

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

Date	24 June 2025
Team ID	LTVIP2025TMID34708
Project Name	Transfer Learning-Based Classification of Poultry Diseases for Enhanced Health Management
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

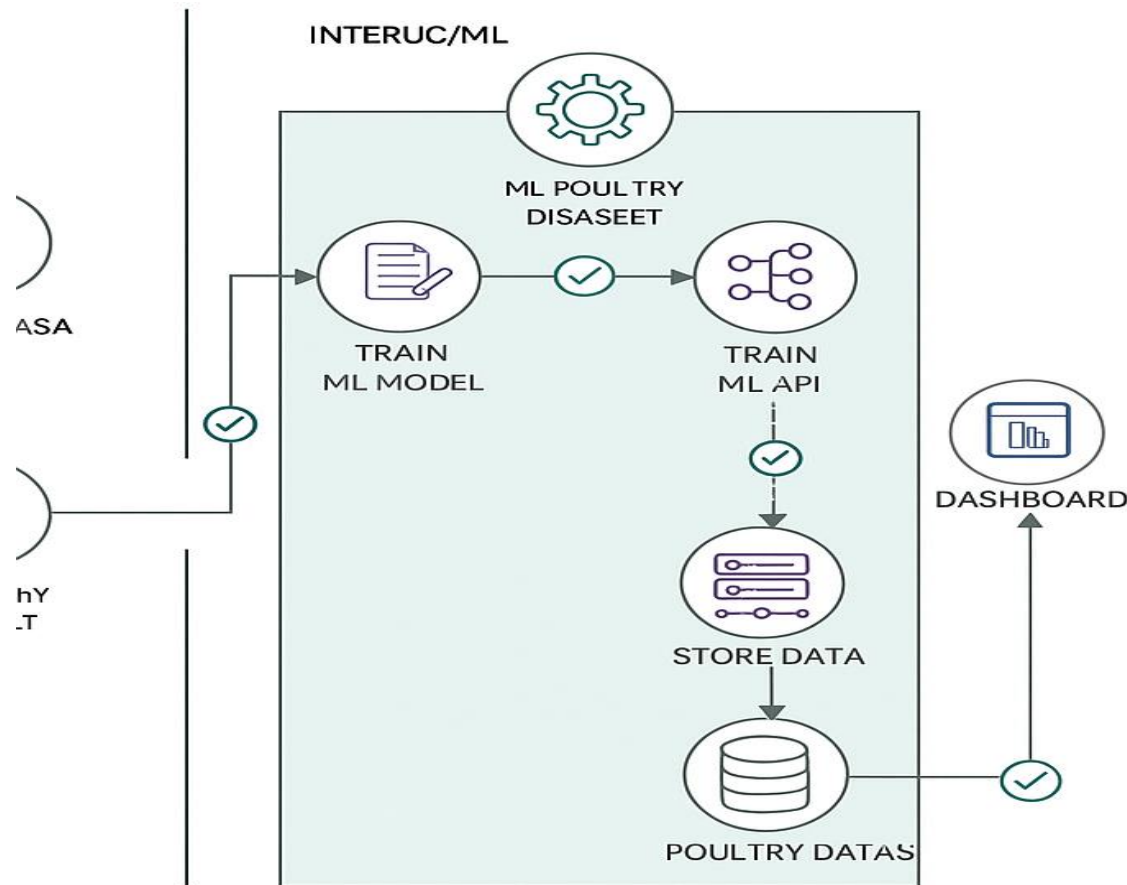
Example: Order processing during pandemics for offline mode

Reference: <https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/>

Guidelines:

- Include all the processes (As an application logic / Technology Block)
- Provide infrastructural demarcation (Local / Cloud)
- Indicate external interfaces (third party API's etc.)
- Indicate Data Storage components / services
- Indicate interface to machine learning models (if applicable)

Example Techniical Architecture



GUIDELINES:

Include all the processes (As an application logi.
Technology Block
Provide
infrastructural demarcation
(Local / Clouc
Indicate extenal interfaces (third party AP)'s etc.)
Indicate Data Storage compnen / services
If applicable

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Mobile & web-based farmer and vet dashboard	HTML, CSS, JavaScript, React Native / React.js
2.	Application Logic-1	Data ingestion & cleaning logic for symptoms, environment, and sample data	Python (Pandas, NumPy, Requests)
3.	Application Logic-2	ML model training & transfer learning for disease classification	Python (TensorFlow, Keras, scikit-learn)
4.	Application Logic-3	API service for real-time disease prediction	Flask / FastAPI
5.	Database	Store structured poultry health and environment data	MongoDB / PostgreSQL
6.	Cloud Database	Scalable cloud database for data & analytics	AWS RDS / Google Cloud Firestore
7.	File Storage	Store raw symptom images, CSV files, and model artifacts	AWS S3 / Google Cloud Storage
8.	External API-1	Get real-time weather and farm environmental data	OpenWeather API / Local IoT integrations
9.	External API-2	Get veterinary disease guidelines and reference data	WHO OIE APIs / FAO datasets
10.	Machine Learning Model	Predict poultry diseases using transfer learning classification	Transfer Learning Models (MobileNetV2, ResNet50)
11.	Infrastructure (Server / Cloud)	Cloud deployment for continuous access and scaling	Docker, Kubernetes, AWS / GCP / Azure

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Use of open-source ML and web frameworks for transparency and cost efficiency	TensorFlow, Keras, FastAPI, React, MongoDB
2.	Security Implementations	API authentication, encrypted data transmission, role-based user access	HTTPS, JWT, OAuth2, IAM

S.No	Characteristics	Description	Technology
3.	Scalable Architecture	Microservice-based design with auto-scaling for increased user/data load	Kubernetes, Docker
4.	Availability	Load-balanced, multi-region cloud deployment for high uptime	AWS ELB, GCP Load Balancer, Azure Front Door
5.	Performance	Caching, optimized model inference, CDN for faster dashboard loading	Redis, Flask Async, Cloud CDN

References:

<https://c4model.com/>

<https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/>

<https://www.ibm.com/cloud/architecture>

<https://aws.amazon.com/architecture>

<https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d>