Confidence Interval Tutorial Assignment

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One of the most important considerations with univariate data are the development of confidence intervals. As you can probably guess, confidence intervals are based on the distribution of the data. There are two main approaches in developing confidence intervals. One relies on the use of theoretical probability distributions but there are a number of methods that do not rely on theoretical distributions. We will learn several methods because each are used in environmental sciences to varying degrees.

Assignment

To create a guide for your peers about what are confidence intervals and how to create them using a univarite dataset (one set of numbers).

Using R-studio, write up an short description and demonstration of how to do a confidence interval.

Rationale

Learning statistics is challenging and teaching it even more so. But I'm convinced that we learn better if we are asked to teach a topic.

Resources

There are tons of resources to complete this assigment. For example, I have several statistics textbooks that might help you figure out how to talk about confidence intervals. There are numerous cheatsheets avaialble, which you can get from Rstudio (`Help/Cheetsheets`) or from Sakai (`Resources/Project 0 General Resources/Software Resources`).

Finally, there are some good (and some terrible – Read: Wrong) resources on the web as well.

Figure 1: Confidence abounds without limits.

Assignment Steps

1. (1 pnt) Successfully Use R-studio to create a pdf from markdown;

2. (1 pnt) Use your random number for the author name AND the file name;

3. (1 pnt) Describe what a confidence interval is and how it depends on probability distributions;

4. (1 pnt) Describe "how" we talk about confidence intervals, relative to the population and sample means;

5. (1 pnt) Generate a vector of 5 random numbers with a mean of 10 and standard deviation of 1;

6. (1 pnt) Report the sample mean and standard deviation;

7. (2 pnts) Calculate the confidence intervals for 95% and 90% and how we should report the results correctly in each case.

8. (2 pnts) Create a probability distribution that shows the confidence intervals. This is the hardest part and relies on create a probability density curve (i.e. `dnorm()`).

Finally, I will also grade your guide based on the clarity and robustness of your approach (2 pnts).

Working an Example

You can see that I have created a working example for myself, which you might find helpful or completely not!

here's the link for my guideline on confidence invervals.

As you work through your guide and find problems with mine, please point them out and I'll fix them!