Decoding the Consumer Price Index: Statistical Modeling and Forecasting of Inflation Trends in India Using SARIMA and LSTM Approaches

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Abstract

We study India's Consumer Price Index (CPI) over 2013–2023 using three approaches: Seasonal Auto-Regressive Integrated Moving Average (SARIMA), Long Short-Term Memory (LSTM) networks, and a hybrid SARIMA–LSTM framework. SARIMA captures linear trend and annual seasonality; LSTM learns nonlinear, long-memory dynamics. Training LSTM on SARIMA residuals yields the most accurate and robust forecasts, especially during volatile episodes such as COVID-19. Results demonstrate how classical and deep-learning models can complement one another for inflation forecasting and policy analysis.

Keywords

Consumer Price Index (CPI), Inflation, SARIMA, LSTM, Hybrid Models, Time Series Forecasting, India, COVID-19 Impact.