

**PREDICTING THE GDP USING ARIMA AND LSTM
MODEL AND BUSINESS CYCLE POSITION USING
CLASSIFICATION MODEL FOR NEXT 12 MONTHS- THE
UNITED STATES OF AMERICA CASE STUDY**

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Abstract

At any given point in time, the economy of a nation will be facing one of the four distinct phases of the economic cycle: expansion, contraction, peak, or trough. A prolonged period of economic contraction would pave the way for an economic downfall, which would lead to a recession. Recession is a period during which there is a decline in Gross Domestic Product (GDP) for an extended period, typically lasting for more than two quarters and is typically caused by several different factors, ranging from political instability to the failure of fiscal policy. The effects of a recession will be felt by all individuals of the society, from the federal government down to the average citizen.

The purpose of this study is to provide an alternative method that is not only complementary to traditional econometric techniques but also to demonstrate how various algorithms and supervised learning techniques network can improve the short-term accuracy of GDP forecasting. In addition to that, the model tries to predict the future economic cycle position using classification model as well. As an example, this paper uses information from the United States of America, such as macroeconomic statistics and articles from newspapers. The algorithm was trained with data spanning from 1970: Q1 to 2021: Q3 (inclusive). Both ARIMA and LSTM are utilized in the forecasting of GDP, with this method demonstrating the accuracy of 75% for GDP prediction accuracy when utilizing ARIMA and 77% accuracy when utilizing the LSTM model. Despite this, the position of the business cycle may be forecast with a precision of 0.981 using the gradient boosting classification model.

Keywords: Economic cycle, Recession, Time Series Analysis, Forecasting, Neural Network, Classification model, and Long Short-Term Memory (LSTM).