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Smartphones

Market Insights using SQL

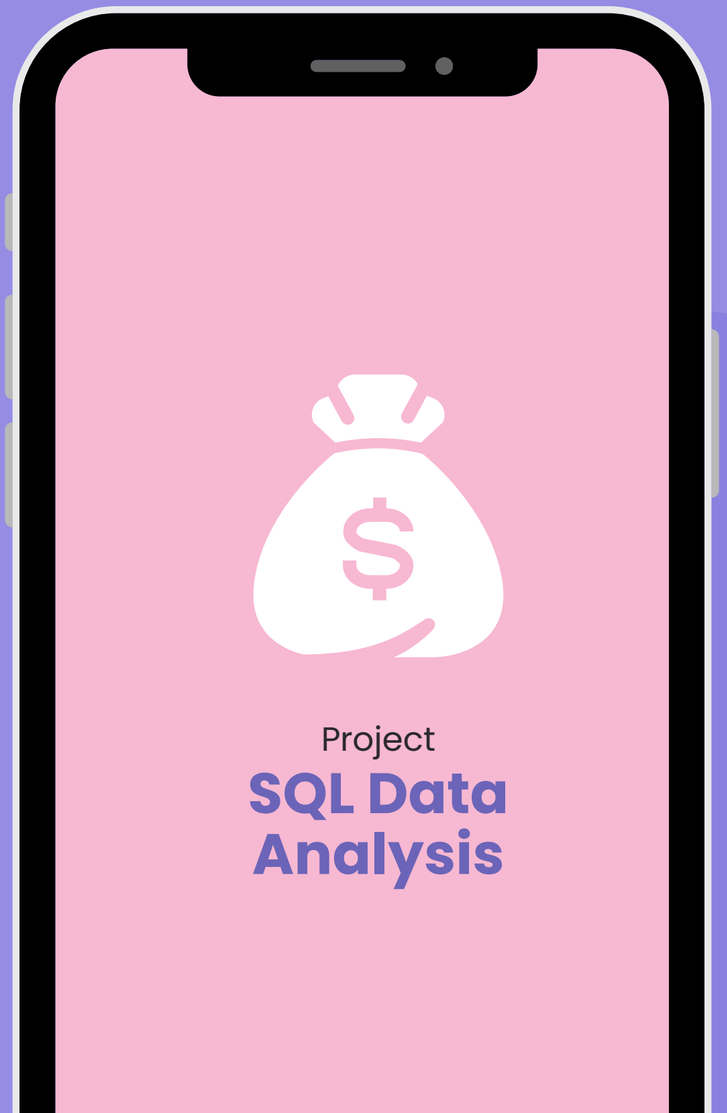
SANCHIT GUPTA | 16-AUG-2025

Introduction

This project explores a smartphone dataset using SQL to uncover meaningful insights about pricing, features, performance, and market trends.

The goal was to move beyond raw specs and answer business-style questions — like which brands dominate premium segments, how features impact value, and what trends shape the market.

Dataset source: Kaggle.com



Data Overview

Total Columns: 24
Key Features Covered:

1. Brand & Model – brand_name, model
2. Price & Rating – price, rating
3. Connectivity – has_5g, has_nfc, has_ir_blaster
4. Performance – processor_brand, num_cores, processor_speed
5. Battery & Charging – battery_capacity, fast_charging_available, fast_charging
6. Memory – ram_capacity, internal_memory, extended_memory_available, extended_upto
7. Display – screen_size, refresh_rate, resolution_width, resolution_height
8. Cameras – num_rear_cameras, num_front_cameras, primary_camera_rear, primary_camera_front
9. Operating System – os

Total Rows: ~ 980
A structured dataset capturing both specifications and features of smartphones across multiple brands.

What is the average prices of smartphones by brand?

Aggregation & Summary Insights

Query | Query History

```sql
select b.brand_name,cast(avg(m.price)
as int) as avg_price_by_brand
from brands b
join models m
on b.brand_id=m.brand_id
group by b.brand_name
order by avg_price_by_brand desc
limit 10;
```

	brand_name text	avg_price_by_brand integer
1	vertu	650000
2	royole	129999
3	leitz	124990
4	apple	95967
5	huawei	80177
6	asus	74709
7	tesla	69999
8	lg	63329
9	sony	60571
10	sharp	59990

Which processor brand has the highest average rating?

Aggregation & Summary Insights

```sql
select h.processor_brand,
cast(avg(m.rating) as int) as average_rating
from hardware_specs h
join models m
on m.model_id=h.model_id
WHERE m.rating IS NOT NULL
group by h.processor_brand
order by average_rating desc
limit 1;
```

	processor_brand text	average_rating integer
1	snapdragon	82

Identify models where fast_charging_available is TRUE but fast_charging is NULL or 0.

NULLs, Defaults & Data Quality Checks

```
26  select m.model_name,
27  h.fast_charging_available,
28  h.fast_charging
29  from models m
30  inner join hardware_specs h
31  on m.model_id=h.model_id
32  where fast_charging_available is true
33  and fast_charging = 0
```

	model_name text	fast_charging_available boolean	fast_charging integer
1	Motorola Moto G62 5G	true	0
2	Apple iPhone 14	true	0
3	Apple iPhone 13	true	0
4	Samsung Galaxy S20 FE 5G	true	0
5	Apple iPhone 14 Pro Max	true	0
6	Apple iPhone 14 Plus	true	0
7	Apple iPhone 13 Pro	true	0
8	OnePlus Ace Racing Edition 5G	true	0
9	Motorola Moto G62 (8GB RAM + 128GB)	true	0
10	OPPO A17	true	0
11	Apple iPhone 14 Pro	true	0
12	Google Pixel 6A	true	0
13	Google Pixel 7A	true	0
14	Apple iPhone 13 Pro Max	true	0
15	Apple iPhone 9	true	0

List all smartphones priced above ₹30,000 that support 5G and have at least 8GB RAM

Filtering & Conditions

```
37  select m.model_name,m.price,
38  h.ram_capacity,c.has_5g
39      from models m
40  join hardware_specs h
41      on m.model_id=h.model_id
42  join conn_features c
43      on h.model_id=c.model_id
44  where m.price>30000
45      and ram_capacity>=8
46      and has_5g is true
```

	model_name text	price numeric	ram_capacity integer	has_5g boolean
1	OnePlus 11 5G	54999	12	true
2	Samsung Galaxy S23 Ultra 5G	114990	8	true
3	OPPO Reno 9 Pro Plus	45999	16	true
4	OnePlus 10R 5G	32999	8	true
5	OnePlus 11R	39999	8	true
6	Vivo V25 Pro 5G	35999	8	true
7	Vivo V26 Pro	42990	12	true
8	OnePlus 11 Pro	69999	8	true
9	Samsung Galaxy S21 FE 5G	39999	8	true
10	Samsung Galaxy S22 Ultra 5G	91999	12	true
11	Samsung Galaxy A74 5G	42999	8	true
12	Samsung Galaxy S23 Plus	84990	8	true
13	Vivo S16 Pro	35499	8	true
14	OnePlus 10 Pro 5G	60999	8	true
15	Xiaomi Redmi Note 12 Pro Pl	32999	12	true

Compare average price of phones with 5G vs. those without.

Derived Metrics & Comparisons

```sql
select
c.has_5g,
round(avg(m.price)) as avg_price
from models m
join conn_features c
on m.model_id=c.model_id
group by c.has_5g
```

	has_5g boolean	avg_price numeric
1	false	18917
2	true	43200

Calculate the pixel density (PPI) for each model using resolution and screen size.

Derived Metrics & Comparisons

```sql
select m.model_name,
round(sqrt(power(d.resolution_width,2)+ power(d.resolution_height,2))/ d.screen_size) as ppi
from display_specs d
join models m on m.model_id=d.model_id
```

	model_name text	ppi double precision
1	OnePlus 11 5G	526
2	OnePlus Nord CE 2 Lite 5G	401
3	Samsung Galaxy A14 5G	400
4	Motorola Moto G62 5G	402
5	Realme 10 Pro Plus	394
6	Samsung Galaxy F23 5G (6GB RAM + 128GB)	400
7	Apple iPhone 14	457

Which brands offer the most models with 5G, NFC, and fast charging combined?

Advanced Analysis Ideas

```sql
select b.brand_name,
count(m.model_id) as total_models
from models m
join conn_features c
    on m.model_id=c.model_id
join hardware_specs h
    on c.model_id=h.model_id
join brands b
    on m.brand_id=b.brand_id
where
c.has_5g = true and
c.has_nfc = true and
h.fast_charging_available = true
group by b.brand_name
order by total_models desc;
```

	brand_name text	total_models bigint
1	samsung	52
2	xiaomi	35
3	oppo	32
4	oneplus	32
5	apple	26
6	motorola	26
7	vivo	17
8	realme	14
9	iqoo	13
10	google	11
11	poco	11

Which processor brand is used in the most premium phones (say, price > (overall avg price))?

Advanced Analysis Ideas

```
85  select h.processor_brand,
86  count(*) as premimum_models
87  from hardware_specs h
88  join models m
89      on m.model_id=h.model_id
90  where m.price > (select avg(price) from models)
91  group by h.processor_brand
92  order by premimum_models desc
93
```

	processor_brand text	premimum_models bigint
1	snapdragon	158
2	bionic	44
3	dimensity	38
4	exynos	23
5	google	8
6	kirin	5
7	Unknown	2
8	fusion	1

Rank Models by Price Within Each Brand

Windows Function Ranking

```
95  select b.brand_name,m.model_name,m.price,
96  rank() over(partition by b.brand_name order by m.price desc)
97  from models m
98  join brands b
99      on b.brand_id=m.brand_id
```

	brand_name text	model_name text	price numeric	rank bigint
1	apple	Apple iPhone 14 Pro Max (1TB)	182999	1
2	apple	Apple iPhone 13 Pro Max (1TB)	179900	2
3	apple	Apple iPhone 14 Pro (1TB)	172999	3
4	apple	Apple iPhone 14 Pro Max (512GB)	169900	4
5	apple	Apple iPhone 15 Ultra	149900	5

1

	brand_name text	model_name text	price numeric	rank bigint
45	apple	Apple iPhone 11	38999	45
46	apple	Apple iPhone 9	29990	46
47	asus	Asus ROG Phone 6D Ultimate	107990	1
48	asus	Asus ROG Phone 6 Pro 5G	89999	2
49	asus	Asus ROG Phone 7	75990	3
50	asus	Asus ROG Phone 6 Batman Edition	72999	4

2

3

	brand_name text	model_name text	price numeric	rank bigint
590	samsung	Samsung Galaxy S10 Plus	42999	35
591	samsung	Samsung Galaxy A74 5G	42999	35
592	samsung	Samsung Galaxy S20	41999	37
593	samsung	Samsung Galaxy A73 5G	41999	37
594	samsung	Samsung Galaxy A73 5G (8GB RAM + 256GB)	41990	39
595	samsung	Samsung Galaxy S21 FE 5G	39999	40

Models with High RAM and Flagship Processor

Common Records Using INTERSECT

```
101  (
102      select model_name
103      from models m
104      join hardware_specs h
105          on m.model_id=h.model_id
106      where h.ram_capacity >8
107  )
108  intersect
109  (
110      select model_name
111      from models m
112      join hardware_specs h
113          on m.model_id=h.model_id
114      where h.processor_brand = 'snapdragon'
115  )
```

	model_name text
1	Motorola Edge Plus
2	Oppo Reno 10 Pro Plus
3	Poco F4 (12GB RAM + 256GB)
4	Vivo X Fold 5G (12GB RAM + 512GB)
5	Honor 70 5G
6	Samsung Galaxy Z Fold 3
7	Xiaomi Mix Fold 2 5G
8	Leitz Phone 2
9	OnePlus 10T (12GB RAM + 256GB)
10	Oppo Find X3 Pro
11	Vivo X80 Pro Plus 5G
12	Asus ROG Phone 7

Thank you for viewing this project!

: Let’s connect

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