Interval Based in Fuzzy Sliding Window for Forecasting Crude Palm Oil Prices

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ABSTRACT

Interval is the main component in time series forecasting, hence a Fuzzy Sliding Window Forecasting Method (SWM) suggested in obtaining intervals of forecasting in the Fuzzy Time Series (FTS). Formerly, almost all the intervals were calculated using class frequency. The intervals are then regrouping into the sub-intervals using the provided category. Whereas in this study, the prediction of interval obtained by embedding the idea of SWM into FTS forecasting. The intention of this suggested method is to further improve the success of a time series forecast and indirectly increase forecasting precision. The daily prices of Crude Palm Oil (CPO) data are taken for verification purposes. Hence, the precision of the suggested method is differentiating the existing forecasting method. The outcome of this method is compared to the other methods and it reveals that the suggested method produces precise intervals determination. The discovery of this study can be used as a replacement of existing forecasting method to get an improved prediction interval.

Keywords: Forecasting, Fuzzy Time Series, Intervals, Sliding Window

INTRODUCTION

Forecasting is an expected value whereby used past and present data. Several methods are used to produce estimation values using a time series study (Ahmad, Ping and Mahamed, 2014). Forecasting has been accomplished using various kinds of techniques (Karia, Bujang and Ahmad, 2013), (Dani and Sharma, 2013) that is applied to solve the forecasting issue, where some of the concepts are adjusted from (Song and Chissom, 1993) and referred to the theory in (Khaliq and Ahmad, 2010). Three steps involve in Fuzzy theory that are fuzzification, determination of rules and fuzzy inference, and defuzzification (Asklany, et. al, 2011).

One of the interesting topics to look into time series is the Fuzzy Sliding Window Forecasting Method (SWM). SWM is introduced by (Datar, et. al, 2002), and it is used in the analysis of time series and ideal in different areas of forecasting (Ben Yahmed, et. al, 2015), (D'Arcy, et. al, 2002), (Kapoor and Bedi, 2013), (Arasu and Manku, 2004). It is evident that the SWM is appropriate in forecasting weather circumstances and the model provides an accurate and precise average forecasting (Kapoor and Bedi, 2013). The procedure of the SWM dictates a point to separate the intervals (Bingham, et. al, 2006). The study in (Rao, et. al, 2015) uses the SWM targeted on climate change and the outcome indicates higher percent accuracy of the method. The study in (Vamitha, et. al, 2012) indicated that mixed FTS with different models able to accomplish good results in forecasting. It is mention in (Dani and Sharma, 2013), SWM is an effective segmented time series forecasting model that should be brought into thought.

In the previous study, all the researchers used the limited intervals for the FTS forecasting approaches and based on expertise suggestion. The interval lengths are importance in forecasting performance and it was stated in (Huarng, 2011), where the study used mean and distribution to find the intervals. In (Huarng and Yu, 2006), researchers are recommended to use the ratios, rather than the same lengths of the interval which able to correctly identify the interval.