



Model Optimization and Tuning Phase Report

Date	15 March 2024
Team ID	739642
	Customer shopping segmentation using machine learning
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
Decision tree		
Random Forest		
KNN		
Gradient Boosting		





Performance Metrics Comparison Report (2 Marks):

Model	Optimized Metric					
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Gradient Boosting	print(clas	precision 1.00 1.00 1.00 1.00	recall f1- 1.00 1.00 1.00 1.00	1.00 1 1.00 6 1.00 3 1.00 2	1022 5885 8059 2919
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Gradient Boosting	print(clas 87]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1 1.00 6 1.00 5 1.00 2 1.00 1	1022 5885 8059 2919 1941 1008
Gradient Boosting	print(clas 87]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1 1.00 6 1.00 5 1.00 2 1.00 1	1022 5885 8059 2919 1941
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Gradient Boosting	print(clas 87]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1 1.00 6 1.00 3 1.00 2 1.00 1 1.00 1	1022 5885 8059 2919 1941 1008
Gradient Boosting	print(class 37]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1 1.00 2 1.00 2 1.00 1 1.00 1 1.00 1	1022 5885 8059 2919 1941 1008 991
Gradient Boosting	print(class 37]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1022 5885 8059 2919 1941 1008 991 2067
Gradient Boosting	print(class 37]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.022 5885 8059 2919 1.941 1.008 991 2.067
Gradient Boosting	print(class 37]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.022 5885 8059 2919 1.941 1.008 991 2.067
Gradient Boosting	print(class 37]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.022 5885 8059 2919 1.941 1.008 991 2.067
Gradient Boosting	print(class 37]	precision 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	recall f1- 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.022 5885 8059 2919 1.941 1.008 991 2.067





Final Model Selection Justification (2 Marks):

Final Model	Reasoning
knn	The knn model was selected for its superior performance, exhibiting high accuracy during hyperparameter tuning. Its ability to handle complex relationships, minimize overfitting, and optimize predictive accuracy aligns with project objectives, justifying its selection as the final model.