



UNDERGRADUATE THESIS

Analysis of Influencer Influence on Bitcoin Price Prediction Using LSTM

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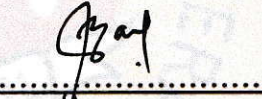
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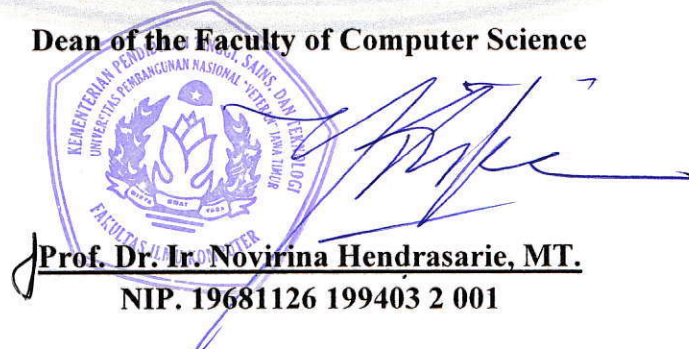
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ABSTRACT

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The price of Bitcoin exhibits significant volatility, rendering predictions based only on previous data challenging. Alongside technological issues, social media advancements also affect market dynamics, especially via the viewpoints articulated by cryptocurrency influencers. This study seeks to examine the impact of influencer sentiment on Bitcoin price forecasts utilising the Long Short-Term Memory (LSTM) technique, and to assess the enhancement in model precision following the incorporation of sentiment data alongside historical Bitcoin price data and technical indicators. The dataset comprises tweets from ten cryptocurrency influencers gathered using twitterapi.io and historical Bitcoin price data sourced from Binance for the period spanning 2020 to 2025. The tweet data is pre-processed and analysed with FinVADER to derive sentiment scores, which are subsequently aggregated and merged with historical data that includes the Relative Strength Index (RSI) and Exponential Moving Average (EMA) indicators. An LSTM model is constructed to forecast Bitcoin prices for 1-day and 7-day prediction intervals, thereafter assessed using Mean Absolute Error (MAE), Root Mean Square Error (RMSE), Mean Absolute Percentage Error (MAPE), and the coefficient of determination (R^2). The findings indicated that for a 1-day prediction horizon, the optimal scenario (S3) yielded a Mean Absolute Error (MAE) of USD 2,642.07, a Root Mean Square Error (RMSE) of USD 3,483.38, a Mean Absolute Percentage Error (MAPE) of 2.76%, and a coefficient of determination (R^2) of 0.8653, reflecting a MAPE reduction of 10.68% relative to the model devoid of sentiment analysis. Within a 7-day forecasting framework, scenario S2 exhibited optimal performance, achieving a Mean Absolute Error (MAE) of USD 5,320, a Root Mean Square Error (RMSE) of USD 6,301, a Mean Absolute Percentage Error (MAPE) of 5.42%, and a R^2 value of 0.6067, thereby decreasing the MAPE by 20.76% relative to the baseline model. The findings suggest that incorporating influencer sentiment enhances the efficacy of the LSTM model in forecasting Bitcoin prices, hence allowing influencer sentiment to serve as supplementary information to augment the precision of price predictions in the cryptocurrency market..

Keywords: Bitcoin, Sentiment Analysis, LSTM, FinVader, Prediction

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Writer

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