SQL Project

About Fraud Detection

The Database used in this project contains tables like card_holder, credit_card, merchant_category, transaction and merchant.

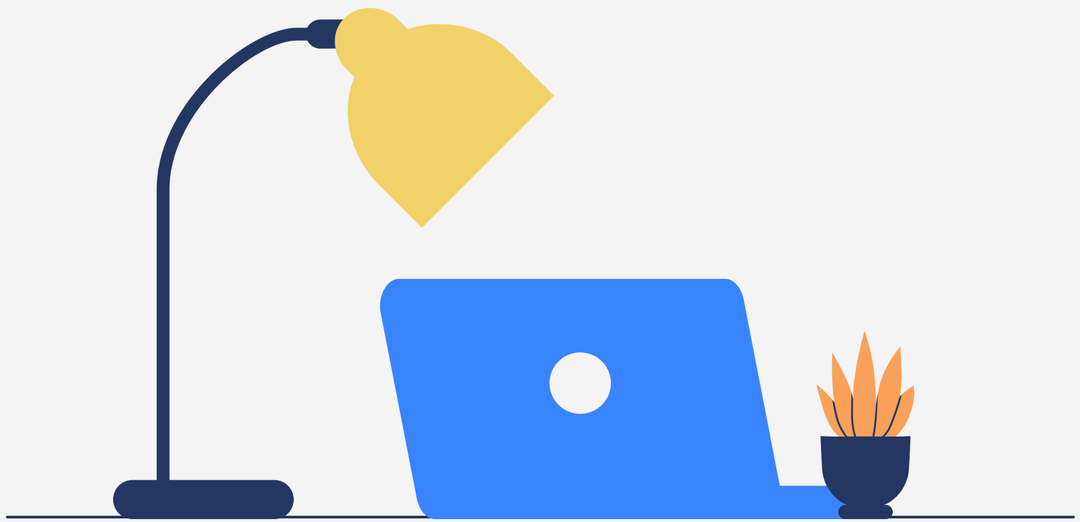
https://www.linkedin.com/in/yuvraj-giri-123530328/

Introducing myself

My name is Yuvraj Giri. Currently I'm learning SQL and have upper intermediate skills .

This is the SQL project of Fraud Detection and also my Fourth Project. I've included various questions on this project which will be beneficial for making data driven business decisions and extracting meaningful insights from this.

Questions



Identify High-Value Transactions

By identifying the records of high value transactions we can filter average customers and further investigation will be easier.

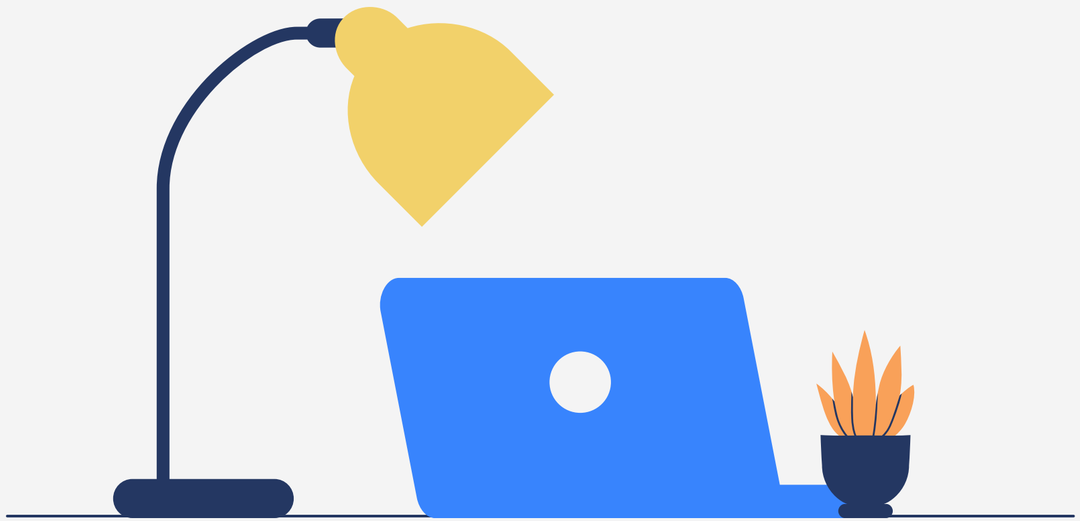
Frequent Transactions at the Same merchant

Frequent transactions will help us to detect frauds as it gives the indication of unusual behavior.

Multiple Active Credit Cards per cardholder

With the help of above analysis we can stop first party frauds, identity theft and credit card bust out frauds.

Questions



Flag transactions in High-risk categories

It identifies unusual transaction patterns like transactions in the high risk merchant category and Rapid moments of funds.

Card holders with unusual Transaction

Transactions that are different from normal transactions might indicate fraud.

Transactions Outside of Normal Business Hours.

Due to the reduced monitoring fraudsters might target unusual times like midnight, early in the morning or even different time zones.

```sql
-- Identify High-Value Transactions
WITH my
AS
(
SELECT
    ch.name
    AS Card_holder_name,
    ROUND(t.amount)
    AS One_time_transaction,
DENSE_RANK()
    OVER( PARTITION BY ch.name
        ORDER BY t.amount desc)
            AS Rank
FROM
    transaction t
JOIN
    credit_card cc
        ON cc.card = t.card
JOIN
    card_holder ch
        ON ch.id = cc.id_card_holder
WHERE t.amount > 1500
)

SELECT
    Card_holder_name,
    One_time_transaction
FROM my
WHERE
    Rank < 5
```

01

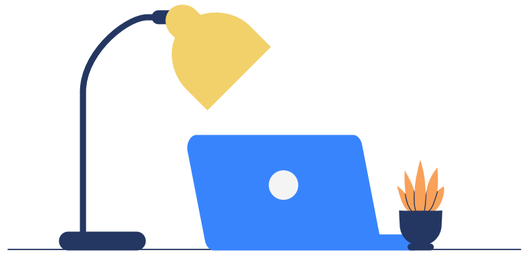
	card_holder_name character varying (50)	one_time_transaction double precision
1	Beth Hernandez	2108
2	Beth Hernandez	2001
3	Beth Hernandez	1856
4	Crystal Clark	1911
5	Crystal Clark	1803
6	Crystal Clark	1634
7	Crystal Clark	1617
8	Laurie Gibbs	1795
9	Laurie Gibbs	1724
10	Laurie Gibbs	1534
11	Malik Carlson	1839
12	Malik Carlson	1814
13	Malik Carlson	1769
14	Megan Price	1802
15	Megan Price	1678
16	Megan Price	1592
17	Megan Price	1530
18	Nancy Contreras	1813
19	Robert Johnson	1894
20	Robert Johnson	1790
21	Robert Johnson	1691
22	Robert Johnson	1660
23	Sean Taylor	2249
24	Sean Taylor	1685

Total rows: 25 of 25 Query complete 00:00:00.201

```sql
--Frequent Transactions at the Same merchant
SELECT
    ch.name
    AS Card_holder_name,
    m.name
    AS merchant_name,
    COUNT(t.card)
    AS Transaction_count
FROM
    transaction t
JOIN
    credit_card cc
        ON cc.card = t.card
JOIN
    card_holder ch
        ON ch.id = cc.id_card_holder
JOIN
    merchant m
        ON m.id = t.id_merchant
GROUP BY
    ch.name, m.name
        HAVING COUNT(t.card) > 4
ORDER BY
    Transaction_count DESC
```

	card_holder_name character varying (50)	merchant_name character varying (255)	transaction_count bigint
1	Matthew Gutierrez	Mcdaniel, Hines and Mcfarla…	7
2	Peter Mckay	Edwards-Aguirre	6
3	Megan Price	Jarvis-Turner	6
4	Sean Taylor	Henderson and Sons	5
5	Beth Hernandez	Vasquez-Parker	5
6	Crystal Clark	Johnson and Sons	5
7	Megan Price	Long, Harrell and Johnson	5
8	Beth Hernandez	Hood-Phillips	5
9	Kyle Tucker	Bond, Lewis and Rangel	5
10	Brandon Pineda	Nguyen, Bautista and Williams	5
11	Brandon Pineda	Ruiz-Anderson	5
12	Kevin Spencer	Garcia and Sons	5
13	Matthew Gutierrez	Turner Ltd	5
14	Crystal Clark	Fleming, Smith and Collins	5
15	Matthew Gutierrez	Atkinson Ltd	5
16	Brandon Pineda	Brown LLC	5

02



```sql
-- Multiple Active Credit Cards per cardholder
SELECT
    ch.id
    AS Cardholder_id,
    ch.name
    AS Cardholder_name,
    COUNT(cc.card)
    AS Card_count
FROM
    card_holder ch
JOIN
    credit_card cc
        ON cc.id_card_holder = ch.id
GROUP BY
    ch.id, ch.name
        HAVING COUNT(cc.card) > 1
ORDER BY
    Card_count desc
```

03

	cardholder_id integer	cardholder_name character varying (50)	card_count bigint
1	13	John Martin	3
2	12	Megan Price	3
3	24	Stephanie Dalton	3
4	19	Peter Mckay	3
5	10	Matthew Gutierrez	3
6	16	Crystal Clark	3
7	23	Mark Lewis	3
8	11	Brandon Pineda	3
9	20	Kevin Spencer	3
10	4	Danielle Green	2
11	8	Michael Floyd	2
12	7	Sean Taylor	2
13	15	Kyle Tucker	2
14	6	Beth Hernandez	2
15	25	Nancy Contreras	2
16	1	Robert Johnson	2
17	5	Sara Cooper	2
18	18	Malik Carlson	2
19	2	Shane Shaffer	2

```sql
-- Flag transactions in High-risk categories
WITH Average_transaction
AS
(
SELECT
    AVG(amount)
    AS Average_Price
FROM
    transaction
where
    amount > 1500)

SELECT
    ch.name
    AS Cardholder_name,
    mc.name
    AS Merchant_categoty,
    ROUND(SUM(t.amount))
    AS Total_transaction
FROM
    transaction t
JOIN
    credit_card cc
        ON cc.card = t.card
JOIN
    card_holder ch
        ON ch.id = cc.id_card_holder
JOIN
    merchant m
        ON m.id = t.id_merchant
JOIN
    merchant_category mc
        ON mc.id = m.id_merchant_category
WHERE
    mc.name IN ('bar','pub')
GROUP BY
    ch.name, mc.name
        HAVING SUM(t.amount) > ( SELECT
        Average_price FROM Average_transaction)
ORDER BY
    Total_transaction DESC
```

04

	cardholder_name character varying (50)	merchant_categoty character varying (50)	total_transaction double precision
1	Megan Price	pub	5799
2	Laurie Gibbs	pub	5666
3	Megan Price	bar	4933
4	Beth Hernandez	bar	3737
5	Elizabeth Sawyer	bar	3653
6	Nancy Contreras	bar	3308
7	Malik Carlson	pub	3287
8	Robert Johnson	bar	3146

```sql
-- Card holders with unusual Transaction
WITH Average_transaction
AS
(
SELECT
    AVG(amount)
    AS Average_Price
FROM
    transaction
where
    amount >2000)

SELECT
    ch.name
    AS Cardholder_name,
    mc.name
    AS Merchant_categoty,
    ROUND(SUM(t.amount))
    AS Total_transaction
FROM
    transaction t
JOIN
    credit_card cc
        ON cc.card = t.card
JOIN
    card_holder ch
        ON ch.id = cc.id_card_holder
JOIN
    merchant m
        ON m.id = t.id_merchant
JOIN
    merchant_category mc
        ON mc.id = m.id_merchant_category
GROUP BY
    ch.name, mc.name
        HAVING SUM(t.amount) >( SELECT
        Average_price FROM Average_transaction)
ORDER BY
    Total_transaction DESC
```

05

	cardholder_name character varying (50)	merchant_categoty character varying (50)	total_transaction double precision
1	Sean Taylor	food truck	7363
2	Malik Carlson	restaurant	6243
3	Crystal Clark	restaurant	5895
4	Megan Price	pub	5799
5	Laurie Gibbs	pub	5666
6	Robert Johnson	coffee shop	4969
7	Megan Price	bar	4933
8	Beth Hernandez	food truck	4059
9	Beth Hernandez	bar	3737
10	Elizabeth Sawyer	bar	3653
11	Crystal Clark	food truck	3390
12	Nancy Contreras	bar	3308

```sql
-- Transactioins Outside of Normal Business Hours
-- Normal Business Hours(10AM to 7PM)
SELECT
    ch.id
    AS Cardholder_id,
    ch.name
    AS Cardholder_name,
    ROUND(SUM(t.amount))
    AS Total_transaction
FROM
    transaction t
JOIN
    credit_card cc
        ON cc.card = t.card
JOIN
    card_holder ch
        ON ch.id = cc.id_card_holder
WHERE NOT
    (EXTRACT(HOUR FROM t.date ) >=10
    AND EXTRACT(HOUR FROM t.date) < 19)
GROUP BY
    ch.id, ch.name
ORDER BY
    total_transaction DESC
```

06

	cardholder_id integer	cardholder_name character varying (50)	total_transaction double precision
1	12	Megan Price	11331
2	1	Robert Johnson	10077
3	16	Crystal Clark	9919
4	18	Malik Carlson	9691
5	6	Beth Hernandez	8699
6	25	Nancy Contreras	7988
7	3	Elizabeth Sawyer	5704
8	9	Laurie Gibbs	5484
9	7	Sean Taylor	4291
10	24	Stephanie Dalton	4000
11	20	Kevin Spencer	1289
12	13	John Martin	1185
13	19	Peter Mckay	1140
14	10	Matthew Gutierrez	1096
15	11	Brandon Pineda	1060
16	23	Mark Lewis	1006
17	4	Danielle Green	986
18	15	Kyle Tucker	841
19	5	Sara Cooper	765
20	8	Michael Floyd	602
21	2	Shane Shaffer	600
22	17	Michael Carroll	470
23	14	Gary Jacobs	427
24	21	Dana Washington	423

Total rows: 25 of 25 Query complete 00:00:00.301 Ln 18, Col 10

Thank you

Yuvraj Giri

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