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A CNN-LSTM HYBRID APPROACH FOR GOLD PRICE FORECASTING
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Abstract

Analysis on Combinations of Algorithm for Gold Price Forecasting

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Gold has been present since the beginning of time. Throughout history the use of gold has many forms of variations. In the current era, gold has been used as a sort of investment which has been deemed reliable. To obtain the most amount of profit in an investment, we need to be able to predict the possible values that might become a reality. In this research, we will explore the possibilities of algorithms that can be used to build a predictive model.

CNN and LSTM are algorithms that can be used for creating predictions. CNN can be used on huge amounts of data however it can result in overfitting and imbalance of results while LSTM can produce a semi-accurate prediction but it's processing time is very slow when used. By implementing a hybrid approach, we can try to reduce the negative effect of both algorithms as well as limit the overfitting and imbalance while keeping a decent processing speed. The hybrid model used is a series type where the two algorithms will be used simultaneously using the result of the first as an input for the second. In this case, CNN will be used first to process the large dataset and the result will then be inputted as input data for the LSTM. The evaluation criteria for this hybrid involve the use of, RMSE, MAPE, and RMAE which allows us to see the extent of the current model's results.

The result of the training showed that the hybrid model showed the best outcome. With an average error of 3.6% for USD currency and 4.6% for IDR currency. The outcome presented by the prediction dataset further proves the versatility of the created model which are then used to test the validation data which gave an error value of 10.4%. With a certain condition applied, it was considered to be validated and can then be used for comparison purposes. Using the same model to be used for comparison dataset, with the parameters based off of previous research, we obtain an error value of 11.75% which is was proven to have been better by 0.61% compared to the original result which was 12.66%. This showed slight improvement by implementing the hybrid model.

Key Words: *Analytical Study, Algorithm Implementation, Error Measurement Tools, Gold Price Forecasting, Prediction Model*