

Lab 10

Github : <https://github.com/sojirat/fintech-lab10.git>

Audit Notes : [docs/Audit_Notes.md](#)

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Run ตอนแรก แบบง่ายไม่ได้แก้อะไร ผลลัพท์ไม่มี Fraud

FinTech Lab 10
Fraud Detection + AML Graph Hunt + XAI + Case Pack

1) Dataset Status

Refresh Summary Train Models Lose Top Anomalies

```
{
  "rows": 1000,
  "columns": [
    "TransactionID",
    "Amount",
    "FraudIndicator",
    "CustomerID",
    "Category",
    "Timestamp",
    "AnomalyScore",
    "FraudIndicator",
    "Category",
    "Age",
    "Address",
    "AccountBalance",
    "MerchantName",
    "Location",
    "SuspiciousLag"
  ],
  "FraudRate": 0.004,
  "ActualCustomerRate": 0.025,
  "AmountAvg": 18.4809356275991,
  "AmountMax": 99.087497432798
}
```

Training Result

```
{
  "status": "trained",
  "x": 0.0001,
  "label_fraud_rate": 0.045,
  "accuracy": 0.978,
  "confusion_matrix": [
    [235, 0],
    [0, 11],
    [0, 0]
  ],
  "precision": 0,
  "recall": 0,
  "f1": 0.978
}
Note: This is a supervised model for explanations (MAZ).2
```

2) Top Anomalies (click a TransactionID)

TransactionID	Amount	IForestRisk	ShadowProb	FraudIndicator
671	67.69	0.0033	0.5049	1
934	59.65	0.0029	0.0397	0
505	53.93	0.0022	0.5813	0
889	26.68	0.0018	0.1967	0
502	77.46	0.0013	0.0813	0
483	44.86	0.0013	0.5977	0
321	57.87	0.0013	0.0498	0
650	62.48	0.0008	0.1667	0
349	78.41	-0.0000	0.0918	0
510	56.79	-0.0002	0.1306	0
449	12.95	-0.0003	0.0483	0
504	93.50	-0.0004	0.0564	0
792	72.01	-0.0005	0.0453	0
456	10.59	-0.0008	0.0566	0
703	53.20	-0.0011	0.1371	0
923	52.16	-0.0012	0.0448	0
89	26.01	-0.0013	0.0626	0
907	61.95	-0.0015	0.1113	0
721	71.44	-0.0016	0.1016	0
148	79.52	-0.0016	0.1086	0
887	26.53	-0.0018	0.0509	0
207	81.56	-0.0018	0.0875	0
339	26.18	-0.0019	0.0269	0
789	69.45	-0.0021	0.0896	0
906	90.39	-0.0022	0.1064	0
282	66.57	-0.0023	0.0613	0
759	60.53	-0.0023	0.0717	0
262	54.47	-0.0023	0.1400	0
847	80.23	-0.0024	0.1369	0
280	16.22	-0.0024	0.0477	0

3) Selected Transaction – Score + Explain + Case Pack

Create Case Pack Refresh Case List

Transaction

```
{
  "TransactionID": 289,
  "Amount": 16.22,
  "FraudIndicator": 0,
  "CustomerID": 10647,
  "Category": "Retail",
  "Timestamp": "2024-02-18T11:54:12.651232Z",
  "MerchantID": 2553,
  "AccountBalance": 6685.598453648112,
  "SuspiciousLag": 8
}
```

Model Outputs

```
{
  "forest_decision_function": 0.0001,
  "iforest_risk_score": 0.0001,
  "shadow_model_pred": 0,
  "AnomalyScore": 0.04755952370745
}
```

Explain (Top Factors)

```
{
  "method": "linear_contribution",
  "top_factors": [
    {
      "feature": "Amount",
      "contribution": -0.31885318495
    },
    {
      "feature": "location_location",
      "contribution": -0.28663995084453
    },
    {
      "feature": "DaysSinceLastLogin",
      "contribution": -0.11914429291562
    },
    {
      "feature": "AnomalyScore",
      "contribution": -0.1740593548618812
    },
    {
      "feature": "Category_Retail",
      "contribution": 0.4918373795536419
    },
    {
      "feature": "Age",
      "contribution": -0.0377825308823
    },
    {
      "feature": "AmountToCustomerAvg",
      "contribution": 0.0006555174059997
    },
    {
      "feature": "TxCount_1h",
      "contribution": 0
    }
  ]
}
```

Note: Install SHAP for more advanced explanations. This fallback is guid-friendly and deterministic.

Classroom scaffold - Evidence-bound decisions - Human-in-the-loop

AML Graph Hunt

Graph Summary Smurfing (Fan-out/Fan-in) Find Cycles

```
{
  "nodes": 1287,
  "edges": 2880,
  "cost": 1000,
  "searchTime": 651,
  "top_degree_nodes": [
    {
      "node": "C11424",
      "degree": 12
    },
    {
      "node": "C16668",
      "degree": 12
    },
    {
      "node": "C1825",
      "degree": 12
    },
    {
      "node": "C1331",
      "degree": 12
    },
    {
      "node": "C1332",
      "degree": 12
    },
    {
      "node": "C1618",
      "degree": 12
    },
    {
      "node": "C1796",
      "degree": 8
    },
    {
      "node": "W12638",
      "degree": 8
    },
    {
      "node": "W12087",
      "degree": 8
    },
    {
      "node": "W12479",
      "degree": 8
    }
  ]
}
```

Smurfing -- Fan-out

```
{
  "node": "fanout",
  "items": []
}
```

Smurfing -- Fan-in

```
{
  "node": "fanin",
  "items": []
}
```

Cycles / Rings

```
{
  "max_length": 6,
  "items": [
    {
      "cycles": [
        {
          "cycle": [
            "C1588",
            "C588",
            "W12638",
            "C1825"
          ],
          "length": 4
        },
        {
          "cycle": [
            "W12087",
            "C1848",
            "W1227",
            "C16668"
          ],
          "length": 4
        }
      ]
    }
  ]
}
```

Cases (Human-in-the-loop)

Refresh Case List

```
{
  "items": [
    {
      "case_id": "255320761114",
      "created_at": "2024-02-18T11:54:12.651232Z",
      "summary": "Tx 289 Fraud triangle case"
    }
  ]
}
```

Run หลังจากปรับข้อจำกัดต่าง ๆ เช่น Balancing, ทำ K-Fold ผลลัพธ์มี Fraud

