SNS College of Technology

Coimbatore - 35

19BAZ782 – Analytics for Everyone

Unit IV – Predictive Analytics I

Topic...Guess...???

Presented by

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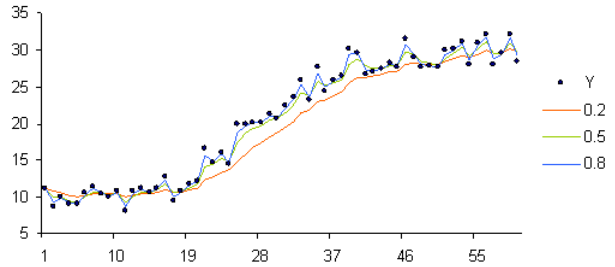
1st Indian Institution to Implement Design Thinking Curriculum

Redesigning Common Mind and Business Towards Excellence

Recall

- Forecasting
- Additive Model
- Multiplicative Model
- Time series technique
- Errors in regression

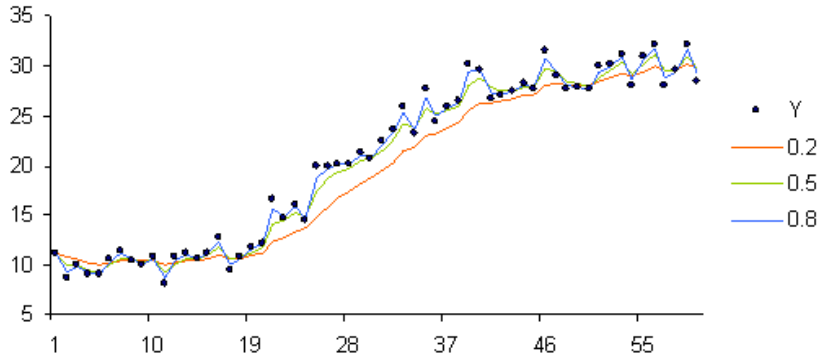
Guess the topic...???



Smoothing in Analytics

Concept

- 1950s – One of the successful model
- Works on weight model
- Suitable for no clear trend or seasonal pattern
- Types: Single, Double and Triple

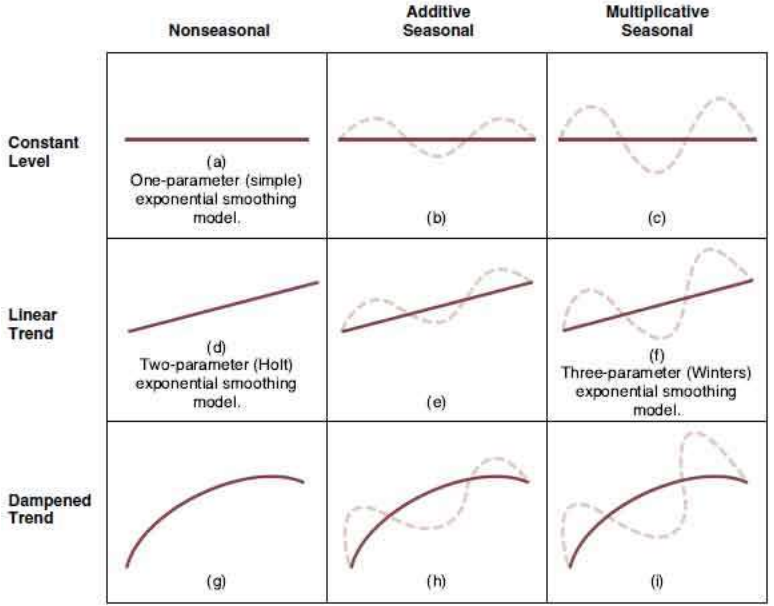


Concept...

- Single Exponential Smoothing
  - *Alpha [Smoothing Factor or Smoothing Coefficient]*
  - *Alpha: 0 to 1 [Past data – Recent data]*
- Double Exponential Smoothing
  - *Extended Version – Influenced by Trend*
  - *Alpha & Beta [Additional Smoothing factor]*
  - *Additive Trend: Double Exponential Smoothing with a linear trend*
  - *Multiplicative Trend: Double Exponential Smoothing with an exponential trend*

Concept...

- Triple Exponential Smoothing
  - *Seasonality*
  - *Also called as Hot Winter Exponential Smoothing*
  - *Gamma: Influence of Seasonal component*
  - *Additive Trend: Triple Exponential Smoothing with a linear trend*
  - *Multiplicative Trend: Triple Exponential Smoothing with an exponential trend*



Single ES

$$F_{t+1} = F_t + \alpha(A_t - F_t)$$

F_{t+1} = Forecast value for time $t+1$

A_t = Actual value at time t

ά = Smoothing constant

Need initial forecast F_t to start.

Example

Week	Demand
1	820
2	775
3	680
4	655
5	750
6	802
7	798
8	689
9	775
10	

Given the weekly demand data what are the exponential smoothing forecasts for periods 2-10 using α=0.10?

Assume $F_1=D_1$

Solution

$$F_{t+1} = F_t + \alpha(A_t - F_t)$$

Week	Demand	*0.1*	*0.6*
1	820	820.00	820.00
2	775	820.00	820.00
3	680	815.50	793.00
4	655	801.95	725.20
5	750	787.26	683.08
6	802	783.53	723.23
7	798	785.38	770.49
8	689	786.64	787.00
9	775	776.88	728.20
10		776.69	756.28

=820+.1(820–820)

=820

Summary

- Exponential Smoothing
- Concepts and its types
- Problem on Single Exponential Smoothing

Reference

- https://machinelearningmastery.com/exponential-smoothing-for-time-series-forecasting-in-python/
- https://www.statisticshowto.com/exponential-smoothing/

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