

**Model Optimization and Tuning Phase Template**

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| Date | 15 July 2024 |
| Team ID | 739834 |
| Project Title | Market Segmentation Analysis |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

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| **Final Model** | **Reasoning** |

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):**

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| --- | --- | --- | --- | --- |
| **Model** |  | **Tuned Hyperparameters** |  | **Optimal Values** |
| KMeans | - |  | - |  |

**Performance Metrics Comparison Report (2 Marks):**

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| --- | --- | --- | --- | --- |
| **Model** |  | **Baseline Metric** |  | **Optimized Metric** |
| KMeans | - |  | - |  |

**Final Model Selection Justification (2 Marks):**



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| --- | --- |
| KMeans | K-means clustering is an unsupervised machine learning algorithm that partitions a dataset into K distinct clusters by iteratively assigning data points to the nearest of K randomly initialized centroids and updating the centroids to the mean of their assigned points. This process repeats until the centroids stabilize or a maximum number of iterations is reached, effectively grouping similar data points together by minimizing intra-cluster variance and maximizing inter-cluster variance. It's widely used for tasks like market segmentation, image compression, and pattern recognition. |