



## ARIMA-Neural Hybrid Estimates of Inflationary Expectations: Some Evidence from Sri Lanka

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### Abstract

In traditional time series forecasting problems, researchers mostly used classical time series models, such as, Autoregressive (AR), Moving average (MA) and ARIMA to model linear time series data. On the other hand, researchers used the technique like artificial neural network (ANN) to model nonlinear time series data. The proposed study aims to create an ARIMA-ANN hybrid model for forecasting monthly inflation rates in Sri Lanka. The study uses historical data from 1988 to 2018, with a total of 368 observations. The data were divided into three parts: training data, test data, and validation data, to test the accuracy of the models. The proposed hybrid model was compared with the traditional ARIMA model and the ANN model, and the accuracy is measured using the mean absolute percentage error (MAPE). The results showed that the hybrid model outperforms both the ARIMA and ANN models, providing more accurate predictions for both test and validation data. The hybrid model leverages the strengths of both ARIMA and ANN models, allowing accurate forecasting of both linear and non-linear patterns in the data. The mean absolute percentage error (MAPE) was used to calculate the accuracy of the ARIMA, ANN, and hybrid models. The MAPE values of test data were 18.5, 12.48, and 3.37, respectively, for ARIMA, ANN, and the hybrid model. The hybrid model outperformed the other two models, with the lowest MAPE value. The MAPE values of validation data were 28.18, 10.85, and 9.27 for ARIMA, ANN, and the hybrid model, respectively. The hybrid model outperformed the other two models, with the second lowest MAPE value. These results show that the ARIMA-ANN hybrid model is a highly accurate method for forecasting inflation rates in Sri Lanka.

*Keywords: Deep Learning, Forecasting, Hybrid Models, Inflation Rate, Nonlinear Time Series.*

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