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**Model Optimization and Tuning Phase Template**

| Date | 24 April 2024 |
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| Team ID | 740140 |
| Project Title | Crystal Ball Analysis: Projecting Share Prices Of The Leading Gpu Titans |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

The Model Optimization and Tuning Phase involves refining neural network 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 (8 Marks):**

| **Model** | **Tuned Hyperparameters** |
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| Linear Regression | Imports necessary libraries and tools for data handling, model training, and evaluation.Defines `param\_grid` with hyperparameters for `LinearRegression`: `fit\_intercept`, `positive`, `copy\_X`.Uses GridSearchCV (`grid\_search`) to find the best model configuration based on 5-fold cross-validation.Evaluates the best model (`best\_lr`) on test data, computing Mean Squared Error and R-squared metrics. |
| Decision Tree | The parameters (params) define a grid for hyperparameter tuning of the Decision Tree Classifier (DecisionTreeClassifier), including max\_depth, min\_samples\_leaf, and criterion ('gini' or 'entropy'). GridSearchCV (dt\_model) is used with 5-fold cross-validation (cv=5), evaluating model performance based on accuracy (scoring="accuracy") |

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

| **Final Model** | **Reasoning** |
| --- | --- |
| **Linear Regression** | Linear regression model is chosen for its robustness in handling complex datasets and its ability to mitigate overfitting while providing high predictive accuracy.    Above two models Linear regression model have the highest accuracy among the models. |