

# Computational Social Science

## Final Projects & Shiny Applications

Dr. Thomas Davidson

Rutgers University

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# Plan

1. Course updates
2. Final projects
3. Developing Shiny applications in R

# Course updates

- ▶ Homework 1 grades and comments published
- ▶ Homework 2 released after class
  - ▶ Github Classroom link in Canvas Module
  - ▶ Topics: tidyverse + ggplot2, APIs, and webscraping
  - ▶ Deadline: Next Wednesday, 10/16, 11:59pm ET

# Final projects

## Goals

- ▶ Build an interactive data visualization app, focused on a topic of social scientific interest
- ▶ Showcase skills and knowledge developed in this class
- ▶ Add to your portfolio or resume

# Final projects

## Five steps

1. Data collection
2. Data cleaning
3. Data analysis
4. Data visualization
5. Building and deploying an app

# Final projects

## Data collection

- ▶ Collect a dataset related to social science
- ▶ Data sources:
  - ▶ APIs
  - ▶ Webscraping
  - ▶ Existing datasets (e.g. General Social Survey, American National Election Study)

# Final projects

## Data cleaning

- ▶ Process dataset to extract relevant data
  - ▶ String pre-processing (more next week)
  - ▶ Parsing HTML
  - ▶ Merging datasets
  - ▶ Selecting, grouping, mutating, etc.

# Final projects

## Data analysis

- ▶ Conduct an analysis of the dataset. Possibilities include
  - ▶ Data summaries
  - ▶ Descriptive statistics (mean, median, mode, etc.)
  - ▶ Statistical tests (correlation, t-test, chi-squared, etc.)
  - ▶ Statistical modeling (regression, machine learning, topic modeling, etc.)



# Final projects

## Data visualization

- ▶ Construct visualizations of the dataset
  - ▶ Relationships between variables
  - ▶ Trends over time
  - ▶ Animations
  - ▶ Maps
- ▶ *All apps must have an interactive component*

# Final projects

## Building and deploying an app

- ▶ Use R Shiny to build an interactive app
- ▶ Deploy the app on the web using `Shinyapps.io`

# Final projects

## Final deliverables

1. A deployed Shiny app for interactive data visualization
2. An organized Github repository for the project
3. Documentation and a short written description of the app

# Final projects

## Milestones

1. Identify a suitable topic
  - ▶ *All projects are subject to approval*
2. Initial proposal (due 10/23)
  - ▶ A short description of the planned project including plan for data collection, cleaning, analysis, and visualization
3. Prototype (due 11/20)
  - ▶ A basic working prototype of your app
4. Presentation (12/9 & 12/11)
  - ▶ Short demo and discussion in class
5. App and deliverables submitted (12/13 at 5pm)

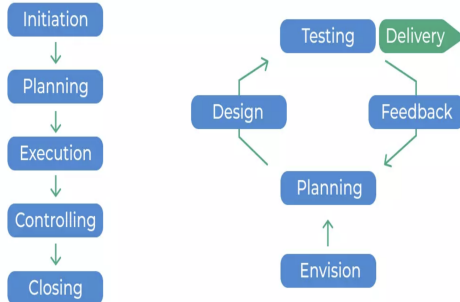
# Final projects

## Feedback

- ▶ There will be several opportunities for formal and informal feedback
  - ▶ Office hours
  - ▶ Discussions with classmates
  - ▶ Feedback on proposal and prototype
  - ▶ Presentation

# Final projects

## Traditional vs Agile Workflow



# Final projects

## Teams

- ▶ You will work as part of a team (3-4 students)
- ▶ Teams will be required to submit a document describing contributions of each member
  - ▶ Ensure fair distribution of work

# Developing Shiny applications in R

## What is Shiny?

- ▶ Shiny is a package you can use to build interactive web pages directly from R
  - ▶ It does not require any experience with HTML, CSS, or Javascript, etc.
- ▶ Apps can be hosted on standalone webpages, enabling anyone to access them
- ▶ Many extensions available, making Shiny a powerful tool for data visualization and construction of dashboards.



# Developing Shiny applications in R

## Example 1: Explore your weather

- ▶ A **simple app** to show data on eruptions of Old Faithful, a geyser in Yellowstone NP

# Developing Shiny applications in R

## Example 2: Bloodbanks in India

- ▶ [This app](#) maps bloodbanks in India using data from the Open Government Platform
- ▶ Interactive, clickable map
- ▶ Tabs to show raw data and provide further details

# Developing Shiny applications in R

## More examples

- ▶ There are many more examples in the [Gallery](#) on the Shiny website.

# Developing Shiny applications in R

## Extensions

- ▶ There are many extensions of the Shiny framework
  - ▶ [D3](#) for data-driven visualization. See '[r2d3](#)' [website](#)
  - ▶ [Leaflet](#) for interactive mapping
  - ▶ [Plotly](#) for interactive plots
- ▶ [This Github page](#) lists a ton of Shiny resources.

# Developing Shiny applications in R

## Further readings

- ▶ RStudio's [Shiny cheatsheet](#) is a really useful quick reference.
- ▶ *Mastering Shiny* by Hadley Wickham is available for free online.
- ▶ RStudio has a [tutorial](#).
- ▶ Lots of videos on YouTube

# Developing Shiny applications in R

## Deployment

- ▶ Apps can be deployed for free using the [Shiny Apps website](#).<sup>\*</sup>  
You just need to do the following:
  - ▶ Sign up (you can use Github account)
  - ▶ Link to RStudio using credentials
  - ▶ Package app in appropriate format
  - ▶ Deploy
- ▶ Free accounts are limited to 5 apps and 25 active hours a month. You will need to ensure you do not exceed these limits.

# Developing Shiny applications in R

## Information on example files in shiny directory

1. `app.R` is an example of simple Shiny app to interactively plot correlations, along with other descriptive statistics
2. `app2.R` modifies the previous app to use the `shinydashboards` framework

# Developing Shiny applications in R



# App template

- ▶ <https://github.com/t-davidson/soc360-project> is a Github repository with a demo of an app that uses additional data.
  - ▶ This can serve as a model for your projects

# Team matching

- ▶ Interesting topics
- ▶ Possible data sources
- ▶ Types of visualizations or analyses

## Next week

- ▶ Introduction to Natural Language Processing