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

\[
\text{Similarity}(a,b) = \begin{cases} a^2 & \text{if } a < b \\ b^2 & \text{if } b < a \end{cases}
\]

and their Dissimilarity is given by

\[
\text{Dissimilarity}(a,b) = \begin{cases} ab - a^2 & \text{if } a < b \\ ab - b^2 & \text{if } b < a \end{cases}
\]

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

\[
S = \{y_1, y_2, y_3, \ldots, y_{n-1}, y_n\}
\]

We can now write \( y_{n+1} \) as

\[
y_{(n+1)} = y_{(n+1)S} + y_{(n+1)DS}
\]

where

\[
y_{(n+1)S} = \left\{ \begin{array}{cc}
\sum_{i=1}^{n} \frac{\text{Total Exhaustive Similarity}(y_i, y_{i+1})}{\text{Total Exhaustive Similarity}(y_i, y_{i+1}) + \text{Total Exhaustive Dissimilarity}(y_i, y_{i+1})} \\
\sum_{i=1}^{n} \frac{\text{Total Exhaustive Similarity}(y_{n+i}, y_j)}{\text{Total Exhaustive Similarity}(y_{n+i}, y_j) + \text{Total Exhaustive Dissimilarity}(y_{n+i}, y_j)}
\end{array} \right.
\]

and

\[
y_{(n+1)DS} = \left\{ \begin{array}{cc}
\sum_{i=1}^{n} \frac{\text{Total Exhaustive Similarity}(y_i, y_{i+1})}{\text{Total Exhaustive Similarity}(y_i, y_{i+1}) + \text{Total Exhaustive Dissimilarity}(y_i, y_{i+1})} \\
\sum_{i=1}^{n} \frac{\text{Total Exhaustive Similarity}(y_{n+i}, y_j)}{\text{Total Exhaustive Similarity}(y_{n+i}, y_j) + \text{Total Exhaustive Dissimilarity}(y_{n+i}, y_j)}
\end{array} \right.
\]

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

\[
\text{Total Exhaustive Similarity}(y_i, y_j) = \\
\text{Similarity}(y_i, y_j) + \text{Similarity}(S_1, S_2) + \\
\text{Similarity}(S_3, S_4) + \text{Similarity}(S_4, S_5) + \\
\ldots + \text{Similarity}(S_{k-1}, S_k)
\]

where

\[
S_1 = \{\text{Smaller}(y_1, y_2)\}
\]

and

\[
S_2 = \{\text{Larger}(y_1, y_2) - \text{Smaller}(y_1, y_2)\}
\]

and so on so forth

where

\[
S_k = \{\text{Smaller}(y_{k-1}, y_k)\}
\]

and

\[
S_{k+1} = \{\text{Larger}(y_{k-1}, y_k) - \text{Smaller}(y_{k-1}, y_k)\}
\]
Similarly, we write

\[
\text{Total Exhaustive Dissimilarity}(y_i, y_j) = \\
\text{Dissimilarity}(y_i, y_j) + \text{Dissimilarity}(S_1, S_2) + \\
\text{Dissimilarity}(S_3, S_4) + \text{Dissimilarity}(S_5, S_6) + \\
\ldots + \text{Dissimilarity}(S_{k-l}, S_{k+1}) \text{ till} \\
\text{Smaller}(S_i, S_{i+1}) = 0
\]

for some \( l \)

where \( S_1 = \{\text{Smaller}(y_i, y_j)\} \) and
\( S_2 = \{\text{Larger}(y_i, y_j) - \text{Smaller}(y_i, y_j)\} \)

where \( S_3 = \{\text{Smaller}(S_1, S_2)\} \) and
\( S_4 = \{\text{Larger}(S_1, S_2) - \text{Smaller}(S_1, S_2)\} \)

where \( S_5 = \{\text{Smaller}(S_3, S_4)\} \) and
\( S_6 = \{\text{Larger}(S_3, S_4) - \text{Smaller}(S_3, S_4)\} \)


\[
\begin{align*}
\vdots
\end{align*}
\]

\[
\begin{align*}
\vdots
\end{align*}
\]

\[
\begin{align*}
\vdots
\end{align*}
\]

\[
\begin{align*}
\vdots
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\]

\[
\begin{align*}
\vdots
\end{align*}
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\[
\begin{align*}
\vdots
\end{align*}
\]

...and so on so forth

Similarly, we can write the Total Exhaustive Similarity and Total Exhaustive Dissimilarity for \((y_i, y_j)\)

REFERENCES


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