

Social Data Science

Final Projects & Shiny Applications

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Plan

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

Course updates

- ▶ Reminder: Homework 2 released on Friday
 - ▶ Deadline: Next Friday, 10/15, 5pm ET

Final projects

Goals

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

Final projects

Five steps

- ▶ Data collection
- ▶ Data cleaning
- ▶ Data analysis
- ▶ Data visualization
- ▶ Building and deploying an app

Final projects

Data collection

- ▶ Collect a dataset
 - ▶ Data of interest to social scientists
 - ▶ 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
 - ▶ Descriptive statistics (mean, median, mode, etc.)
 - ▶ Statistical tests (correlation, t-test, chi-squared, etc.)
 - ▶ Statistical modeling (regression, machine learning, topic modeling, etc.)
- ▶ Depending on the type of analysis, there may specific resources for using Shiny to show results

Final projects

Data visualization

- ▶ Construct visualizations of the dataset
 - ▶ Relationships between variables
 - ▶ Trends over time
 - ▶ Maps
 - ▶ Animations
- ▶ 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

- ▶ A deployed Shiny app for interactive data visualization
- ▶ An organized Github repository for the project
 - ▶ Including a README with documentation
- ▶ A short written description of the work

Final projects

Milestones

- ▶ Identify a suitable topic, next 2 weeks
 - ▶ All projects are subject to approval
- ▶ Initial proposal (due 10/22), ~2 weeks
 - ▶ A short description of the planned project including plan for data collection, cleaning, analysis, and visualization
- ▶ Prototype (due 11/19), ~6 weeks
 - ▶ A simple working prototype of your app
- ▶ Presentation (12/6 & 12/8), ~9 weeks
 - ▶ A chance to present your app and get feedback
- ▶ Finished app and deliverables submitted (12/16), ~10 weeks

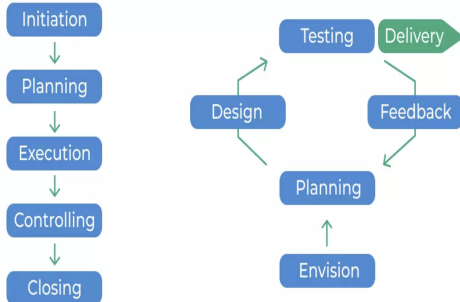
Final projects

Feedback

- ▶ There will be several opportunities for formal and informal feedback
- ▶ Informal
 - ▶ Office hours
 - ▶ Discuss before submitting proposals
 - ▶ Discussions with classmates
- ▶ Formal
 - ▶ Written feedback on proposal and prototype
 - ▶ Presentation

Final projects

Traditional vs Agile Workflow



Final projects

Teamwork

- ▶ You can work on the project individually or as part of a team
- ▶ Make a decision when you submit your proposal
- ▶ Teams will be required to submit an additional document describing contributions of each member
 - ▶ Ensure fair distribution of work
 - ▶ Git commit history to highlight contributions

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 trends in temperature and precipitation using data from NOAA

Developing Shiny applications in R

Example 1: Explore your weather

- ▶ This app visualizes an existing dataset containing information about average temperatures in a given location
- ▶ Features
 - ▶ Two different plots show temperature and precipitation
 - ▶ The user interface contains a search bar, return button, and a random city button
 - ▶ Options to change light/dark mode
 - ▶ Links to original data and code on Github

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
 - ▶ [STMinsights](#) for exploring structural topic models (Week 9)
- ▶ [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 two and a half hour long [video tutorial](#), along with a set of short online tutorials
- ▶ Lots of videos on YouTube

Developing Shiny applications in R

Deployment

- ▶ Apps can be deployed for free using the [Shiny Apps website](#).*
- You just need to do the following:
- ▶ Sign up (you can use Github account)
 - ▶ Get credentials (key and secret)
 - ▶ Authorize 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

- ▶ `app.R` is an example of simple Shiny app to interactively plot correlations, along with other descriptive statistics
- ▶ `app2.R` modifies the previous app to use the `shinydashboards` framework
- ▶ `/app` is a directory containing two files, `ui.R` and `server.R` (the components of `app.R`)
 - ▶ `test.R` uses the files in `/app` to launch a local version of the app
 - ▶ `app_deploy_template.R` can be run to deploy the app to `shinyapps.io`.
 - ▶ You must add credentials and other information to this template before running it.

Next week

- ▶ Introduction to Natural Language Processing

Questions