Universal Forecasting Scheme {Version 3}

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

INTRODUCTION

The best known methodology of Forecasting is that of Time Series Forecasting. A lot of literature is available in this domain.

THEORY (AUTHOR'S FORECASTING MODEL)

Firstly, we define the definitions of Similarity and Dissimilarity as follows:
Given any two real numbers a and b, their Similarity is given by

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

and their Dissimilarity is given by

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

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

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

and

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

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

$$Total\ Exhaustive\ Similarity(y_i, y_j) =$$
$$Similarity(y_i, y_j) + Similarity(S_1, S_2) +$$
$$Similarity(S_3, S_4) + Similarity(S_4, S_5) +$$
$$....... + Similarity(S_k, S_{k+1})\ till$$
$$Smaller(S_k, S_{k+1}) = 0$$
$$for\ some\ k$$
$$where\ S_1 = \{Smaller(y_i, y_j)\}\ and$$
$$S_2 = \{Larger(y_i, y_j) - Smaller(y_i, y_j)\}$$
$$where\ S_3 = \{Smaller(S_1, S_2)\}\ and$$
$$S_4 = \{Larger(S_1, S_2) - Smaller(S_1, S_2)\}$$
$$where\ S_4 = \{Smaller(S_3, S_4)\}\ and$$
$$S_5 = \{Larger(S_3, S_4) - Smaller(S_3, S_4)\}$$

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$$and\ so\ on\ so\ forth$$
$$where\ S_k = \{Smaller(S_{k-1}, S_k)\}\ and$$
$$S_{k+1} = \{Larger(S_{k-1}, S_k) - Smaller(S_{k-1}, S_k)\}$$

Similarly, we write

$$Total\ Exhaustive\ Dissimilarity\left(y_i, y_j\right) =$$
$$Dissimilarity\left(y_i, y_j\right) + Dissimilarity\left(S_1, S_2\right) +$$
$$Dissimilarity\left(S_3, S_4\right) + Dissimilarity\left(S_4, S_5\right) +$$
$$....... + Dissimilarity\left(S_k, S_{k+1}\right)\ till$$
$$Smaller\left(S_l, S_{l+1}\right) = 0$$
$$for\ some\ l$$
$$where\ S_1 = \left\{Smaller\left(y_i, y_j\right)\right\}\ and$$
$$S_2 = \left\{L\arg er\left(y_i, y_j\right) - Smaller\left(y_i, y_j\right)\right\}$$
$$where\ S_3 = \left\{Smaller\left(S_1, S_2\right)\right\}\ and$$
$$S_4 = \left\{L\arg er\left(S_1, S_2\right) - Smaller\left(S_1, S_2\right)\right\}$$
$$where\ S_4 = \left\{Smaller\left(S_3, S_4\right)\right\}\ and$$
$$S_5 = \left\{L\arg er\left(S_3, S_4\right) - Smaller\left(S_3, S_4\right)\right\}$$

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$$and\ so\ on\ so\ forth$$

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

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