THE WALK-IN FORECAST

## LET'S PREDICT... LET'S FORECAST...!!!

INTRODUCTION

Given is a daily walk-in data of a medical store from second quarter of year 2015 to the first quarter of year 2019. The task is to forecast or predict the number of walk-in patients in the first week on April 2019 each day. By using forecasting methods like Moving Average, Naïve Byes Classifier, ARIMA and Holt-Winters, we will plot the forecast, determine error statistics, plot seasonality, trend and residuals.

DESCRIPTIVE ANALYSIS AND GRAPHICAL SUMMARY

Variable	Observations	Missing data	Minimum	Maximum	Mean	Std. deviation
Number of patients	1461	0	16	97	46.72	12.91

FORECAST GRAPH
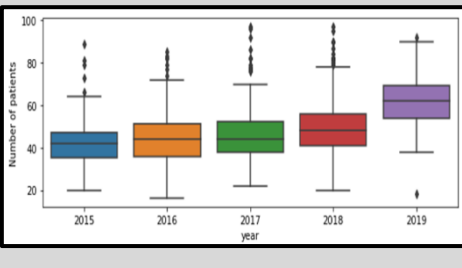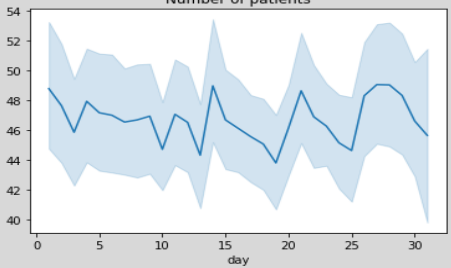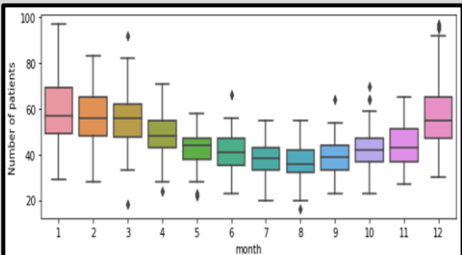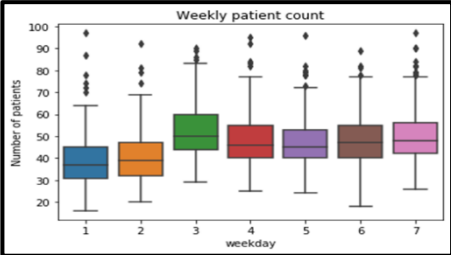
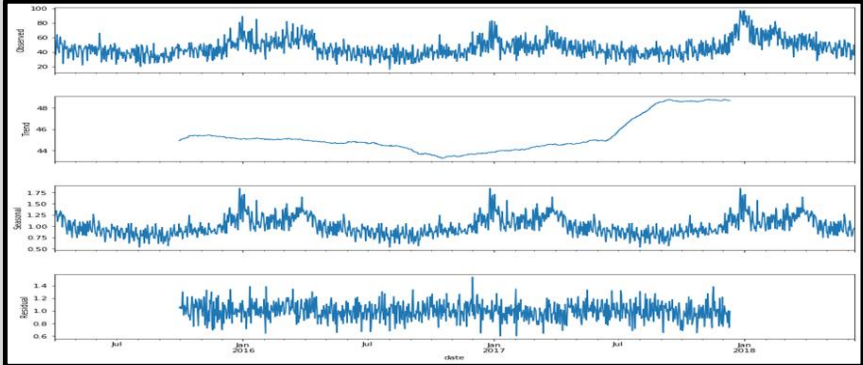### TIME AND DECOMPOSITION PLOT
(Trend, seasonality and Residual plots)

General time plot, day wise plot, month wise plot, weekday wise time plot and yearly plot have been displayed to determine walk-in of patients.
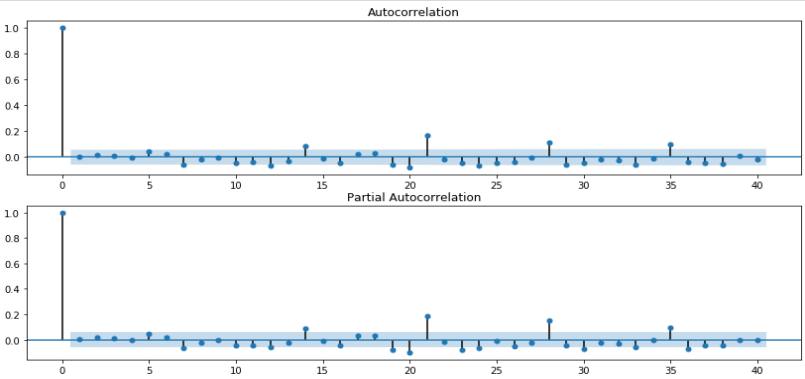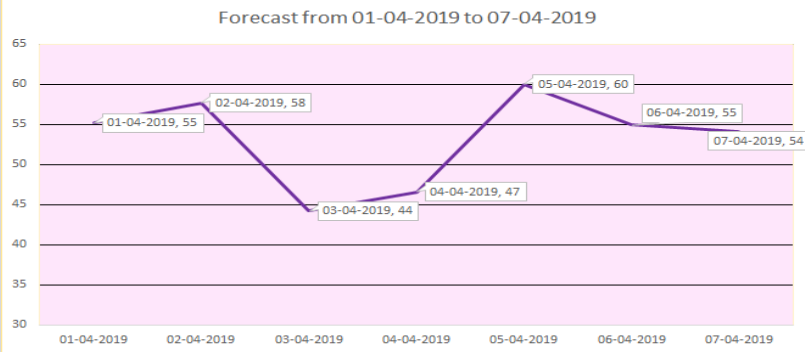

FORECAST GRAPH

01-04-2019	------->55
02-04-2019	------->58
03-04-2019	------->44
04-04-2019	------->47
05-04-2019	------->60
06-04-2019	------->55
07-04-2019	------->54

SUMMARY OF FORECAST

By applying the formula:
Forecast = Seasonality Index * Trend Component
We have used methods like Moving Average and double moving average of order 7. We have also used forecasting methods like Baseline (Naïve Classifier), extrapolation (Holtz Winter), ARIMA and autocorrelation.

FORECASTING METHODS

ARIMA FORECASTING MODEL


```
                    ARIMA Model Results
=================================================================
Dep. Variable:      D.Number of patients   No. Observations:      1167
Model:                    ARIMA(7, 1, 1)   Log Likelihood     -4166.852
Method:                          css-mle   S.D. of innovations    8.592
Date:               Thu, 09 Apr 2020       AIC                 8353.704
Time:                        11:29:55      BIC                 8404.326
Sample:                     04-02-2015     HQIC                8372.799
                          - 06-11-2018
-----------------------------------------------------------------
                             Roots
=================================================================
              Real        Imaginary      Modulus     Frequency
-----------------------------------------------------------------
AR.1         0.7338       -0.9132j        1.1715       -0.1423
AR.2         0.7338       +0.9132j        1.1715        0.1423
AR.3        -0.2628       -1.0970j        1.1280       -0.2874
AR.4        -0.2628       +1.0970j        1.1280        0.2874
AR.5        -1.0746       -0.6025j        1.2320       -0.4187
AR.6        -1.0746       +0.6025j        1.2320        0.4187
AR.7        -1.2385       -0.0000j        1.2385       -0.5000
MA.1        -1.4111       +0.0000j        1.4111        0.5000
-----------------------------------------------------------------
```
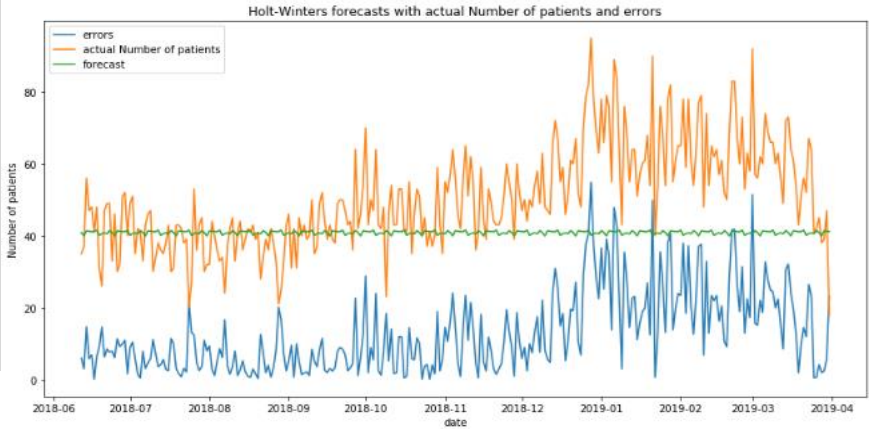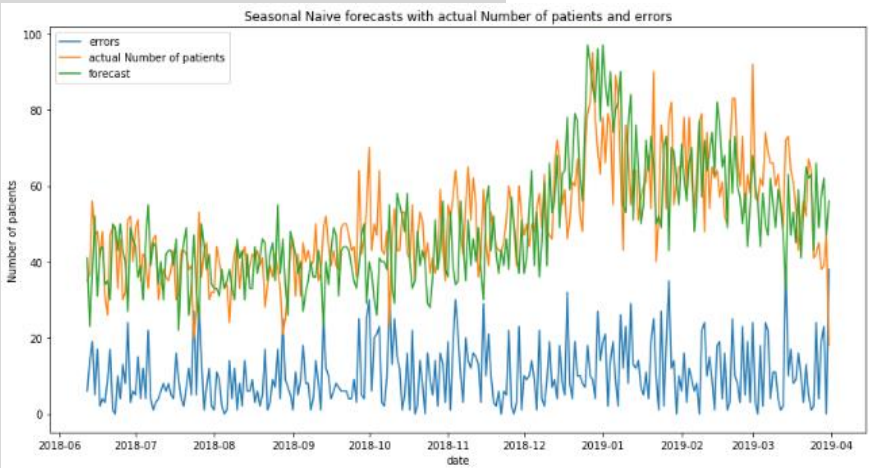
ERROR ANALYSIS OF FORECASTING METHODS USED

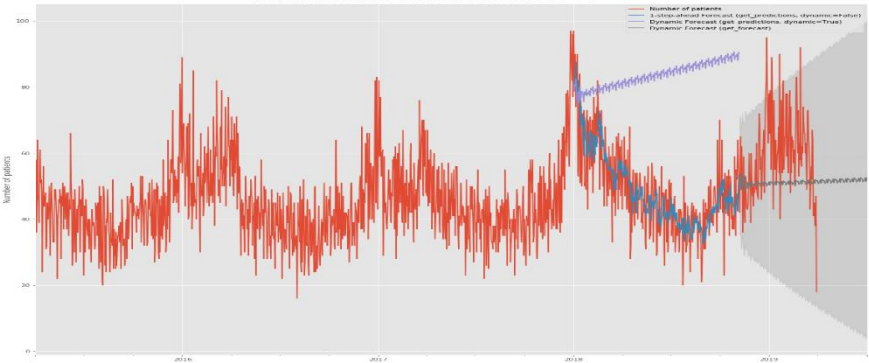|	MODEL	ARIMA	NAÏVE CLASSIFIER	Holt Winters
ERROR				
MSE		145.11	173.9761	294.4656
MAE		23.88	10.34	12.9
RMSE		12.04616121	13.19	17.16
MAPE		22.49	20.43	25.49

CONCLUSION AND RECOMMENDATION

We considered three time series models for forecasting the time series. Since ARIMA or SARIMA model fits in better as it has less value of Mean Square Error and Root Mean Square Error. Thus, for better results ARIMA model or Naïve Classifier Model can be recommended.

Please Note: For better view, please zoom the poster to 300%.

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