DFD & User Stories

Online Payments Fraud Detection using Machine Learning

---

1. Data Flow Diagram — Level 0 (Context)

The Level 0 DFD shows the system as a single process with its external entities:

```
  [User] → (Transaction Details) → [Fraud Detection System] → (Fraud Verdict + Probability) → [User]
```

External Entities: User (fraud analyst or end user entering transaction data)

Data Stores: payments.pkl (trained Random Forest model)

2. Data Flow Diagram — Level 1

Processes:

1. P1 — Input Validation: Validates that all 7 fields are numeric and present
2. P2 — Feature Assembly: Constructs numpy array in correct feature order
3. P3 — Model Inference: Calls model.predict_proba() on the feature array
4. P4 — Threshold Decision: Applies 0.20 threshold to classify as fraud/legitimate
5. P5 — Result Rendering: Formats result string and renders submit.html template

Data Flows:

- User → P1: Raw form values (step, type, amount, balances)
- P1 → P2: Validated float values
- P2 → P3: numpy array shape (1, 7)
- P3 → P4: Probability array [[P(legit), P(fraud)]]
- P4 → P5: fraud_prob float, verdict string
- P5 → User: Rendered HTML result page

3. User Stories

ID	User Story	Acceptance Criteria
US-01	As a user, I want to enter transaction details so I can	Form accepts all 7 inputs; submit

ID	User Story	Acceptance Criteria
	check for fraud	redirects to result
US-02	As a user, I want to see a clear verdict so I know if the transaction is safe	Result page shows Legitimate or Fraud Detected
US-03	As a user, I want to see a probability score so I can judge the risk level	Score displayed as percentage (0–100%)
US-04	As a user, I want to select transaction type easily without knowing numeric codes	Type selector shows icons: Payment, Transfer, Cash Out, Debit
US-05	As a user, I want to test another transaction from the result page	'Test Another' button navigates back to /predict
US-06	As a developer, I want the model to be swappable without code changes	Only payments.pkl needs replacing for a new model