One Step Forecasting Model

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Abstract

In this research investigation, the author presents tow Models of One Step Forecasting.

Theory

The author presents below two models of forecasting:

Given

$$Y_n = \{y_1, y_2, ..., y_n\}$$

$$Y_{(k+1),n} = \{y_k, y_{(k+1)}, ..., y_n\}$$

$$Y_{1,(n-k)} = \{y_1, y_2, ..., y_{(n-k-1)}, y_{(n-k)}\}$$

$${}^{j}Y_{1,(n-k)} = j^{th}\ arrangement\ of\ Y_{1,(n-k)}\ among\ the\ (n-k)!\ arrangements$$

$$Cosine Similarity\left(Y_{(k+1),n}, {}^{j}Y_{1,(n-k)}\right) = Dot\ Product\left(Y_{(k+1),n}, {}^{j}Y_{1,(n-k)}\right)$$

Model 1

$$y_{n+1} = \sum_{k=0}^{n-1} \alpha_{n-k} y_{n-k}$$

$$\alpha_{n-k} = \frac{Cosine Similarity\left(Y_{(k+1),n}, Y_{1,(n-k)}\right)}{\left\{\sum_{k=0}^{n-1} \left\{Cosine Similarity\left(Y_{(k+1),n}, Y_{1,(n-k)}\right)\right\}^2\right\}^{1/2}}$$

Model 2

$$y_{n+1} = \sum_{k=0}^{n-1} {}^{j}\alpha_{n-k} y_{n-k}$$

$${}^{j}\alpha_{n-k} = \frac{Cosine Similarity\left(Y_{(k+1),n}, {}^{j}Y_{1,(n-k)}\right)}{\left\{\sum_{j=1}^{(n-k)!} \sum_{k=0}^{n-1} \left\{Cosine Similarity\left(Y_{(k+1),n}, {}^{j}Y_{1,(n-k)}\right)\right\}^2\right\}^{1/2}}$$

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