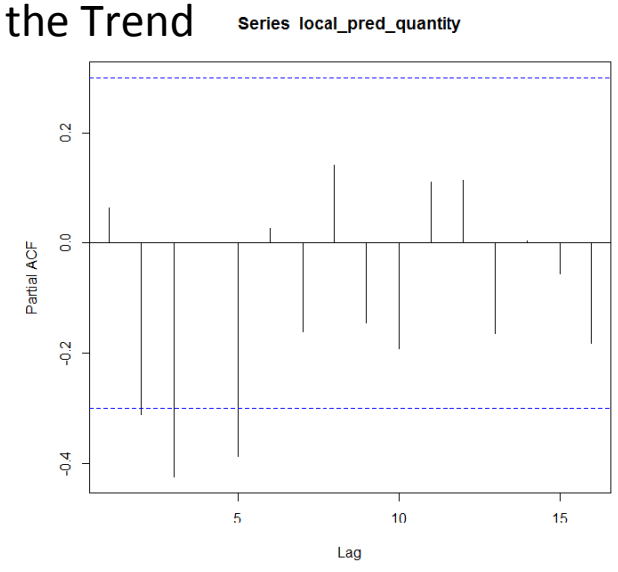


(b)

Series After Removing the Trend

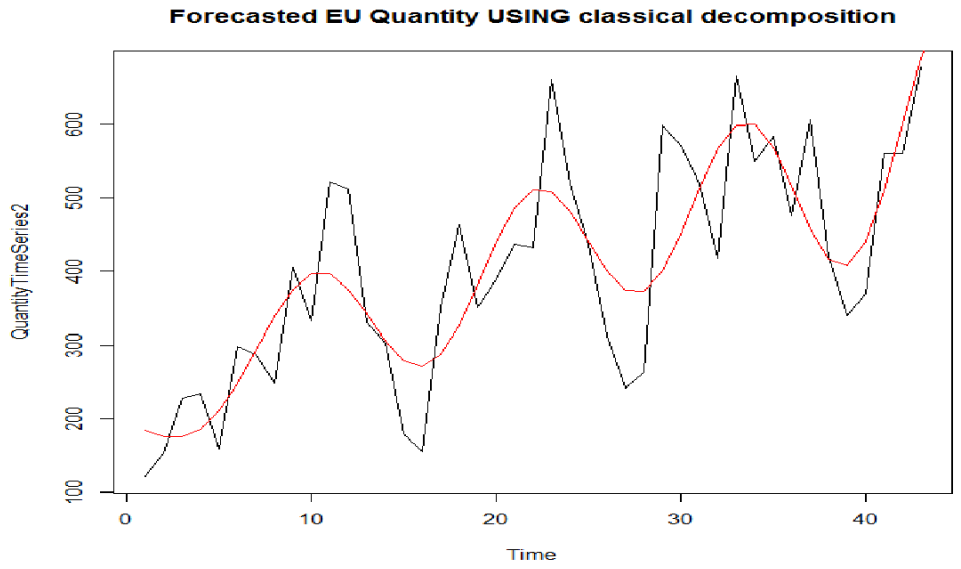


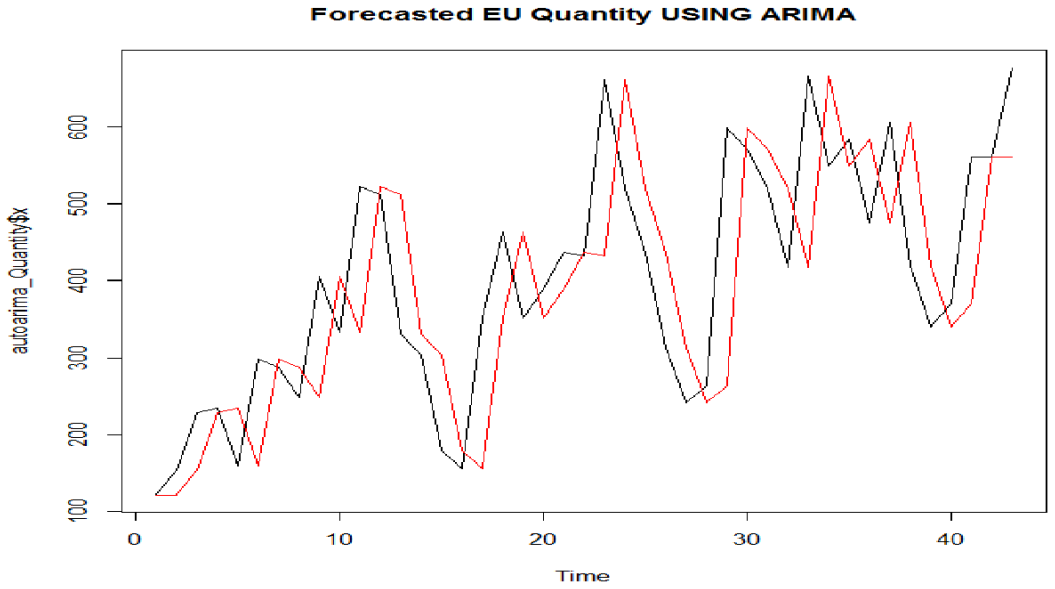
(c)



(d)

EU Consumer Segment- Quantity Forecast





Forecasted Method	% of Error
Classical decomposition	17.05325%
Auto Arima	24.82369%

Forecasted Quantity for EU in next 6 Months

1	2	3	4	5	6
338	340	418	559	731	891

RESULTS OF Global Store Forecast Analysis

- APAC consumer and EU consumer are considered two most profitable segments

- In both the segments the Quantity of the product ordered has increased and hence the sales has also increased

- We can say that the company will gain more profit in near future

Recommendations OF Global Store Forecast Analysis

1. The products must be changed according to the changes in Science & Technology or Season changes

2. Surveys must be conducted to know the need of common man and accordingly products must be supplied

3. Supply & Demand must be monitored

4. Atleast the average of forecasted quantity must be present in the stock

THANK YOU