ABSTRAK

ANALISIS PERBANDINGAN KINERJA MODEL REGRESI UNTUK PREDIKSI HARGA PENJUALAN PRODUK DI SMC PNEUMATICS BANDUNG

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SMC Pneumatics Bandung, sebagai pemimpin dalam industri pneumatik, menghadapi tantangan dalam menentukan kebijakan harga yang optimal untuk meningkatkan daya saing. Penelitian ini bertujuan untuk menganalisis dan membandingkan kinerja lima model regresi dalam memprediksi harga penjualan produk di SMC Pneumatics Bandung tahun 2023. Model yang diuji meliputi *Linear Regression*, *Random Forest Regressor*, *Decision Tree Regressor*, *Extreme Gradient Boosting* (*XGBoost*) *Regressor*, dan *Support Vector Regression*. *Dataset* terdiri dari 2844 data penjualan, dengan tahapan data mining meliputi pengumpulan data, *preprocessing*, analisis data eksploratif, pemodelan, dan evaluasi. Hasil penelitian menunjukkan bahwa model *Linear Regression* memiliki kinerja terbaik dengan nilai *R-square* 0.99, MSE 3.984, RMSE 1.99, MAE 1.99, dan MAPE 0%. Model *Random Forest Regressor* dan *Decision Tree Regressor* juga menunjukkan kinerja yang baik dengan nilai *R-square* 0.99. Sementara itu, model *Extreme Gradient Boosting Regressor* mencapai *R-square* 0.99 dengan nilai MSE, RMSE, dan MAE yang lebih tinggi. Namun, model *Support Vector Regression* menunjukkan kinerja yang buruk dengan *R-square* -0.13. Penelitian ini menyimpulkan bahwa model *Linear Regression* memberikan performa terbaik dalam memprediksi harga penjualan produk di SMC Pneumatics Bandung tahun 2023, dengan tingkat akurasi yang sangat tinggi. Temuan ini menunjukkan potensi aplikasi *machine learning* dalam optimalisasi strategi penetapan harga di industri pneumatik.

Kata kunci: Regresi, *Machine Learning*, Prediksi, SMC Pneumatics

ABSTRACT

COMPARATIVE ANALYSIS OF REGRESSION MODEL PERFORMANCE FOR PRODUCT SALES PRICE PREDICTION AT SMC PNEUMATICS BANDUNG

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SMC Pneumatics Bandung, as a leader in the pneumatic industry, faces challenges in determining the optimal pricing policy to improve competitiveness. This study aims to analyze and compare the performance of five regression models in predicting product sales prices at SMC Pneumatics Bandung in 2023. The models tested include Linear Regression, Random Forest Regressor, Decision Tree Regressor, Extreme Gradient Boosting (XGBoost) Regressor, and Support Vector Regression. The dataset consists of 2844 sales data, with data mining stages including data collection, preprocessing, exploratory data analysis, modeling, and evaluation. The results showed that the Linear Regression model had the best performance with an R-square value of 0.99, MSE 3.984, RMSE 1.99, MAE 1.99, and MAPE 0%. The Random Forest Regressor and Decision Tree Regressor models also showed good performance with an R-square value of 0.99. Meanwhile, the Extreme Gradient Boosting Regressor model achieved an R-square of 0.99 with higher MSE, RMSE, and MAE values. However, the Support Vector Regression model showed poor performance with an R-square of -0.13. This study concludes that the Linear Regression model provides the best performance in predicting product sales prices at SMC Pneumatics Bandung in 2023, with a very high level of accuracy. This finding shows the potential of machine learning applications in optimizing pricing strategies in the pneumatic industry.

Keywords: Regression, Machine Learning, Prediction, SMC Pneumatics