POLI 30 D: Political Inquiry

TA Sessions

Lab 10 | What can I do with R?

Before we start

Announcements:

- GitHub page: **https://github.com/umbertomig/POLI30Dpublic**
- Piazza forum: Check with instructors for an alternative link.

Before we start

Announcements: Final Exam

- Three questions.
  - Everyone needs to do Question 1.
  - Then you choose between Q2 and Q3.
- Each question: five points (letters a to e)
  - Q1: Theoretical (interpretation)
  - Q2 or Q3: Coding (R) + Theory (interpretation)
- We cannot help you during the exam. Keep calm and put your brain to work.
- You are fantastic. You got this!

Before we start

Recap: In the Lab sessions so far, you learned:

- How to install R and R Studio on your computer.
- How to do basic and advanced operations with vectors and data frames.
- How to install packages and work with R Markdown.
- How to create plots, run data analysis, and run regressions.

Great job!

- Do you have any questions about these contents?

Plan for Lab 10

- Cool stuff you can do if you keep learning R:
  - Join two datasets
  - Plotting a Map
  - Doing an Interactive Plot
  - A bit of Text-as-data
  - A bit of Machine Learning
  - Shiny WebApps
  - Scrollytells

Getting started

Getting started

- I prepared a `Lab10.R` script for you to follow the class.
- Use that script!
- Step 0: Install all the needed packages. Then load them.

Join two datasets

Join two datasets

- Join two datasets is something that R does fast and reliably. Consider you have these two datasets in here:

Dataset 1:

```
##      country courts barb2 prsexp2
## 1  Argentina      0 -0.72       1
## 2  Australia      1 -6.91       5
## 3    Austria      1 -4.91       5
## 4 Bangladesh      0  0.78       1
## 5    Belgium      1 -4.62       5
```

Dataset 2:

```
##      country prscorr2 gdpw2
## 1  Australia        4 10.30
## 2    Austria        4 10.10
## 3 Bangladesh        0  8.38
## 4    Belgium        4 10.25
## 5    Bolivia        0  8.58
```

- Note that they have they variable `country` in common, but different variables. Why could that be?

Join two datasets

To join it, we use the `full_join` command:

```
full_join(dat1, dat2)
## Joining, by = "country"
##      country courts barb2 prsexp2 prscorr2 gdpw2
## 1  Argentina      0 -0.72       1       NA    NA
## 2  Australia      1 -6.91       5        4 10.30
## 3    Austria      1 -4.91       5        4 10.10
## 4 Bangladesh      0  0.78       1        0  8.38
## 5    Belgium      1 -4.62       5        4 10.25
## 6    Bolivia     NA    NA      NA        0  8.58
```

- Note that whenever we have no idea of the value, R fills it with NAs.
- And there are several other ways to join datasets. Keep learning!

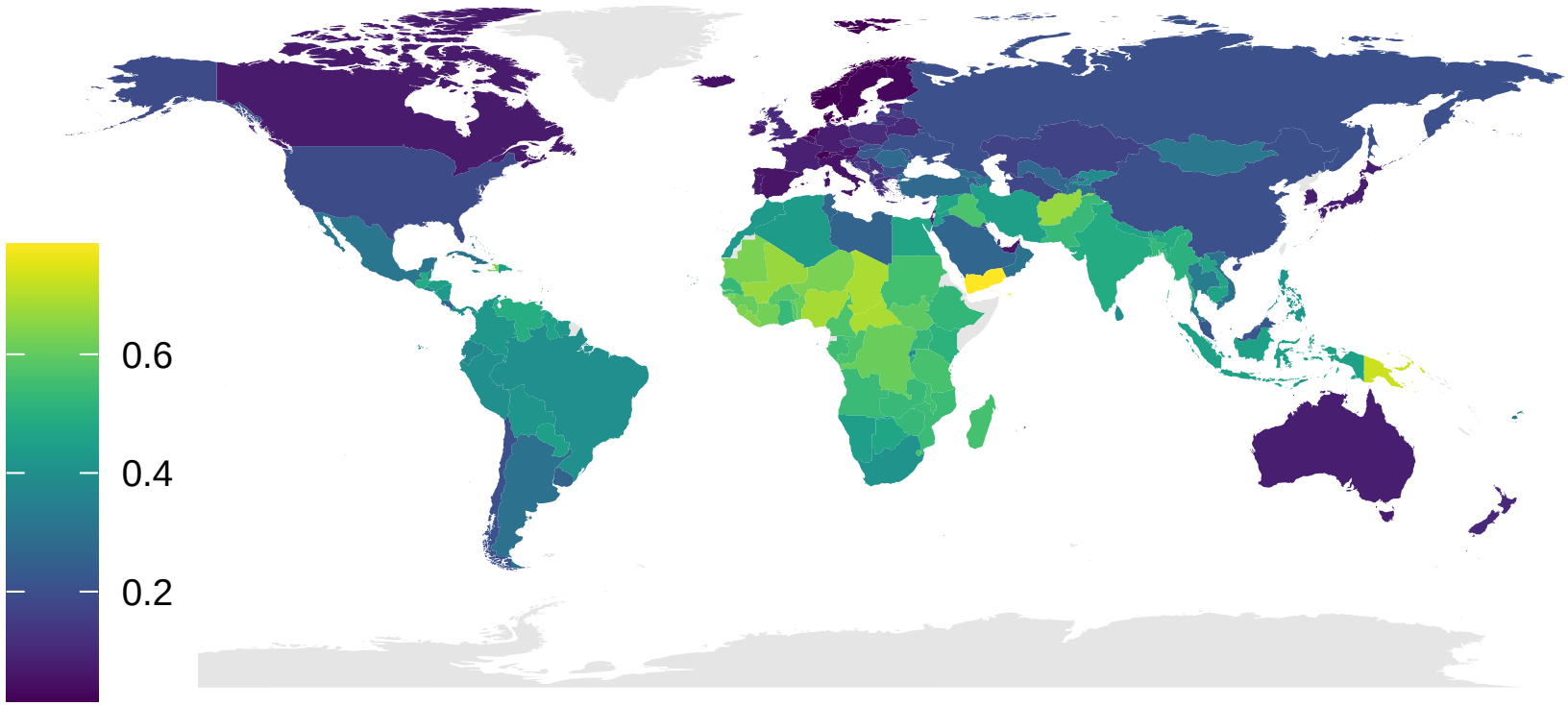
Maps

Maps

- You can plot beautiful (and informative) maps in R.
- There are many ways to do that. We are going to use one here that is the most common.
- We are going to draw two maps:
  1. Gender Inequality Index (2021)
  2. Corruption Perception Index (2018)
- You can do other maps as well. Keep learning!

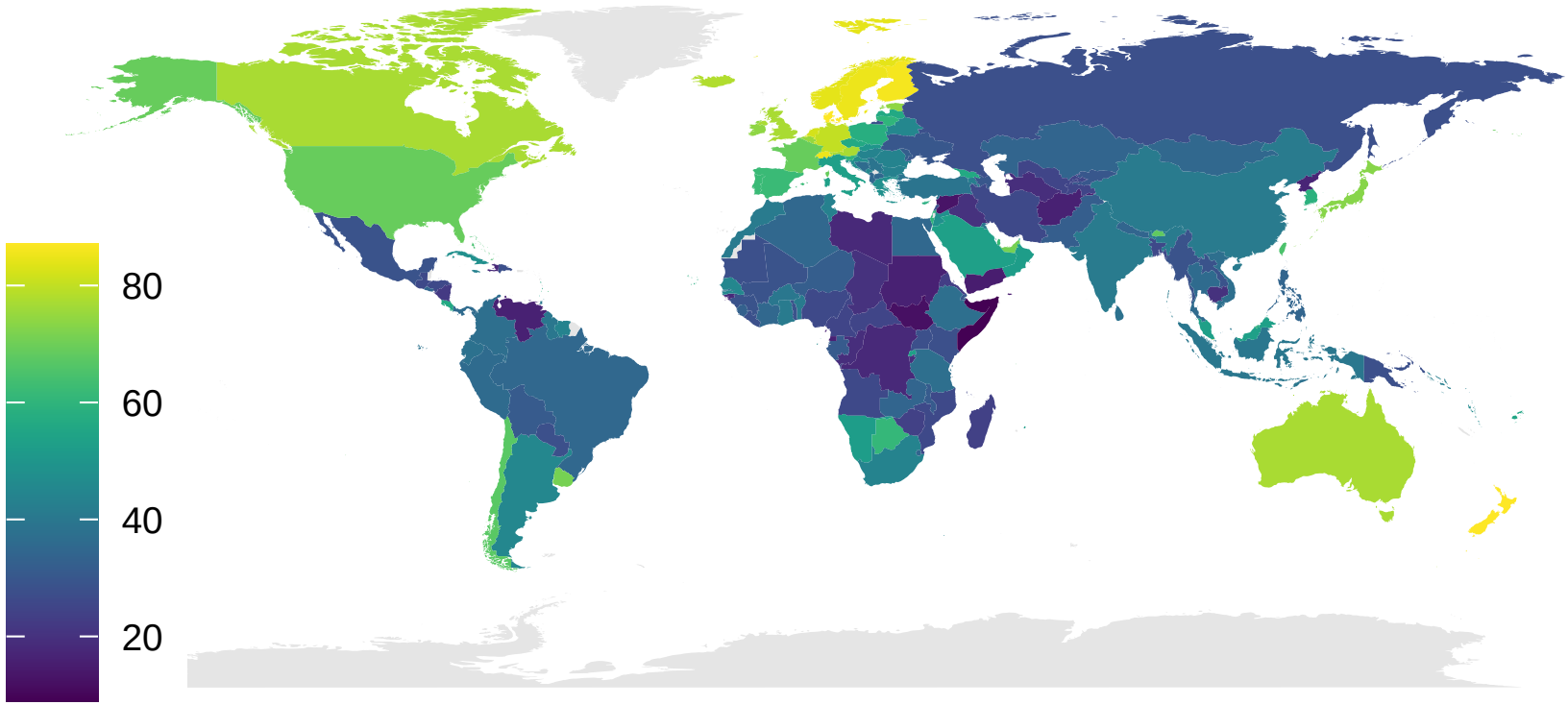
Maps

Gender Inequality Index
(higher values represent more inequality)



Maps

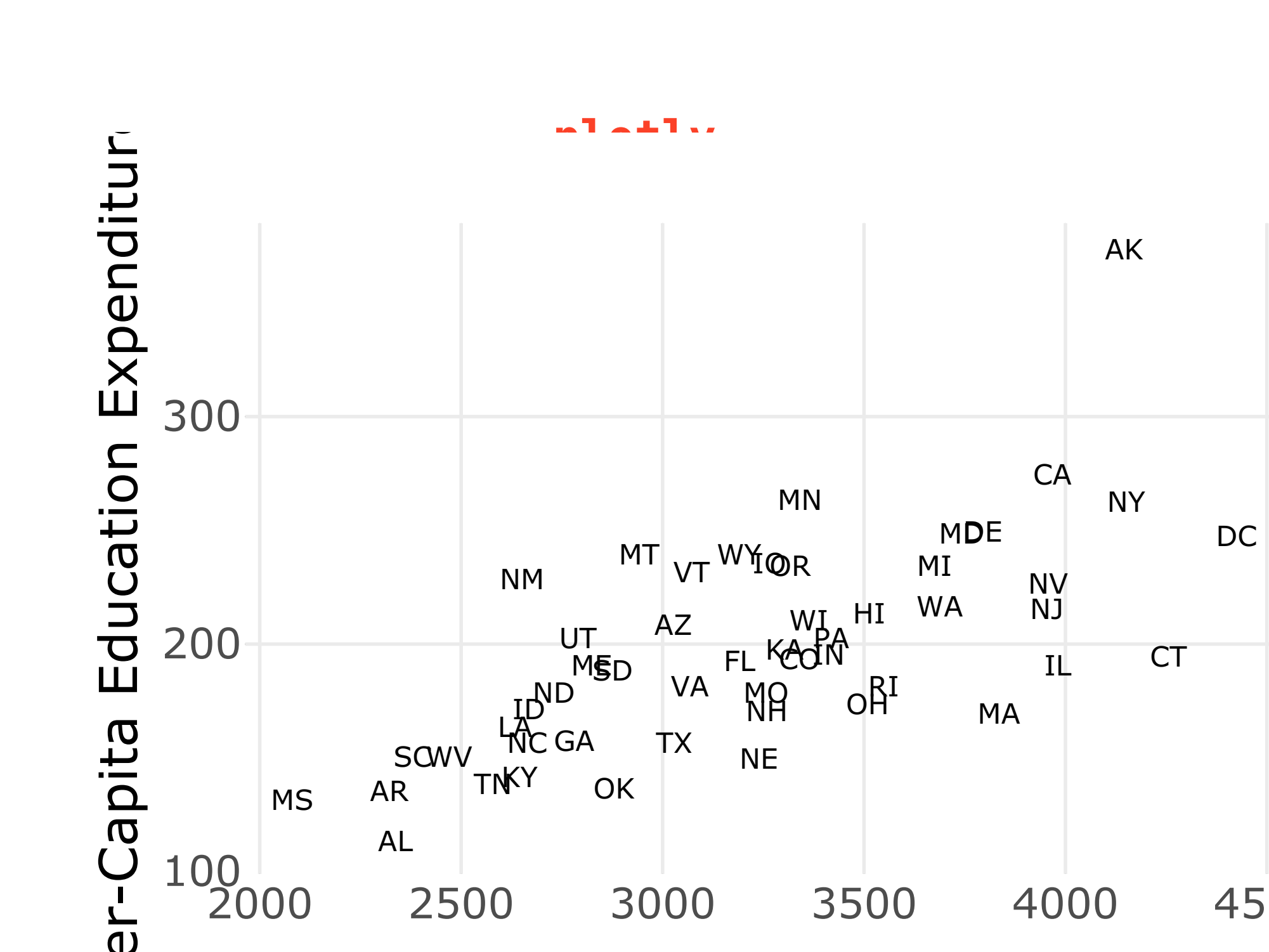
Corruption Perception Index
(higher values represent lower corruption)



plotly

plotly

- Interactive graphs are great, especially when taking data to people that are not specialists.
- `plotly` helps us to plot the graphs and play with them.
- Since we cannot do it in a PDF, just run the code on your computer.
- You can build your interactive plot. Keep learning!


plotly
Per-Capita Education Expenditur
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200
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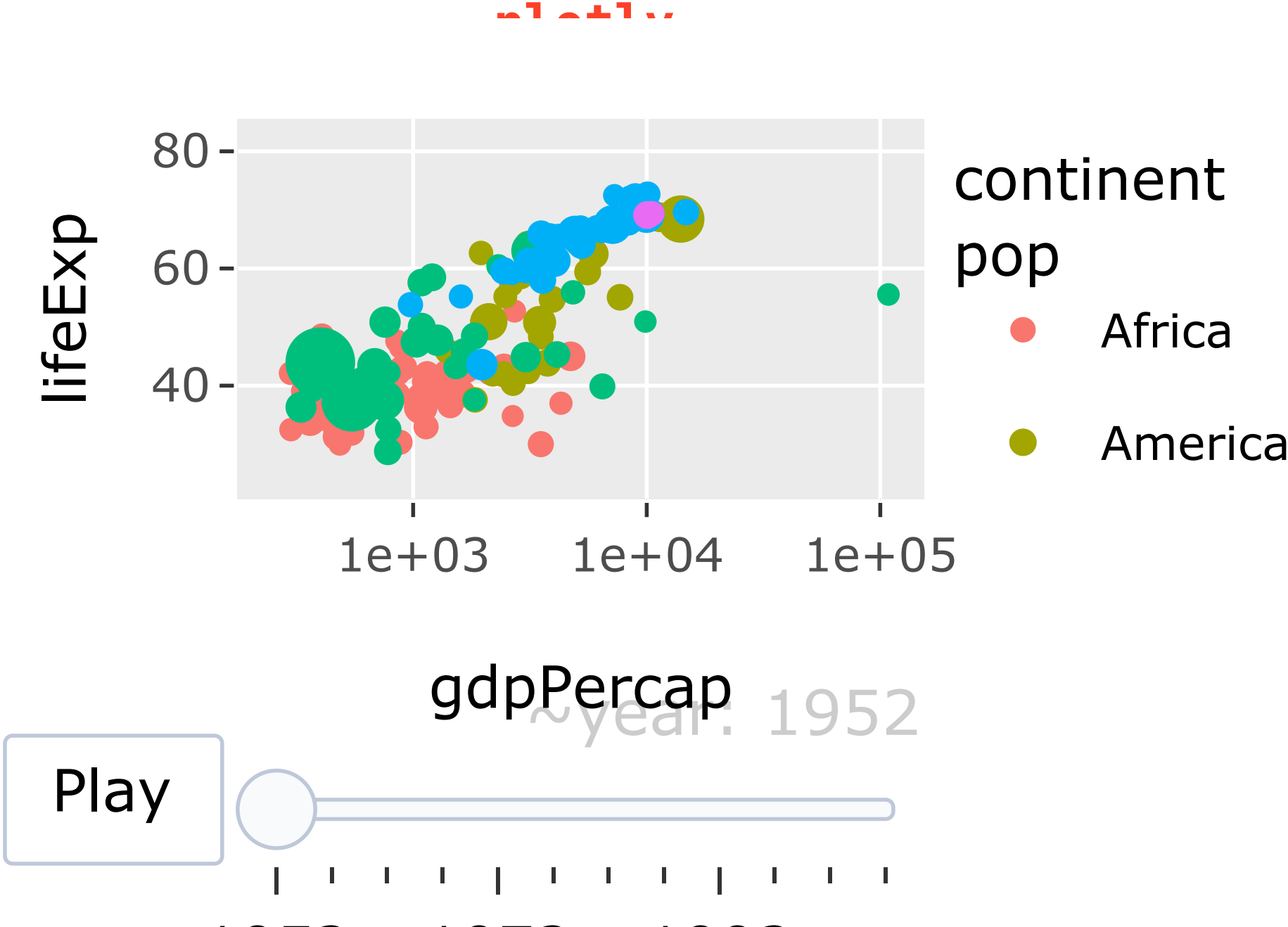
plotly
80
60
40
lifeExp
1e+03
1e+04
1e+05
gdpPercap
continent
pop
Africa
America
~year: 1952
Play

Text-as-data

Text-as-data

- Lots of our work in PoliSci is about analyzing a massive text corpus.
  - Tweets
  - Books
  - Reports
  - You name it...
- R is at the forefront when it comes to text-as-data.
- You can also analyze text-as-data using R. Keep learning!

oil
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prices
opec
mln
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saudi
dlrs
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pct
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industry
kuwait
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analysts
exports
arab
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imports
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april
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nymex
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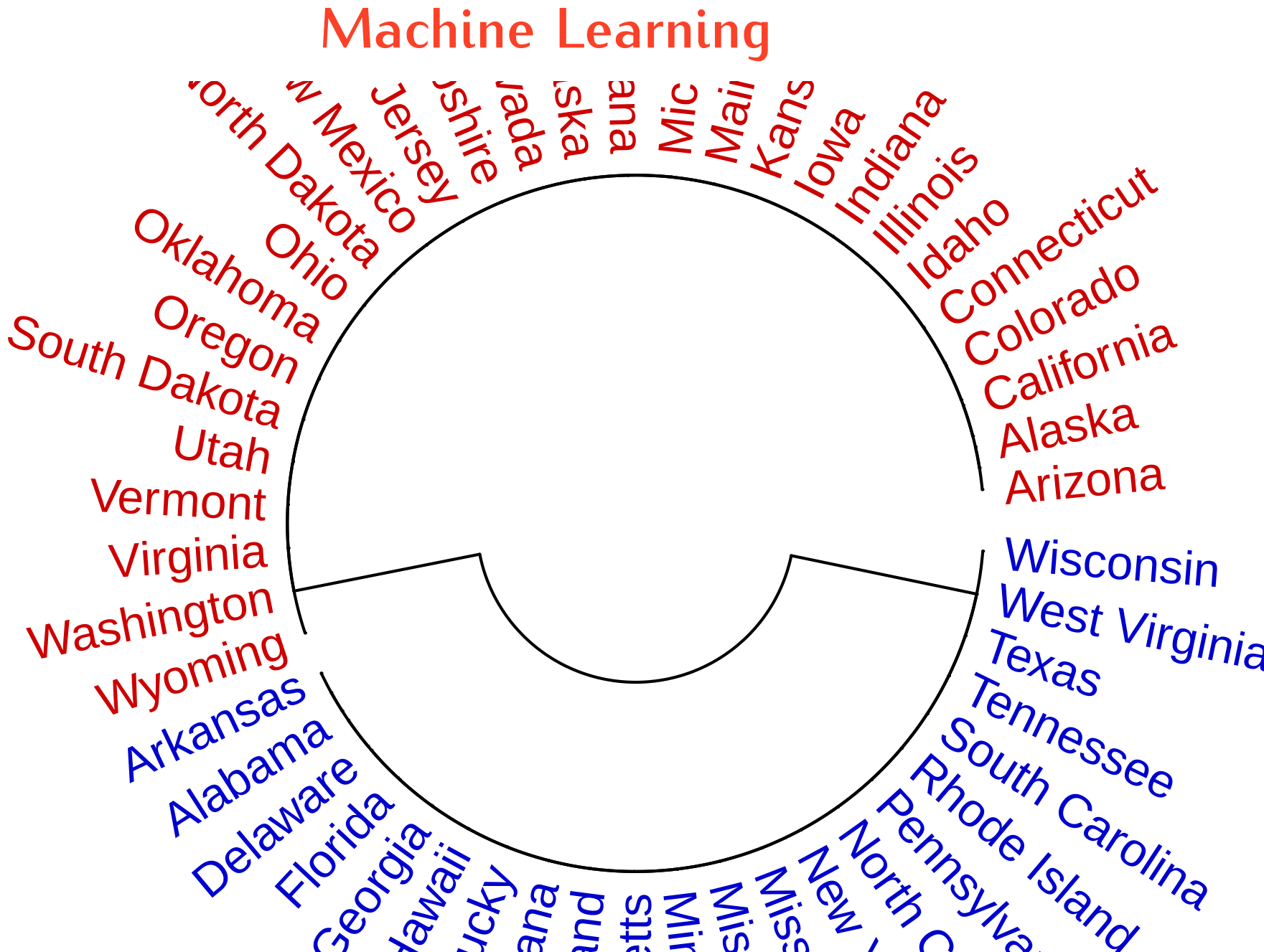
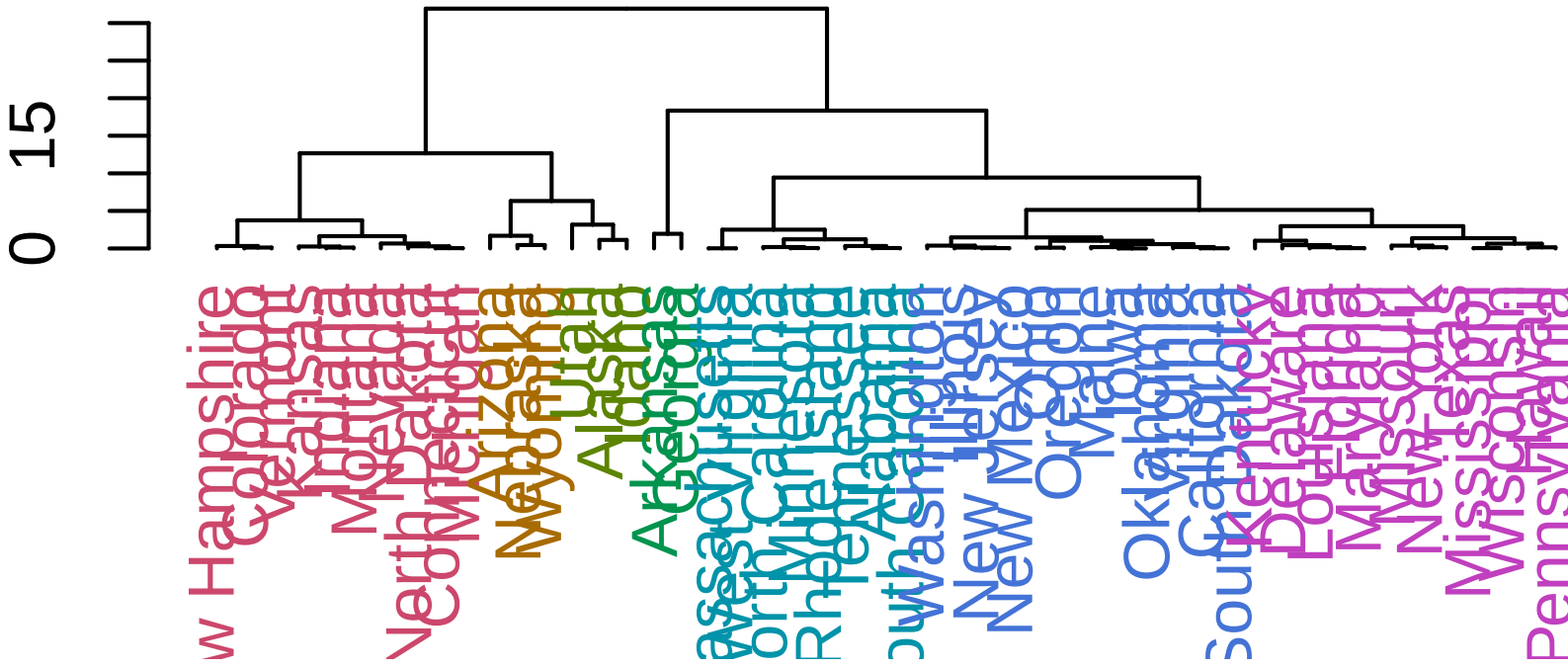
Machine Learning

Machine Learning

- Machine learning is a set of tools that aims to discover and predict data patterns.
- We can use machine learning to predict the outcome of a variable or do classification.
- You can also use machine learning on your data. Keep learning!
- Let us use Machine Learning to cluster voters in the 1976 Carter (Democrat) x Ford (Republican) election.
  - We rely on past Republican vote shares.


Machine Learning
Arizona
Alaska
California
Colorado
Connecticut
Idaho
Illinois
Indiana
Iowa
Kans
Mic
Wisconsin
West Virginia
Texas
Tennessee
South Carolina
Rhode Island
Pennsylva
North C
New
Miss
Florida
Delaware
Alabama
Arkansas
Wyoming
Washington
Virginia
Vermont
Utah
South Dakota
Oregon
Oklahoma
Ohio
North Dakota
Mexico
Jersey

Machine Learning



Shiny WebApps

Shiny WebApps

- Shiny WebApps are great for creating web applications to manipulate and visualize real-time data.
- We are not doing those here, but here are a few examples to explore. All done in R!
- Health Expenditure x Life Expectancy
- US Zipcode explorer
- Wordcloud creator

Shiny WebApps

- Bus company simulation game
- k-Means clustering
- COVID tracker
- Data analyzer
- You can also build your Shiny WebApp. Keep learning!

Scrollytells

Scrollytells

- Scrollytell is a nice wrapper for your Shiny. It helps you to present your analysis results using data.
- We are not doing those here, but here is an example for you to explore. All done in R!
- Scrollytell on Labor Automation
- You can also build your Scrollytell. Keep learning!

Questions?

Thank you all for a great quarter!