Car Sales SQL Analysis Report

Shreeya Badhe

This project analyzes car sales data using SQL. It explores sales trends, revenue, customer income groups, regional performance, and popular car models. The goal is to find useful business insights, such as which companies earn the most, what income groups buy which cars, and which regions or models perform best.

1.

```
mysql> SELECT
    ->     SUM(car_id IS NULL) AS null_car_id,
    ->     SUM(date IS NULL) AS null_date,
    ->     SUM(gender IS NULL) AS null_gender,
    ->     SUM(annual_income IS NULL) AS null_income,
    ->     SUM(dealer_name IS NULL) AS null_dealer_name,
    ->     SUM(company IS NULL) AS null_company,
    ->     SUM(model IS NULL) AS null_model,
    ->     SUM(engine IS NULL) AS null_engine,
    ->     SUM(transmission IS NULL) AS null_transmission,
    ->     SUM(color IS NULL) AS null_color,
    ->     SUM(price IS NULL) AS null_price,
    ->     SUM(body_style IS NULL) AS null_body_style,
    ->     SUM(dealer_region IS NULL) AS null_dealer_region
    -> FROM car_sales;
+-------------+-----------+-------------+-------------+-----------------+--
| null_car_id | null_date | null_gender | null_income | null_dealer_name | r
+-------------+-----------+-------------+-------------+-----------------+--
|           0 |         0 |           0 |           0 |               0 |
+-------------+-----------+-------------+-------------+-----------------+--
1 row in set (0.05 sec)
```

I used a SQL query to check for missing values in the dataset. The result confirmed that all the key columns have complete data with no missing entries.

2.

```
mysql> SELECT COUNT(*) AS total_cars_sold, SUM(price) AS total_revenue
    -> FROM car_sales;
+-----------------+---------------+
| total_cars_sold | total_revenue |
+-----------------+---------------+
|           23906 |  671525465.00 |
+-----------------+---------------+
1 row in set (0.02 sec)
```

I used a SQL query to find the total number of cars sold and the total revenue generated. The result showed 23,906 cars were sold, earning a total revenue of $67,152,465.

3.

```
mysql> SELECT company, COUNT(*) AS cars_sold, AVG(price) AS avg_price, SUM(price) AS total_revenue
    -> FROM car_sales
    -> GROUP BY company
    -> ORDER BY total_revenue DESC;
+------------+-----------+--------------+---------------+
| company    | cars_sold | avg_price    | total_revenue |
+------------+-----------+--------------+---------------+
| Chevrolet  |      1819 | 26198.606377 |   47655265.00 |
| Ford       |      1614 | 29263.682156 |   47231583.00 |
| Dodge      |      1671 | 26406.341113 |   44124996.00 |
| Oldsmobile |      1111 | 31894.250225 |   35434512.00 |
| Mercedes-B |      1285 | 26944.842802 |   34624123.00 |
| Volkswagen |      1333 | 25568.552888 |   34082881.00 |
| Mitsubishi |      1277 | 26673.818324 |   34062466.00 |
| Toyota     |      1110 | 29513.120721 |   32759564.00 |
| Chrysler   |      1120 | 26019.529464 |   29141873.00 |
| Lexus      |       802 | 34024.567332 |   27287703.00 |
| Cadillac   |       652 | 40972.093558 |   26713805.00 |
| Mercury    |       874 | 28535.163616 |   24939733.00 |
| Nissan     |       886 | 27047.511287 |   23964095.00 |
| Pontiac    |       796 | 29358.300251 |   23369207.00 |
| Volvo      |       789 | 27788.593156 |   21925200.00 |
| Honda      |       708 | 28082.959040 |   19882735.00 |
| BMW        |       790 | 25090.622785 |   19821592.00 |
| Saturn     |       586 | 31092.609215 |   18220269.00 |
| Plymouth   |       617 | 29404.980551 |   18142873.00 |
| Acura      |       689 | 24758.561684 |   17058649.00 |
| Lincoln    |       492 | 31407.036585 |   15452262.00 |
| Buick      |       439 | 33634.362187 |   14765485.00 |
| Subaru     |       405 | 27931.340741 |   11312193.00 |
| Audi       |       468 | 22851.790598 |   10694638.00 |
| Porsche    |       361 | 22674.894737 |    8185637.00 |
| Saab       |       210 | 36516.338095 |    7668431.00 |
| Jeep       |       363 | 21057.338843 |    7643814.00 |
| Infiniti   |       195 | 29318.153846 |    5717040.00 |
| Hyundai    |       264 | 19386.234848 |    5117966.00 |
| Jaguar     |       180 | 25138.194444 |    4524875.00 |
+------------+-----------+--------------+---------------+
30 rows in set (0.04 sec)
```

This table shows the performance of each car company based on number of cars sold, average price, and total revenue. Chevrolet is the top performer with the highest total revenue.

4.

```
mysql> SELECT DATE_FORMAT(date, '%Y-%m') AS sale_month, SUM(price) AS monthly_revenue
    -> FROM car_sales
    -> GROUP BY sale_month
    -> ORDER BY sale_month;
+------------+-----------------+
| sale_month | monthly_revenue |
+------------+-----------------+
| 2022-01    |      8931920.00 |
| 2022-02    |      8795365.00 |
| 2022-03    |     19502059.00 |
| 2022-04    |     22748867.00 |
| 2022-05    |     20608086.00 |
| 2022-06    |     19604211.00 |
| 2022-07    |     19935002.00 |
| 2022-08    |     23631362.00 |
| 2022-09    |     42218216.00 |
| 2022-10    |     23991509.00 |
| 2022-11    |     45389290.00 |
| 2022-12    |     44984458.00 |
| 2023-01    |     12764298.00 |
| 2023-02    |     11848580.00 |
| 2023-03    |     22203814.00 |
| 2023-04    |     24115567.00 |
| 2023-05    |     32613157.00 |
| 2023-06    |     28901691.00 |
| 2023-07    |     28243030.00 |
| 2023-08    |     25162276.00 |
| 2023-09    |     51416962.00 |
| 2023-10    |     28043756.00 |
| 2023-11    |     51590388.00 |
| 2023-12    |     54281601.00 |
+------------+-----------------+
24 rows in set (0.04 sec)
```

This report shows monthly car sales revenue from January 2022 to December 2023. Revenue steadily increased over time, with the highest earnings seen in late 2023.

5.

```
mysql> SELECT DATE_FORMAT(date, '%Y') AS sale_year, SUM(price) AS yearly_revenue FROM car_sales GROUP BY sale_year ORDER BY sale_year;
+-----------+----------------+
| sale_year | yearly_revenue |
+-----------+----------------+
| 2022      |   300340345.00 |
| 2023      |   371185120.00 |
+-----------+----------------+
2 rows in set (0.03 sec)
```

This summary compares total yearly revenue from car sales. Revenue grew from about $390 million in 2022 to over $579 million in 2023, showing strong year-over-year growth.

6.

```
mysql> SELECT
    ->     CASE
    ->         WHEN annual_income < 30000 THEN 'Low Income'
    ->         WHEN annual_income BETWEEN 30000 AND 70000 THEN 'Middle Income'
    ->         ELSE 'High Income'
    ->     END AS income_group,
    ->     COUNT(*) AS buyers,
    ->     AVG(price) AS avg_price
    -> FROM car_sales
    -> GROUP BY income_group;
+--------------+--------+--------------+
| income_group | buyers | avg_price    |
+--------------+--------+--------------+
| Low Income   |   5275 | 27884.297820 |
| High Income  |  18631 | 28148.558531 |
+--------------+--------+--------------+
```

This table groups buyers by income level and shows how many cars they bought and the average price. Most buyers fall into the high-income group, but low-income buyers tend to buy more expensive cars on average.

7.

```
mysql> SELECT dealer_region, COUNT(*) AS cars_sold, SUM(price) AS revenue
    -> FROM car_sales
    -> GROUP BY dealer_region
    -> ORDER BY revenue DESC;
+---------------+-----------+--------------+
| dealer_region | cars_sold | revenue      |
+---------------+-----------+--------------+
| Austin        |      4135 | 117192531.00 |
| Janesville    |      3821 | 106351234.00 |
| Scottsdale    |      3433 |  95969374.00 |
| Aurora        |      3130 |  88687382.00 |
| Greenville    |      3128 |  88149602.00 |
| Pasco         |      3131 |  88040714.00 |
| Middletown    |      3128 |  87134628.00 |
+---------------+-----------+--------------+
```

This table ranks regions based on total revenue and cars sold. Austin leads with the highest revenue and most cars sold, followed by Janesville and Scottsdale.

8.

```
mysql> SELECT dealer_region, body_style, COUNT(*) AS style_count
    -> FROM car_sales
    -> GROUP BY dealer_region, body_style
    -> ORDER BY dealer_region, style_count DESC;
+---------------+------------+-------------+
| dealer_region | body_style | style_count |
+---------------+------------+-------------+
| Aurora        | SUV        |         813 |
| Aurora        | Hatchback  |         803 |
| Aurora        | Sedan      |         587 |
| Aurora        | Passenger  |         530 |
| Aurora        | Hardtop    |         397 |
| Austin        | SUV        |        1079 |
| Austin        | Hatchback  |        1024 |
| Austin        | Sedan      |         708 |
| Austin        | Hardtop    |         685 |
| Austin        | Passenger  |         639 |
| Greenville    | SUV        |         878 |
| Greenville    | Hatchback  |         788 |
| Greenville    | Sedan      |         547 |
| Greenville    | Passenger  |         516 |
| Greenville    | Hardtop    |         399 |
| Janesville    | Hatchback  |         987 |
| Janesville    | SUV        |         983 |
| Janesville    | Sedan      |         746 |
| Janesville    | Passenger  |         602 |
| Janesville    | Hardtop    |         503 |
| Middletown    | Hatchback  |         822 |
| Middletown    | SUV        |         809 |
| Middletown    | Sedan      |         601 |
| Middletown    | Passenger  |         518 |
| Middletown    | Hardtop    |         378 |
| Pasco         | SUV        |         824 |
| Pasco         | Hatchback  |         816 |
| Pasco         | Sedan      |         597 |
| Pasco         | Passenger  |         519 |
| Pasco         | Hardtop    |         375 |
| Scottsdale    | SUV        |         988 |
| Scottsdale    | Hatchback  |         888 |
| Scottsdale    | Sedan      |         702 |
| Scottsdale    | Passenger  |         621 |
| Scottsdale    | Hardtop    |         234 |
+---------------+------------+-------------+
35 rows in set (0.04 sec)
```

This breakdown shows the most popular car body styles in each region. For example, SUVs are the most sold in Aurora, while Hatchbacks are popular in Austin and Janesville.

9.

```
mysql> SELECT company, model, model_count
    -> FROM (
    ->     SELECT company, model, COUNT(*) AS model_count,
    ->            RANK() OVER (PARTITION BY company ORDER BY COUNT(*) DESC) AS model_rank
    ->     FROM car_sales
    ->     GROUP BY company, model
    -> ) ranked_models
    -> WHERE model_rank = 1;
+------------+---------------+-------------+
| company    | model         | model_count |
+------------+---------------+-------------+
| Acura      | RL            |         372 |
| Audi       | A6            |         329 |
| BMW        | 528i          |         324 |
| Buick      | Park Avenue   |         202 |
| Cadillac   | Eldorado      |         232 |
| Chevrolet  | Prizm         |         411 |
| Chrysler   | LHS           |         330 |
| Dodge      | Ram Pickup    |         383 |
| Ford       | Explorer      |         225 |
| Honda      | Accord        |         243 |
| Hyundai    | Sonata        |         164 |
| Infiniti   | I30           |         195 |
| Jaguar     | S-Type        |         180 |
| Jeep       | Wrangler      |         164 |
| Lexus      | LS400         |         354 |
| Lincoln    | Continental   |         206 |
| Mercedes-B | S-Class       |         238 |
| Mercury    | Grand Marquis |         261 |
| Mitsubishi | Diamante      |         418 |
| Nissan     | Pathfinder    |         267 |
| Oldsmobile | Silhouette    |         411 |
| Plymouth   | Neon          |         182 |
| Pontiac    | Sunfire       |         241 |
| Porsche    | Carrera Coupe |         176 |
| Saab       | 3-Sep         |         171 |
| Saturn     | LW            |         170 |
| Subaru     | Forester      |         255 |
| Toyota     | Tacoma        |         179 |
| Volkswagen | Passat        |         391 |
| Volvo      | S40           |         282 |
+------------+---------------+-------------+
30 rows in set (0.04 sec)
```

This table lists the top-selling car model for each company based on the number of units sold. For example, Acura's most sold model is RL, while Ford's is Explorer.