

DSC5211C Workshop 2

Introduction to Smoothing Forecasting Methods

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A) Us Exponential Smoothing (in its several models) to analyse the time series on monthly motor vehicle population by vehicle type in Singapore. Comment on the quality of the different models.

1. Data selected:
Monthly Singapore taxi population data from 2012 January to 2018 February
2. Model selection and parameter setting

We tried 0.1, 0.3 and 0.05 for the parameters, below are the optimal values found:

Simple exponential smoothing

$$\alpha = 0.05$$

Holt – exponential smoothing

$$\alpha = 0.05 \quad \gamma = 0.05$$

Holt – winters exponential smoothing

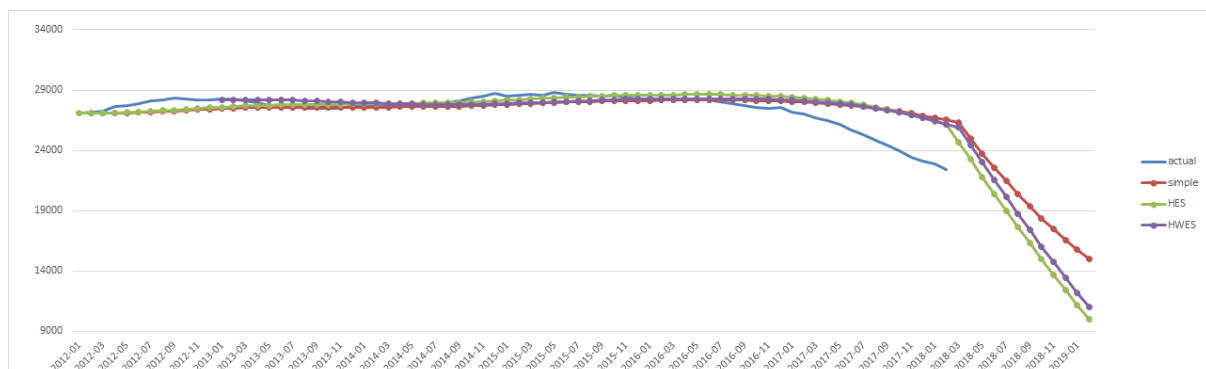
$$\alpha = 0.05 \quad \gamma = 0.05 \quad \delta = 0.05$$

α is the weight to latest observation

δ is the rate we smooth the seasonality

γ is the weight to latest growth, rate we smooth the change between the latest 2 periods

3. Model result comparison



Before 2016 September, the 3 models results are closer to the actual values, as the data is relatively consistent. After 2016 September, the population started declining, but there is a smoother change shown in the 3 model results.

Simple exponential smoothing

MAPE	3.20
MAD	823.12
MSD	1,626,050.46

Holt – exponential smoothing

MAPE	3.11
MAD	799.39
MSD	1,562,375.56

Holt – winters exponential smoothing

MAPE	3.25
MAD	827.49
MSD	1,684,251.62

A) Provide forecasts for March/2018 to February/2019. Comment on your results and on the quality of your forecasts.

Found from the above graph, when we do the forecast for 12 months, there is a more significant drop in the predicted population for all 3 models. Holt- exponential smoothing performs the best based on the 3 measures. Potential reason could be there is no seasonality of our data, as it might be controlled by the government.