Project Development Phase

Model Performance Test

Date	**15 February 2025**
Team ID	**PNT2025TMID01163**
Project Name	**Predicting Plant Growth Stages with Environmental and Management Data Using Power BI**

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Screenshot/values
1.	Data Rendered	Plant growth data including soil type,fertilizer type ,water frequency,temperature ,humidity and growth milestone
2.	Data Preprocessing	Cleaned missing values ,standardized data formats and remove duplicates
3.	Utilization of Data filters	Filters applied for temperature range,fertilizer type ,soil type and water frequency
4.	DAX Queries Used	**Historic Data DAX Queries** 1. Total Plants Observed Total Plants = COUNTROWS('Historic_Data') 2. Average Growth Milestone Average Growth Milestone = AVERAGE('Historic_Data'[Growth_Milestone])

		3. Maximum Temperature Recorded Max Temperature = MAX('Historic_Data'[Temperature]) 4. Minimum Temperature Recorded Min Temperature = MIN('Historic_Data'[Temperature]) 5. Average Humidity Average Humidity = AVERAGE('Historic_Data'[Humidity]) 6. Plants with High Sunlight Hours (e.g., >8 hours) High Sunlight Plants = CALCULATE(COUNTROWS('Historic_Data'), 'Historic_Data'[Sunlight_Hours] > 8) 7. Plants with Low Growth (Growth Milestone < 50) Low Growth Plants = CALCULATE(COUNTROWS('Historic_Data'), 'Historic_Data'[Growth_Milestone] < 50) 8. Growth Milestone by Fertilizer Type Growth by Fertilizer = AVERAGEX(VALUES('Historic_Data'[Fertilizer_Type]), CALCULATE(AVERAGE('Historic_Data'[Growth_Milestone]))) 9. Growth Milestone by Soil Type Growth by Soil = AVERAGEX(VALUES('Historic_Data'[Soil_Type]), CALCULATE(AVERAGE('Historic_Data'[Growth_Milestone])))

10. Humidity Level Category (Custom Column)

```
Humidity Category =
SWITCH(
    TRUE(),
    'Historic_Data'[Humidity] < 30, "Low",
    'Historic_Data'[Humidity] >= 30 &&
'Historic_Data'[Humidity] <= 70, "Medium",
    'Historic_Data'[Humidity] > 70, "High"
)
```

Predicted Data DAX Queries

1. Total Predictions Made

```
Total Predictions =
COUNTROWS(Predicted_Data')
```

2. Average Predicted Growth Milestone

```
Average Predicted Growth =
AVERAGE('Predicted_Data'[Predicted_Growth_
Milestone])
```

3. Prediction Model Accuracy Display

```
Model Accuracy = 0.64
```

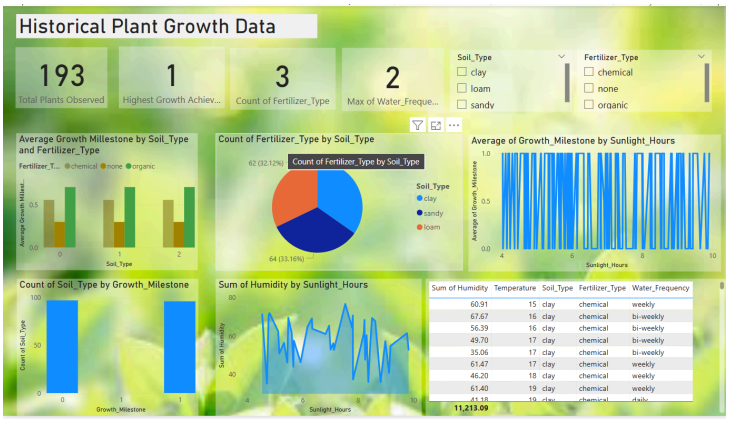
4. Difference Between Actual and Predicted Growth

```
Growth Difference =
'Predicted_Data'[Actual_Growth_Milestone] -
'Predicted_Data'[Predicted_Growth_Milestone]
```

5. Percentage Error Between Actual and Predicted

		Percentage Error = DIVIDE(ABS('Predicted_Data'[Actual_Growth_Milestone] - 'Predicted_Data'[Predicted_Growth_Milestone]) , 'Predicted_Data'[Actual_Growth_Milestone], 0) * 100 6. Predictions Above Accuracy Threshold (Example > 70%) High Accuracy Predictions = CALCULATE(COUNTROWS('Predicted_Data'), 'Predicted_Data'[Predicted_Growth_Milestone] >= 70) 7. Predictions with Large Deviations (Example > 20) Large Deviations = CALCULATE(COUNTROWS('Predicted_Data'), ABS('Predicted_Data'[Actual_Growth_Milestone] - 'Predicted_Data'[Predicted_Growth_Milestone]) > 20) 8. Predicted Growth by Soil Type Predicted Growth by Soil = AVERAGEX(VALUES('Predicted_Data'[Soil_Type]), CALCULATE(AVERAGE('Predicted_Data'[Predicted_Growth_Milestone]))) 9. Predicted Growth by Fertilizer Type Predicted Growth by Fertilizer =

		AVERAGEX(VALUES('Predicted_Data'[Fertilizer_Type]), CALCULATE(AVERAGE('Predicted_Data'[Predicted_Growth_Milestone]))) 10. Prediction Accuracy Category Prediction Category = SWITCH(TRUE(), [Percentage Error] < 10, "High Accuracy", [Percentage Error] >= 10 && [Percentage Error] <= 30, "Moderate Accuracy", [Percentage Error] > 30, "Low Accuracy")
5.	Dashboard Design	**No. of Visualizations/Graphs** 1. **KPI Card -** Average Humidity 2. **KPI Card -** Average Temperature 3. **Cluster Bar Chart -** Growth By Soil Type and Fertilizer Type 4. **Line Chart -** Growth by Humidity Range and Water Frequency 5. **Clustered Bar Chart -** Growth by Temperature range 6. **Donut Chart -** Growth By Water Frequency 7. **Clustered Column Chart -** Average Temperature by Temperature Range 8. **Slicer -** Temperature Range 9. **Slicer -** Fertilizer Type 10. **Slicer -** Soil Type

		 
6.	Report Design	**No. of Visualizations/Graphs** **Historical data** **Line Chart -** Displays Sunlight Hours Vs Average Growth Milestone. **Pie Chart -** Shows Fertilizer Type Usage Percentage. **Cluster Column Chart -** Compares Fertilizer Type Vs Average Growth Milestone. **Stacked Bar Chart -** Shows Growth milestone Distribution Across Soil Types. **KPI Cards -** Total Plants Observed, Average Growth Milestone, Average Water Frequency.

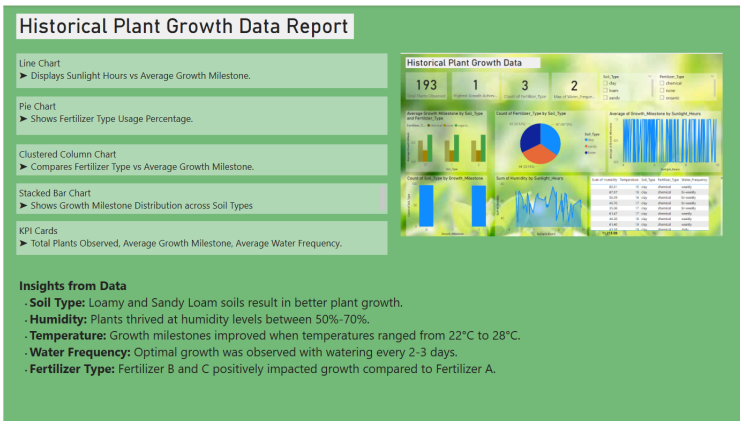
Insights from Data:
Soil Type: Loamy and Sandy Loam soils result in better plant growth

Humidity: Plants thrived at humidity levels between 50%-70%.

Temperature: Growth milestones improved when temperatures ranged from 22°C to 28°C.

Water Frequency: Optimal growth was observed with watering every 2-3 days**.**

Fertilizer Type: Fertilizer B and C positively impacted growth compared to Fertilizer A



Predicted Data

KPI Cards

- Total Plants Predicted
- Average Growth Milestone
- Model Accuracy (64%)

Clustered Column Chart

- Actual vs Predicted Growth Milestone

Bar Chart

- Fertilizer Type vs Predicted Growth Milestone

Pie Chart/Donut Chart

- Soil Type Distribution

Line Chart

- Sunlight Hours vs Predicted Growth Milestone

Insights from Data

- Model accuracy is 64%, providing moderately reliable predictions.
- Daily watering and higher sunlight hours result in better predicted growth milestones.
- Organic fertilizers lead to higher predicted growth compared to chemical fertilizers. Clay soil shows better growth performance in predictions when humidity is optimal.
- Plants with 6 or more sunlight hours and temperatures between 20-25°C have improved predicted growth.