Model Optimization and Tuning Phase Report

Date	07 JULY 2024
Team ID	739947
Project Title	Slop sense: utilising resort features for regression modelling
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency. **Hyperparameter Tuning Documentation (6 Marks):**

Model	Tuned Hyperparameters	Optimal Values

KNN	`from sklearn.cluster import KMeans`
	`wcss_list=[]`
	
	`for i in range(2,11):`
	`  kmeans=KMeans(n_clusters=i,init='k-means++',random_state=42)`
	`  kmeans.fit(new_df)`
	`  wcss_list.append(kmeans.inertia_)`
	`plt.plot(range(2,11),wcss_list,marker='o')`
	`plt.title('The Elbow Method Graph')`
	`plt.xlabel('Number of clusters(k)')`
	`plt.ylabel('wcss_list')`
	`plt.show()`
		`cluster_assignments.value_counts()`
		
		`0  4685`
		`3  610`
		`4  132`
		`2  33`
		`1  18`
		`Name: count, dtype: int64`

LR	!pip install scikit-learn import pandas as pd from sklearn.linear_model import LinearRegression from sklearn.impute import SimpleImputer imputer=SimpleImputer(strategy='mean') x_train=imputer.fit_transform(x_train) x_test=imputer.transform(x_test) LR=LinearRegression() LR.fit(x_train,y_train)	2.4538768184408024

Performance Metrics Comparison Report (2 Marks):

XGB	models=[] models.append(('Linear Regression',LinearRegression())) models.append(('KNeighborsRegressor',KNeighborsRegressor())) models.append(('Support Vector Regression',SVR())) models.append(('Random Forest Regressor',RandomForestRegressor())) models.append(('XBG Regressor',XGBRegressor())) d={} for name,model in models: model.fit(X_train,y_train) score=round(model.score(X_test,y_test)*100,4) d[name]=score ✓ 4.1s

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
XGB Boosting	XGBoosting in a resort setting, you can gain valuable insights, improve operational efficiency, and enhance the overall guest experience! - Predicts room occupancy, guest satisfaction, and revenue optimization - Analyzes feedback, reviews, and demographics - Identifies loyal customers and preferences - Predicts equipment failures for maintenance scheduling