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

Date	02 March 2025
Team ID	PNT2025TMID02999
Project Name	Global Malnutrition Trends: A Power BI Analysis (1983-2019)
Maximum Marks	4 Marks

Technical Architecture:

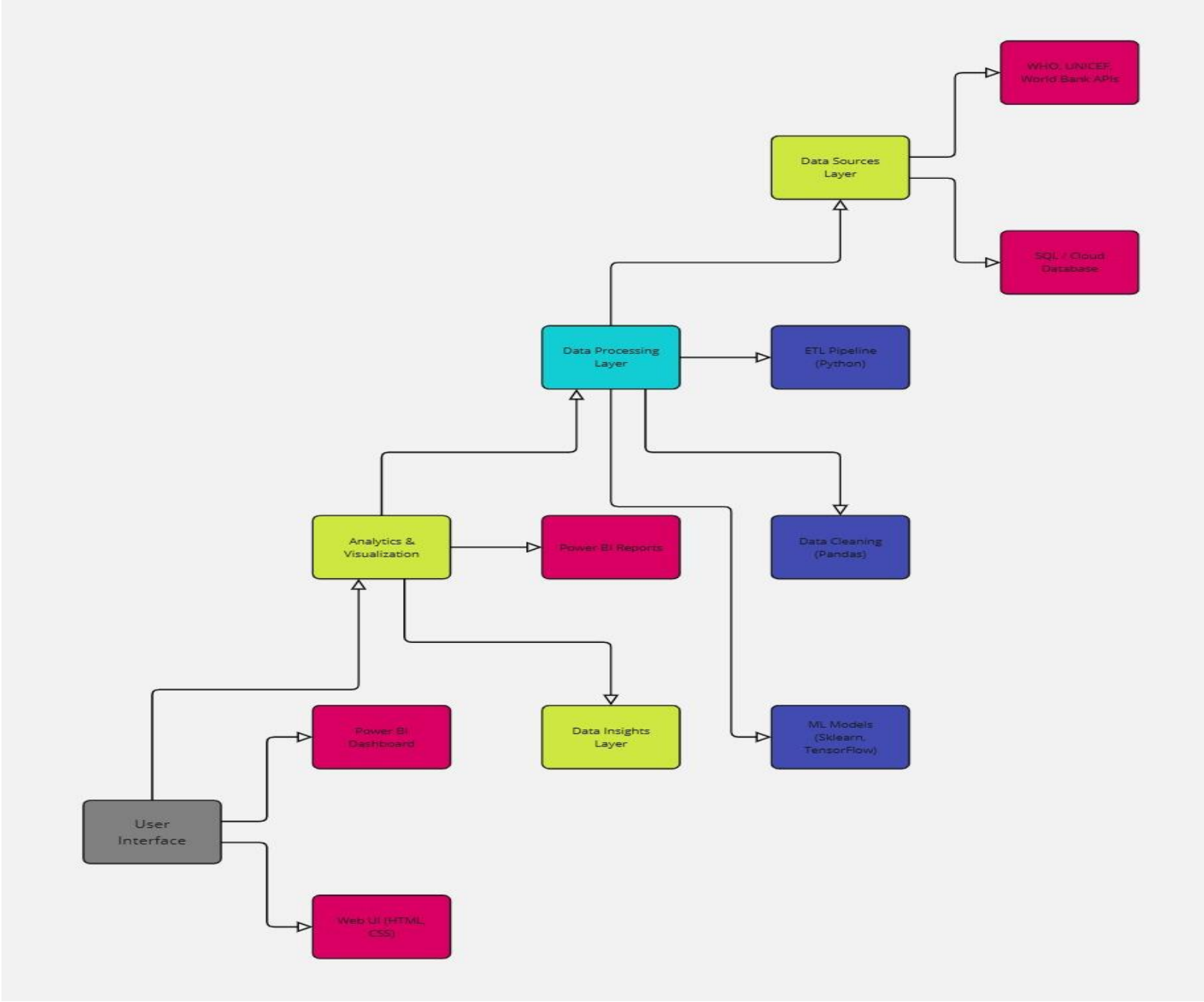
WHO, UNICEF, World Bank APIs
Data Sources Layer
SQL / Cloud Database
Data Processing Layer
ETL Pipeline (Python)
Analytics & Visualization
Power BI Reports
Data Cleaning (Pandas)
Power BI Dashboard
Data Insights Layer
ML Models (Sklearn, TensorFlow)
User Interface
Web UI (HTML, CSS)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web based interactive dashboard for users	Power BI,HTML, CSS
2.	Application Logic-1	Data cleaning,Transformation,and aggregation	Python(Pandas)
3.	Application Logic-2	Data ingestion from various sources	ETL pipleline(SQL ,Python)
4.	Application Logic-3	Machine Learning For trend Prediction	Scikit-learn,Tensorflow.
5.	Database	Storage of malnutrition	MySQL, Postgre SQL.
6.	Cloud Database	Cloud Storage for scalability.	AWS,RDS,Google bigqurey.
7.	File Storage	Storage for report and analysis files.	AWS,S3,Google Drive.
8.	External API-1	Data source API for global health data.	WHO,API,World Bank API.
9.	External API-2	Socioeconomic factors data integration.	IMF API,FAO API.
10.	Machine Learning Model	Predictive analysis for malnutrition trends.	Regression Model,CNN.
11.	Infrastructure (Server / Cloud)	Deployment platform for power bi.	Microsoft Azure,AWS,

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Use of open-source libraries for data analysis and	Python ,Pandas,Matplotlib

S.No	Characteristics	Description	Technology
		visualization .	
2.	Security Implementations	Data encryption ,access control,and Secure API integration.	SSL,OAuth,LAM controls.
3.	Scalable Architecture	Cloud-based scalable powerBI dashboard	Microservice,AWS Lambda.
4.	Availability	High availability through cloud redundancy and backups.	Load Balance,CDNs.
5.	Performance	Optimized performance with caching and parallel processing	Redis,CloudFront,FastAPI.