

PS C:\Users\devpa\OneDrive\Desktop\HarshAgenticAI> python main.py

 Launching Agentic AI Fraud Detection System...

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 Cleaning Agent (LLM): Analyzing and cleaning data...

 Raw LLM response: [

```
{  
  "action": "dropna"  
},  
{  
  "action": "handle_inconsistent_dtypes",  
  "column": "age"  
},  
{  
  "action": "strip_whitespace",  
  "columns": [  
    "customer",  
    "gender",  
    "merchant",  
    "category"  
  ]  
},  
{  
  "action": "convert_to_titlecase",  
  "columns": [  
    "customer",  
    "gender",  
    "merchant",  
    "category"  
  ]  
},  
{  
  "action": "encode_categoricals",  
  "columns": [  

```

```
"gender",
"category",
"merchant"
]
}
]
```

✅ Cleaning completed based on LLM instructions.

🤖 Planner Agent (Groq): Analyzing dataset schema...

✅ Groq Planner Agent Output:

```
{'features': ['age', 'gender', 'merchant', 'category', 'amount'], 'model': 'xgboost',
'scaling': 'standard', 'imbalance_strategy': 'scale_pos_weight'}
```

🔄 ETL Pipeline: Cleaning, engineering, and scaling data...

🔧 Feature Engineering: Creating temporal and customer-level features...

⚠️ Encoding column 'gender' as it is still object dtype.

⚠️ Encoding column 'merchant' as it is still object dtype.

⚠️ Encoding column 'category' as it is still object dtype.

📊 Applying standard scaling to numeric features.

✅ Final shape: (594643, 5)

🤖 Modeling Agent: Building model based on LLM plan...

✅ Applied Standard Scaling.

✅ Model trained using xgboost.


📈 Model Performance:

| | precision | recall | f1-score | support |
|----------|-----------|--------|----------|---------|
| 0 | 1.00 | 0.98 | 0.99 | 117489 |
| 1 | 0.36 | 0.97 | 0.53 | 1440 |
| accuracy | | | 0.98 | 118929 |


✅ Predictions saved to outputs/fraud_scores.csv


⚠️ Skipped code check: 'charmap' codec can't decode byte 0x8f in position 1414: character maps to <undefined>


🔍 Explainability Agent: Calculating SHAP values...

100%|=====| 594422/594643 [11:11<00:00]  SHAP
summary plot saved to outputs/shap_summary.png

 Rule Suggester Agent: Asking LLM for fraud rules...

100%|=====| 593724/594643 [29:25<00:02]  Saved
rule suggestions to outputs/rule_suggestions.txt

 Memory saved to outputs/memory.json.

 Pipeline completed. All outputs saved in /outputs.