

R Markdown - Assignment 3 in SDS 6103

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2024-11-05

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1 Illustration of R Markdown Capabilities

1.1 Exploring the Use of R Markdown for Presentations, Notebooks, and Interactive Graphics

This document explores how R Markdown can be used to create presentations, notebooks, and interactive graphics, along with examples for each.

1.2 R Markdown for Presentations

R Markdown supports creating various types of presentations:

1. HTML Presentations:

- **ioslides**: Simple and clean HTML-based slides.
- **Reveal.js**: Rich with themes, transitions, and interactivity.
- **xaringan**: Highly customizable, built on `remark.js`.

2. PDF Presentations:

- **Beamer**: LaTeX-based, suitable for academic and professional presentations.

3. Microsoft PowerPoint:

- Directly generate `.pptx` files from R Markdown.

1.2.1 Creating an HTML Presentation with ioslides

Example YAML header for ioslides:

```
---
title: "Data Analytics Overview"
author: "John Andrew"
output: ioslides_presentation
---
```

This will create a basic HTML slide deck with ioslides.

1.2.2 Creating a PDF Presentation with Beamer

Example YAML header for Beamer:

```
---
title: "Statistical Analysis"
author: "John Andrew"
output: beamer_presentation
---
```

This setup will generate a Beamer PDF presentation with numbered sections.

1.2.3 Creating a PowerPoint Presentation

Example YAML header for PowerPoint:

```
---
title: "Business Intelligence"
author: "John Andrew"
output: powerpoint_presentation
---
```

This setup outputs directly to a .pptx file.

1.3 Interactive Graphics with Shiny and HTML Widgets

R Markdown can produce interactive graphics using: - **Shiny**: R's web framework for dynamic, reactive content. - **HTML Widgets**: A collection of R packages for embedding interactive JavaScript widgets like plotly and leaflet.

1.3.1 Interactive Plot Example (HTML Only)

To ensure compatibility with both HTML and PDF, the code is in HTML output.

```
library(plotly)
plot_ly(data = mtcars, x = ~mpg, y = ~hp, type = 'scatter', mode = 'markers')
```

If i render as HTML, this chunk will display an interactive Plotly scatter plot.

1.3.2 Interactive Map with Leaflet (HTML Only)

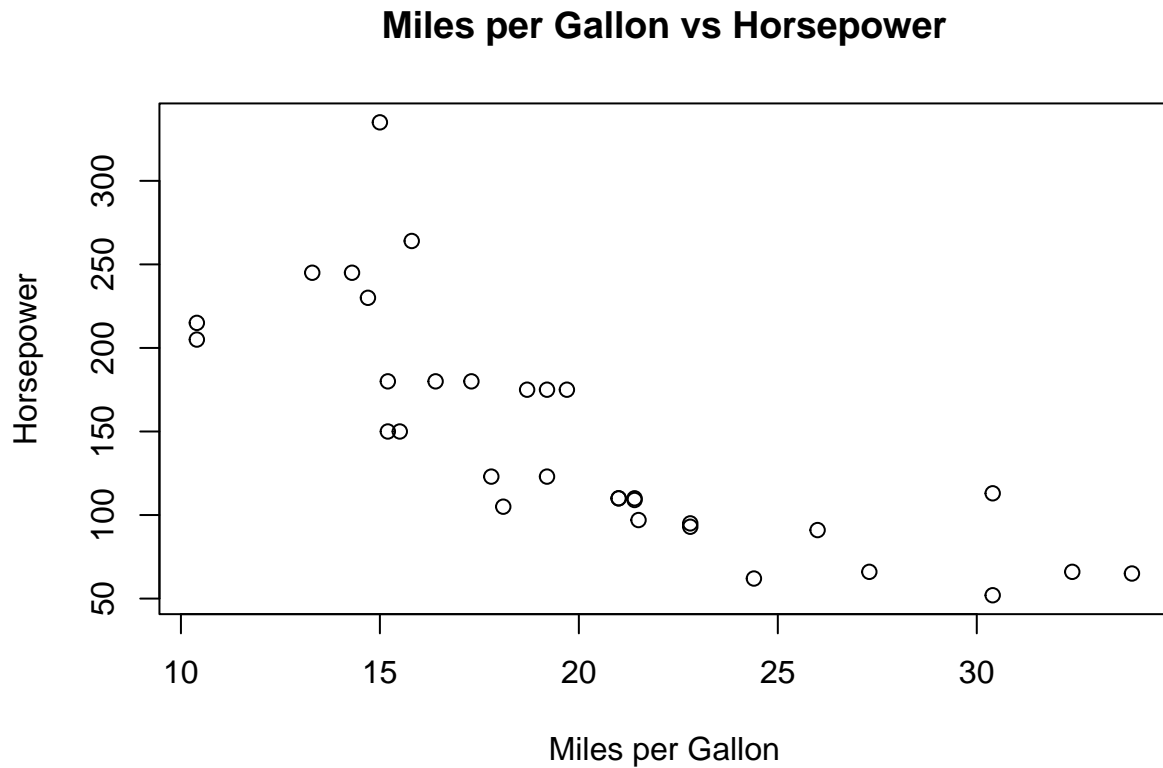
```
library(leaflet)
leaflet() %>%
  addTiles() %>%
  addMarkers(lng = -122.4194, lat = 37.7749, popup = "San Francisco")
```

1.4 R Notebooks in R Markdown

An R Notebook is an extension of R Markdown that supports inline execution and interactive analysis.

1.4.1 Inline Plotting in R Notebook

```
plot(mtcars$mpg, mtcars$hp,
     main = "Miles per Gallon vs Horsepower",
     xlab = "Miles per Gallon",
     ylab = "Horsepower")
```



1.4.2 Using HTML Widgets in R Notebook (HTML Only)

```
library(DT)
datatable(mtcars)
```

1.5 Caching in R Notebooks

R Notebooks support caching, which saves results of computationally expensive code chunks.

```
Sys.sleep(5) # Simulate a long computation
sum(rnorm(1e6))
```

```
## [1] -1564.287
```

1.6 Parameterized Reports in R Notebooks

Example YAML for parameterized reports:

```
---
title: "Parameterized Report"
output: html_notebook
params:
  sample_size: 20
  region: "West"
---
```

This feature allows flexible, dynamic reports based on parameter values.

1.7 Using Other Language Engines in R Markdown

R Markdown supports different programming languages.

1.7.1 Python Example (Illustrative Only)

```
# Python calculation example
x = 10
y = 5
result = x * y
result
```

1.7.2 SQL Example (Illustrative Only)

```
-- SQL query example
SELECT * FROM mtcars WHERE mpg > 20
```

1.7.3 Bash Example (Illustrative Only)

```
# Bash command example
ls -l
```
