Fuzzy Time Series Forecasting Based on Fuzzy Logical Relationships, PSO Technique, and Automatic Clustering Algorithm

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Abstract : Forecasting model has a great impact in terms of prediction and continues to do so into the future. Although many forecasting models have been studied in recent years, most researchers focus on different forecasting methods based on fuzzy time series to solve forecasting problems. The forecasted models accuracy fully depends on the two terms that are the length of the interval in the universe of discourse and the content of the forecast rules. Moreover, a hybrid forecasting method can be an effective and efficient way to improve forecasts rather than an individual forecasting model. There are different hybrids forecasting models which combined fuzzy time series with evolutionary algorithms, but the performances are not quite satisfactory. In this paper, we proposed a hybrid forecasting model which deals with the first order as well as high order fuzzy time series and particle swarm optimization to improve the forecasted accuracy. The proposed method used the historical enrollments of the University of Alabama as dataset in the forecasting process. Firstly, we considered an automatic clustering algorithm to calculate the appropriate interval for the historical enrollments. Then particle swarm optimization and fuzzy time series are combined that shows better forecasting accuracy than other existing forecasting models.