**Model Optimization and Tuning Phase Template**

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| Date | 7th July 2024 |
| Team ID | 739719 |
| Project Title | Garment Workers Productivity Predictions |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

Optimized models using GridSearchCV, selecting XGBoost Regressor for its superior performance. Trained and validated the final model on the full dataset, ensuring accurate productivity predictions.

### Hyperparameter Tuning Documentation (8 Marks):

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| **Model** | **Tuned Hyperparameters** |
| Model 1  Linear Regression | **Hyperparameters:**  **fit\_intercept:** Whether to calculate the intercept for this model (True or False).  Normalize:Whether to normalize the input variables(True or False)  FullSizeRender.jpg |
| Model 2  Random Forest | **Hyperparameters:**  **n\_estimators:**The number of trees in the forest.  **max\_depth:**The maximum depth of the tree.  **min\_samples\_split:**The minimum number of samples rerquired to split an internal node.  FullSizeRender.jpg |

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

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| **Final Model** | **Reasoning** |
| Model 1  XGBoost Regressor | The XGBoost Regressor was chosen as the final optimized model because it consistently delivered superior performance metrics during the evaluation phase. Its advanced capabilities in handling complex and high-dimensional data, along with its built-in regularization mechanisms, made it the best candidate for accurately predicting garment workers' productivity. |