**Key Components & Examples**

**1. Unusual Trade Volume**

* **What It Does:**
  + Checks if the trade quantity is significantly large compared to the stock's total available shares (market float).
* **Example:**
  + **Scenario:**
    - **Stock A** has available\_shares = 1,000,000.
    - Total traded shares for **Stock A** so far today = 500,000.
    - **Market Float** = available\_shares + total\_traded = 1,500,000.
    - **Threshold Volume** = 10% of 1,500,000 = 150,000 shares.
  + **Trade:** A trader places an order to buy **200,000 shares** of **Stock A**.
  + **Evaluation:**
    - **200,000** > **150,000** (Threshold).
    - **Result:** Trade flagged for **Unusually high volume**.

**2. Price Manipulation**

* **What It Does:**
  + Detects if the trade price deviates significantly (e.g., ±20%) from the stock's average price.
* **Example:**
  + **Scenario:**
    - **Stock B** has an average price of **$50**.
    - **Price Deviation Threshold** = ±20% → **$40** to **$60**.
  + **Trade 1:** A trader sells **100 shares** of **Stock B** at **$65**.
    - **Evaluation:** $65 > $60 → **Flagged** for **Price manipulation**.
  + **Trade 2:** A trader buys **150 shares** of **Stock B** at **$55**.
    - **Evaluation:** $55 is within $40-$60 → **Not flagged**.

**3. Frequent Trader Activity**

* **What It Does:**
  + Monitors if a trader executes multiple trades on the **same stock** within a short timeframe (e.g., 2 trades within 10 minutes).
* **Example:**
  + **Scenario:**
    - **Trader X** places trades on **Stock C**.
    - **Frequency Threshold** = 2 trades within **10 minutes**.
  + **Trade Sequence:**
    - **Trade 1:** 9:00 AM - Buy **50 shares** of **Stock C**.
    - **Trade 2:** 9:05 AM - Sell **30 shares** of **Stock C**.
  + **Evaluation:**
    - **2 trades** within **5 minutes** → **Flagged** for **High trading frequency**.
  + **Note:** If Trader X trades **Stock D** instead, it doesn't count towards **Stock C**'s frequency.

**4. Recording Suspicious Activity**

* **What It Does:**
  + If any of the above conditions are met, it creates a record in the SuspiciousActivity model with the reasons.
* **Example:**
  + **Trade:** Trader Y buys **200,000 shares** of **Stock A** at **$65**.
  + **Evaluation:**
    - **Unusually high volume** (200,000 > 150,000).
    - **Price manipulation** ($65 > $60).
  + **Action:**
    - Create a SuspiciousActivity record detailing both reasons.

**Real-World Alignment & Recommendations**

**Current Behavior:**

* **Counts Trades on the Same Stock:**
  + The function **only** counts the number of trades a trader makes **on the same stock** within the specified timeframe.
* **Trade on Different Stocks:**
  + Trades on **different stocks** by the same trader **do not** contribute to the frequency count for any single stock.

**What Should Be in Real-World:**

* **Comprehensive Monitoring:**
  + **Same Stock:** Continue monitoring multiple trades on the **same stock**.
  + **Different Stocks:** Optionally, monitor overall trading activity across **all stocks** to detect patterns like rapid switching or high-frequency trading that could indicate manipulative behavior.

**Example Enhancement:**

* **Scenario:**
  + **Trader Z** makes:
    1. **Trade 1:** 10:00 AM - Buy **100 shares** of **Stock D**.
    2. **Trade 2:** 10:03 AM - Buy **150 shares** of **Stock E**.
    3. **Trade 3:** 10:07 AM - Sell **200 shares** of **Stock D**.
  + **Current Implementation:**
    1. **Stock D:** 2 trades within 7 minutes → **Flagged**.
    2. **Stock E:** 1 trade → **Not flagged**.
  + **Potential Enhancement:**
    1. Monitor **total trades** by Trader Z within 10 minutes across all stocks (3 trades) → **Flagged** for overall high-frequency trading.

**Summary**

* **Current Implementation:**
  + **Counts multiple trades** by the **same trader on the same stock** within a set timeframe.
  + **Flags trades** that exceed **volume thresholds**, have **price deviations**, or are part of **frequent trading** on a single stock.
* **Real-World Best Practices:**
  + **Monitor both same and different stocks** to detect broader suspicious trading patterns.
  + **Automate alerts** to compliance teams when suspicious activities are detected.
  + **Adjust thresholds** based on market conditions and regulatory guidelines to minimize false positives.