Model Optimization and Tuning Phase Report

|  |  |
| --- | --- |
| Date | 23 April 2024 |
| Team ID | Team-738178 |
| Project Title | Envisioning Success : Predicting University Scores With 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 |  |  |

|  |  |  |
| --- | --- | --- |
| SVR | - | - |
| Linear Regression | - | - |
| Lasso  Regression |  |  |

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

|  |  |
| --- | --- |
| **Model** | **Optimized Metric** |
| Decision Tree |  |

|  |  |
| --- | --- |
| Random Forest |  |
| SVR |  |
| Linear Regression |  |
| Lasso Regression |  |

# Final Model Selection Justification (2 Marks):

|  |  |
| --- | --- |
| **Final Model** | **Reasoning** |
| Random Forest | The Gradient Boosting 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. |