عنوان مقاله:

An improved fuzzy time series forecasting model based on hesitant fuzzy sets

محل انتشار:

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نویسندگان:

.Lubna Shafi - Department of Mathematics and Actuarial Science, B.S. Abdur Rahman Crescent Institute of Science & Technology, Chennai, India

.Shilpi Jain - Poornima College of Engineering, University of Rajasthan, Jaipur, Rajasthan, India

.Praveen Agarwal - Department of Mathematics, Anand International College of Engineering, Jaipur, ۳۰۳۰۱۲, Rajasthan, India

.Pervaiz Iqbal - Department of Mathematics & Actuarial Science, B.S. Abdur Rahman Crescent Institute of Science & Technology, Chennai, India

Aadil Rashid Sheergojri - Department of Mathematics & Actuarial Science, B.S. Abdur Rahman Crescent Institute of Science & Technology, Chennai, .India

خلاصه مقاله:

Fuzzy Time Series Forecasting (TSF) is an approach for dealing with uncertainty in time series data that uses fuzzy logic. The Hesitant Fuzzy Set (HFS) theory better emphasizes the chances of capturing fuzziness and uncertainty due to randomness than the classic fuzzy set theory. This study aims to improve the previously identified hesitant fuzzy TSF models by including various degrees of hesitation to improve forecasting performance. The goal is to deal with the issue of identifying a common membership grade when several fuzzification methods are available to fuzzify time series data. The proposed method utilizes trapezoidal and bell-shaped fuzzy membership functions for constructing HFSs. Ahesitant fuzzy weighted averaging operator is then applied to the Hesitant Fuzzy Elements (HEFs) to create fuzzy logical relations. The suggested technique is employed to forecast enrollment in the University of Alabama and Cancer Incidence Rates (CIRs) in India. The efficiency of the proposed forecasting approach is determined by rigorously comparing it to various computational fuzzy TSF methods in terms of error measurements like Root Mean Square Error (RMSE), Average Forecasting Error (AFE), and Mean Absolute Deviation (Mad). The validity of the proposed forecasting model is verified by using correlation coefficients, coefficients of determination, Tracking Signals (TSs), and Performance Parameters (PPs). The significance of improved accuracy in forecasted results is also confirmed using the two-tailed t-test. The study results revealed that the enhanced hesitant Fuzzy Time Series (FTS) model is more effective and accurate in forecasting the .university enrolment of Alabama and the CIRs of India

کلمات کلیدی:

Fuzzy time series, Hesitant fuzzy sets, Trapezoidal and bell-shaped membership function, Cancer Incidence rates-India