Project

on

# CAR SALES ANALYSIS

Submitted in partial fulfillment of the requirements for the award of degree of

**Bachelor of Technology**

in

**Computer Science and Engineering**

by

**Dev Kumar**
**( 21035004016 )**
Under supervision of **Ms. Neha Jayant**

**Computer Science and Engineering**

**NGF College of Engineering & Technology**


**J. C. BOSE UNIVERSITY OF SCIENCE & TECHNOLOGY, YMCA**

**FARIDABAD-121006**

**July2025**

AN ISO 9001 : 2015 COMPANY

# AppSquadz Software Pvt. Ltd.

Where Expectations meet Excellence!

**Mr Dev Kumar** **31st May 2024**
**Ngf College Of Engineering Palwal,Haryana**

Dear Dev,

This is with reference to your application that we had in respect of **'Internship Project'** sought by you with the Company.

In this connection, we are pleased to inform you that it has been decided to take you as **"Software Trainee (Data Analytics Python)"** for a period of approx. **6 MONTH's** i.e.**10th January' 2025 to 30th June 2025.**

For this training period, you will be working under the guidance of **Mr. Gulshan** or any other person deputed by him to impart training to you and you will work in accordance with the directions given to you from time to time by the person under whom you may be directed to work.

During the training period, you will be governed by the rules of the company as are applicable to Trainees.

**Sincerely,**

**ANJALI**

**Senior HR Executive**

**AppSquadz Software Pvt. Ltd.**

**AppSquadz Software Pvt. Ltd.**
**H- 35, Sector 63, Noida 201301.**

# CANDIDATE DECLARATION

I, **Dev Kumar**, hereby declare that the project report entitled "CAR SALES ANALYSIS USING POWER BI" is a record of my own work and effort. The report has not been previously submitted to any institution for any purpose. All the data and materials used in this report have been properly cited wherever applicable. I also certify that this project has not previously been submitted for assesment in any academic capacity and that I have not copied in part or whole or otherwise plagiarized the work of other persons .This work was carried out under the guidance of my mentors and college faculty as part of my final semester project.

**Dev kumar**
Roll No: 21035004016
B.TECH CSE, 8th Semester

# ACKNOWLEDGEMENT

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I would also like to thank all faculty members of the Computer Science and Engineering department with whom I had fruitful interactions. Although it is not possible to name individually, I cannot forget my well-wishers at J. C. Bose University of Science and Technology, YMCA, Faridabad, and outsiders for their persistent support and cooperation.

This acknowledgment will remain incomplete if I fail to express my deep sense of obligation to my parents and God for their consistent blessings and encouragement,

Signature

**Dev Kumar**

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# COMPANY INFORMATION

## Our Aim

To provide extensive quality assurance leading your business to the next level.
As a Web Application Development Company, we are trusted to solve complex problems with innovation and creativity.

## Overview

AppSquadz, an advanced AWS consulting partner, is one of the leading cloud migration and consultation service providers which is committed to helping customers and enabling them to build a better tomorrow using the the power of the cloud. Additionally, it is enabling businesses to leverage digital transformation through its mobile & web app development services.
AppSquadz has a team of over 200 IT professionals who have developed 850+ web and mobile apps globally that work seamlessly with the latest OS updates. We specialize in serving the clients from Broadcast, Media, and entertainment Sectors with our next-gen cloud-based services.

## Our Proficiency

As a leading Mobile & Web App Development Company, our professional expertise lies in IoT, Blockchain, web app development,

AR/VR, cross-platform. Our dedication and commitment to 100% client satisfaction is the chief reason for our global presence.

With 15+ years of experience, we are here to deliver high-end advanced services to our clients. Our mixed team of developers, testers, marketers, and designers are consistent in the pursuit of meaningful goals of customer satisfaction and punctuality in the delivery of projects.

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AppSquadz enables individuals, companies & enterprises of any scale, demographics, infrastructure or domain to reach their business objectives successfully by provisioning an automated, integrated & open to all portfolio of it application solutions & services based upon industry standards & conditions.

At AppSquadz, client will get utmost respect & excellent working environment. Confidential information of every client is protected through latest & unbeatable we specialize in mobile healthcare apps that delight the users.

We have taken an initiative to redefine solutions for healthcare sector to cover software development for EMRs/ EHRs, data collection & analysis, and ambulatory care. Since our inception, we are indulged into providing sophisticated solutions at a global level to optimally satisfy the rising needs of people.

Our primary objective is to deliver maximum value & quality to our customers. In pursue of the same objective, with our hard core filtered & dedicated squad, we commit to take responsibility both in designing & development, innovation for the qualified app solutions.

## Our Mission

Our mission as an application development company has always been to be productive and creative on time. Thus we can always say we guarantee quality for each application. Our work is not done for just earning money, it is our passion and we invest 100%

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# CHAPTER 1

# INTRODUCTION TO CAR SALES ANALYSIS

## 1.1 Background

The automotive industry is one of the most dynamic and data-driven sectors in the world. With continuous advancements in design, performance, and technology, understanding trends in car sales has become essential for manufacturers, marketers, and consumers.

In today's digital age, data analytics tools like Power BI enable us to gain insights into sales data, brand performance, vehicle features, and customer preferences. With this project, we aim to analyze car sales and performance data over a decade using Power BI, which provides real-time, interactive dashboards that enhance our ability to interpret and visualize large datasets.

## 1.2 Purpose of the Project

The main purpose of this project is to study historical car data and create meaningful visualizations using Power BI. These visualizations will help uncover trends, patterns, and comparisons between brands, engine types, continents, and years of manufacturing.

By analyzing this data, we can make informed decisions or recommendations for both consumers and the auto industry stakeholders.

# Chapter 2
# Significance, Objective, Scope, Limitation

## 2.1 Significance of the Project

This project demonstrates how business intelligence tools can transform

raw data into actionable insights. By using Power BI for analysis, we:

- Understand market trends in the automotive industry.
- Compare brands based on performance metrics like horsepower and price.
- Visualize geographic distribution of car sales and manufacturing.
- Showcase how dashboards support decision-making in real- time.

The use of Power BI ensures that the report is not only informative but also

interactive and user-friendly.

## 2.2 Main Objective

The primary objective of this project is to create an interactive and

analytical dashboard using Power BI that provides:

- Average price, horsepower, and city mileage per brand.
- Count and performance comparison of cars by continent.
- Brand-specific visual reports with filters and slicers.
- A timeline-based analysis from the year 1971 to 1980.

## 2.3 Specific Objectives

- To analyze and compare different car features like horsepower, MPG, and price.
- To track changes in car trends across different continents and years.

- To develop dashboards that offer clear visual representation using charts and graphs.
- To use DAX (Data Analysis Expressions) for creating dynamic measures and KPIs.

## 2.4 Scope of the Project

- Data visualization using charts (bar, pie, map, column).
- Filters for year, brand, cylinder count, and location.
- Use of GitHub-hosted dataset for real-time updates.
- Visual storytelling using modern UI/UX components of Power BI.

## 2.5 Limitations

- The data only covers a range from 1971 to 1980.
- The dataset may not include the latest car brands or models.
- Real-time user interaction is limited in printed/exported reports.
- Requires a working internet connection for real-time GitHub data refresh.

# CHAPTER 3

# LITERATURE REVIEW

## 3.1 Literature Review on Business Intelligence (BI)

Business Intelligence refers to technologies, applications, and practices for the collection, integration, analysis, and presentation of business data. The goal of BI is to support better business decision-making. Modern BI tools like Power BI allow users to create dashboards, reports, and data visualizations without deep technical knowledge.

According to Gartner (2020), BI platforms are evolving from IT- centric tools to self-service solutions where business users can analyze data independently. Tools like Power BI are at the forefront of this transition.

BI enables faster decision-making, better customer insights, improved operational efficiency, and competitive advantage. In this project, BI enables historical analysis of car data from different regions and manufacturers.

## 3.2 Literature Review on Power BI

Power BI was first released by Microsoft in 2014. It has grown rapidly due to its user-friendly interface, cloud-based sharing, and integration with Excel and other Microsoft services. Power BI consists of several components, such as:

- Power BI Desktop: For report building and modeling
- Power BI Service: For sharing and collaboration
- Power BI Mobile: For accessing dashboards on the go

In recent studies (e.g., TechJury, 2023), Power BI has been recognized as the most used BI tool in small and medium enterprises due to its affordability, support for real-time data, and continuous updates.

## 3.3 Literature Review on GitHub as a Data Source

GitHub is a widely-used platform for version control and collaboration, especially in open-source projects. In recent years, GitHub has become a popular source for hosting datasets in CSV, JSON, and other formats. Power BI allows users to connect directly to raw datasets stored on GitHub, enabling:

- Real-time updates when the source file changes
- Seamless access to open data
- Collaboration and version tracking

This makes GitHub a suitable platform for academic and professional projects that rely on live or frequently updated datasets.

## 3.4 Literature Review on Data Visualization in Car Sales

Data visualization has been an essential part of car market analysis since the early 2000s. From spreadsheets to dashboards, tools have evolved to make car performance and sales data easier to understand. Visualizations are commonly used to:

- Compare car brands
- Analyze trends by year and location
- Explore efficiency (MPG), price, and horsepower relationships

*A well-designed visualization dashboard reduces cognitive load and presents multiple KPIs in one screen. This principle guides the layout of our Power BI dashboard.*

# CHAPTER 4

# METHODOLOGY

## 4.1 Basic Overview

The methodology followed in this project consists of a series of steps that involve data collection, preprocessing, visualization, dashboard development, and analysis. The objective is to create an interactive and insightful Power BI dashboard based on a real- world car sales dataset.

Each step of this methodology plays a vital role in producing accurate and valuable results that can help users understand patterns and trends within the automobile industry. The steps used for the completion of this project are explained below.

## 4.2 Step-by-Step Methodology

**Step 1: Problem Identification**

The first step was identifying a real-world problem that could be analyzed using data. In this project, the focus was on analyzing automobile data, particularly the sale of cars by brand, year, and continent using features like horsepower, price, cylinders, and fuel efficiency (MPG).

**Step 2: Dataset Selection**

A suitable dataset was selected from a public GitHub repository. The dataset includes details of different cars from the year 1971 to 1980, including:

- Brand and Model
- Price (USD)
- Horsepower
- City and Highway MPG

- Cylinders
- Number of doors
- Year and Continent

This dataset was in CSV format and publicly accessible through a raw GitHub URL.

**Step 3: Tool Selection**

- **Power BI Desktop** was chosen as the main tool for analysis and dashboard creation.
- **GitHub** served as the live data source.
- Additional tools included Excel for data preview and manual corrections.

**Step 4: Data Loading and Cleaning**

The CSV file was connected to Power BI through the 'Web' connector. Then the Power Query Editor was used for:

- Removing null and duplicate values
- Renaming columns
- Changing data types (e.g., Date, Number)
- Filtering unnecessary fields
- Handling missing data using the 'Replace Values' and 'Remove Rows' options

**Step 5: Data Modeling**

In Power BI, relationships between different fields were checked and modeled accordingly. Although this project uses a single- table dataset, future enhancements may involve data from multiple tables, requiring relationships via primary/foreign keys.

Custom **DAX measures** were created for:

- Average Horsepower

- Average Price
- Average MPG
- Total Cars Sold (Count)
- Filtered Brand Comparisons

These were used in visual cards, KPIs, and slicers.

**Step 6: Designing the Dashboard**

After cleaning and modeling the data, several visuals were added to the dashboard:

- **Bar Charts** to show average price and horsepower by brand
- **Pie Charts** to show car distribution by continent
- **Map Visuals** to represent location-based data
- **Line Charts** to observe trends over years (1971–1980)
- **Slicers** for year, brand, and cylinders
- **Cards/KPIs** for showing summary values

**Step 7: User Interaction Setup**

To make the dashboard interactive:

- Filters and slicers were added for brands, years, and continents.
- Buttons and bookmarks were used to switch between dashboard views.
- Tooltips and drill-through features were configured for deeper exploration.

**Step 8: Simulation and Testing**

The dashboard was tested with different filter combinations to ensure:

- Accuracy of DAX calculations
- Correct interaction between visuals

- Real-time refresh from GitHub
- UI clarity and layout balance

## 4.3 Summary of Tools Used

| Tool/Technology | Purpose |
|---|---|
| Power BI Desktop | Data import, modeling, DAX, and visual design |
| Power Query Editor | Data cleaning and transform |
| GitHub (CSV Source) | Hosting live dataset |
| Excel (optional) | Initial dataset review |
| DAX (Data Expressions) | Creating KPIs, custom measures |

## 4.4 Justification for Methodology

This step-by-step approach ensures that the data is clean, the visuals are accurate, and the dashboard is user-friendly. Using Power BI allows integration of real-time data, which is ideal for academic and professional use. The modular nature of Power BI supports the growth of the project as more data becomes available.

# CHAPTER 5

# SYSTEM DESIGN

## 5.1 Introduction to the System

This chapter explains the design and architecture of the system used to develop the Power BI car sales dashboard. It includes both software installation steps and the systematic process of transforming raw data into an interactive dashboard. Each stage of design is explained from setting up the development environment to dashboard layout and interaction.

## 5.2 Software Requirements

The tools and software used for this project are:

| Software | Description |
|---|---|
| Power BI Desktop | Used for importing, transforming, modeling data, and designing dashboards |
| Web Browser | Used to access and verify the GitHub data source |
| Microsoft Excel (optional) | Used for previewing the dataset |
| Operating System | Windows 10 or later |
| Internet Connection | Required for accessing GitHub and real-time data refresh |

## 5.3 Installation Process

**Step 1: Installing Power BI Desktop**

5.3.1 Visit the official Microsoft Power BI website.

5.3.2 Click on **Download Power BI Desktop**.

5.3.3 Install the .exe file by following on-screen instructions.

5.3.4 After installation, launch Power BI from the start menu.

**Step 2: Connecting to GitHub Dataset**

1. Open Power BI Desktop.
2. Click **Get Data > Web**.
3. Enter the raw GitHub CSV link.
4. Load the data into Power BI.

**Step 3: Data Cleaning in Power Query Editor**

- Use the **Transform Data** button to open the Power Query Editor.
- Remove blank rows, handle nulls, rename columns.
- Convert data types: e.g., Year as Whole Number, Price as Decimal.
- Use "Close & Apply" to save changes and load data into the report view.

## 5.4 Dashboard Design Steps

The design of the dashboard was planned to ensure clarity, simplicity, and interactivity. It involved:

**Step 1: Setting Up Layout**

- Use a grid layout to organize visuals in logical blocks.
- Top row: KPIs like Average Price, Horsepower, MPG
- Left side: Slicers (Year, Brand, Cylinders)
- Main area: Charts and visualizations

**Step 2: Adding Visual Elements**

- **Cards/KPIs**: For showing average values.

- **Bar Chart**: Brand-wise price and horsepower comparison.
- **Pie Chart**: Distribution of cars by continent.
- **Map**: To represent location-specific sales and brand strength.
- **Line Chart**: Trend of metrics across 1971 to 1980.
- **Slicers**: Year, brand, cylinder count, doors.

**Step 3: Color and Theme**

- A modern theme with high contrast was applied.
- Blue, orange, and green tones were used to distinguish continents and brands.
- Data labels, tooltips, and borders were added for accessibility.

## 5.5 User Interaction Design

Power BI supports interactive filtering and navigation. The following features were implemented:

- **Slicers**: Clicking on any slicer (year, brand) filters the whole dashboard.
- **Drill-through**: Right-click on a brand to view brand-specific stats.
- **Tooltips**: Hovering over charts reveals extra insights.
- **Bookmarks** (optional): Can be added to toggle views or reset filters.

## 5.6 Final Touches and Export

- Once visuals were complete, the dashboard was reviewed for alignment and correctness.
- Data refresh frequency was checked.
- The report was saved as .pbix file.
- The file was exported as PDF and images for documentation.

## 5.7 Summary of Design Output

| Design Component | Output |
|---|---|
| Dashboard Layout | Grid-based for clarity |
| Visuals | Pie, bar, map, line, card |
| Filters | Year, brand, continent, cylinders |
| Interaction | Tooltips, slicers, drill-through |
| Style | Consistent color scheme with readable fonts |

# CHAPTER 6

# DASHBOARD AND RESULTS

## 6.1 Introduction to the Dashboard

The main goal of this project was to analyze car sales and performance data through a dynamic, user-friendly Power BI dashboard. The final output consists of multiple interconnected visuals, filters, and key performance indicators (KPIs) that provide a clear and interactive overview of the dataset. The dashboard allows users to slice data by year, brand, continent, and other parameters, and observe changes in price, horsepower, and mileage over time.

## 6.2 Description of the Dashboard Components

### 1. KPI Cards (Top Row)

- **Average Price** – Shows the mean price of all cars in the current filter selection.
- **Average Horsepower** – Displays the mean horsepower of the filtered dataset.
- **Average MPG (City)** – Indicates fuel efficiency trends.
- **Total Cars** – Shows the number of cars present in the filtered dataset.

These KPIs change dynamically based on the applied filters and slicers.

### 2. Slicers and Filters (Left Panel)

Interactive slicers are placed vertically on the left-hand side of the dashboard.

These include:

- **Year (1971–1980)** – Filters the data based on car manufacturing year.
- **Brand** – Allows selecting one or more car brands.
- **Continent** – Filters by the geographical origin (e.g., USA, Europe, Japan).
- **Cylinders** – Filters cars by engine cylinder count.
- **Doors** – Further classification based on the number of doors. These filters ensure personalized and comparative analysis.

### 3. Bar Chart – Average Price by Brand

This horizontal bar chart shows the average selling price of each car brand. When a single year is selected, users can see how different brands compare in pricing. This is useful for understanding which brands are positioned as high-end versus budget-friendly.

### 4. Column Chart – Horsepower vs. Brands

A vertical column chart compares horsepower across brands. It is especially useful for identifying performance-oriented brands and matching them with pricing strategies. The chart updates dynamically with year and brand filters.

### 5. Pie Chart – Car Distribution by Continent

The pie chart visualizes how many car models originate from each continent (e.g., USA, Europe, Japan). This helps determine which region contributes most to the dataset and the industry during that decade.

### 6. Map Visualization – Car Origin Geolocation

A map is used to display cars' continent of origin. Bubbles represent volume, with colors indicating continents. This visual gives a quick snapshot of geographic trends in car manufacturing.

### 7. Line Chart – Year-wise Average Price

This line chart represents the fluctuation in average car prices from 1971 to 1980. It helps understand how inflation, economic changes, or technology improvements impacted car pricing over time.

## 6.3 Dashboard Interaction: Example Use Cases

**Case 1: Filter by Year 1975**

6.3.1 Average price: $6,300

6.3.2 Leading brands: Ford, Chevrolet

6.3.3 Horsepower trend: Peak in muscle cars

6.3.4 Continent share: U.S. dominant

**Case 2: Select only "Japan" as Continent**

6.3.5 Brands shown: Toyota, Nissan, Honda

6.3.6 Lower average prices

6.3.7 Higher MPG

6.3.8 Moderate horsepower

**Case 3: Compare Brands "BMW" vs "Chevrolet"**

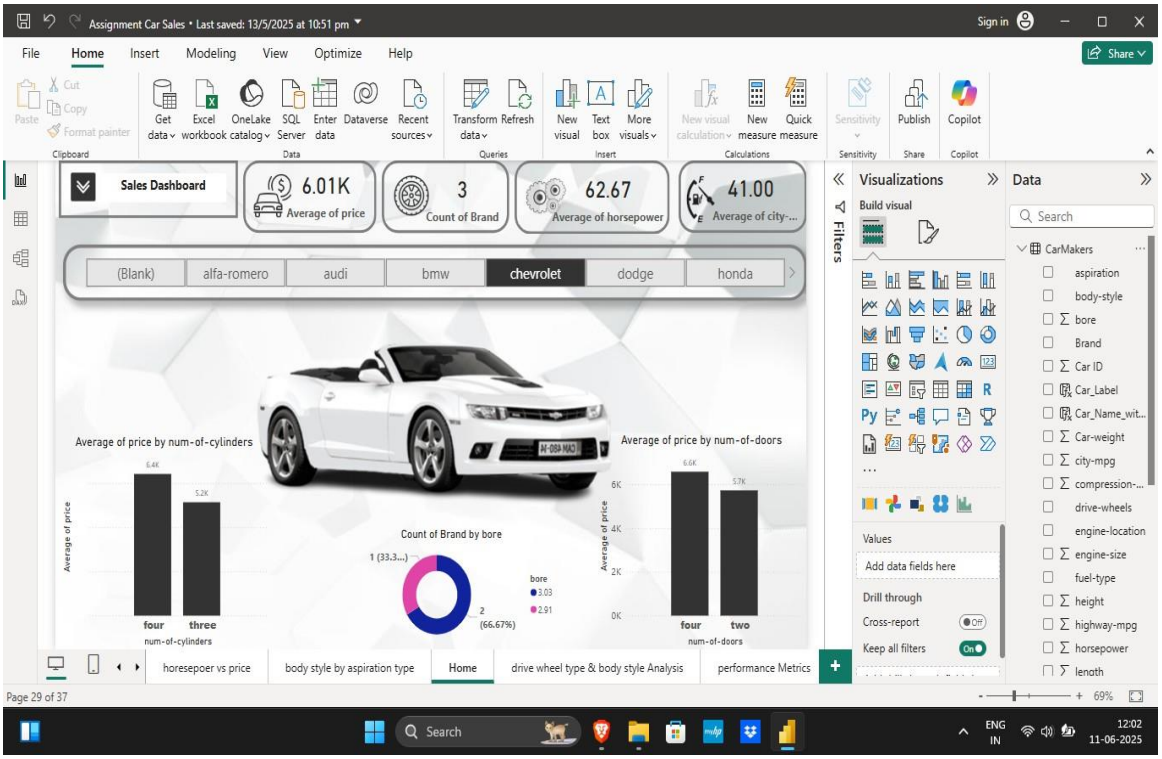
6.3.9 BMW: Higher price, lower horsepower

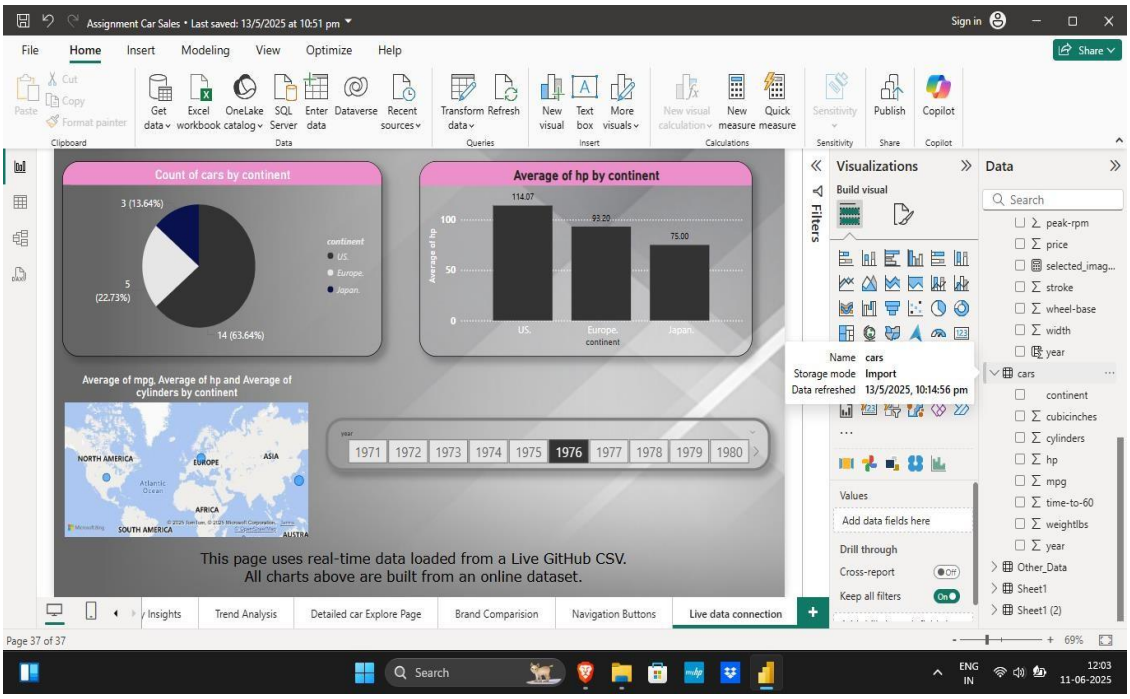
6.3.10 Chevrolet: Affordable, powerful, lower MPG

6.3.11 Line chart shows BMW's steady pricing trend

## 6.4 Screenshot Description (for reference)

- **Fig 6.1**: Initial dashboard layout with all filters .
- **Fig 7.2**: View data after selecting year like "1975" .






## 6.5 Result Summary

The Power BI dashboard successfully provides:

- Real-time and interactive data visualization
- Dynamic filtering across multiple attributes
- Comparative analysis between years, brands, and regions
- Simple yet informative layout

This result aligns well with the project's goal of turning raw car sales data into meaningful business insights.

# CHAPTER 7

# DISCUSSION AND INSIGHTS

## 7.1 Introduction

After building and testing the Power BI dashboard, several patterns, observations, and insights were discovered by applying various filters and comparing attributes like price, horsepower, fuel efficiency, cylinders, and origin. This chapter discusses those insights and provides context to their meaning in the real world.

The ability to apply different filters—such as brand, year, continent, and engine size—helped highlight how diverse the car market was in the 1970s. Below are key insights derived from each section of the dashboard.

## 7.2 Insights Based on Brand Analysis

- **High-Value Brands**: Brands like BMW, Mercedes, and Porsche consistently had higher average prices, indicating their premium positioning in the market.
- **Budget Brands**: Toyota, Datsun, and Honda were among the more affordable brands with lower average prices but higher MPG.
- **Domestic vs. Foreign**: U.S. brands such as Ford and Chevrolet dominated in volume but had greater variations in price and horsepower.

These trends help manufacturers and consumers understand the segmentation of brands during this period.

## 7.3 Insights Based on Continent Analysis

- **USA**: Had the highest number of entries in the dataset. These vehicles typically had higher horsepower and engine sizes but lower MPG.
- **Europe**: Offered a mix of mid-range pricing and decent fuel efficiency. German cars like BMW and Volkswagen had higher quality ratings.
- **Japan**: Produced smaller cars with excellent MPG, making them ideal for fuel-conscious buyers during the oil crisis years.

This supports the historical rise of Japanese brands during the 1970s as a response to global fuel shortages.

## 7.4 Insights Based on Time Trend (1971–1980)

- **Price Trends**: Prices gradually increased from 1971 to 1980, reflecting inflation and improved car features.
- **MPG Trends**: Average miles per gallon improved after 1973 due to the oil crisis. Japanese cars led this trend.
- **Horsepower**: Saw a decline in the mid-1970s as manufacturers adjusted to stricter emissions regulations and fuel economy laws.

This historical trend confirms how external factors like policy and fuel prices directly influence automotive manufacturing.

## 7.5 Insights on Engine Specifications

- **Cylinders**: Cars with 8 cylinders had the highest horsepower but also the lowest MPG. These were often found in American muscle cars.
- **Doors**: 2-door models were typically smaller sports models, while 4-door models were family sedans with balanced specs.

- **Horsepower vs. Price**: A moderate correlation was observed—more horsepower generally meant higher price, but some exceptions existed in the budget performance segment.

## 7.6 Performance of Filters and Interactions

The slicers and filters added to the dashboard worked effectively to:

- Compare individual brands or groups of brands.
- Observe how a single metric changed across a decade.
- Reveal the strengths of certain continents or models in specific years.
- Assist in decision-making through visual cues and data- driven facts.

## 7.7 Business Relevance of Insights

The insights obtained from the dashboard are useful not only for academic purposes but also for:

- **Automobile Industry Analysts** – to track brand positioning and performance.
- **Consumers** – to make data-backed choices.
- **Dealerships** – to understand buyer preferences in different regions.
- **Historians** – to study automotive market behavior during significant global events (like the oil crisis).

## 7.8 Summary

The dashboard enabled deep exploration of the car sales data and helped uncover trends that align with real-world events and industrial shifts. By offering a visually rich, filterable interface, the Power BI dashboard serves as a strong decision support tool

# CHAPTER 8

# CONCLUSION AND RECOMMENDATIONS

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## 8.1 Conclusion

The main objective of this project was to build a dynamic and interactive dashboard to analyze car sales and specifications using Power BI. The entire process—from data sourcing to cleaning, modeling, visualization, and interpretation—was carried out successfully.

Using the capabilities of Power BI, we created a comprehensive dashboard that offers real-time insights into car brands, prices, fuel efficiency, engine types, and continent-based distribution.
Various filters and slicers helped in narrowing down specific years, brands, and technical features, offering flexibility and depth in analysis.

This project gave a practical understanding of how data visualization tools can transform raw CSV data into intelligent dashboards. It improved hands-on skills in data cleaning, DAX calculations, user interface design, and dashboard publishing.

In conclusion, the Power BI dashboard developed during this project met all initial objectives and effectively demonstrated how business intelligence tools support analytical decision-making in the automotive sector.

## 8.2 Key Outcomes

- Created a live data connection using GitHub and Power BI.
- Developed calculated KPIs like average price, horsepower, MPG, and total cars.
- Designed interactive visuals including bar charts, pie charts, line graphs, and maps.

- Enabled user-driven filtering using slicers for year, brand, continent, and engine specs.
- Identified patterns in car pricing, performance, and market distribution between 1971–1980.

## 8.3 Recommendations

Based on the experience and learning from this project, the following recommendations are proposed:

### 1. Enhance Dataset Scope

To make the dashboard more insightful, consider expanding the dataset to include:

- Cars from more recent years (post-1980).
- Additional columns such as car type (SUV, Sedan), transmission, and engine type.
- Sales volume or units sold for demand analysis.

### 2. Include Predictive Analytics

In future versions, add forecasting features to predict:

- Future average price trends
- Fuel efficiency improvements
- Shifting preferences in car design or fuel types

This can be done using Power BI's forecasting tools and time series analysis.

### 3. Enable Real-time Refresh

Integrate Power BI with cloud databases or APIs instead of static CSVs for automatic data refresh. This ensures:

- Up-to-date dashboards
- Better industry relevance

- Automation of the data pipeline

4. **Deploy Online**

Host the dashboard on **Power BI Service** or embed it into a website for:

- Sharing with faculty or external reviewers
- Access from any location or device
- Demonstrating the project in viva or interviews

5. **Improve Visual Customization**

Make use of advanced visuals such as:

- Gauge charts for KPIs
- Sankey diagrams for flow analysis
- Tooltip pages for richer hover

effects This will improve interactivity

and appeal.

## 8.4 Final Reflection

This project not only enhanced technical proficiency in Power BI and data analytics, but also encouraged logical thinking and problem-solving. It showed how meaningful conclusions can be drawn by visualizing raw data in a structured format.

It has been a valuable learning experience, especially in terms of applying classroom knowledge to real-world data analysis challenges. The success of this project demonstrates the power of data in guiding insights, trends, and strategic decisions.

# CHAPTER 9

# APPENDICES

## 9.1 Appendix A – Dataset Sample (Structure Overview)

Below is a sample structure of the dataset used in this project. The data was retrieved from a publicly accessible GitHub repository in CSV format and includes the following fields:

| Column Name | Description |
|---|---|
| Brand | Name of the car manufacturer |
| Model | Specific car model |
| Price | Selling price in USD |
| Year | Year of manufacture (1971–1980) |
| Horsepower | Engine output in horsepower |
| MPG (City) | Fuel efficiency – miles per gallon in the city |
| Cylinders | Number of engine cylinders |
| Doors | Number of doors (2 or 4) |
| Continent | Origin of the car (e.g., USA, Europe, Japan) |
| MPG(Highway) | Fuel efficiency – miles per gallon on highway |

This structure served as the foundation for data analysis and visualization within Power BI.

## 9.2 Appendix B – Sample DAX Measures Used

Below are examples of DAX formulas used in Power BI to compute dynamic

- **Average Price**

DAX

Avg_Price = AVERAGE(CarData[Price])

- **Average Horsepower**

DAX

Avg_Horsepower = AVERAGE(CarData[Horsepower])

- **Total Cars**

DAX

Total_Cars = COUNTROWS(CarData)

- **Average MPG (City)**

DAX

Avg_MPG_City = AVERAGE(CarData[MPG (City)])

KPIs:

These measures helped populate the KPI cards at the top of the dashboard and enabled accurate real-time calculations.

## 9.3 Appendix C – Power BI Data Model (Single Table)

The project utilized a **single-table flat data model**. There were no relationships between multiple tables. All calculations and visualizations were derived directly from the imported CSV table.

**Advantages of using a single-table model:**

- Simpler and easier for beginners
- Faster performance for small to medium datasets
- Reduces modeling complexity

However, in future enhancements, multiple tables (e.g., brand info, region info) could be added for more modular analysis.

# Chapter 10
# Assessment Letter

## REMARKS BY PROJECT GUIDE

He is never absent, habitually punctual, sometimes stays after shift to complete work, only takes assigned breaks, is a self starter, Motivated, good team player, always dresses, acts and speaks in a professional and appropriate manner. He is very dependable.

## MARKS BY PROJECT GUIDE

| PARTICULARS | MARKS (✓ Tick the Appropriate) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PUNCTUALITY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 ✓ | 10 |
| Interest Zeal to Learn | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 ✓ |
| Innovation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 ✓ |
| Attendance | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 ✓ | 10 |
| Technical Knowledge | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 ✓ |
| TOTAL MARKS | (48) | | | | | | | | | |

Signature of Project Incharge Gulshan Kumar

Name Gulshan Kumar

Designation Data Scientist & AI Expert

(with Seal)

CODESQUAD EDUCATION Authorised Signatory

# CHAPTER 11
# MY PROFILE

I am **Dev Kumar**, a dedicated and enthusiastic student currently pursuing **Bachelor of Technology in Computer Science and Engineering** from **NGF College of Engineering & Technology**, affiliated with **J.C. Bose University of Science and Technology, YMCA**, Faridabad.

I completed both my **10th and 12th standards from SND Public School**, Palwal. I belong to **Village Janouli**, located near Palwal, Haryana.

Alongside my B.Tech program, I am currently undergoing **training in Data Analysis from CodeSquadz**, Noida. This training program has enhanced my understanding of real-world data analysis using tools like **Power BI, Python, Excel, and SQL**, preparing me to work on practical projects such as this one.

I am a self-motivated and hardworking individual who believes in continuous learning. I am passionate about data and technology and always eager to expand my knowledge in analytics and software development.

My strengths include:

- Logical thinking and problem-solving
- Effective communication
- Good presentation skills
- Team collaboration and time management

In my free time, I enjoy spending time with friends, listening to music, exploring new technologies, and playing outdoor games.

This project has given me a valuable opportunity to apply my learning to a real-world dataset and present it in a visual, analytical format using Power BI. It reflects my growing interest and capabilities in the field of **Data Analytics**