Transition Discard Rate: Adaptive Alpha Methodology

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Adaptive Alpha

Pros / Cons

• Forecasting Model: Data Driven
• Initialization Method: No need to choose Alpha
  – Seed Rate and Alpha = 1
• Alpha is adjusted by prediction error
  – Alpha increases when error is high (rapidly changing or systematic under/over forecasting)
  – Alpha decreases when error is low (slowly changing)

\[ TR_i = \alpha \cdot SR + (1 - \alpha) \cdot \frac{\sum_{i=0}^{I} d_i}{\sum_{i=0}^{I} kall_i}, \quad I = 1 \text{ to } I_{\max} \]

Where
- \( TR \) is the transition rate
- \( I \) is the number of observations
- \( \alpha \) is the exponential weight
- \( SR \) is the seed rate
- \( i \) is an observation
- \( d \) is the observed discard
- \( kall \) is the observed kept-all
- \( I_{\max} \) is the maximum number of observations
Adaptive Alpha: Observed YT

Cumulative Discard Ratio

I: Observations
Adaptive Alpha

- Error\(_i\) = (Current Cumulative Ratio – Forecasted Cumulative Ratio)

- SAD\(_i\) = Exponentially weighted error
  \[= \beta \times \text{Error}_i + (1 - \beta) \times \text{SAD}_{i-1}\] (where \(\beta = 0.2\))

- MAD\(_i\) = Exponentially weighted absolute error
  \[= \beta \times |\text{Error}_i| + (1 - \beta) \times \text{MAD}_{i-1}\] (where \(\beta = 0.2\))

- Alpha\(_i\) = \(|\text{SAD}_i / \text{MAD}_i|\)

- Forecast Cumulative Ratio\(_{i+1}\) = Forecast Cumulative Ratio\(_i\) + Alpha\(_i\) * Error\(_i\)
Adaptive Alpha: Observed YT
Adaptive Alpha Behavior

Cumulative Discards

Adaptive Alpha