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

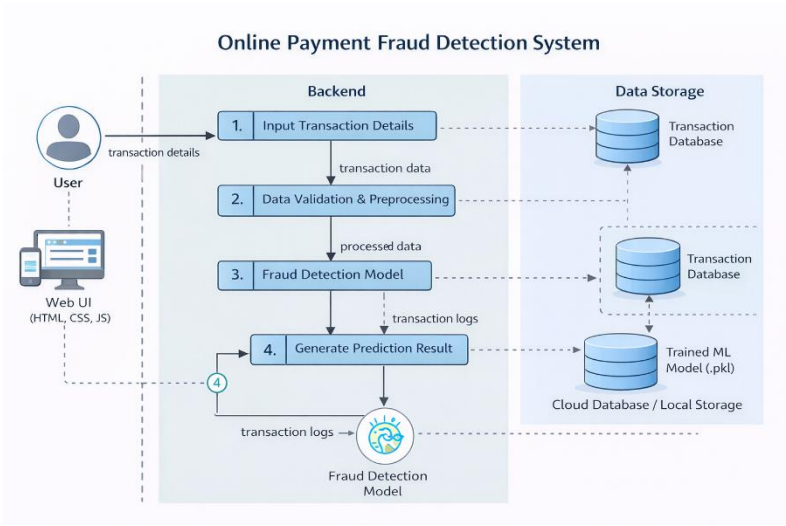
Date	18 February 2026
Team ID	LTVIP2026TMIDS65699
Project Name	Online Payments Fraud Detection using Machine Learning
Maximum Marks	4 Marks

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)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web interface for entering transaction details and viewing prediction results	HTML, CSS, JavaScript
2.	Application Logic-1	Input validation and request handling logic	Python (Flask / FastAPI)
3.	Application Logic-2	Data preprocessing and feature engineering	Pandas, NumPy
4.	Application Logic-3	Fraud detection inference logic	Scikit-learn
5.	Database	Stores transaction logs and prediction results	SQLite / MySQL
6.	Cloud Database	Database service hosted on cloud	Render Cloud DB / Managed MySQL
7.	File Storage	Storage of trained ML model file (.pkl)	Local File System (Server Storage)
8.	External API-1	(Future Enhancement) Payment Gateway Integration	Razorpay / Stripe API
9.	External API-2	(Future Enhancement) SMS/Email Alert Service	SMTP
10.	Machine Learning Model	Fraud classification model for predicting fraudulent transactions	XGBoost
11.	Infrastructure (Server / Cloud)	Application deployment and hosting environment	Render Cloud Platform

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Backend and ML libraries used in development	Python, Flask, Scikit-learn
2.	Security Implementations	Secure data transmission, input validation, and encrypted communication	HTTPS, SSL, Form Validation

S.No	Characteristics	Description	Technology
3.	Scalable Architecture	Three-tier cloud-based architecture supporting scaling	Cloud Deployment
4.	Availability	Cloud hosting ensures high uptime and accessibility	Render Cloud
5.	Performance	Fast ML inference with optimized model loading	Pre-trained ML Model

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