Experiment-5

siju.swamy@saintgits.org

14/07/2021

Study of confidence intervals How to compute confidence intervals for the mean when the standard deviation is known.

Study of Confidence Intervals for means of Large and Small Samples

Calculate Confidence Interval in R – Normal Distribution

confidence interval in r confidence interval r confidence intervals confidence interval in r linear regression confint r histogram with confidence interval in r confidence intervals in r plot confidence interval in r confidence interval function percentile confidence interval in r confidence interval for variance in r how to calculate 95 percent confidence interval in r confidence confidence interval function in r

Given the parameters of the population proportion distribution and sample standard deviation, generate the bootstrap confidence interval. In this situation, we're basically using r like an error interval calculator... Using the 95 percent confidence level and confidence coefficient function, we will now create the R code for a confidence interval. What does a 95 percent confidence interval mean? Essentially, a calculating a 95 percent confidence interval in R means that we are 95 percent sure that the true probability falls within the confidence interval range that we create in a standard normal distribution.

$$CI = \bar{X} \pm t_{0.975} SE$$

```
# Calculate Confidence Interval in R for Normal Distribution
# Confidence Interval Statistics
# Assume mean of 12
# Standard deviation of 3
# Sample size of 30
# 95 percent confidence interval so right tail at 0.975

xbar <- 12
stddev <- 3
n <- 30
error <- qnorm(0.975)*stddev/sqrt(n)
lower_bound <- xbar - error
upper_bound <- xbar + error
lower_bound
```

```
## [1] 10.92648
```

```
upper_bound
```

```
## [1] 13.07352
```

Calculate Confidence Interval in R – t Distribution

For experiments run with small sample sizes it is generally inappropriate to use the standard normal distribution or normal approximation. For more accurate small sample hypothesis testing a student T distribution is the correct choice for this environment. A t confidence interval is slightly different from a normal or percentile approximate confidence interval in R. When creating a approximate confidence interval using a t table or student t distribution, you help to eliminate some of the variability in your data by using a slightly different base dataset binomial distribution.

R can support this by substituting the qt function for the qnorm function, as demonstrated below.... assume we are working with a semi large sample size of 15. You will need to tell the qt function the degrees of freedom as a parameter (should be n-1).

```
# Calculate Confidence Interval in R for t Distribution
# t test confidence interval
# Assume mean of 12
# Standard deviation of 3
# Sample size of 15
# 95% confidence interval so the right tail at .975

xbar <- 12
stddev <- 3
n <- 30
error <- qt(0.975,df=n-1)*stddev/sqrt(n)
lower_bound <- xbar - error
upper_bound <- xbar + error
lower_bound
```

```
## [1] 10.87978
```

```
upper_bound
```

```
## [1] 13.12022
```