# APSCHE LONG TERM VIRTUAL INTERNSHIP

## (PROJECT DOCUMENT)

## *PREDICTING PLANT GROWTH STAGES WITH ENVIRONMENTAL DATA USING POWER BI*

SSBN DEGREE COLLEGE ANANTHAPURAM [AUTONOMOUS]


**Team ID** : LTVIP2025TMID22335

**Team Size** : 4

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**Company name** : SMARTBRIDGE

**Course** : Data analytics with power bi

# TITLE: PREDICTING PLANT GROWTH STAGES WITH ENVIRONMENTAL DATA USING POWER BI

## Introduction:

The project main aim is to analyse the plant growth findings and suggest that maintain the optimal conditions- such as watering for loam soil moderate temperature ranges and high humidity- leads to the best plant growth outcomes.

## Scenario 1:

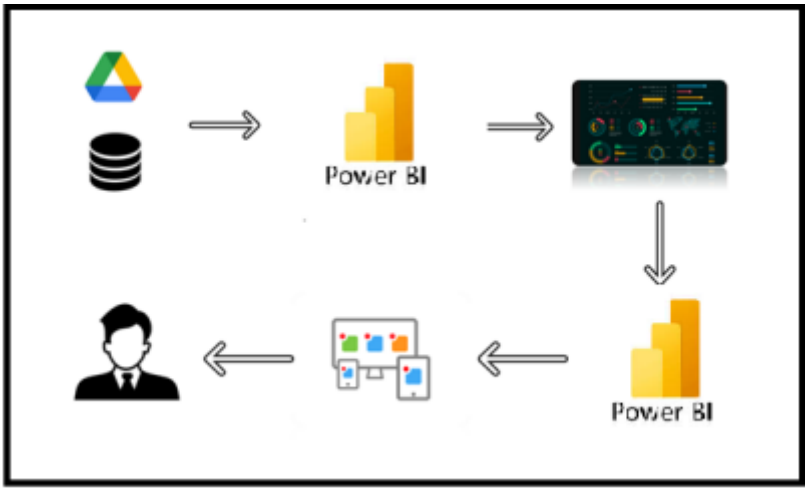
ABC Greenhouses has been facing challenges with inconsistent plant growth across its different greenhouse locations. By leveraging Power BI, the company plans to identify the best combination of soil type, sunlight hours, and watering frequency that leads to the highest growth milestones. The decomposition tree will help break down growth milestone counts by these factors, revealing that loam soil combined with daily watering and 6-8 hours of sunlight yields the best results. This insight will enable ABC Greenhouses to standardize these conditions across all locations, improving overall plant health and productivity.

## Scenario 2:

Green Earth Farms has noticed varying growth rates in their organic crops and wants to ensure consistency in their yield. By analysing the dataset, the company discovers that organic fertilizer combined with loam soil and bi-weekly watering leads to the most significant growth milestones. The decomposition tree further reveals that maintaining temperatures between 20-30°C and humidity levels between 50-70% optimizes plant growth. Green Earth Farms will use these insights to adjust their farming practices, ensuring their crops achieve the best possible growth under organic farming conditions.

## Scenario 3:

Future Grow Tech has been developing smart farming solutions but needs to validate their technology's effectiveness under different conditions. By using Power BI to analyse dataset, the company identifies that their smart sensors for monitoring soil moisture and adjusting water frequency in real-time significantly improve growth milestones. The decomposition tree analysis reveals that these sensors work best with sandy soil and weekly organic fertilizer application, under moderate temperature and humidity conditions. Future Grow Tech will integrate these findings into their product development, enhancing their technology




## Project Flow

To accomplish this, we have to complete all the activities listed below,

- Data Collection & Extraction from Database
  - Collect the dataset,
  - Storing Data in DB
  - Perform SQL Operations
  - Connect DB with Power Bi
- Data Preparation
  - Prepare the Data for Visualization
- Data Visualizations
  - No of Unique Visualizations
- Dashboard
  - Responsive and Design of Dashboard
- Report
  - Responsive and Design of Dashboard
- Performance Testing
  - No of Visualizations/ Graphs
- Project Demonstration & Documentation
  - Record explanation Video for project end to end solution

o Project Documentation-Step by step project development procedure

## Milestone 1: Data Collection & Extraction from Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

### Activity 1: Collect the dataset

Please use the link to download the dataset: Link

https://docs.google.com/spreadsheets/d/1fGhq2wqwkITKaQXi31Xq9lnHdKLA_r_y/edit?usp=drivesdk&ouid=103244069021549367265&rtpof=true&sd=true

### Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files.

### Milestone 2: Data Preparation

Data preparation is a critical phase in the data lifecycle, encompassing activities that transform raw data into a format suitable for analysis. This multifaceted process involves several steps including data cleaning, integration, transformation, and enrichment. Data cleaning involves identifying and rectifying errors, inconsistencies, and missing values within datasets to ensure accuracy and reliability.

### Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

## Milestone 3: Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

### Activity 1: No of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the performance and efficiency of plant growth- water frequency- humidity-soil type and etc. include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes according to the seasons and climate changes.

## Activity1.1: sum of sunlight hours by soil type

1.Soil_ type

2.Sunlight_hours

3.Water_frequency

4.Fertilizer _type

5.Temperature

6.Humidity

7.Growth_ milestone

8.Water_frequency _ numeric

9.Temperature_range

10.Humidity_range

11.Humidity_level_description

12.Temperature_range-description

13.Growth_milestone-description

14.Plant_growth_category

## Activity 2: Connect Data with Power BI

With Power BI, users can seamlessly connect to a wide range of data sources, including databases, cloud services, spreadsheets, and streaming data. This capability allows organizations to consolidate disparate data sources into a single, unified platform, breaking down data soils and enabling holistic analysis.

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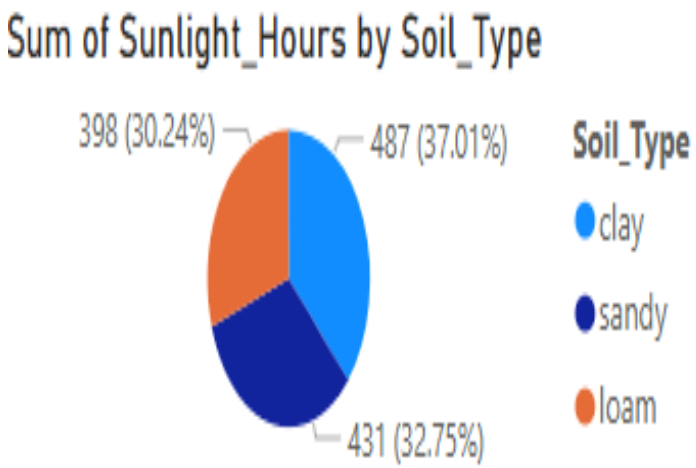
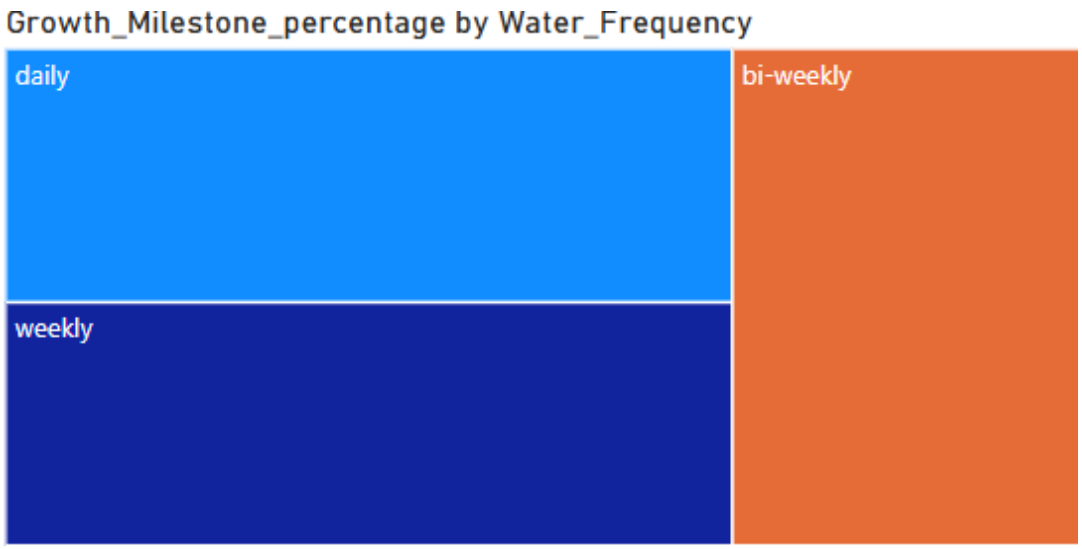
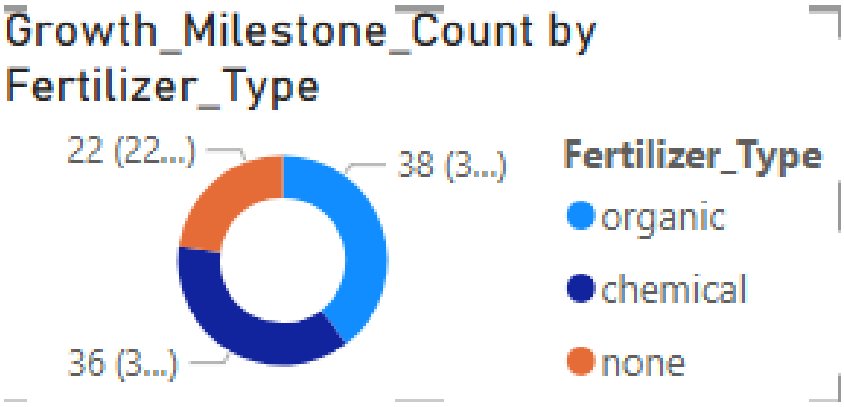


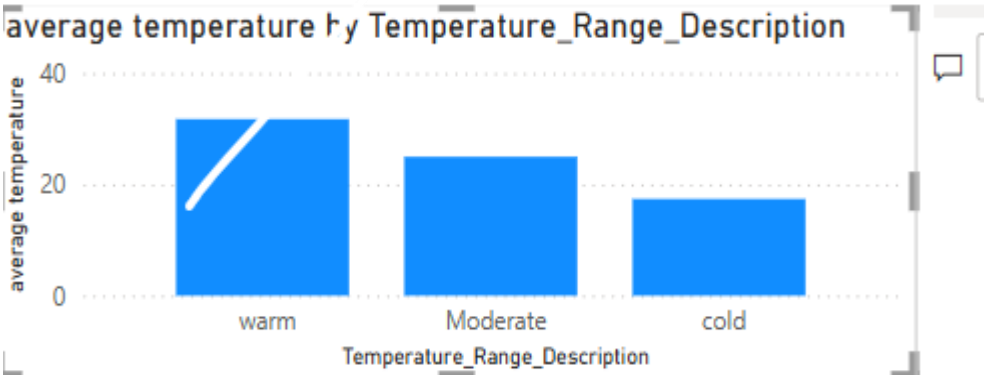

## Activity 1.2: water frequency



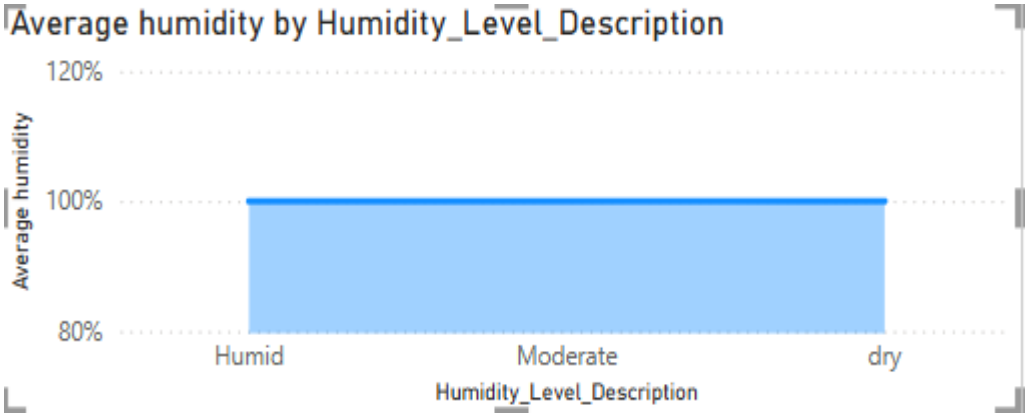

## Activity 1.3: Fertilizer type




## Activity 1.4: Temperature




## Activity1.5: Humidity




## Activity 1.6: Growth milestone


### Milestone 4: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

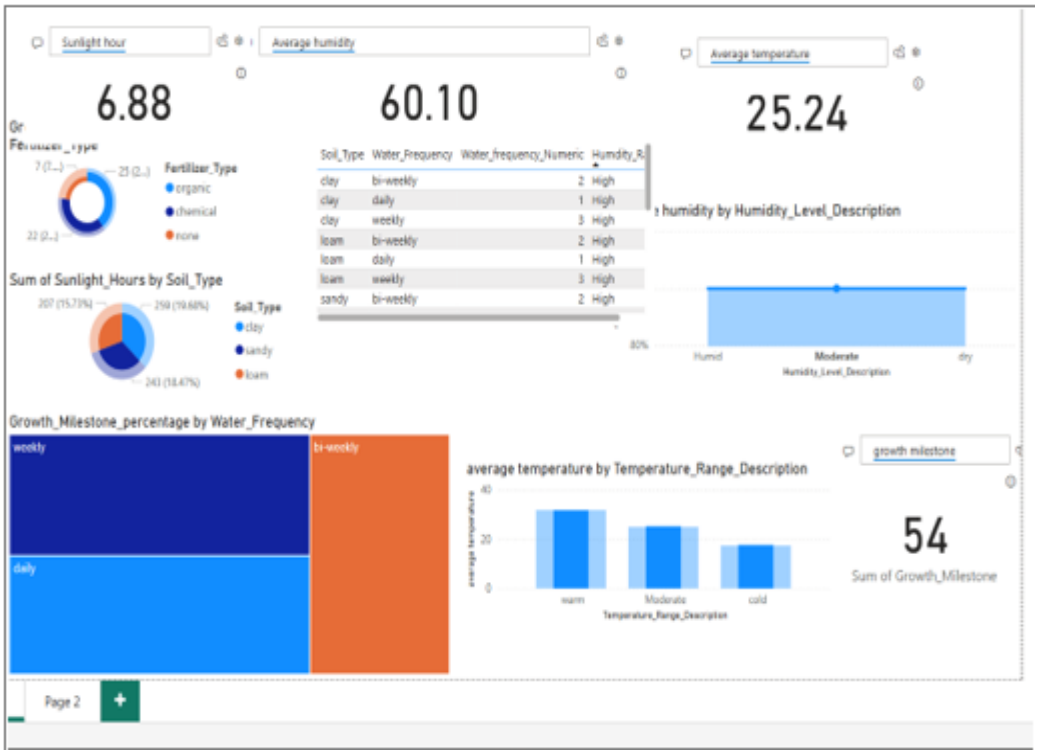
## Activity :1- Responsive and Design of Dashboard

The responsiveness and design of a dashboard for Social Pulse Illuminating the Digital Footprint  Unveiling Social Media Engagement Is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centred design, clear and concise information, interactivity, data-driven approach, accessibility, customization, and security. The goal is to create a

dashboard that is user-friendly, interactive, and data-driven, providing actionable insights to improve the performance and efficiency of Social Pulse Illuminating the Digital Footprint Un veiling Social Media Engagement.

## Dashboard 1:

## Pant growth analysis dashboard




## Dash board 2:

## Milestone 5: Report

A data report is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data Report can be told using a variety of mediums, presentations, interactive visualizations, and videos.

## Milestone 6: Performance Testing

Performance testing is a crucial aspect of software development aimed at evaluating the speed, responsiveness, stability, and scalability of an application under various workload conditions. It involves simulating real-world usage scenarios to assess how the system behaves and performs under stress, peak loads, or normal conditions.

## Activity 1: Utilization of Data Filters

The utilization of data filters plays a pivotal role in streamlining information processing and analysis across various domains. By selectively extracting or excluding specific data points based on predefined criteria, filters enable efficient data management and enhance decision-making processes.

## 12. Owns Car by demographics

## Milestone 7: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables.

### Activity 1: Record explanation Video for project end to end solution

Creating a record explanation video for a project's end-to-end solution is crucial for ensuring clarity and transparency in its implementation. This video serves as a comprehensive guide, detailing every aspect of the project from inception to completion.