



# Using Forecasting Models in Cryptocurrency Price Prediction

HOANG NHAT MINH<sup>1</sup>, LE NGUYEN NHAT MINH<sup>2</sup>, AND TRAN THI LUYEN<sup>3</sup>

<sup>1</sup>Faculty of Information Systems, University of Information Technology, (e-mail: 21522336@gm.uit.edu.vn)

<sup>2</sup>Faculty of Information Systems, University of Information Technology, (e-mail: 21522338@gm.uit.edu.vn)

<sup>3</sup>Faculty of Information Systems, University of Information Technology, (e-mail: 21521107@gm.uit.edu.vn)

**ABSTRACT** Predicting cryptocurrency price has become a central focus for investors and traders in the rapidly evolving landscape of digital assets. Cryptocurrencies like Bitcoin, Ethereum, and other altcoins have captured global attention, with their prices subject to fluctuations influenced by various factors, from market sentiment to technological developments. With the unprecedented volatility of these markets, the need for accurate forecasting models has never been more crucial. In this research, we conduct an in-depth analysis using various models including Linear regression (LR), Autoregressive Integrated Moving Average (ARIMA), Recurrent Neural Network (RNN), Gated Recurrent Unit (GRU), Long Short-Term Memory (LSTM), Seasonal Autoregressive Integrated Moving Average with eXogenous factors (SARIMAX), Neural Basis Expansion Analysis Time Series (NBEATS), Random Forest (RF) to predict cryptocurrency price and determine the effectiveness of each model.

**INDEX TERMS** Cryptocurrency, price prediction, Bitcoin, Ethereum, Linear regression, ARIMA, RNN, GRU, LSTM, SARIMAX, NBEATS, RF.

## I. INTRODUCTION

Cryptocurrency, a digital form of currency, has transformed the traditional concept of money. Unlike cash, cryptocurrencies exist purely in electronic form, utilizing encryption techniques for secure transactions. Bitcoin, the pioneering cryptocurrency introduced in 2009 by Satoshi Nakamoto, paved the way for a myriad of digital currencies that followed. The decentralized nature of cryptocurrencies means they operate without a central authority, using blockchain technology to record and verify transactions across a network of computers. This decentralization provides a level of transparency and security previously unseen in financial systems. As interest and adoption continue to grow, cryptocurrencies are reshaping the landscape of finance, offering individuals around the globe new avenues for transactions, investments, and financial freedom.

By using forecasting models and machine learning algorithms to analyze historical data of Bitcoin, Ethereum, and BNB, the research objective is to provide valuable insights for investors and traders to forecast the cryptocurrency price movement. To evaluate the performance of each predictive model, we use three metrics Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and Root Mean Squared Error (RMSE).