Global Mart
Retail Case Study

SUBMISSION

BY:

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Abstract

Business Objective:

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

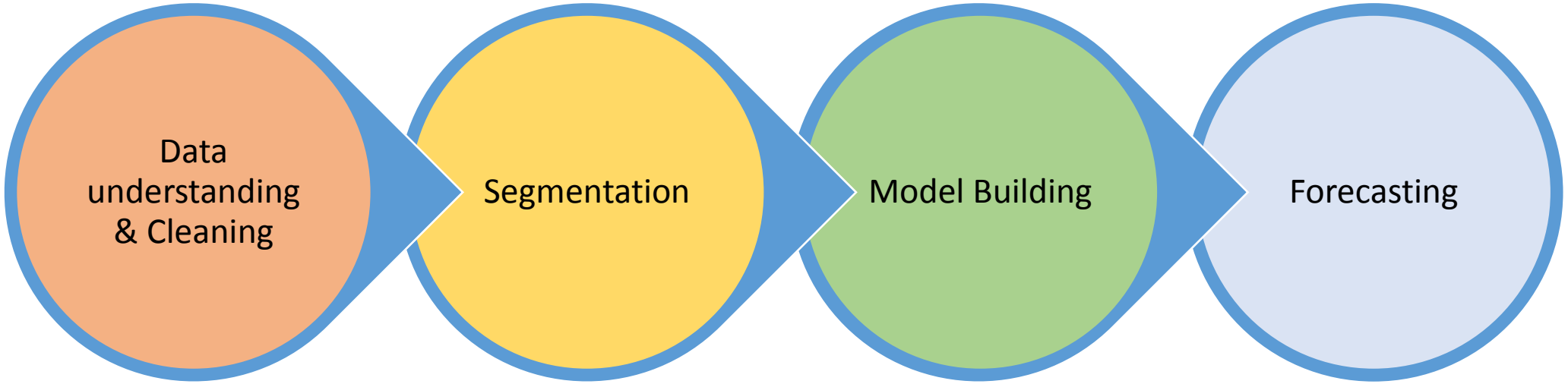
Data Source:

- Data set for 51290 orders(Transactions) which includes transactional data of 7 different market segments and in 3 major categories.
- Each order or a transaction has 24 attributes

Strategy:

- Identify the 2 most profitable and consistently profitable segments using CoV (Coefficient of Covariance)
- Forecast the sales and quantity for the next 6 months by using classical decomposition and auto ARIMA for forecasting

Problem solving methodology



- AS-IS loading Loan in R
- Analysis of key columns of loan data.
- Check for Duplicate & null values
- Convert Date to standard format

- Segmentation of data based on Market and Segments
- Aggregate Sales, Quantity and Profit over Order Date
- Use Coefficient of Covariance to find the most profitable and consistently profitable segments

- Perform Smoothening
- Use Classical Decomposition method to identify:
  - Trend
  - Global predictable
  - Local predictable
  - White Noise
- Use Auto-Arima to build model

- Forecast next 6 months data using the model built using Classical Decomposition & Auto-Arima
- Data to be forecasted:
  - Sales
  - Quantity

Analysis – Identify Top 2 Market Segments based on Profitability

Problem Statement

- find the 2 most profitable and consistently profitable segments.

Criteria

- use Coefficient of Variation of the Profit for all 21 market segments.

CV Analysis

	Consumer	Corporate	HomeOffice
Africa	1.32	1.78	1.79
APAC	**0.63**	0.7	1.05
Canada	1.4	1.55	2.24
EMEA	2.19	4.47	5.88
EU	**0.62**	0.76	1.12
LATAM	0.66	0.81	1.18
US	1.01	1	1.1

Conclusion

- Low value of COV means High Mean suggesting the segments are most profitable
- Low Standard Deviation suggests that they are consistently profitable
- Top 2 Market Segments:
  - **1. EU – Consumer** **2. APAC – Consumer**

Model Building & Forecasting

Problem Statement

- Forecast the sales and quantity for the next 6 months.

Approach

- Use smoothening before performing classical decomposition.
- Use Classical Decomposition model for Model forecasting
- Use Auto ARIMA for forecasting

Result

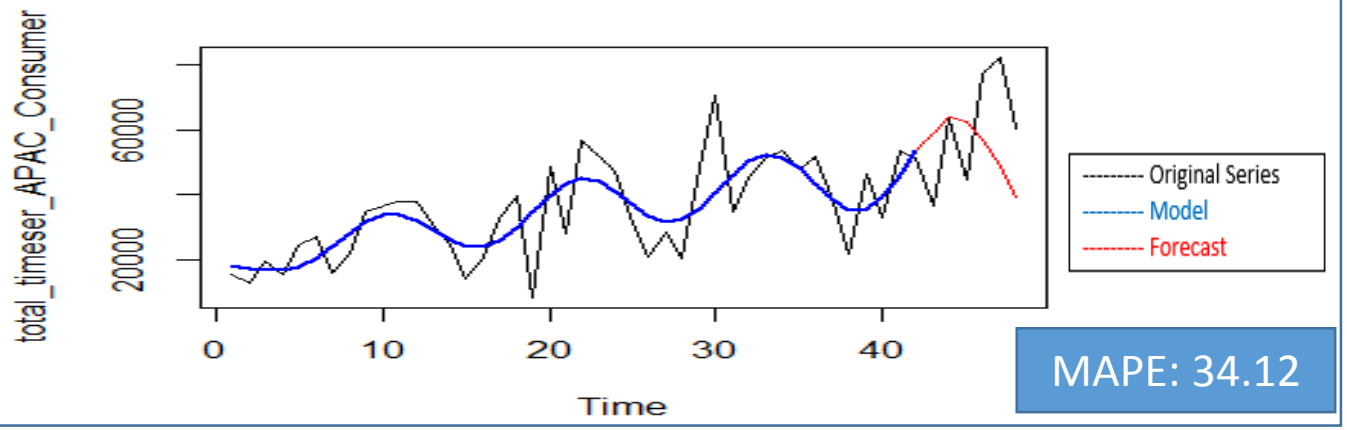
- Demand and Sales forecast models for:
  - EU Consumer Segment
  - APAC Consumer Segment

Sales Forecasting – APAC Consumer Segment

Results

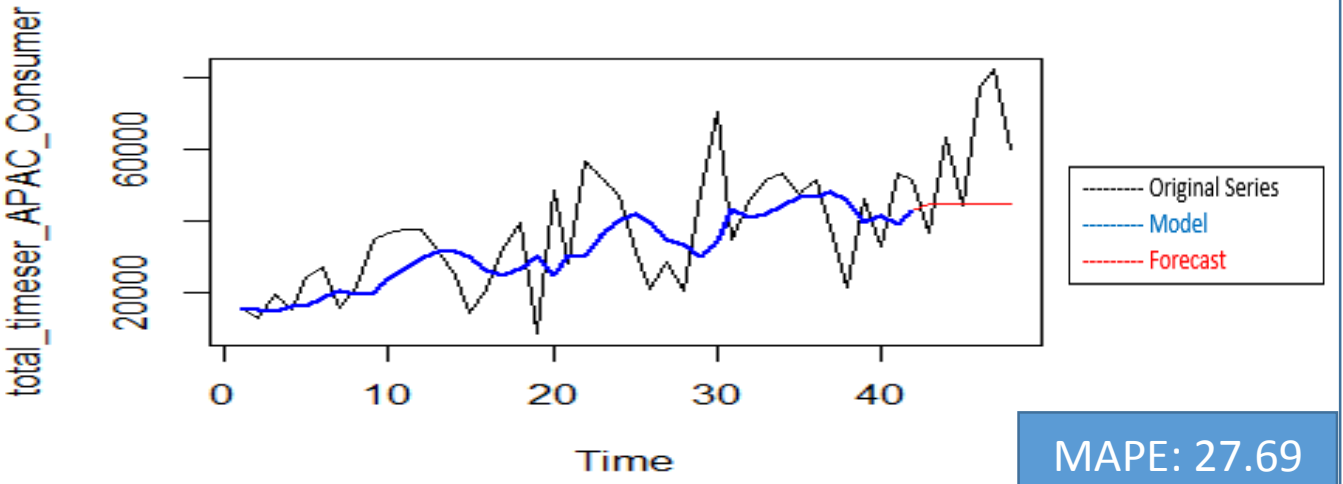
- Classical Decomposition Model is able to forecast sales **better** than Auto ARIMA model
- Auto ARIMA model have lower MAPE than Classical Decomposition model.

Classical Decomposition



MAPE: 34.12

Auto ARIMA



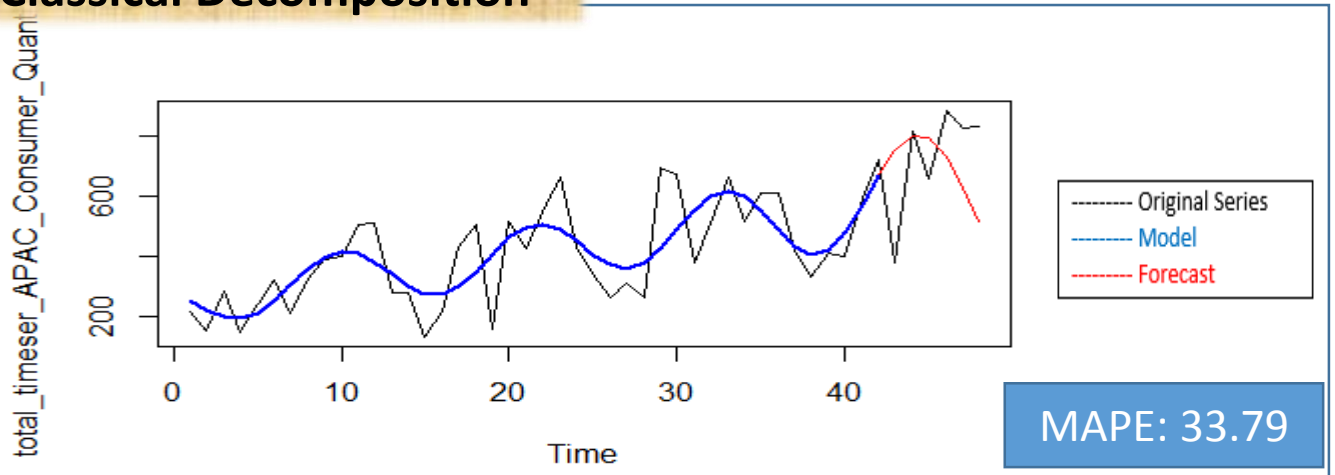
MAPE: 27.69

Demand Forecasting – APAC Consumer Segment

Results

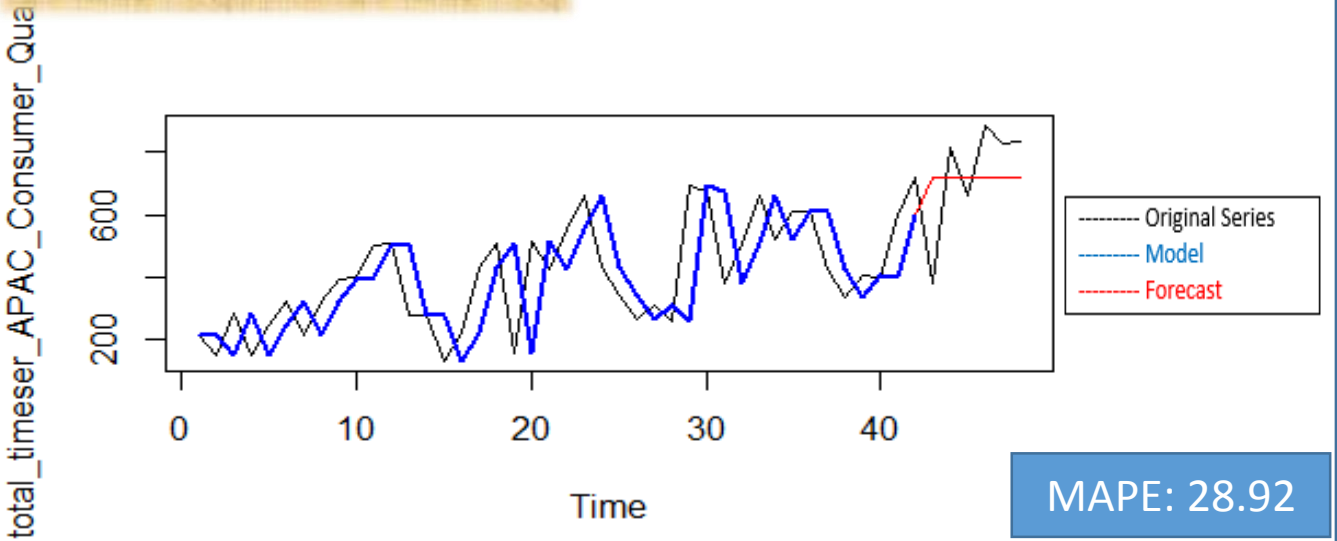
- Both Models are visually similar
- Auto ARIMA model have lower MAPE than Classical Decomposition model.

Classical Decomposition



MAPE: 33.79

Auto ARIMA



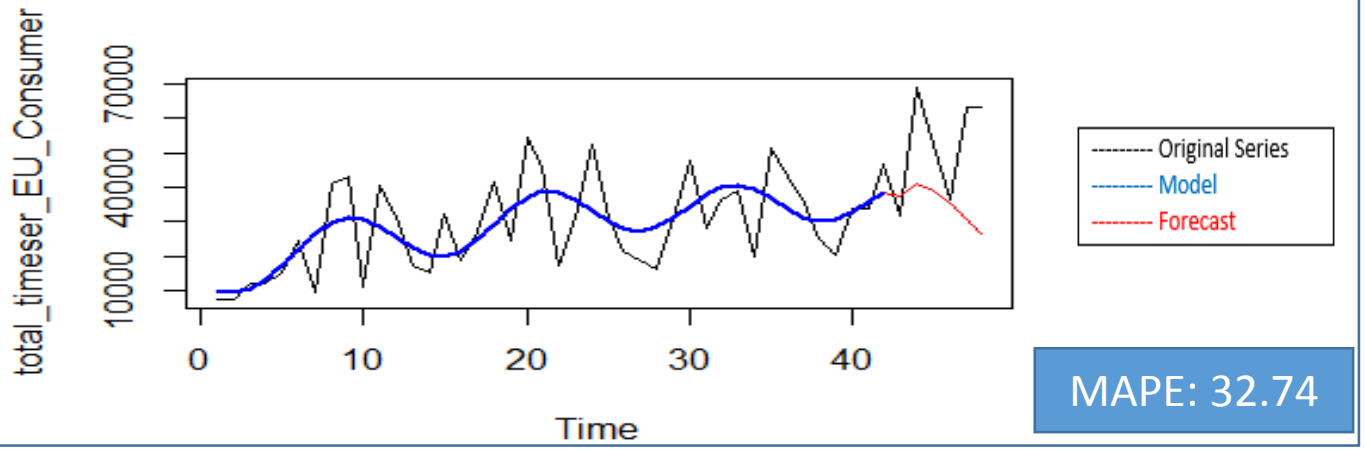
MAPE: 28.92

Sales Forecasting – EU Consumer Segment

Results

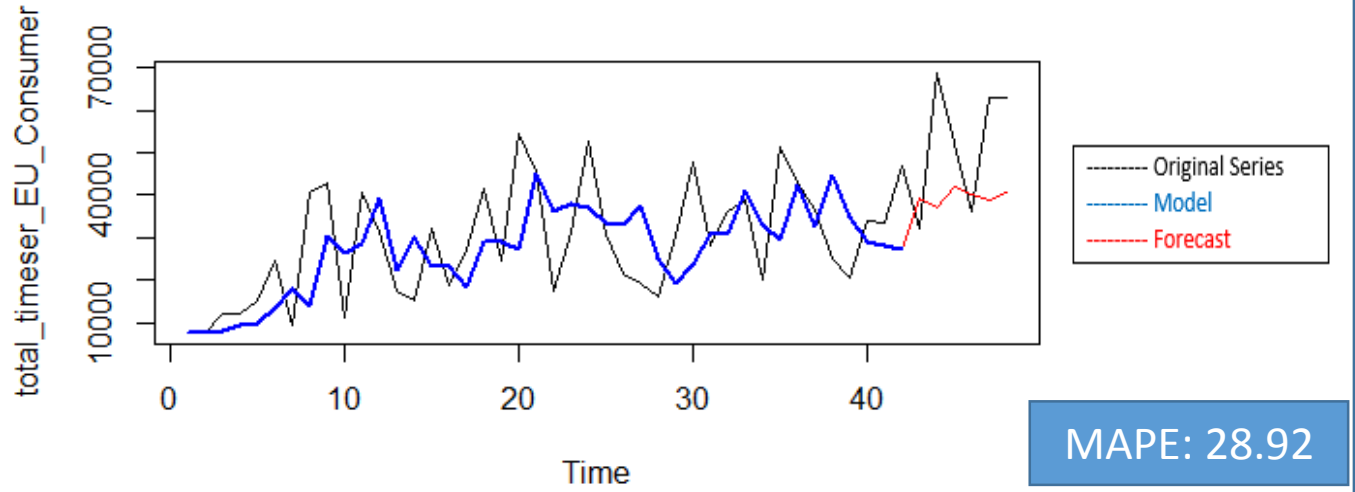
- Both models looks visually similar
- Auto ARIMA model have lower MAPE than Classical Decomposition model.

Classical Decomposition



MAPE: 32.74

Auto ARIMA



MAPE: 28.92

Demand Forecasting – EU Consumer Segment

Results

- Classical Decomposition Model is able to forecast sales **better** than Auto ARIMA model
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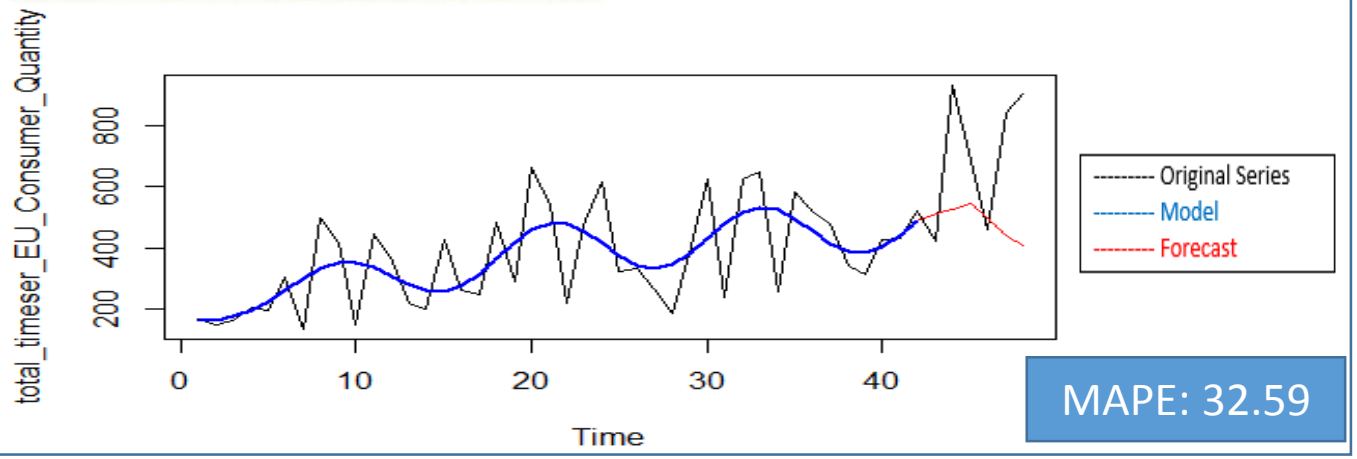
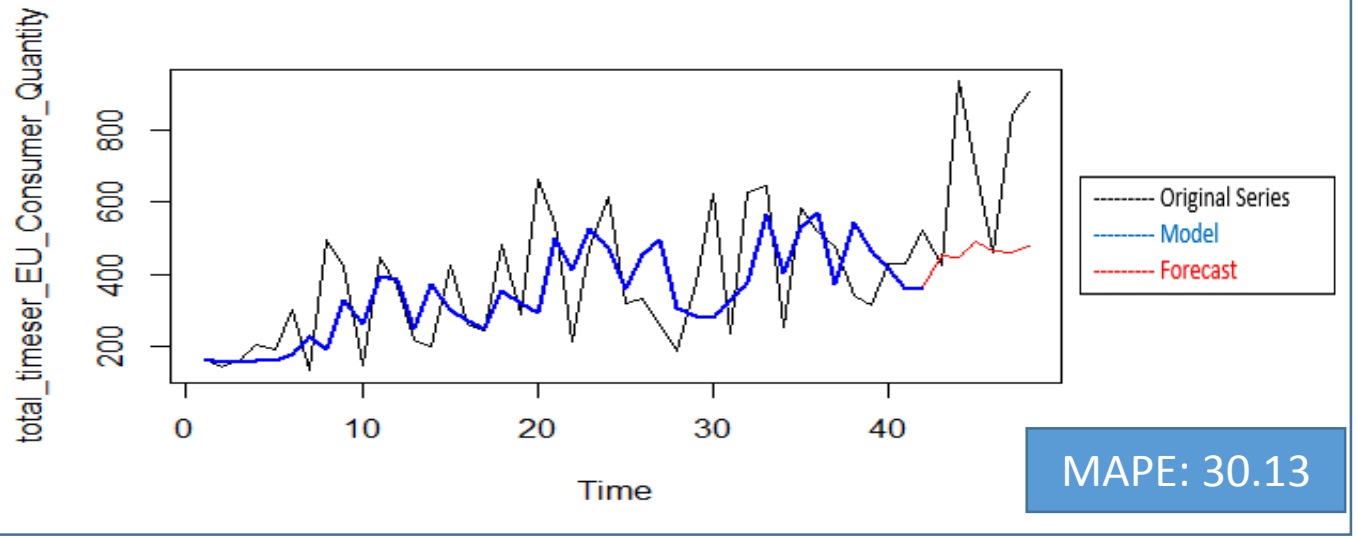
Classical Decomposition



MAPE: 32.59

Auto ARIMA



MAPE: 30.13

Recommendations:

- **Most Profitable Segments:**
  - APAC Consumer Segment
  - EU Consumer Segment

  These Markets and Segments should have more stocks than others.
- **Demand & Sales Forecasting**
  - ARIMA models should be used for forecasting as the MAPE of Auto-ARIMA model is lower than Classical decomposition model in all 4 forecasts.
  - MAPE values are high (>25%) and hence the models are not very accurate.
  - High buffer levels should be maintained to models have low accuracy.


Thank You