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A Price Forecasting Model for Aquatic Products

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Abstract

Changes in the consumption price of aquatic products will affect demand and fishermen's income. The accurate prediction of consumer price index provides important information regarding the aquatic product market. Based on the non-linear and non-smooth characteristics of fishery product price series, this paper innovatively proposes a fishery product price forecasting model that is based on Variational Modal Decomposition and improved bald eagle search algorithm optimized Long Short Term Memory Network (VMD-IBES-LSTM). Empirical analysis was conducted using fish price data from the Department of Marketing and Informatization of the Ministry of Agriculture. The proposed model in this study was subsequently compared with common forecasting models such as VMD-LSTM and SSA-LSTM.

Keywords: Marketing • Modal decomposition • Variational modal

Introduction

The development of China's fishery economy and international market competition both depend heavily on aquatic products. The price of aquatic products is not only related to the production and sales of businesses and economic interests, but it is also related to China's macroeconomic policies as a specific reflection of the cost of fishing and the relationship between supply and demand for aquatic products. Residents of China have gradually increased their demand for high-quality and safe aquatic products like abalone and shark fin in recent years, as the economy has grown rapidly and urbanization has continued to rise. In the meantime, China's market structure for aquatic products is becoming increasingly globalized. An accurate price forecast for aquatic products can help aqua culturists anticipate market shifts, rationally plan the aquaculture structure and realize the maximum benefits of aquaculture.

Literature Review

In addition, the price forecast provides the government with a scientific foundation on which to base relevant industry policies, strive to maximize resource utilization and support aquaculture's healthy and sustainable growth. Additionally, consumers' decisions may be influenced in part by the cost of aquatic products. The research results show that the VMD-IBES-LSTM model that was constructed in this paper has good fitting results and high prediction accuracy, which can better explain the seasonality and trends of the change of aquatic product consumer price index, provide a scientific and effective method for relevant management departments and units to predict the aquatic product consumer price and have a certain reference value for reasonably coping with the fluctuation of China's aquatic product market price [1].

The subject of this investigation is the prices of five common fishery products, including carp, crucian carp and grass carp. Listed below are the reasons why. A lot of Chinese people are affected by changes in the prices of aquatic products. However, the impact of price changes on fishermen in other countries is relatively small due to the relatively small proportion of people who are engaged in fishing, as stated by the China Fisheries Economic Statistics. As a result, developing a prediction model for the price of aquatic products is crucial. Introducing variational modal decomposition (VMD), which has significant advantages when dealing with non-stationary and non-linear time series, is one of the innovations presented in this paper [2].

Discussion

The VMD model is able to break up the original time series into multiple sub-series. This lets more details show up in the data and makes the sub-series' fluctuations smoother than the original ones, which can make each sub-model's predictions better. In order to increase the model's accuracy, variational modal decomposition was used in this study to break down the fish price series. Levy flight and Tent mapping are used to improve the bald eagle search optimization algorithm, which is then used to improve the accuracy of the model by optimizing the parameters of the long short-term memory network (LSTM) based on the characteristics that the bald eagle search optimization algorithm has strong optimization-seeking ability, requires fewer parameters to be set and easily falls into local optimality. 3) The VMD-IBES-LSTM model that was proposed in this paper on the five fish price test sets had RMSEs that were significantly lower than those of other popular prediction models, with values of 0.480, 0.214, 0.288, 0.5, 0.68 respectively, when compared to other models. Strengthening information analysis is needed [3].

To begin, we ought to actively investigate the analysis models, both to enhance our investigation of the adaptability of the existing models such as time series, autoregressive models, moving average models, mixed autoregressive-moving average models, vector autoregressive models and so forth and to and to investigate novel models based on previously collected data. Second, the cross-disciplinary analysis should be strengthened. Economic analysis as well as the integration of information technology, computer technology, database technology and agricultural technology is required in the multidisciplinary field of agricultural monitoring and early warning. Thirdly, various target groups should be incorporated into special analyses. It is necessary to take into account the entire economic operation of agriculture, including the returns to producers and benefits to consumers, reasonable fluctuations in the prices of agricultural products and more. At the same time, technology is actively used to free up labour and boost productivity in the workplace [4].

To make the production of agricultural goods more effective, the construction of the agricultural Internet of Things needs to be strengthened. The agricultural Internet of Things is a specific application of agricultural production, management and services that makes use of a variety of sensing devices to collect information about the process of agricultural production, the logistics of agricultural products, animals and plants. It transmits data via wireless sensor networks, mobile communication wireless networks and the Internet using a variety of sensing devices to learn about the agricultural production process, product logistics and the plants and animals they. Through wireless sensor networks, mobile communication wireless networks and the internet, the information that was obtained is combined and processed. Finally, intelligent operation terminals

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enable process monitoring, scientific decision making and real-time services for the pre-, production and post-production of agricultural products [5,6].

Conclusion

The trade in aquatic products became stagnant. This model's prediction accuracy decreased as a result of short-term shifts in external factors. The SARIMA model is more accurate when predicting the values of the next three to six periods, according to some studies. However, when the prediction range exceeds six periods, the simulation effect becomes worse and the prediction error gradually increases. In the actual prediction process described in this paper, the same conclusion was reached. The comparison of the actual value and the predicted value in Table 4 demonstrates that the relative error of prediction gradually grows over time. The transient changes of the interior and outside factors likewise need to reconsider their boundaries routinely as per the continually refreshed information, in order to work on the exactness of model expectation.

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Conflict of Interest

No potential conflict of interest was reported by the authors.

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