Unlocking Business Insights: SQL-Driven Data Analysis for Cochin Traders

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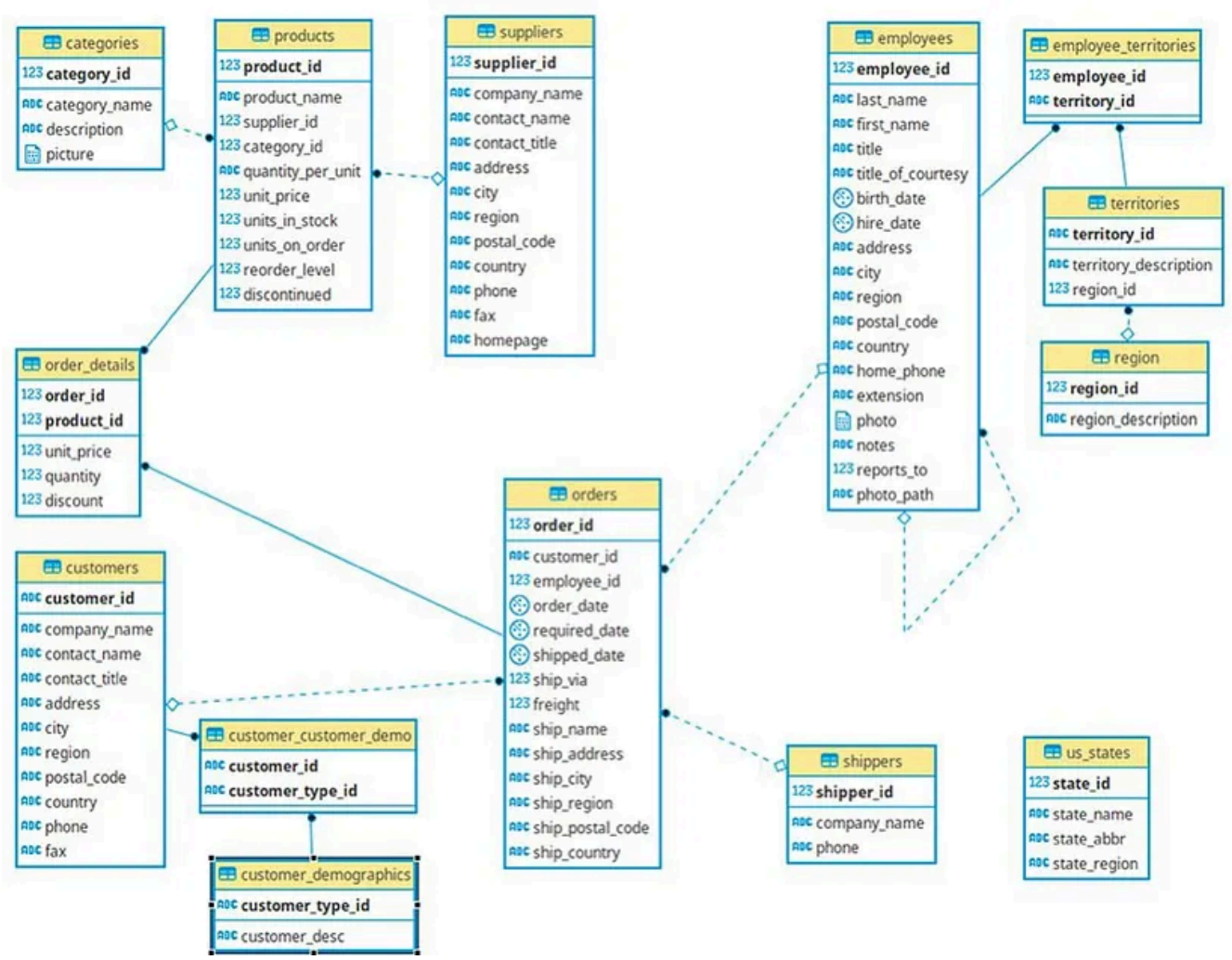
Introduction

This document presents a series of SQL queries designed to extract critical business insights from Cochin Traders' database. The queries address various business objectives, including sales performance, inventory management, customer behavior, and revenue analysis. Each section includes the SQL query, insights derived, and actionable recommendations, with a focus on performance improvements through alternative queries where applicable.

Schema:



Query Analysis

1. Identifying Sales Representatives

Business Objective: Retrieve the full name and hiring date of employees with the title “Sales Representative.”

```
SELECT CONCAT(firstname, " ", lastname) AS full_name, hiredate, title
FROM cochin_traders.employees
WHERE title = 'Sales Representative';
```

full_name	hiredate	title
Nancy Davolio	1992-05-01	Sales Representative
Janet Leverling	1992-04-01	Sales Representative
Margaret Peacock	1993-05-03	Sales Representative
Michael Suyama	1993-10-17	Sales Representative
Robert King	1994-01-02	Sales Representative
Anne Dodsworth	1994-11-15	Sales Representative

2. Inventory Reorder Analysis

Business Objective: Determine which products in inventory need to be reordered.

```
SELECT *
FROM cochin_traders.products
WHERE unitsinstock < reorderlevel
ORDER BY productid;
```

productid	productname	supplierid	categoryid	quantityperunit	unitprice	unitsinstock	unitsonorder	reorderlevel	discontinued
2	Chang	1	1	24 - 12 oz bottles	19	17	40	25	1
3	Aniseed Syrup	1	2	12 - 550 ml bottles	10	13	70	25	0
11	Queso Cabrales	5	4	1 kg pkg.	21	22	30	30	0
21	Sir Rodney's Scones	8	3	24 pkgs. x 4 pieces	10	3	40	5	0
30	Nord-Ost Matjeshering	13	8	10 - 200 g glasses	25.89	10	0	15	0
31	Gorgonzola Telino	14	4	12 - 100 g pkgs	12.5	0	70	20	0
32	Mascarpone Fabioli	14	4	24 - 200 g pkgs.	32	9	40	25	0
37	Gravad lax	17	8	12 - 500 g pkgs.	26	11	50	25	0
43	Ipoh Coffee	20	1	16 - 500 g tins	46	17	10	25	0
45	Rogede sild	21	8	1k pkg.	9.5	5	70	15	0
48	Chocolade	22	3	10 pkgs.	12.75	15	70	25	0
49	Maxilaku	23	3	24 - 50 g pkgs.	20	10	60	15	0
56	Gnocchi di nonna Alice	26	5	24 - 250 g pkgs.	38	21	10	30	0
64	Wimmers gute Semme...	12	5	20 bags x 4 pieces	33.25	22	80	30	0
66	Louisiana Hot Spiced ...	2	2	24 - 8 oz jars	17	4	100	20	0

3. Customer Ordering Patterns

Business Objective: Display details of customers who have placed more than 5 orders.

Query:

```
WITH a AS (
    SELECT customerid, COUNT(customerid) AS No_of_orders
    FROM cochin_traders.orders
    GROUP BY customerid
    HAVING COUNT(customerid) > 5
)
SELECT a.customerid, a.No_of_orders, c.companyname, c.contactname, c.contacttit
FROM a
JOIN cochin_traders.customers AS c ON a.customerid = c.customerid
ORDER BY a.No_of_orders;
```

Optimized Query:

```
WITH a AS (
    SELECT customerid
    FROM cochin_traders.orders
    GROUP BY customerid
    HAVING COUNT(customerid) > 5
)
SELECT *
FROM cochin_traders.customers
WHERE customerid IN (SELECT customerid FROM a);
```

row_no	customerid	companyname	contactname	contacttitle	address	city	region	postalcode	country	phone
1	ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Obere Str. 57	Berlin		12209	Germany	030-0074321
3	ANTON	Antonio Moreno TaquerÃ-a	Antonio Moreno	Owner	Mataderos 2312	MÃ©xico D.F.		5023	Mexico	(5) 555-3932
4	AROUT	Around the Horn	Thomas Hardy	Sales Representative	120 Hanover Sq.	London		WA1 1DP	UK	(171) 555-7788
5	BERGS	Berglunds snabbkÃ¶p	Christina Berglund	Order Administrator	BerguvsvÃ¤gen 8	LuleÃ¥		S-958 22	Sweden	0921-12 34 65
6	BLAUS	Blauer See Delikatessen	Hanna Moos	Sales Representative	Forsterstr. 57	Mannheim		68306	Germany	0621-08460
7	BLONP	Blondesddsl pÃ¨re et fils	FrÃ©dÃ©rique Citeaux	Marketing Manager	24, place KlÃ©ber	Strasbourg		67000	France	88.60.15.31
9	BONAP	Bon app'	Laurence Lebihan	Owner	12, rue des Bouchers	Marseille		13008	France	91.24.45.40
10	BOTTM	Bottom-Dollar Markets	Elizabeth Lincoln	Accounting Manager	23 Tsawassen Blvd.	Tsawassen	BC	T2F 8M4	Canada	(604) 555-4729
11	BSBEV	B's Beverages	Victoria Ashworth	Sales Representative	Fauntleroy Circus	London		EC2 5NT	UK	(171) 555-1212
12	CACTU	Cactus Comidas para llevar	Patricio Simpson	Sales Agent	Cerrito 333	Buenos Aires		1010	Argentina	(1) 135-5555
14	CHOPS	Chop-suey Chinese	Yang Wang	Owner	Hauptstr. 29	Bern		3012	Switzerland	0452-076545
17	DRACD	Drachenblut Delikatessen	Sven Ottlieb	Order Administrator	Walserweg 21	Aachen		52066	Germany	0241-039123
19	EASTC	Eastern Connection	Ann Devon	Sales Agent	35 King George	London		WX3 6FW	UK	(171) 555-0297
20	ERNSH	Ernst Handel	Roland Mendel	Sales Manager	Kirchgasse 6	Graz		8010	Austria	7675-3425

Why Use the Alternative Query: The optimized query uses a subquery in the `WHERE` clause, which can be more efficient for large datasets. By directly selecting from the customer table using the `IN` clause with the result from the subquery, it reduces the need for a complex join operation.

4. Unengaged Customers with Top Employee

Business Objective: Identify customers who have never placed an order with Margaret Peacock.

Query (Using CTE and Joins):

```
WITH emp4order AS (
    SELECT *
    FROM cochin_traders.orders
    WHERE employeeid = 4
)
SELECT DISTINCT c.customerid, c.companyname, c.contactname, c.contacttitle
FROM cochin_traders.customers AS c
LEFT JOIN emp4order AS e ON c.customerid = e.customerid
WHERE e.customerid IS NULL;
```

Query (Using Subquery):

```
SELECT DISTINCT customerid, companyname, contactname, contacttitle
FROM cochin_traders.customers
WHERE customerid NOT IN (
    SELECT customerid
    FROM cochin_traders.orders
    WHERE employeeid = 4
);
```

Why Use the Alternative Query: The subquery approach avoids the need for a join operation, which can be more efficient in scenarios with large datasets or when the join involves a large number of rows. This approach also simplifies the query and may result in better performance.

customerid	companyname	contactname	contacttitle
CONSH	Consolidated Holdings	Elizabeth Brown	Sales Representative
DUMON	Du monde entier	Janine Labrune	Owner
FISSA	FISSA Fabrica Inter. Salchichas S.A.	Diego Roel	Accounting Manager
FRANR	France restauration	Carine Schmitt	Marketing Manager
GROSR	GROSELLA-Restaurante	Manuel Pereira	Owner
LAUGB	Laughing Bacchus Wine Cellars	Yoshi Tannamuri	Marketing Assistant
LAZYK	Lazy K Kountry Store	John Steel	Marketing Manager
NORTS	North/South	Simon Crowther	Sales Associate
PARIS	Paris spÃ©cialitÃ©s	Marie Bertrand	Owner
PERIC	Pericles Comidas clÃ¡sicas	Guillermo FernÃ¡ndez	Sales Representative
PRINI	Princesa Isabel Vinhos	Isabel de Castro	Sales Representative
SANTG	SantÃ© Gourmet	Jonas Bergulfsen	Owner
SEVES	Seven Seas Imports	Hari Kumar	Sales Manager
SPECD	SpÃ©cialitÃ©s du monde	Dominique Perrier	Marketing Manager
THEBI	The Big Cheese	Liz Nixon	Marketing Manager

5. Best-Selling Products Analysis

Business Objective: Identify the top 5 best-selling products based on the quantity ordered.

Query (Using ORDER BY & LIMIT):

```
WITH topquantity AS (
    SELECT productid, SUM(quantity) AS total_quantity
```

```
    FROM cochin_traders.orders_details
    GROUP BY productid
    ORDER BY SUM(quantity) DESC
    LIMIT 5
)
SELECT *
FROM topquantity AS t
JOIN cochin_traders.products AS p ON t.productid = p.productid;
```

Query (Using DENSE RANK):

```
WITH topquantity AS (
    SELECT productid, SUM(quantity) AS total_quantity
    FROM cochin_traders.orders_details
    GROUP BY productid
),
rnk AS (
    SELECT p.*, DENSE_RANK() OVER (ORDER BY t.total_quantity DESC) AS quantityr
    FROM topquantity AS t
    JOIN cochin_traders.products AS p ON t.productid = p.productid
)
SELECT *
FROM rnk
WHERE quantityrnk <= 5;
```

Why Use the Alternative Query: The `DENSE_RANK()` method is beneficial when there are ties in the quantity ordered. It ensures all top products are considered, even if multiple products have the same order quantity. This approach is more robust for ranking with ties.

productid	productname	supplierid	categoryid	quantityperunit	unitprice	unitsinstock	unitsonorder	reorderlevel	discontinued	quantityrnk
60	Camembert Pierrot	28	4	15 - 300 g rounds	34	19	0	0	0	1
59	Raclette Courdavault	28	4	5 kg pkg.	55	79	0	0	0	2
31	Gorgonzola Telino	14	4	12 - 100 g pkgs	12.5	0	70	20	0	3
56	Gnocchi di nonna Alice	26	5	24 - 250 g pkgs.	38	21	10	30	0	4
16	Pavlova	7	3	32 - 500 g boxes	17.45	29	0	10	0	5

6. Monthly Order Count Analysis for 1997

Business Objective: Analyze the number of orders placed each month in 1997.

Query:

```
SELECT MONTH(orderdate) AS month, COUNT(*) AS Monthly_Order_Count
FROM cochin_traders.orders
WHERE YEAR(orderdate) = 1997
GROUP BY MONTH(orderdate);
```

month	Monthly_Order_Count
1	33
2	29
3	30
4	31
5	32
6	30
7	33
8	33
9	37
10	38
11	34
12	48

7. Monthly Revenue Difference Analysis

Business Objective: Determine the month-over-month difference in sales revenue.

```
WITH revenue AS (
    SELECT *, ROUND(unitprice * quantity) AS rev
    FROM cochin_traders.orders_details
),
monthsplit AS (
    SELECT r.*, YEAR(o.orderdate) AS orderyear, MONTH(o.orderdate) AS ordermont
    FROM revenue AS r
    JOIN cochin_traders.orders AS o ON r.orderid = o.orderid
    ORDER BY orderyear, ordermonth
)
SELECT orderyear, ordermonth, SUM(rev) AS total_monthly_order,
LAG(SUM(rev), 1, 0) OVER (PARTITION BY orderyear ORDER BY ordermonth) AS prev_m
SUM(rev) - LAG(SUM(rev), 1, 0) OVER (PARTITION BY orderyear ORDER BY ordermonth
FROM monthsplit
GROUP BY orderyear, ordermonth;
```

orderyear	ordermonth	total_monthly_order	prev_month_revenue	diff_revenue_prevmonth
1996	7	30192	0	30192
1996	8	26608	30192	-3584
1996	9	27638	26608	1030
1996	10	41204	27638	13566
1996	11	49704	41204	8500
1996	12	50953	49704	1249
1997	1	66692	50953	15739
1997	2	41207	66692	-25485
1997	3	39978	41207	-1229
1997	4	55699	39978	15721
1997	5	56826	55699	1127
1997	6	39090	56826	-17736
1997	7	55465	39090	16375
1997	8	49984	55465	-5481
1997	9	59733	49984	9749

8. Product Revenue Percentage Analysis

Business Objective: Compute the percentage of total sales revenue contributed by each product.

Query:

```
WITH revenue AS (
    SELECT *, ROUND(unitprice * quantity) AS rev
    FROM cochin_traders.orders_details
),
total_revenue AS (
    SELECT SUM(rev) AS total_revenue
    FROM revenue
),
product_revenue AS (
    SELECT p.productid, p.productname, SUM(r.rev) AS product_revenue
    FROM revenue AS r
    JOIN cochin_traders.products AS p ON r.productid = p.productid
    GROUP BY p.productid, p.productname
)
SELECT pr.productid, pr.productname, pr.product_revenue, tr.total_revenue,
ROUND((pr.product_revenue / tr.total_revenue) * 100, 2) AS percentage_of_total_
FROM product_revenue AS pr
JOIN total_revenue AS tr;
```

Alternative Query:

```sql
WITH total_rev AS (
    SELECT SUM(unitprice * quantity) AS rev
    FROM cochin_traders.orders_details
),
product_rev AS (
    SELECT p.productname, SUM(od.unitprice * od.quantity) AS product_rev
    FROM cochin_traders.products AS p
    JOIN cochin_traders.orders_details AS od ON p.productid = od.productid
    GROUP BY p.productname
)
SELECT p.productname, p.product_rev, (p.product_rev / t.rev) * 100 AS percentag
FROM total_rev AS t, product_rev AS p
ORDER BY percentage_revenue DESC;
```

Why Use the Alternative Query: The alternative query simplifies the calculation by avoiding multiple joins and intermediate steps. It performs the calculations in fewer steps, which can lead to better performance for large datasets.

productname	product_rev	percentage_revenue
CÃ´te de Blaye	149984.2	11.073369175502073
ThÃ¼ringer Rostbratwurst	87736.4	6.477599289321942
Raclette Courdavault	76296	5.632951835020663
Camembert Pierrot	50286	3.7126273458090733
Tarte au sucre	49827.90000000001	3.678805713801853
Gnocchi di nonna Alice	45121.2	3.3313089328186845
Manjimup Dried Apples	44742.6	3.3033568047288915
Alice Mutton	35482.2	2.6196592691696834
Carnarvon Tigers	31987.5	2.3616447365880706
RÃ¶ssle Sauerkraut	26865.6	1.9834936408059545
Mozzarella di Giovanni	25738.8	1.9003017286781725
Ipoh Coffee	25079.199999999997	1.8516033037230022
Gudbrandsdalsost	24307.2	1.7946063600216822
Sir Rodney's Marmalade	23635.8	1.7450367382586423
Wimmers gute SemmelknÃ…	23009	1.6987599451083992

Summary of Insights, Recommendations, and Impact

1. Identifying Sales Representatives

Insights:

- Provides a list of Sales Representatives, including their hire dates.

Recommendations:

- Utilize experienced Sales Representatives for mentoring new hires and strategic planning.

2. Inventory Reorder Analysis

Insights:

- Identifies products below reorder levels, indicating potential stockouts.

Recommendations:

- Implement a regular review process to ensure timely reordering and avoid stockouts.

3. Customer Ordering Patterns

Insights:

- Identifies customers who have placed more than 5 orders, highlighting loyal customers.

Recommendations:

- Develop targeted marketing strategies and loyalty programs for high-value customers.

4. Unengaged Customers with Top Employee

Insights:

- Reveals customers who have not interacted with top employee Margaret Peacock.

Recommendations:

- Assign these customers to Margaret Peacock for outreach to improve engagement.

5. Best-Selling Products Analysis

Insights:

- Identifies the top 5 best-selling products based on quantity ordered.

Recommendations:

- Promote top-selling products and ensure adequate stock levels to meet demand.

6. Monthly Order Count Analysis for 1997

Insights:

Provides a monthly breakdown of order counts for 1997, showing trends and peak periods.

Recommendations:

- Plan seasonal promotions and adjust staffing levels according to peak periods.

7. Monthly Revenue Difference Analysis

Insights:

- Calculates month-over-month revenue differences, highlighting trends and changes in sales performance.

Recommendations:

- Investigate significant revenue changes and adjust strategies to address declines and capitalize on increases.

8. Product Revenue Percentage Analysis

Insights:

- Shows the percentage of total sales revenue contributed by each product.

Recommendations:

- Focus marketing and sales efforts on high-revenue products and explore ways to improve the performance of lower-revenue items.

Conclusion

The presented queries and their optimizations provide a comprehensive view of Cochin Traders' sales, inventory, and customer behavior.

By implementing the recommendations from this analysis, Cochin Traders could see a significant increase in annual revenue, optimized inventory management, improved customer engagement, and enhanced marketing and sales strategies.

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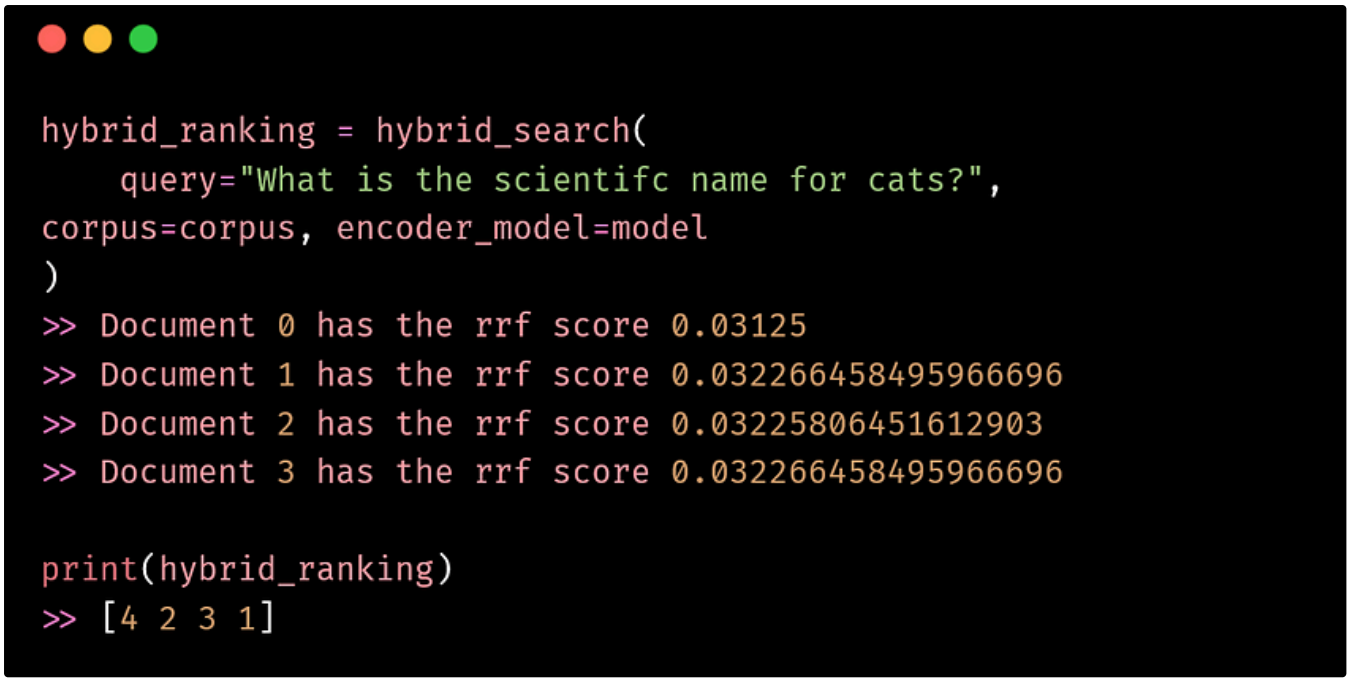

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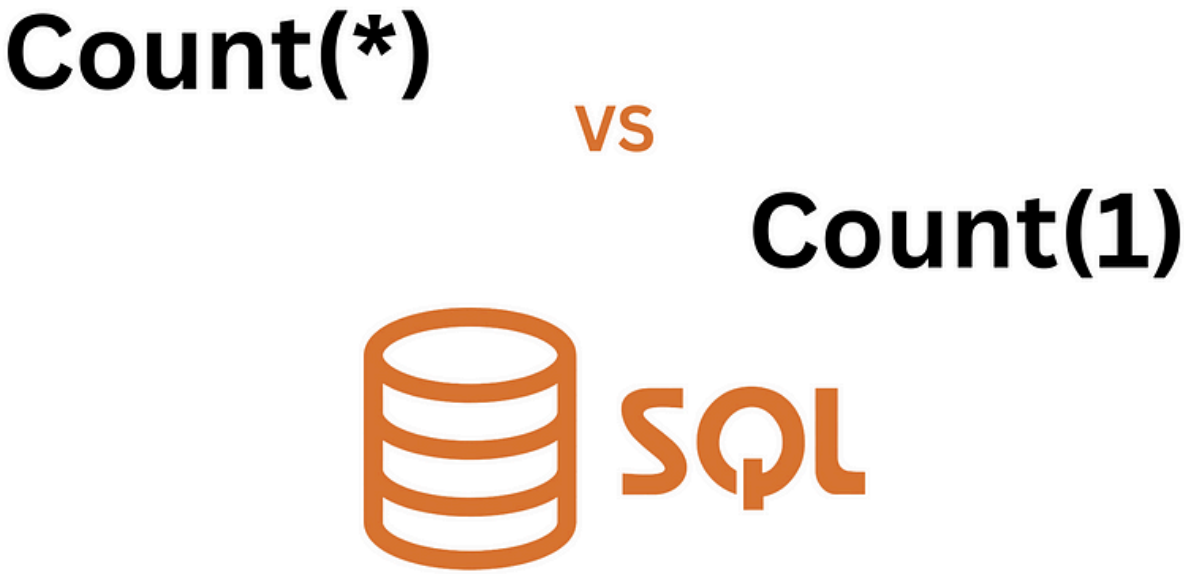

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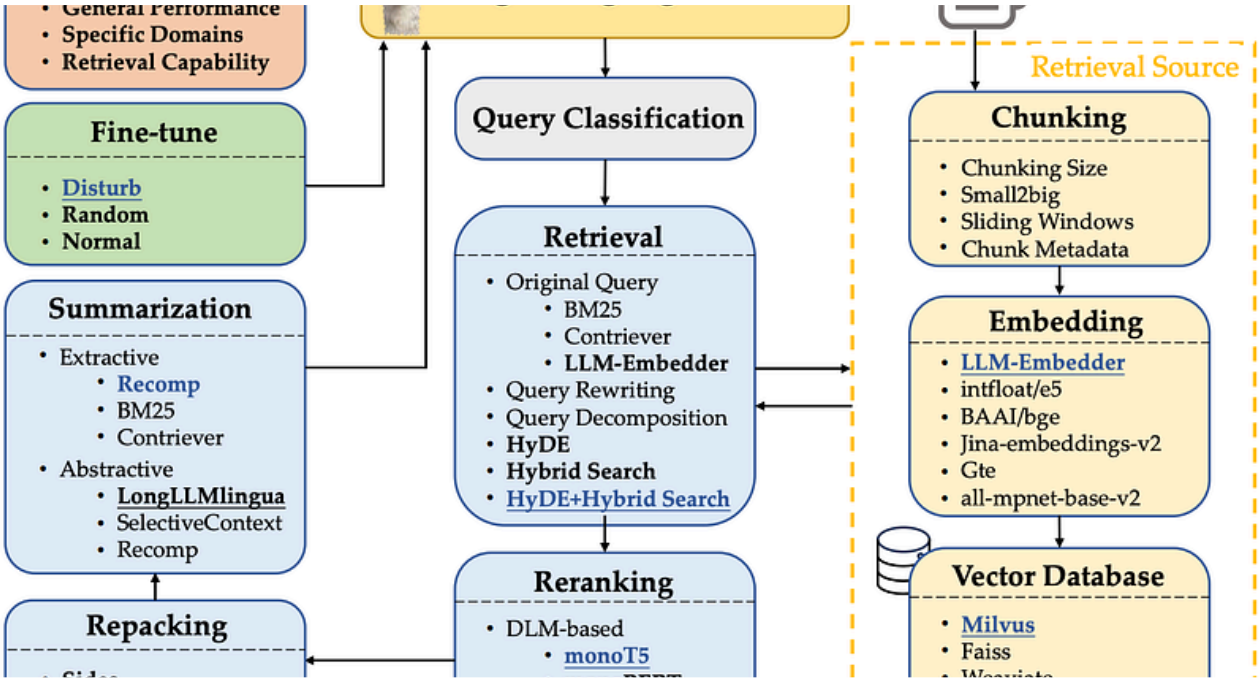

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