

## Predicting Cryptocurrency Price Using RNN and LSTM Method

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### Abstract

Cryptocurrency price prediction is a crucial task for financial investors as it helps determine appropriate investment strategies and mitigate risk. In recent years, deep learning methods have shown promise in predicting time-series data, making them a viable approach for cryptocurrency price prediction. In this study, we compare the effectiveness of two deep learning techniques, the Recurrent Neural Network (RNN) and Long-Short Term Memory (LSTM), in predicting the prices of Bitcoin and Ethereum. Results of this research show that the LSTM method outperformed the RNN method, obtaining lower Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE) values for predicting both cryptocurrencies. Bitcoin and Ethereum. Specifically, the LSTM model had a RMSE of 0.061 and MAPE of 5.66% for predicting Bitcoin, and a RMSE of 0.036 and MAPE of 4.58% for predicting Ethereum. In this research, we found that the LSTM model is a more effective method for predicting cryptocurrency prices than the RNN model.

**Keywords**— Cryptocurrency, RNN, LSTM, RMSE, MAPE

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### Abstrak

Prediksi harga cryptocurrency merupakan tugas yang sangat penting bagi investor keuangan karena dapat membantu menentukan strategi investasi yang sesuai dan mengurangi risiko. Dalam beberapa tahun terakhir, metode deep learning telah menunjukkan potensi dalam memprediksi data time-series, sehingga menjadi metode yang layak untuk prediksi harga cryptocurrency. Dalam studi ini, kami membandingkan efektivitas dua teknik deep learning, yaitu Recurrent Neural Network (RNN) dan Long-Short Term Memory (LSTM), dalam memprediksi harga Bitcoin dan Ethereum. Hasil penelitian ini menunjukkan bahwa metode LSTM lebih unggul dibanding metode RNN, dengan nilai Root Mean Squared Error (RMSE) dan Mean Absolute Percentage Error (MAPE) yang lebih rendah untuk memprediksi kedua cryptocurrency tersebut. Bitcoin dan Ethereum. Secara spesifik, model LSTM memiliki nilai RMSE sebesar 0,061 dan MAPE sebesar 5,66% untuk memprediksi Bitcoin, serta nilai RMSE sebesar 0,036 dan MAPE sebesar 4,58% untuk memprediksi Ethereum. Dalam penelitian ini, kami menemukan bahwa model LSTM merupakan metode yang lebih efektif untuk memprediksi harga cryptocurrency dibanding model RNN.

**Kata Kunci**— Cryptocurrency, RNN, LSTM, RMSE, MAPE

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## 1. Introduction

### 1.1. Background

Cryptocurrencies are digital or virtual currencies that are used to exchange and transfer assets digitally. They use cryptography to ensure the secure transfer of assets, to regulate the creation of new cryptocurrencies, and to protect the integrity of transactions [1], [2]. This blockchain-based digital currencies have experienced significant fluctuations in value in recent years [3]. Cryptocurrency tokens, which are based on blockchain