Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	13 March 2025
Team ID	PNT2025MID02625
Project Name	Global Food Production Trends and Analysis: A Comprehensive Study from 1961 to 2023 Using Power BI
Maximum Marks	4 Marks

Technology Stack (Architecture & Stack)

Project Name: Global Food Production Trends and Analysis (1961-2023) using Power BI

Technical Architecture:

The project follows a structured architecture for data collection, processing, and visualization using Power BI. The architecture consists of: 1. **Data Sources**: FAO, World Bank, Kaggle datasets (CSV/Excel format).

2.Data Storage: SQL Database / Cloud Storage / Local Filesystem.

3. Data Processing: Python (Pandas, NumPy) for cleaning and transformation.

4. Data Modeling: Fact and Dimension tables in a star schema.

5. Visualization Layer: Power BI for dashboards and reports

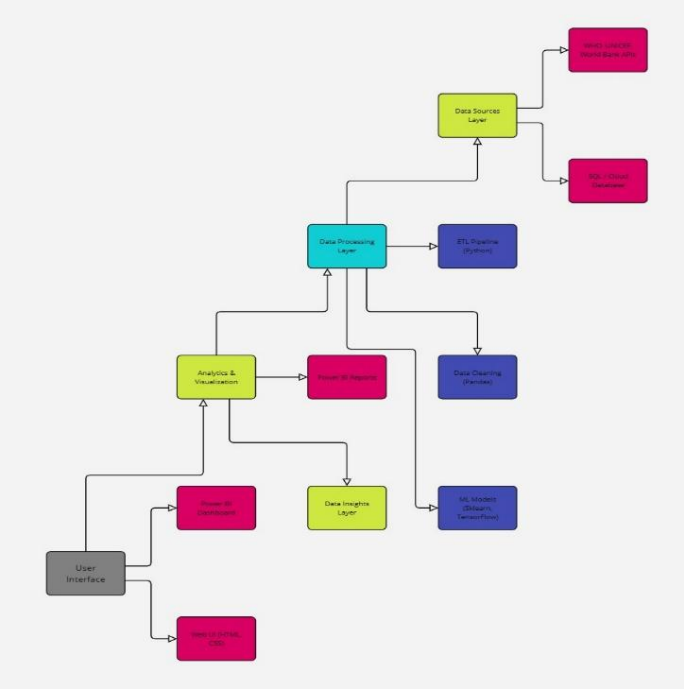

Fig. technology architecture diagram

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Interactive Dashboard & Reports	Power BI
2.	Data Storage	Storage for historical food production data	SQL / Azure / CSV / Excel
3.	Data Processing	Data transformation and calculations	Python (Pandas, NumPy), DAX (Power BI)
4.	Data Modeling	Fact-Dimension relationships for better analysis	Star Schema in Power BI
5.	External API	Fetching live data if needed	FAO API, World Bank API
6.	Infrastructure	Hosting and sharing reports Storage	Power BI Service / Local / Cloud

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Data analysis and visualization tools	Python (Pandas, Matplotlib)
2.	Security Implementations	Access control and data security	Power BI Role-Based Access, IAM
3.	Scalable Architecture	Handling large datasets efficiently	SQL Indexing, Cloud-based storage
4.	Availability	Ensuring data availability for users	Power BI Service, Azure Cloud
5.	Performance	Optimized data loading and visualization	DAX Measures, Query Folding, Caching

References:

https://www.fao.org/faostat/en/

https://data.worldbank.org/

https://ourworldindata.org/food-agriculture

https://www.kaggle.com/datasets?search=agriculture