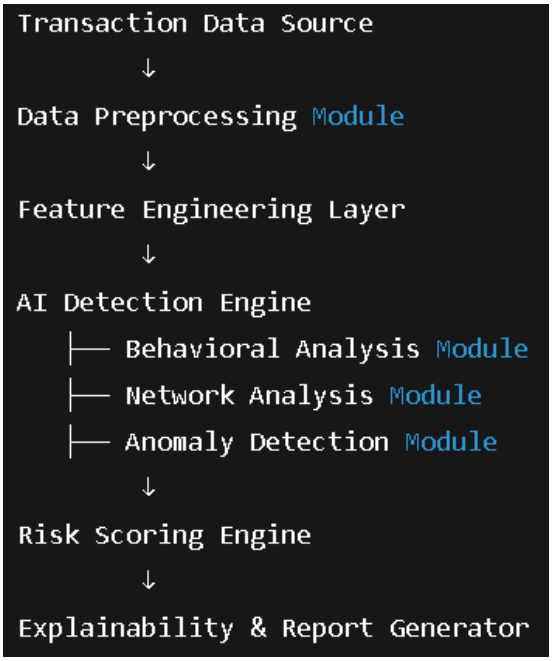
🏗️ Architecture & Workflow

🔷 System Architecture Overview

The AI-Based AML Detection Agent follows a modular and scalable architecture designed for efficient transaction monitoring and risk evaluation.



Each module is designed to work independently, allowing scalability and easy integration with existing banking systems.

🔄 Workflow

Step 1: Data Ingestion

The system collects transaction data and account information in either real-time or batch mode.

Step 2: Data Preprocessing

The data is cleaned and prepared by:

-Removing inconsistencies
-Handling missing values
-Normalizing transaction amounts
-Extracting relevant features

Step 3: Feature Engineering

Key behavioral and network-related features are generated, such as:

-Transaction frequency
-Average transaction value
-Account activity patterns
-Transaction connectivity metrics

Step 4: Behavioral Analysis

The agent compares current transaction patterns with historical behavior to detect unusual deviations.

Step 5: Network Graph Analysis

A transaction graph is constructed to identify:

-Suspicious clusters
-Circular fund movements
-High-risk connected accounts

Step 6: Risk Score Calculation

The system combines behavioral and network insights to generate a dynamic risk score for each transaction or account.

Step 7: Explainable Report Generation

If a transaction or account crosses a risk threshold, the system generates a structured report explaining:

- Why it was flagged

- Risk score breakdown
- Detected suspicious patterns

📊 Use Cases

The AI-Based AML Detection Agent can be applied across various financial environments to improve fraud detection and compliance efficiency.

🏦 1️⃣ Banking Institutions

-Real-time monitoring of customer transactions
-Detection of suspicious account behavior
-Identification of high-risk customers
-Reducing false positives in AML alerts

Banks can use the agent to strengthen internal compliance systems and prioritize investigations more effectively.

💳 2️⃣ Payment Gateways & FinTech Platforms

-Monitoring merchant and customer transactions
-Detecting rapid fund transfers and structured payments
-Preventing fraudulent account usage

This ensures safer digital payment ecosystems.

🌍 3️⃣ Cross-Border Transaction Monitoring

-Identifying layered international fund transfers
-Detecting circular money movement across regions
-Monitoring high-risk international accounts

The system helps prevent global money laundering networks.

📄 4️⃣ Compliance & Regulatory Teams

-Automated suspicious activity detection
-Risk-based alert prioritization
-Generation of explainable compliance reports

This reduces manual workload and improves audit readiness.