

## ABSTRACT

The stock market is an essential element of the modern economy, and stock price prediction has become a crucial area of research for investors and traders alike. Predicting stock prices is a complex task that involves analyzing a vast amount of historical data and extracting patterns and trends to predict future prices accurately. In recent years, various techniques have been developed to predict stock prices, including machine learning and artificial intelligence algorithms. In this research article, we present a comparative study of several of the most effective techniques for stock price prediction: Deep Neural Networks (DNN), Facebook prophet model and Extended Kalman Filters (EKF).

The aim of this study is to determine which method is more effective at predicting stock prices for the Pakistan Stock Exchange (PSX). The Deep Neural Networks (DNN), Facebook prophet model and Extended Kalman Filters (EKF) models were trained and tested on historical data, and their performance was evaluated based on their accuracy and computational complexity. The results of our study showed that the Facebook prophet model outperformed the Extended Kalman Filters (EKF), Deep Neural Networks (DNN) model in terms of accuracy, while the EKF model was found to be more computationally efficient.

Our research has several implications for investors and traders, as it provides valuable insights into the effectiveness of these two techniques for stock price prediction. The Facebook prophet model, which has been shown to be more accurate, could be used to make informed investment decisions, while the EKF model, which is computationally more efficient, could be used to develop real-time trading strategies.

In conclusion, the results of our research suggest that while all techniques have their advantages and disadvantages, the DNN model is more effective at predicting stock prices for the PSX. However, the EKF model could still be used in certain situations where computational efficiency is crucial. Our study provides a foundation for future research in this field, as there is still much to be explored around stock price prediction using machine learning and artificial intelligence algorithms.

**Keywords:** Stock price prediction, Predictive models, financial forecasting, Deep Neural Network (DNN), Facebook prophet model, Extended Kalman Filter (EKF), Pakistan stock exchange (PSX).