Interactive Data Visualization with Plotly

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Welcome to Interactive Data Visualization

This presentation demonstrates the power of Plotly for creating interactive visualizations.

What is Plotly?

- **Interactive plotting library** for R
- Creates **web-based visualizations**
- Supports **hover effects** and **zoom**
- Perfect for **data exploration**

Sample Dataset

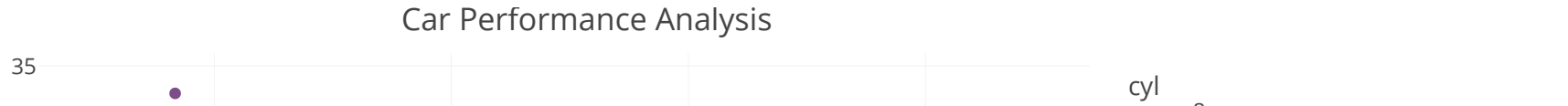
Let's explore the **mtcars** dataset:

```
##                   mpg cyl disp  hp drat    wt  qsec vs am gear carb
## Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
## Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
## Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

Interactive Scatter Plot

```
# Create interactive scatter plot
p <- plot_ly(data = mtcars,
             x = ~wt,
             y = ~mpg,
             color = ~cyl,
             size = ~hp,
             text = ~paste("Car: ", rownames(mtcars),
                           "<br>Weight: ", wt,
                           "<br>MPG: ", mpg,
                           "<br>Cylinders: ", cyl,
                           "<br>Horsepower: ", hp),
             hoverinfo = "text") %>%
  add_markers() %>%
  layout(title = "Car Performance Analysis",
         xaxis = list(title = "Weight (1000 lbs)"),
         yaxis = list(title = "Miles per Gallon"))

p
```

```
## Warning: `line.width` does not currently support multiple values.
```

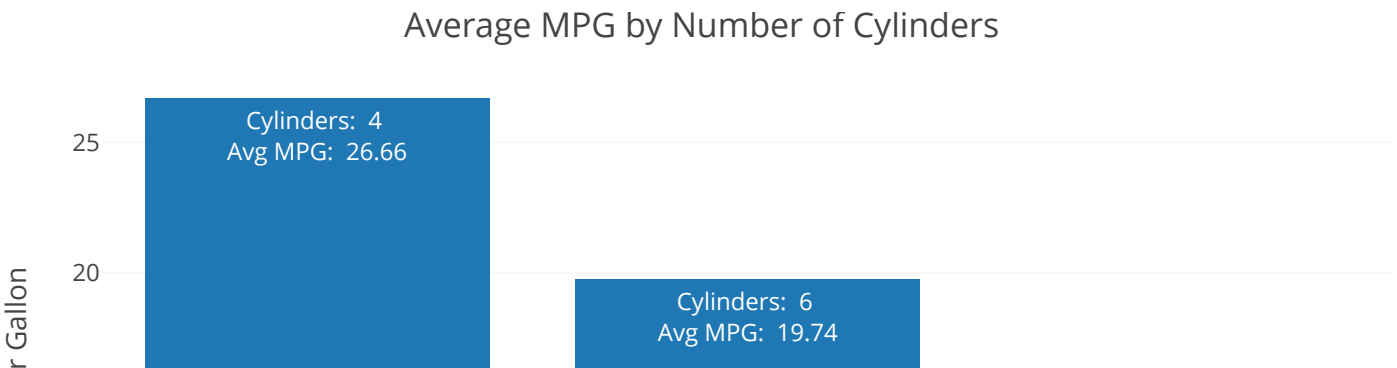


Key Insights

- **Lighter cars** tend to have **better fuel efficiency**
- **More cylinders** generally mean **higher weight**
- **Horsepower** varies significantly across car types

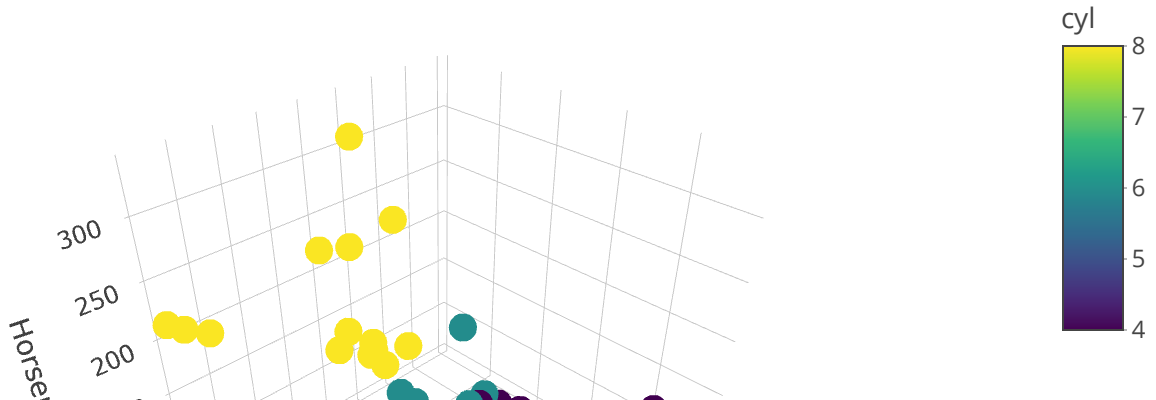
Interactive Bar Chart

```
# Create interactive bar chart
avg_mpg <- mtcars %>%
  group_by(cyl) %>%
  summarise(avg_mpg = mean(mpg), .groups = 'drop')

p2 <- plot_ly(data = avg_mpg,
              x = ~cyl,
              y = ~avg_mpg,
              type = "bar",
              text = ~paste("Cylinders: ", cyl, "<br>Avg MPG: ", round(avg_mpg, 2)),
              hoverinfo = "text") %>%
  layout(title = "Average MPG by Number of Cylinders",
         xaxis = list(title = "Number of Cylinders"),
         yaxis = list(title = "Average Miles per Gallon"))

p2
```



3D Visualization

```
# Create 3D scatter plot
p3 <- plot_ly(data = mtcars,
              x = ~wt,
              y = ~mpg,
              z = ~hp,
              color = ~cyl,
              text = ~paste("Car: ", rownames(mtcars)),
              hoverinfo = "text") %>%
  add_markers() %>%
  layout(scene = list(xaxis = list(title = "Weight"),
                      yaxis = list(title = "MPG"),
                      zaxis = list(title = "Horsepower")))

p3
```



Benefits of Interactive Visualization

- **Zoom and pan** for detailed exploration
- **Hover effects** for instant data access
- **Multiple views** of the same data
- **Professional presentation** quality

Thank You!

Interactive visualizations make data more engaging and accessible.

Plotly provides the tools to create stunning, interactive charts.

Contact Information

- **Author:** Phuoc Nguyen
- **Date:** 2025-10-24
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