PERFORMANCE TESTING & HYPERPARAMETER TUNING

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TESTING THE MODEL WITH EVALUATION METRICS

In order to assess the performance of the regression and Random Forest models in the energy consumption analysis system, rigorous testing is conducted using evaluation metrics. The test dataset, distinct from the training data, is utilized to evaluate the models' predictive capabilities. Evaluation metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R-squared (R^2) are computed. MAE quantifies the average absolute difference between predicted and actual energy consumption values, while RMSE provides a measure of the standard deviation of these differences. R^2 assesses the proportion of variance in the energy consumption explained by the models. Lower MAE and RMSE values indicate better predictive accuracy, while a higher R^2 value signifies a better fit of the models to the data. By analyzing these metrics, the performance of the regression and Random Forest models can be evaluated, enabling refinement and optimization of the energy consumption analysis system to ensure reliable and accurate predictions for energy-efficient appliances.

COMPARING MODEL ACCURACY

When comparing the accuracy of the regression and Random Forest models in the energy consumption analysis system, several factors need to be considered. The regression model, being a simpler approach, may provide a good baseline for predicting energy consumption based on input features. However, the Random Forest model, with its ability to capture complex interactions and handle non-linear relationships, may offer improved accuracy. To determine the superior model, evaluation metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and R-squared (R^2) can be compared. A lower MAE and RMSE indicate better accuracy, as they represent smaller differences between predicted and actual energy consumption values. Similarly, a higher R^2 value suggests a better fit of the model to the data. By examining these metrics, the model with the lower MAE and RMSE and higher R^2 can be identified as the more accurate one. Nonetheless, it's important to consider the specific requirements and characteristics of the energy consumption analysis system to make an informed decision about which model to utilize.