

**Project Design Phase**  
**Proposed Solution Template**

Date	15 February 2025
Team ID	LTVIP2026TMIDS42143
Project Name	online payments fraud detection using machine learning
Maximum Marks	2 Marks

**Proposed Solution Template:**

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Online payment systems are increasingly vulnerable to fraudulent transactions. Traditional rule-based systems fail to detect sophisticated fraud patterns in real time, leading to financial losses, customer dissatisfaction, and reduced trust in digital payment platforms. There is a need for an intelligent system that can accurately detect fraudulent transactions before completion.
2.	Idea / Solution description	The proposed solution is a Machine Learning-based Fraud Detection System built using Python, Flask, and a trained ML model. The system takes transaction details (step, type, amount, balances) as input, encodes categorical features using a Label Encoder, and predicts whether the transaction is Fraud or Not Fraud using a trained model (model.pkl). The result is displayed instantly through a web interface.
3.	Novelty / Uniqueness	Unlike traditional rule-based systems, this solution uses data-driven Machine Learning algorithms to detect fraud patterns dynamically. The system is lightweight, deployable on cloud platforms, and capable of real-time prediction. It can also be upgraded with advanced models (Random Forest, XGBoost, Deep Learning) and integrated directly into payment gateways.
4.	Social Impact / Customer Satisfaction	This solution enhances financial security and builds trust in digital payment systems. It reduces fraud-related losses for individuals and businesses, increases confidence in online transactions, and contributes to safer digital economies. Customers feel more secure knowing their transactions are monitored intelligently.

5.	Business Model (Revenue Model)	<p>The system can be offered as:</p> <ul style="list-style-type: none"> <li>• SaaS (Software as a Service) for banks and fintech companies</li> <li>• API-based fraud detection service per transaction</li> <li>• Subscription-based model for payment gateways</li> <li>• Enterprise licensing for large financial institutions</li> </ul>
6.	Scalability of the Solution	<p>The solution can scale by deploying on cloud platforms (AWS, Azure, Render, etc.), using containerization (Docker), and integrating load balancers. The ML model can be retrained periodically with new transaction data to improve accuracy. It can also be extended to handle millions of transactions per day using distributed systems.</p>