Universal Forecasting Scheme

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Abstract

In this research investigation, the author has detailed a novel method of forecasting.

Theory

Firstly, we define the definitions of Similarity and Dissimilarity using author's [1] as follows:
Given any two real numbers a and b, their Similarity is given by

$$Similarity(a,b) = \begin{matrix} a^2 \text{ if } a<b \\ b^2 \text{ if } b<a \end{matrix}$$

and their Dissimilarity is given by

$$Dissimilarity(a,b) = \begin{matrix} ab-a^2 \text{ if } a<b \\ ab-b^2 \text{ if } b<a \end{matrix}$$

Given any time series or non-time series sequence of the kind

$$S=\{y_1, y_2, y_3, ..., y_{n-1}, y_n\}$$

We can now write y_{n+1} as

$y_{(n+1)} = y_{(n+1)S} + y_{(n+1)DS}$ where

$$y_{(n+1)S} = \sum_{i=1}^{n} y_i \left\{ \frac{\displaystyle\sum_{\substack{j=1 \\ j\neq i}}^{n} \left(\frac{Total\ Exhaustive\ Similarity(y_i, y_j)}{Total\ Exhaustive\ Similarity(y_i, y_j) + Total\ Exhaustive\ Dissimilarity(y_i, y_j)} \right)}{\displaystyle\sum_{r=1}^{n} \sum_{\substack{j=1 \\ j\neq i}}^{n} \left(\frac{Total\ Exhaustive\ Similarity(y_r, y_j)}{Total\ Exhaustive\ Similarity(y_r, y_j) + Total\ Exhaustive\ Dissimilarity(y_r, y_j)} \right)} \right\}$$

and

$$y_{(n+1)DS} = \sum_{i=1}^{n} y_i \left\{ \frac{\displaystyle\sum_{\substack{j=1 \\ j\neq i}}^{n} \left(\frac{Total\ Exhaustive\ Dissimilarity(y_i, y_j)}{Total\ Exhaustive\ Similarity(y_i, y_j) + Total\ Exhaustive\ Dissimilarity(y_i, y_j)} \right)}{\displaystyle\sum_{r=1}^{n} \sum_{\substack{j=1 \\ j\neq i}}^{n} \left(\frac{Total\ Exhaustive\ Dissimilarity(y_r, y_j)}{Total\ Exhaustive\ Similarity(y_r, y_j) + Total\ Exhaustive\ Dissimilarity(y_r, y_j)} \right)} \right\}$$

The definitions of Total Exhaustive Similarity and Total Exhaustive Dissimilarity are detailed as follows:

$$Total\ Exhaustive\ Similarity\left(y_i, y_j\right) = Similarity\left(y_i, y_j\right) + Similarity\left(S_1, S_2\right) +$$
$$Similarity\left(S_3, S_4\right) + Similarity\left(S_4, S_5\right) + ... + Similarity\left(S_k, S_{k+1}\right)\ till\ S_k = S_{k+1}$$
$$where\ S_1 = \left\{Smaller\left(y_i, y_j\right)\right\}\ and\ S_2 = \left\{Larger\left(y_i, y_j\right) - Smaller\left(y_i, y_j\right)\right\}$$
$$where\ S_3 = \left\{Smaller\left(S_1, S_2\right)\right\}\ and\ S_4 = \left\{Larger\left(S_1, S_2\right) - Smaller\left(S_1, S_2\right)\right\}$$
$$where\ S_4 = \left\{Smaller\left(S_3, S_4\right)\right\}\ and\ S_5 = \left\{Larger\left(S_3, S_4\right) - Smaller\left(S_3, S_4\right)\right\}$$

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and so on so forth.

$$Total\ Exhaustive\ Dissimilarity\left(y_i, y_j\right) = Dissimilarity\left(y_i, y_j\right) + Dissimilarity\left(S_1, S_2\right) +$$
$$Dissimilarity\left(S_3, S_4\right) + Dissimilarity\left(S_4, S_5\right) + ... + Dissimilarity\left(S_k, S_{k+1}\right)\ till\ S_k = S_{k+1}$$
$$where\ S_1 = \left\{Smaller\left(y_i, y_j\right)\right\}\ and\ S_2 = \left\{Larger\left(y_i, y_j\right) - Smaller\left(y_i, y_j\right)\right\}$$
$$where\ S_3 = \left\{Smaller\left(S_1, S_2\right)\right\}\ and\ S_4 = \left\{Larger\left(S_1, S_2\right) - Smaller\left(S_1, S_2\right)\right\}$$
$$where\ S_4 = \left\{Smaller\left(S_3, S_4\right)\right\}\ and\ S_5 = \left\{Larger\left(S_3, S_4\right) - Smaller\left(S_3, S_4\right)\right\}$$

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and so on so forth.

Similarly, we can write the Total Exhaustive Similarity and Total Exhaustive Dissimilarity for $\left(y_r, y_j\right)$

References

1. http://vixra.org/author/ramesh_chandra_bagadi