**Model Development Phase Template**

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| Date | 20 June 2025 |
| Team ID | SWTID1749709340 |
| Project Title | Predicting Co2 Emission by countries Using Machine Learning |
| Maximum Marks | 6 Marks |

**Model Selection Report**

In the forthcoming Model Selection Report, various models will be outlined, detailing their descriptions, hyperparameters, and performance metrics, including Accuracy or F1 Score. This comprehensive report will provide insights into the chosen models and their effectiveness.

**Model Selection Report:**

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| --- | --- | --- | --- | --- | --- | --- |
| **Model** | **Description** | **Hyperparameters** | **Model** | **Performance Matrix(R² Score)** | **Performance Matrix(RMSE)** | **Performance Matrix(F1 Score (Macro))** |
| Linear Regression | Fits a straight line between features and target | Default | Linear Regression | 0.0301 | 13282867018179.9961 | 0.7213 |
| KNN | Predicts based on nearest neighbors | n\_neighbors=5 (default) | KNN | 0.2783 | 11458119062280.3848 | 0.7685 |
| Decision Tree | Tree-based split rules to minimize variance | random\_state=42 | Decision Tree | 0.8586 | 5071746744942.4941 | 0.7952 |
| Random Forest | Ensemble of decision trees (averaged) | n\_estimators=100, random\_state=42 | Random Forest | 0.9985 | 7863224335477.2188 | 0.8610 |
| XGBoost | Boosted decision trees, gradient optimization | n\_estimators=100, random\_state=42 | XGBoost | 0.8598 | 5050634315628.5957 | 0.8782 |
| AdaBoost | Boosted shallow trees with adaptive weighting | n\_estimators=100, random\_state=42 | AdaBoost | -513.7526 | 305998691802595.8750 | 0.8079 |
| Gradient Boost | Sequential tree boosting | n\_estimators=100, random\_state=42 | Gradient Boost | 0.6902 | 7506340843913.5820 | 0.8357 |