Universal Future Average Of A Time Series Type Sequence

Author: Ramesh Chandra Bagadi, *FIE, CEng(India)*
Affiliation 1: Associate Professor & Head, Department Of Civil Engineering,
Sanketika Vidya Parishad Engineering College, Visakhapatnam-41, India
Email: rameshcbagadi@uwalumni.com
Tel: +91-9440032711

ABSTRACT

In this research investigation, the author has detailed a novel Future Average of a Time Series Type Sequence.

INTRODUCTION

A lot of literature is available in the domain of Future Averages. The reader can refer to the types of Future Averages dealt in the subject of Time Series Analysis.

THEORY (AUTHOR'S FUTURE AVERAGE OF A TIME SERIES TYPE SEQUENCE 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

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

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 the Future Average of the Time Series Type Sequence S, i.e., 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:

$$Total\ Exhaustive\ Similarity(y_i, y_j) = Similarity(y_i, y_j) + Similarity(S_1, S_2) + Similarity(S_3, S_4) + Similarity(S_4, S_5) + \ldots\ldots + Similarity(S_k, S_{k+1})\ till$$

$$Smaller(S_k, S_{k+1}) = 0$$

$$for\ some\ k$$

$$where\ S_1 = \{Smaller(y_i, y_j)\}\ and$$
$$S_2 = \{Larger(y_i, y_j) - Smaller(y_i, y_j)\}$$
$$where\ S_3 = \{Smaller(S_1, S_2)\}\ and$$
$$S_4 = \{Larger(S_1, S_2) - Smaller(S_1, S_2)\}$$
$$where\ S_4 = \{Smaller(S_3, S_4)\}\ and$$
$$S_5 = \{Larger(S_3, S_4) - Smaller(S_3, S_4)\}$$

....

....

....

....

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

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

Similarly, we write

$$Total\ Exhaustive\ Dissimilarity(y_i, y_j) = Dissimilarity(y_i, y_j) + Dissimilarity(S_1, S_2) + Dissimilarity(S_3, S_4) + Dissimilarity(S_4, S_5) + \ldots\ldots + Dissimilarity(S_k, S_{k+1})\ till$$

$$Smaller(S_l, S_{l+1}) = 0$$

$$for\ some\ l$$

$$where\ S_1 = \{Smaller(y_i, y_j)\}\ and$$
$$S_2 = \{Larger(y_i, y_j) - Smaller(y_i, y_j)\}$$
$$where\ S_3 = \{Smaller(S_1, S_2)\}\ and$$
$$S_4 = \{Larger(S_1, S_2) - Smaller(S_1, S_2)\}$$
$$where\ S_4 = \{Smaller(S_3, S_4)\}\ and$$
$$S_5 = \{Larger(S_3, S_4) - Smaller(S_3, S_4)\}$$

....

....

....

....

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

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

One can note that this notion of Future Average does not induct the Causal Nature of the Time Series Type Of Sequence.

REFERENCES

1. Ramesh Chandra Bagadi, *Universal Forecasting Scheme* http://vixra.org/abs/1803.0069
2. Ramesh Chandra Bagadi, *Universal Forecasting Scheme*, International Journal Of Innovative Research & Technology, Vol 4, Issue 11, April 2018, Pages 43-43, ISSN 2349-6002

http://ijirt.org/Article?manuscript=145722

3. Ramesh Chandra Bagadi, *Universal Forecasting Scheme {Version 2}*, International Journal Of Innovative Research & Technology, Vol 5, Issue 4, September 2018, Pages 191-193, ISSN 2349-6002 http://ijirt.org/Article?manuscript=147110
4. Ramesh Chandra Bagadi, *Universal Forecasting Scheme {Version 3}*, International Journal Of Innovative Research & Technology, Vol 5, Issue 6, September 2018, Pages 191-193, ISSN 2349-6002 http://ijirt.org/Article?manuscript=147298

ACKNOWLEDGEMENTS

The author would like to express his deepest gratitude to all the members of his Loving Family, Respectable Teachers, En-Dear-Able Friends, Inspiring Social Figures, Highly Esteemed Professors, Reverence Deserving Deities that have deeply contributed in the formation of the necessary scientific temperament and the social and personal outlook of the author that has resulted in the conception, preparation and authoring of this research manuscript document. The author pays his sincere tribute to all those dedicated and sincere folk of academia, industry and elsewhere who have sacrificed a lot of their structured leisure time and have painstakingly authored treatises on Science, Engineering, Mathematics, Art and Philosophy covering all the developments from time immemorial until then, in their supreme works. It is standing on such treasure of foundation of knowledge, aided with an iota of personal god-gifted creativity that the author bases his foray of wild excursions into the understanding of natural phenomenon and forms new premises and scientifically surmises plausible laws. The author strongly reiterates his sense of gratitude and infinite indebtedness to all such ‘Philosophical Statesmen’ that are evergreen personal librarians of Science, Art, Mathematics and Philosophy.