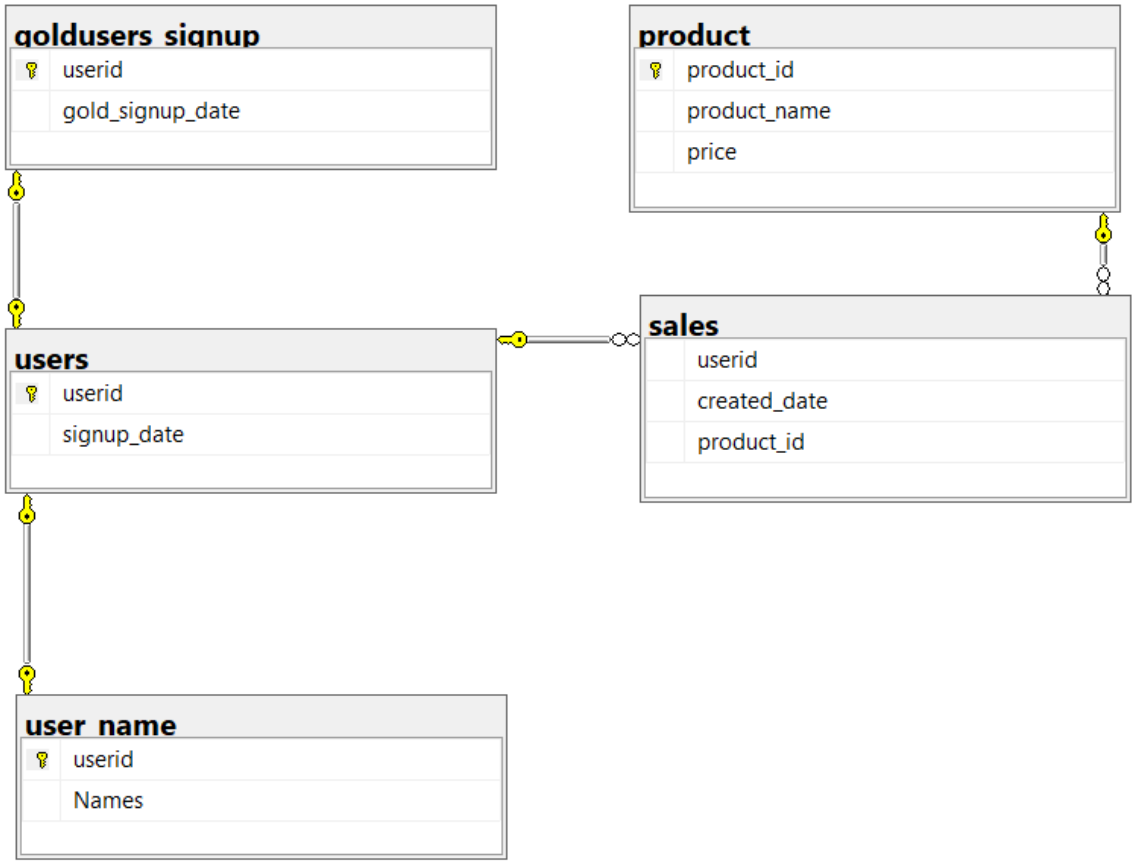
Case Study: Exploring Customer Behavior

1. Introduction

This case study aims to analyze customer behavior patterns by leveraging data from an online food delivery platform. By exploring various queries, the study identifies trends, product popularity, revenue streams, and customer preferences. The dataset contains tables representing products, sales, users, gold memberships, and user names, allowing us to derive insights into customer actions and their impact on revenue.

2. ERD Diagram

The following Entity-Relationship Diagram (ERD) represents the relationships between the database tables:



3. Data Analysis Questions and Answers

Q1. What is the total sales revenue generated by each product?

```
select p.product_id, p.product_name, sum(price) as sales_revenue from product p
join sales s on p.product_id =s.product_id
group by p.product_name, p.product_id;
```

Results Messages

product_id	product_name	sales_revenue
1	Dal Makani	1120
2	Shahi Paneer	1360
3	Butter Chicken	1700
6	Fish Curry	380
7	Chicken Tikka	600
8	Mutton Biryani	1350
9	Veg Pulao	200
10	Mango Lassi	80
11	Gulab Jamun	100

Observation: Dal Makani generates the highest sales revenue compared to others.

Q2. Which 3 product has the highest sales revenue?

```
select top 3 p.product_id, p.product_name, sum(price) as sales_revenue from product p
join sales s on p.product_id =s.product_id
group by p.product_name, p.product_id
order by sales_revenue desc;
```

Results Messages

product_id	product_name	sales_revenue
3	Butter Chicken	1700
2	Shahi Paneer	1360
8	Mutton Biryani	1350

Observation: Butter Chicken, Shahi Paneer, and Mutton Biriyani are the top-performing products.

Q3. How many users have signed up for the service and has taken the gold membership?

```
select (select count(*) from users) as no_of_users_signed_up,  count(*)  as no_of_users_taken_gold_membership
from goldusers_signup;
```

Results Messages

no_of_users_signed_up	no_of_users_taken_gold_membership
10	8

Observation: Out of 10 users, 8 have taken the gold membership.

Q4. What is the revenue generated from gold users?

```
select g.userid ,un.Names ,SUM(p.price) as total_revenue_by_gold_users from product p
join sales s on p.product_id =s.product_id
join goldusers_signup g on s.userid = g.userid
join user_name un on g.userid = un.userid
group by g.userid, un.Names;
```

Results Messages

userid	Names	total_revenue_by_gold_users
1	Anshul	1000
3	Shreya	1340
5	Aryan	520
6	Sara	200
7	Sahil	750
8	Tanvi	750
9	Ritika	830
10	Gaurav	170

Observation: Gold users have contributed significantly to the overall revenue.

Q5. What is the total revenue generated from gold users?

```
select  SUM(p.price) as total_revenue_by_gold_users from product p
join sales s on p.product_id =s.product_id
join goldusers_signup g on s.userid = g.userid;
```

Results Messages

total_revenue_by_gold_users
5560

Observation: The total revenue from gold users is 5560.

Q6. Which users has been a gold user for the How much of time?

```
select g.userid,un.Names, g.gold_signup_date, CAST(GETDATE() AS DATE) as today ,
DATEDIFF(DAY,g.gold_signup_date,GETDATE()) as period_of_membership_in_days
from goldusers_signup g
join user_name un on g.userid = un.userid
order by period_of_membership_in_days desc;
```

Results Messages

userid	Names	gold_signup_date	today	period_of_membership_in_days
6	Sara	2014-12-13	2024-12-17	3657
7	Sahil	2015-12-02	2024-12-17	3303
10	Gaurav	2016-09-02	2024-12-17	3028
5	Aryan	2016-09-08	2024-12-17	3022
3	Shreya	2017-04-11	2024-12-17	2807
1	Anshul	2017-09-02	2024-12-17	2663
9	Ritika	2017-12-02	2024-12-17	2572
8	Tanvi	2019-05-15	2024-12-17	2043

Observation: Sara has been a gold member for the longest period.

Q7. What is the most popular product among gold users?

```
select  p.product_name, count(*) as orderd_times  from product p
join sales s on p.product_id =s.product_id
join goldusers_signup g on s.userid = g.userid
group by p.product_name
order by orderd_times desc;
```

Results Messages

product_name	orderd_times
Shahi Paneer	7
Dal Makani	4
Butter Chicken	3
Mutton Biryani	3
Chicken Tikka	2
Veg Pulao	1
Fish Curry	1
Gulab Jamun	1
Mango Lassi	1

Observation: Shahi Paneer is the most popular product among gold users.

Q8. What is the total sales revenue generated in each year?

```
select YEAR(created_date) as year, sum(p.price) as sales_revenue from sales s
join product p on p.product_id = s.product_id
group by YEAR(created_date);
```

Results Messages

year	sales_revenue
2014	400
2016	1330
2017	1950
2018	1470
2019	790
2020	950

Observation: Sales revenue was highest in 2017

Q9. How has the sales revenue changed over the years?

```
with revenue_change as(
select YEAR(created_date) as sales_year, sum(p.price) as sales_revenue from sales s
join product p on p.product_id = s.product_id
group by YEAR(created_date)
)
select  sales_year, sales_revenue ,
lag(sales_revenue) over (order by sales_year) as Previous_year_revenue,
sales_revenue - lag(sales_revenue) over (order by sales_year) as revenue_change,
case
when lag(sales_revenue) over (order by sales_year) is null then null
else
((sales_revenue - lag(sales_revenue) over (order by sales_year))  * 100) /lag(sales_revenue) over (order by sales_year)
end as percentage_change
from revenue_change;
```

Results Messages

sales_year	sales_revenue	Previous_year_revenue	revenue_change	percentage_change
2014	400	NULL	NULL	NULL
2016	1330	400	930	232
2017	1950	1330	620	46
2018	1470	1950	-480	-24
2019	790	1470	-680	-46
2020	950	790	160	20

Observation: Sales increased by 232% in 2016 but dropped by 46% in 2019.

Q10. What is the average Gold-signup compare to just sign up for the users?

```
with user_comparison as (
select
(select
count(*) from users) as no_of_users_signed_up,
count(*)  as no_of_users_taken_gold_membership from goldusers_signup
)
select no_of_users_signed_up, no_of_users_taken_gold_membership,
round((cast(no_of_users_taken_gold_membership as float) * 100.0) / no_of_users_signed_up,1) as
gold_sign_up_percentage
from user_comparison;
```

Results | Messages

no_of_users_signed_up	no_of_users_taken_gold_membership	gold_sign_up_percentage
10	8	80

Observation: 80% of total users opted for the gold membership.

Q11. How many gold members users have order how many numbers of time ?

```
select g.userid, un.Names, count(*) as Total_orders from sales s
join goldusers_signup g on g.userid = s.userid
join user_name un on un.userid = g.userid
group by g.userid,un.Names
order by Total_orders desc;
```

Results | Messages

userid	Names	Total_orders
1	Anshul	6
3	Shreya	6
5	Aryan	3
7	Sahil	2
8	Tanvi	2
9	Ritika	2
10	Gaurav	1
6	Sara	1

Observation: Anshul and Shreya placed the highest number of orders among gold members.

Q12. What is the total amount each customer spend on Online Food Delivery?

```
select u.userid, un.Names, sum(p.price) as Total_spends from sales s
join users u on u.userid = s.userid
join user_name un on un.userid = u.userid
join product p on p.product_id = s.product_id
group by u.userid, un.Names;
```

Results Messages

userid	Names	Total_spends
1	Anshul	1000
2	Rohan	1010
3	Shreya	1340
4	Priya	320
5	Aryan	520
6	Sara	200
7	Sahil	750
8	Tanvi	750
9	Ritika	830
10	Gaurav	170

Observation: Shreya spent the most on online food delivery.

Q13. What is the frequency of customer visits to the online platform?

```
select u.userid, un.Names, count(*) as Total_visits from sales s
join users u on u.userid = s.userid
join user_name un on un.userid = u.userid
group by u.userid, un.Names;
```

Results Messages

userid	Names	Total_visits
1	Anshul	6
2	Rohan	4
3	Shreya	6
4	Priya	2
5	Aryan	3
6	Sara	1
7	Sahil	2
8	Tanvi	2
9	Ritika	2
10	Gaurav	1

Observation: Anshul visited the platform more frequently.

Q14. What was the first order purchase by each customer ?

```
with purchase_cte as (
select u.userid, un.Names, s.created_date,
rank() over (partition by u.userid order by s.created_date) as purchased_rank
from sales s
join users u on u.userid = s.userid
join user_name un on un.userid = u.userid
)
select userid,names,created_date from purchase_cte where purchased_rank = 1 order by created_date;
```

Results Messages

userid	names	created_date
7	Sahil	2014-04-02
5	Aryan	2014-07-27
1	Anshul	2016-03-11
2	Rohan	2016-05-20
3	Shreya	2016-11-10
6	Sara	2017-06-30
9	Ritika	2017-09-08
10	Gaurav	2018-09-22
8	Tanvi	2019-03-19
4	Priya	2019-05-01

Observation: Sahil placed the first order on 2014-04-02.

Q15. What is the most purchase item on the menu and how many times was it purchased by all customers?

```
select top 1 p.product_name, count(s.product_id) as total_purchases from sales s
join product p on p.product_id = s.product_id
group by p.product_name
order by total_purchases desc;
```

Results Messages

product_name	total_purchases
Shahi Paneer	8

Observation: Shahi Paneer is the most purchased item.

Q16. Which item was most popular for each customer ?

```
with popular_cte as (
select un.Names,p.product_name , count(p.product_id) as total_purchases ,
rank() over (partition by un.names order by count(p.product_id) desc) as purchased_rank --can use row_number() as
well but that will ignore products with same number of purchases
from sales s
join users u on u.userid = s.userid
join user_name un on un.userid = u.userid
join product p on p.product_id = s.product_id
group by un.names,p.product_name
)
select names,product_name from popular_cte where purchased_rank = 1;
```

Results Messages

names	product_name
Anshul	Shahi Paneer
Aryan	Butter Chicken
Aryan	Gulab Jamun
Aryan	Mango Lassi
Gaurav	Shahi Paneer
Priya	Dal Makani
Ritika	Mutton Biryani
Ritika	Fish Curry
Rohan	Butter Chicken
Sahil	Mutton Biryani
Sahil	Chicken Tikka
Sara	Veg Pulao
Shreya	Butter Chicken
Shreya	Dal Makani
Shreya	Shahi Paneer
Tanvi	Mutton Biryani

Q17. Which item was purchase first by the customer after they become a member ?

```
with purchase_cte as (
select un.Names, s.created_date as purchase_date, p.product_name ,
rank() over (partition by u.userid order by s.created_date) as purchased_rank
from sales s
join goldusers_signup u on u.userid = s.userid
join user_name un on un.userid = u.userid
join product p on p.product_id = s.product_id
where s.created_date > u.gold_signup_date
)
select Names,product_name as first_purchase from purchase_cte where purchased_rank = 1;
```

Results Messages

	Names	first_purchase
1	Anshul	Shahi Paneer
2	Shreya	Shahi Paneer
3	Aryan	Mango Lassi
4	Sara	Veg Pulao
5	Sahil	Mutton Biryani
6	Tanvi	Mutton Biryani
7	Ritika	Fish Curry
8	Gaurav	Shahi Paneer

Q18.Which item was purchase before the customer become a member ?

```
with purchase_cte as (
select u.userid ,un.Names, s.created_date as purchase_date, p.product_name ,u.gold_signup_date ,
rank() over (partition by u.userid order by s.created_date desc) as purchased_rank
from sales s
join goldusers_signup u on u.userid = s.userid
join user_name un on un.userid = u.userid
join product p on p.product_id = s.product_id
where s.created_date < u.gold_signup_date
)
select Names,product_name as first_purchase from purchase_cte where purchased_rank = 1;
```

Results Messages

Names	first_purchase
Anshul	Shahi Paneer
Shreya	Butter Chicken
Aryan	Gulab Jamun
Sahil	Chicken Tikka
Tanvi	Chicken Tikka
Ritika	Mutton Biryani

Q19. What is the total orders and amount spent for each member before they become a member ?

```
select u.userid ,un.Names,  count(s.product_id) as times_purchased ,sum(p.price) as total_amount
from sales s
join goldusers_signup u on u.userid = s.userid
join user_name un on un.userid = u.userid
join product p on p.product_id = s.product_id
where s.created_date < u.gold_signup_date
group by u.userid ,un.Names;
```

Results Messages

userid	Names	times_purchased	total_amount
1	Anshul	4	660
3	Shreya	3	670
5	Aryan	1	100
7	Sahil	1	300
8	Tanvi	1	300
9	Ritika	1	450

Observation: Members spent a significant amount and placed several orders before becoming gold members.

Q20. Rank all the transactions for each member whenever they are a XYZ gold member for every non gold member Transaction marks as na ?

```
select un.Names, p.product_name, p.price,
case
when g.userid is null then 'NA'
else cast(dense_rank() over (partition  by un.names order by p.price desc) as varchar(2))
end as Purchase_rank
from sales s
join users u on u.userid = s.userid
join product p on p.product_id = s.product_id
left join goldusers_signup g on u.userid = g.userid
join user_name un on u.userid = un.userid;
```

Results Messages

Names	product_name	price	Purchase_rank
Anshul	Shahi Paneer	170	1
Anshul	Shahi Paneer	170	1
Anshul	Shahi Paneer	170	1
Anshul	Shahi Paneer	170	1
Anshul	Dal Makani	160	2
Anshul	Dal Makani	160	2
Aryan	Butter Chicken	340	1
Aryan	Gulab Jamun	100	2
Aryan	Mango Lassi	80	3
Gaurav	Shahi Paneer	170	1
Priya	Dal Makani	160	NA
Priya	Dal Makani	160	NA
Ritika	Mutton Biryani	450	1
Ritika	Fish Curry	380	2
Rohan	Butter Chicken	340	NA
Rohan	Butter Chicken	340	NA
Rohan	Shahi Paneer	170	NA

Observation: Transactions made during gold membership are ranked, while non-gold transactions are marked as "NA."