**Sri Lanka Institute of**

**Information Technology**

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**Model Performance Summary**

|  |  |
| --- | --- |
| **2025-Y2-S1-MLB-B8G2-05** | |
| IT24102214 | Disen M.L.S |
| IT24102219 | Minthaka M.M |
| IT24102231 | Rathnayake S.N.S |
| IT24102269 | Senesh K.H.M |
| IT24102299 | Balamanage K.D.W |
| IT24102315 | Abeyrathna G.M.H.D |

**Artificial Intelligence and Machine Learning - IT2011**

**Team Collaboration & Coherence**

**GitHub Repository Link :**

[**https://github.com/IT24102214/AIML-Y1S2-Weather\_Predictor**](https://github.com/IT24102214/AIML-Y1S2-Weather_Predictor)

**Organized Table with Exact Values**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | Accuracy | F1 Score | Precision | Recall | AUC-ROC |
| Logistic Regression | 0.8445 | 0.5807 | 0.7094 | 0.4916 | 0.8649 |
| Decision Tree | 0.8385 | 0.5612 | 0.6936 | 0.4712 | 0.8377 |
| SVM | 0.7928 | 0.6067 | 0.5225 | 0.7232 | 0.8604 |
| Random Forest | 0.7924 | 0.6126 | 0.5182 | 0.7490 | 0.8616 |
| XGBoost | 0.8206 | 0.6459 | 0.5691 | 0.7465 | 0.8834 |
| KNN | 0.8268 | 0.5200 | 0.6500 | 0.4333 | 0.8066 |

**Model Performance Evaluation**

Six machine learning models were compared using Accuracy, F1 Score, Precision, Recall, and AUC-ROC. XGBoost performed best overall with a composite score of 0.7370, balancing high F1 Score (0.6459), Recall (0.7465), and AUC-ROC (0.8834). Logistic Regression led in Accuracy (0.8445), while Random Forest had the highest Recall (0.7490). KNN showed the lowest scores in F1 (0.5200) and Recall (0.4333).

**Composite Score Analysis for Model Selection**

To evaluate the performance of six machine learning models—Logistic Regression, Decision Tree, SVM, Random Forest, XGBoost, and KNN—a composite score was calculated for each model based on five key performance metrics: Accuracy, F1 Score, Precision, Recall, and AUC-ROC. The composite score provides a single, aggregated measure of model performance, enabling a balanced and objective comparison across models.

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**XGBoost** achieved the highest composite score of 0.7370, indicating superior overall performance across the evaluated metrics. This model demonstrated a strong balance of accuracy (0.8206), F1 Score (0.6459), Precision (0.5691), Recall (0.7465), and AUC-ROC (0.8834), making it the best-performing model for this task.

The composite score approach ensures a comprehensive evaluation, accounting for multiple aspects of model performance, and supports the selection of **XGBoost** as the optimal model for deployment.