

ABSTRAK

PENERAPAN ALGORITMA *LONG SHORT-TERM MEMORY* (LSTM) UNTUK PREDIKSI HARGA DAN VISUALISASI SINYAL TRADING CRYPTOCURRENCY PADA PLATFORM TRADINGVIEW

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Pergerakan harga *cryptocurrency* yang sangat fluktuatif menimbulkan tantangan besar dalam pengambilan keputusan *trading*, sehingga diperlukan sistem yang mampu memberikan rekomendasi sinyal secara akurat dan berbasis data. Penelitian ini bertujuan mengimplementasikan algoritma *Long Short-Term Memory* (LSTM) untuk memprediksi pergerakan harga serta menghasilkan rekomendasi sinyal *trading* (*buy dan sell signal*) *cryptocurrency* yang diintegrasikan langsung pada platform TradingView. Metodologi penelitian mengadopsi kerangka kerja *Cross-Industry Standard Process for Data Mining* (CRISP-DM). Model LSTM 3 *layer* dilatih menggunakan data historis OHLCV dari empat aset (Bitcoin, Ethereum, Cardano, dan Algorand) lintas *timeframe* (1 jam, 4 jam, dan 1 hari) periode 2020 hingga 2026, dengan target prediksi utama difokuskan pada harga penutupan Bitcoin *timeframe* 4 jam (BTC_4h_close). Fitur masukan diperkaya dengan indikator teknikal RSI, EMA, dan MACD. Hasil pelatihan menunjukkan model mencapai kinerja stabil dengan validation loss sebesar $1,0690 \times 10^{-4}$ dan MAE sebesar 0,0080. Pada tahap pengujian data uji (*testing set*), diperoleh MAE sebesar 571,4659, RMSE sebesar 759,2780, dan MAPE sebesar 0,68%. Hasil prediksi yang dikonversi ke Pine Script v6 di platform TradingView serta diuji melalui backtesting menunjukkan *Total Return* sebesar 8,24%, *Win Rate* sebesar 65,85%, *Maximum Drawdown* sebesar -23,56%, dan *Sharpe Ratio* sebesar 0,92. Penelitian ini membuktikan bahwa pendekatan LSTM multivariat dan *multi-timeframe* efektif menghasilkan rekomendasi sinyal *trading* yang presisi dan aplikatif pada grafik interaktif *real-time*.

Kata kunci: Bitcoin, CRISP-DM, Cryptocurrency, Long Short-Term Memory, Sinyal Trading, TradingView

ABSTRACT
***Application of Long Short-Term Memory (LSTM) Algorithm for
Cryptocurrency Price Forecasting and Trading Signal Visualization on the
TradingView Platform***

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The highly volatile movement of cryptocurrency prices poses significant challenges in trading decision-making, requiring an automated system capable of providing accurate, data-driven recommendations. This study aims to implement the Long Short-Term Memory (LSTM) algorithm to forecast prices and generate trading signal recommendations (buy and sell signals) for cryptocurrencies, integrated directly into the TradingView platform. The methodology adopts the Cross-Industry Standard Process for Data Mining (CRISP-DM) framework. The 3-layer LSTM model was trained on historical OHLCV data from four assets (Bitcoin, Ethereum, Cardano, and Algorand) across multiple timeframes (1-hour, 4-hour, and 1-day) spanning 2020 to 2026, with target predictions focused on Bitcoin 4-hour closing prices (BTC_4h_close). Feature engineering was enhanced by integrating RSI, EMA, and MACD technical indicators. The optimal model achieved a validation loss of $1,0690 \times 10^{-4}$ and an MAE of 0.0080 during training. On the testing set, it yielded an MAE of 571.4659, an RMSE of 759.2780, and a MAPE of 0.68%. Converted into Pine Script v6 for TradingView visualization, strategy evaluation via backtesting demonstrated a Total Return of 8.24%, a Win Rate of 65.85%, a Maximum Drawdown of -23.56%, and a Sharpe Ratio of 0.92. The results confirm that multi-coin and multi-timeframe LSTM models effectively generate actionable trading signal recommendations in real-time charting environments.

Keywords: Bitcoin, CRISP-DM, Cryptocurrency, Long Short-Term Memory, Trading Signal, TradingView