Practical R: About the class

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BIOF 339

About this class

Learning Objectives

- Run R and RStudio, making use of inherent R features
- Find and make use of the extensive packages (R add-ons) available for analyzing biological and other forms of data
- Load, manipulate, and combine data to make it amenable to further analyses
- Visualize data with extensive graphics capabilities of R (including ggplot)
- Use R to run statistical models and hypothesis tests and report results conforming to standards expected in scientific journals
- Write reports using the powerful `rmarkdown` package and its derivatives

Plan

Week	Topic
Week 1	Introduction to R: Working environmnent and data structures
Week 2	Using packages to enhance data ingestion, munging, and reporting
Week 3	Data visualization for exploration and reporting
Week 4	Statistical analyses using R
Week 5	Statistical learning using R
Week 6	Designing and analyzing experiments, with a sprinkling of bioinformatics
Week 7	Reproducible documents for analytic reporting

Teaching materials

1. The main ideas for the week will be developed through videos, screencasts and slides
2. I will assign tutorials where you can interactively work with R to improve your understanding
    - RStudio Primers
    - I will create and periodically update a R package of R tutorials, that will be called `BIOF339Tutorials`. Instructions are forthcoming

Grading rubric

1. Homeworks for each week are due Sunday at 11:59pm (50%)
    - No late homeworks
    - We'll have 6 homeworks, I'll score the top 4 for grade
2. Final project: A RMarkdown report/presentation demonstrating an end-to-end data analysis in R using your own data, from data ingestion to munging to analyses and graphics, with a brief introduction and conclusion (30%)
3. Class participation (20%): Discussion topics each week

Submitting assignments

Homework

- All homework will be submitted via Canvas
- You must submit your homework using R Markdown
    - The submission will consist of 2 files: A Rmd file and the corresponding HTML file. Both are required for full credit.
- I will initially provide templates for the homework, but you will be expected to create your own R Markdown documents by week 4.

Communication

- Primarily via Slack.
  - Please join the BIOF339 Slack channel using this link.
  - You will see a channel `#fall2020-a`. Please join this channel
- Slack for broadcasting messages, answering questions and the like.
  - If you have a question, you can directly message me on Slack. Expect an answer within 24 hours.
- Office hours by appointment

Class project

- Create a R Markdown document or presentation
- Use your own data, or data available on the web (legally)
- Show me that you can
    - import data into R
    - manipulate (munge) the data
    - perform some analysis on the data
    - create a visualization
    - create a report in R Markdown
- 5 minute *lightning talks* that can be recorded using Quicktime or Screencastify