

Testing of Hypothesis - Student's t-test

Introduction:

The two-sample t -test (also known as the independent samples t -test) is a method used to test whether the unknown population means of two groups are equal or not.

You can use the test when your data values are independent, are randomly sampled from two normal populations and the two independent groups have equal variances.

Procedure:

- Import the data set
- Determine the critical value and sample statistic using R functions
- Conclude the problem using R functions

Example :

In a random sample of six students each from the CSE major batch of 2014 and 2020, each student was asked about their salary package after they completed graduation. We wanted to know if the typical salary offered after graduation had changed over the past six years.

batch2014 = 667, 859, 1129, 500, 1098, 1036

batch2020 = 920, 1060, 800, 645, 869, 1101

Code and Results:

```
batch2014=c(667,859,1129,500,1098,1036)
batch2014

## [1] 667 859 1129 500 1098 1036

batch2020=c(920,1060,800,645,869,1101)
batch2020

## [1] 920 1060 800 645 869 1101

x1bar<-mean(batch2014)
x2bar<- mean(batch2020)
s1<-sd(batch2014)
s2<-sd(batch2020)
n1<-length(batch2014)
n2<-length(batch2020)
diff_in_means<-x1bar-x2bar
SE_diff_mean<-sqrt(s1^2/n1+s2^2/n2)
t_stat<-diff_in_means/SE_diff_mean
t_stat

## [1] -0.1416828
```

```
pvalue=2*pt(t_stat,df=n1+n2-2)
pvalue
## [1] 0.8901443
```

Interpretation:

We fail to reject the null hypothesis since the p-value is bigger than 0.05. It means that the mean pay offered to students in batches 2014 and 2020 is not significantly different from one another.