Customer Behavioural Spending Patterns for Early Financial Stress Detection (SQL-based Analysis)

Business question:

– Can we identify early signs of customer financial stress by analyzing transaction behavior using SQL?

Use cases:

- Banks/Fintech corporations need to identify financial stress of the customers **early** and not after the payment default.
- Internal Collections and risk teams can identify customers and **prioritize** efforts based on their behaviour patterns.

Dataset used:

- Personal Financial transactions data over 365 days (CSV file)
- Fields are as below,
    - Transaction_date
    - Weekday
    - Amount
    - Time_of_day
    - Merchant_type
    - Month

Assumption:

- Dataset comprises anonymized customer spending behavior. No real customer data is used.

Analytics: Four behavioral KPIs were used to identify early financial stress signals.

- **Spend Volatility**: Higher fluctuations would indicate unstable cash flow.
    - SQL query used:
    - select
    - avg(amount) as avg_spend,
    - stddev(amount) as spend_volatility
    - from finance_transactions;
    - **Insight** – Customers with high spending volatility may have unstable cash flows, even if their average spending appears normal.
- **Spend by Day (Behavioural Timing):**
    - SQL query used:
    - select weekday,
    - round(sum(amount),2) as total_spend
    - from finance_transactions
    - group by weekday
    - order by total_spend desc;
    - **Insight** – Would provide the day where customers spend the most, implying impulsive spending or financial pressure.

- **Spend by Category (Merchant split up spend):**
    - SQL query used:
    - select merchant_type,
    - round(sum(amount),2) as total_spend
    - from finance_transactions
    - group by merchant_type
    - order by total_spend desc;
    - **Insight –** Would provide the area where customer spends the most, indicating their priorities and obligations.
- **Early Warning Signal (Daily spend):**
    - SQL query used:
    - select transaction_date,
    - weekday,
    - sum(amount) as daily_spend
    - from finance_transactions
    - group by transaction_date, weekday
    - order by daily_spend desc;
    - **Insight** – Spikes in daily spending may reflect emergency expenses or poor cash flow planning.

Findings:

- Spending pattern shows significant day level volatility even with stable averages.
- Certain weekdays consistently show higher customer spend.
- Services and Subscriptions (Merchant type) dominate peak spend days; retail is where the customers spend the least indicating the trend towards online platforms.

Business Implications:

- Highly volatile customers can be flagged early preventing default risks.
- Peak spend days can help internal teams to increase outreach and communication effectively improving efficiency.
- Classification based on categorical spending helps identify risks and priorities associated with respective teams ensuring holistic approach.

Conclusion:

- Transaction-level data provides strong early indicators of financial stress.
- Spending volatility and timing-based patterns can help risk and collections teams take proactive action even in the absence of traditional credit data.