**LITERATURE SURVEY**

**1) A comparative study of linear and nonlinear models for aggregate retails sales forecasting**

**AUTHORS:**  Ching Wu Chu and Guoqiang Peter Zhang

The purpose of this paper is to compare the accuracy of various linear and nonlinear models for forecasting aggregate retail sales. Because of the strong seasonal fluctuations observed in the retail sales, several traditional seasonal forecasting methods such as the time series approach and the regression approach with seasonal dummy variables and trigonometric functions are employed. The nonlinear versions of these methods are implemented via neural networks that are generalized nonlinear functional approximators. Issues of seasonal time series modeling such as deseasonalization are also investigated. Using multiple cross-validation samples, we find that the nonlinear models are able to outperform their linear counterparts in out-of-sample forecasting, and prior seasonal adjustment of the data can significantly improve forecasting performance of the neural network model. The overall best model is the neural network built on deseasonalized time series data. While seasonal dummy variables can be useful in developing effective regression models for predicting retail sales, the performance of dummy regression models may not be robust. Furthermore, trigonometric models are not useful in aggregate retail sales forecasting.

**2) Sustainable development and management in consumer electronics using soft computation**

**AUTHORS:** Wang, Haoxiang

Combination of Green supply chain management, Green product deletion decision and green cradle-to-cradle performance evaluation with Adaptive-Neuro-Fuzzy Inference System (ANFIS) to create a green system. Several factors like design process, client specification, computational intelligence and soft computing are analysed and emphasis is given on solving problems of real domain. In this paper, the consumer electronics and smart systems that produce nonlinear outputs are considered. ANFIS is used for handling these nonlinear outputs and offer sustainable development and management. This system offers decision making considering multiple objectives and optimizing multiple outputs. The system also provides efficient control performance and faster data transfer.

**3) Data Mining based Prediction of Demand in Indian Market for Refurbished Electronics**

**AUTHORS:** Suma, V., and Shavige Malleshwara Hills

There has been an increasing demand in the e-commerce market for refurbished products across India during the last decade. Despite these demands, there has been very little research done in this domain. The real-world business environment, market factors and varying customer behavior of the online market are often ignored in the conventional statistical models evaluated by existing research work. In this paper, we do an extensive analysis of the Indian e-commerce market using data-mining approach for prediction of demand of refurbished electronics. The impact of the real-world factors on the demand and the variables are also analyzed. Real-world datasets from three random e-commerce websites are considered for analysis. Data accumulation, processing and validation is carried out by means of efficient algorithms. Based on the results of this analysis, it is evident that highly accurate prediction can be made with the proposed approach despite the impacts of varying customer behavior and market factors. The results of analysis are represented graphically and can be used for further analysis of the market and launch of new products.

**4) Forecasting Monthly Sales Retail Time Series: A Case Study**

**AUTHORS:** Giuseppe Nunnari, Valeria Nunnari

This paper presents a case study concerning the forecasting of monthly retail time series recorded by the US Census Bureau from 1992 to 2016. The modeling problem is tackled in two steps. First, original time series are de-trended by using a moving windows averaging approach. Subsequently, the residual time series are modeled by Non-linear Auto-Regressive (NAR) models, by using both Neuro-Fuzzy and Feed-Forward Neural Networks approaches. The goodness of the forecasting models, is objectively assessed by calculating the bias, the mae and the rmse errors. Finally, the model skill index is calculated considering the traditional persistent model as reference. Results show that there is a convenience in using the proposed approaches, compared to the reference one.

**5) Multiple Linear Regression Analysis of the Overlay Accuracy Model Zone**

**AUTHORS:** Zone-Ching Lin, Wen-Jang Wu

The multiple linear regression method was used to analyze the overlay accuracy model and study the feasibility of using linear methods to solve parameters of nonlinear overlay equations. The methods of analysis include changing the number of sample points to derive the least sample number required for solving the accurate estimated parameter values. Besides, different high-order lens distortion parameters were ignored, and only the various modes of low-order parameters were regressed to compare their effects on the overlay analysis results. The findings indicate that given a sufficient number of sample points, the usage of multiple linear regression analysis to solve the high-order nonlinear overlay accuracy model containing seventh-order lens distortion parameters is feasible. When the estimated values of low-order overlay distortion parameters are far greater than those of high-order lens distortion parameters, excellent overlay improvement can still be obtained even if the high-order lens distortion parameters are ignored. When the overlay at the four corners of image field obviously exceeds that near the center of image field, it is found, through simulation, that the seventh-order parameters overlay model established in this paper has to be corrected by high-order lens distortion parameters to significantly improve the overlay accuracy.