

Project Ideas

1. A method in **R**. In the same way I covered scatterplot smoothing, you can cover additional statistical methods with the assistance of **R**. A project like this would briefly discuss methodology, introduce an interesting application, and then show how to use the appropriate function(s) in **R**. These projects are modular by their nature, and thus serve as good group projects. Here are some possible topics:
 - Scatterplot smoothing
 - Density estimation
 - CART (Classification and Regression Trees)
 - Bootstrapping
 - tidyverse programming
 - Enhanced plotting methods (coplots, panel graphics, contour plots, wireframe plots, 3-d scatter plots, matrix scatterplots, etc.)
2. In recent years, students have been interested in R plug-ins for software packages widely used in their field, or R packages like the tidyverse packages (dplyr, ggplot2, readr, tibble, forcats, etc), Shiny (building web apps using R) or RMarkdown (Building documents with links to R code and output). These can make interesting projects as well.
3. Stochastic simulation in **R**. You saw a demonstration of the *Gambler's Ruin* problem in class. There are several properties of that simulation that could be explored: average time to going broke given a fixed bankroll, average time between break-even points, average number of returns to break-even point, etc. I demonstrated a couple of these ideas in class, but only ran single simulations. A more detailed study involving multiple simulations could be conducted. Other stochastic simulations are possible as well (e.g., a more comprehensive study comparing Hit-or-Miss Integration to Classic MC Integration).
4. SAS tutorials. There are several important topics in SAS I will be covering only briefly, including SAS macros, SAS/GRAPH, PROC TABULATE, PROC REPORT, SAS/SGPANEL and reading directly from a database (e.g., SQL or ACCESS). You can set up a tutorial demonstrating these topics in more depth.
5. Work/thesis/hobby items. Students often have thesis or work-related tasks that are relevant project topics. Sometimes, these tasks are not necessarily closely related to the coursework, but I try to be flexible in terms of what may be relevant. Students with hobbies (e.g., sports analysis) often can combine tools like webscraping, data cleaning and exploratory data analysis into an interesting project. Kaggle, with its interesting array of data challenges, can be a source of project ideas too.