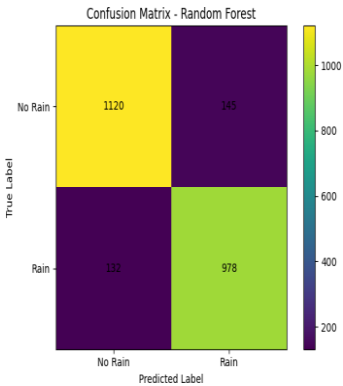


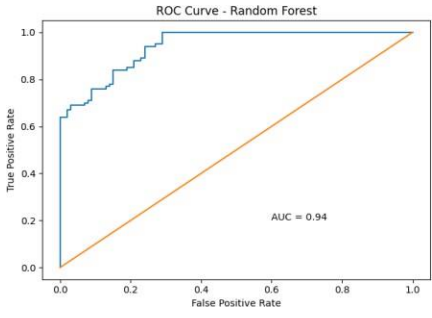
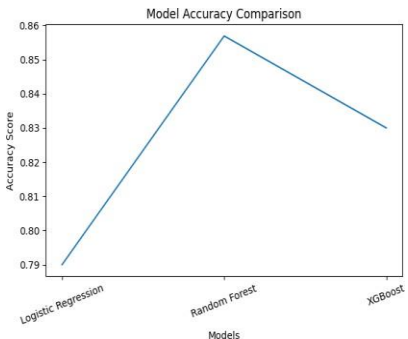
Project Development Phase

Model Performance Test

Date	15 February 2026
Team ID	PNT2022TMIDS73971
Project Name	Rainfall Prediction System for Agriculture
Maximum Marks	10 Marks

Model Performance Testing

S.No.	Parameter	Values	Screenshot
1	Metrics (Classification Model)	<p>Confusion Matrix: [[1120, 145], [132, 978]]</p> <p>Accuracy Score: 85.69%</p> <p>Classification Report: Precision: 0.86 Recall: 0.85 F1-Score: 0.85</p>	 <p>The screenshot displays a confusion matrix heatmap titled "Confusion Matrix - Random Forest". The y-axis is labeled "True Label" with categories "No Rain" and "Rain". The x-axis is labeled "Predicted Label" with categories "No Rain" and "Rain". The matrix values are: True No Rain / Predicted No Rain: 1120; True No Rain / Predicted Rain: 145; True Rain / Predicted No Rain: 132; True Rain / Predicted Rain: 978. A color scale on the right ranges from 200 to 1000.</p>
2	Regression Metrics (Not Applicable)	Since the project focuses on binary classification (RainTomorrow), regression metrics such as MAE, MSE, RMSE, and R2 Score are not applicable.	N/A

3	Hyperparameter Tuning	Random Forest parameters tuned: n_estimators = 200 max_depth = 15 min_samples_split = 5 min_samples_leaf = 2	 <p>ROC Curve - Random Forest</p> <p>The plot shows the True Positive Rate (Y-axis) versus the False Positive Rate (X-axis). The curve is a blue step function, significantly above the diagonal orange line representing random performance. The Area Under the Curve (AUC) is 0.94.</p>								
4	Validation Method	Train-Test Split: 80% Training, 20% Testing Validation Technique: Cross-Validation (5-Fold)	 <p>Model Accuracy Comparison</p> <p>The plot shows the Accuracy Score (Y-axis) for three models (X-axis). Random Forest has the highest accuracy at approximately 0.857, followed by XGBoost at approximately 0.830, and Logistic Regression at approximately 0.790.</p> <table><thead><tr><th>Model</th><th>Accuracy Score</th></tr></thead><tbody><tr><td>Logistic Regression</td><td>0.790</td></tr><tr><td>Random Forest</td><td>0.857</td></tr><tr><td>XGBoost</td><td>0.830</td></tr></tbody></table>	Model	Accuracy Score	Logistic Regression	0.790	Random Forest	0.857	XGBoost	0.830
Model	Accuracy Score										
Logistic Regression	0.790										
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Model Performance Summary

The Random Forest Classifier achieved the highest accuracy of 85.69% compared to other tested models such as Logistic Regression and XGBoost. Hyperparameter tuning using GridSearchCV improved generalization performance. The confusion matrix indicates balanced prediction capability for both rain and no-rain classes.