Model Optimization and Tuning Phase Report

Date	18 June 2024
Team ID	739991
Project Title	Smart Home Temperature
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

Optimizing and tuning a model for smart home temperature control involves several critical steps to ensure its efficiency and accuracy. First, focus on data preparation, which includes cleaning the data to remove inconsistencies, missing values, and outliers. Feature engineering is essential in this phase, where you identify and create relevant features such as indoor temperature, outdoor temperature, humidity levels, time of day, seasonality, occupancy status, and weather forecasts.

Hyperparameter Tuning Documentation (6 Marks):

Model	Tuned Hyperparameters	Optimal Values
Linear regression	-	-
Random Forest	-	-

Light Gradient Boosting	-	-
Xgboost	-	-

Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric
Linear Regression	-

Random Forest	-
Light Gradient Boosting	-
Xgboost	-

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Random forest	Random forest is a popular machine learning algorithm chosen for its ability to handle high- dimensional data, missing values, non linear relationships, and categorical variables, while being robust to overfitting and providing feature importance scores for interpretability. It's also suitable for imbalanced datasets, and is relatively fast in both training and prediction, making it applicable to a wide range of problems, including classification, regression, and feature selection. Additionally, random forest can capture non-linear interactions between variables, handle complex relationships, and provide accurate predictions, making it a versatile and powerful algorithm in machine learning.

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