

IMPLEMENTASI ALGORITMA KNN UNTUK PREDIKSI HARGA SAHAM PT BANK CENTRAL ASIA TBK. SEBAGAI STRATEGI PENGAMBILAN KEPUTUSAN INVESTASI

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ABSTRAK

Permasalahan yang diangkat dalam penelitian ini adalah tingginya ketidakpastian pergerakan harga saham yang menyebabkan investor sering kesulitan dalam menentukan strategi investasi yang tepat, khususnya pada saham PT Bank Central Asia Tbk. (BBCA) yang memiliki volatilitas cukup tinggi. Untuk menjawab tantangan tersebut, penelitian ini menggunakan metodologi machine learning dengan algoritma *K-Nearest Neighbors* (KNN) karena sifatnya yang non-parametrik dan mampu memodelkan hubungan non-linear pada data deret waktu. Literatur terdahulu menunjukkan bahwa KNN efektif digunakan dalam prediksi pasar saham serta sering dibandingkan dengan algoritma lain dalam konteks time series forecasting, sehingga mendasari pemilihan metode ini. Proses penelitian dilakukan dengan pendekatan *Cross Industry Standard Process for Data Mining* (CRISP-DM) yang mencakup tahapan pemahaman bisnis, pemahaman data, persiapan data melalui feature engineering seperti *Simple Moving Average* (SMA), *Bollinger Bands Width* (BB_Width), *Relative Strength Index* (RSI), serta penambahan fitur lag untuk menangkap pola historis. Model kemudian dibangun menggunakan pipeline yang terintegrasi dengan *RandomizedSearchCV* untuk optimasi hiperparameter, sementara validasi dilakukan dengan skema Time Series Split agar sesuai dengan sifat data deret waktu. Hasil penelitian menunjukkan bahwa model KNN yang dikembangkan mampu menghasilkan performa prediksi yang baik dengan nilai *koefisien determinasi* (R^2) lebih dari 8483 dan nilai *Mean Absolute Error* (MAE) 1,84%, sehingga dapat dijadikan alat bantu prediktif yang andal bagi investor dalam mendukung pengambilan keputusan investasi.

Kata kunci: Prediksi harga saham, *K-Nearest Neighbors*, CRISP-DM, BBCA, *RandomizedSearchCV*.

***IMPLEMENTATION OF THE KNN ALGORITHM FOR PREDICTING THE
SHARE PRICE OF PT BANK CENTRAL ASIA TBK. AS AN INVESTMENT
DECISION-MAKING STRATEGY***

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ABSTRACT

The problem addressed in this study is the high uncertainty of stock price movements, which often makes it difficult for investors to determine the right investment strategy, especially for PT Bank Central Asia Tbk. (BBCA) shares, which have high volatility. To address this challenge, this study employs a machine learning methodology using the K-Nearest Neighbors (KNN) algorithm due to its non-parametric nature and ability to model non-linear relationships in time series data. Previous literature indicates that KNN is effective for stock market prediction and is often compared with other algorithms in the context of time series forecasting, thereby justifying the selection of this method. The research process was conducted using the Cross Industry Standard Process for Data Mining (CRISP-DM) approach, which includes the stages of business understanding, data understanding, data preparation through feature engineering such as Simple Moving Average (SMA), Bollinger Bands Width (BB_Width), Relative Strength Index (RSI), and the addition of lag features to capture historical patterns. The model was then built using a pipeline integrated with RandomizedSearchCV for hyperparameter optimization, while validation was performed using a Time Series Split scheme to align with the nature of time series data. The research results show that the developed KNN model is capable of producing good prediction performance with a coefficient of determination (R^2) value of over 84.83 and a Mean Absolute Error (MAE) value of 1.84%, making it a reliable predictive tool for investors in supporting investment decision-making.

Keywords: *Stock price prediction, K-Nearest Neighbors, CRISP-DM, BBCA, RandomizedSearchCV.*