

# ctapply - An R package to measure central tendency and spread

Anthony McCofie - anthonymccofie@usf.edu

April 23, 2022

## ctapply: Object Summaries

### Description:

**ctapply** is a package used to produce summaries of basic statistics, such as central tendency(mean, median..) and standard deviation (spread). The package calls specific methods to produce the result. The user have option to print the result.

The sample data used for this package is: **Cost Function of Electricity Producers (1955)**

Below are the fields for the sample data used for the package

##	X	cost	output	labor	laborshare	capital	capitalshare	fuel	fuelshare
## 1	1	0.082	2	2.09	0.3164	183	0.4521	17.9	0.2315
## 2	2	0.661	3	2.05	0.2073	174	0.6676	35.1	0.1251
## 3	3	0.990	4	2.05	0.2349	171	0.5799	35.1	0.1852
## 4	4	0.315	4	1.83	0.1152	166	0.7857	32.2	0.0990
## 5	5	0.197	5	2.12	0.2300	233	0.3841	28.6	0.3859
## 6	6	0.098	9	2.12	0.1881	195	0.2926	28.6	0.5193

### Usage:

- You can use the package in two ways:
  - Either with the data that comes with the package **electricdata** as shown below

```
ctapply(electricdata$fuel, options=2)
```

```
## OPTION: 2
```

```
##
```

```
## Call:
```

```
## lm(formula = log(cost/fuel) ~ log(output) + log(labor/fuel) +  
##     log(capital/fuel), data = electricdata)
```

```
##
```

```
## Residuals:
```

```
##      Min      1Q   Median      3Q      Max
```

```
## -1.02819 -0.23068 -0.01754  0.15501  1.79910
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)  
## (Intercept)   -4.772086   0.880175  -5.422 2.22e-07 ***  
## log(output)    0.722676   0.016859  42.865 < 2e-16 ***
```

```
## log(labor/fuel)    0.561425    0.203908    2.753    0.0066 **
## log(capital/fuel) -0.001553    0.188565   -0.008    0.9934
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3998 on 155 degrees of freedom
## Multiple R-squared:  0.9299,    Adjusted R-squared:  0.9286
## F-statistic: 685.6 on 3 and 155 DF,  p-value: < 2.2e-16
```

– Or use your own data such as creating a numeric vector shown below:

```
data1 <- c(4,5,6,5,6,5,6,4,6,5,6,4,5,4,5,6)
ctapply(data1, options=2)
```

```
## OPTION: 2
```

```
##
## Call:
## lm(formula = log(cost/fuel) ~ log(output) + log(labor/fuel) +
##     log(capital/fuel), data = electricdata)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.02819 -0.23068 -0.01754  0.15501  1.79910
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -4.772086    0.880175  -5.422 2.22e-07 ***
## log(output)     0.722676    0.016859  42.865 < 2e-16 ***
## log(labor/fuel)  0.561425    0.203908   2.753  0.0066 **
## log(capital/fuel) -0.001553    0.188565  -0.008  0.9934
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3998 on 155 degrees of freedom
## Multiple R-squared:  0.9299,    Adjusted R-squared:  0.9286
## F-statistic: 685.6 on 3 and 155 DF,  p-value: < 2.2e-16
```

## Arguments

**object** : An object for which a summary is desired. This could be a numeric vector or a data frame dataset.

**np** : A boolean value (**TRUE/FALSE**). The statistics to use (**Mean, Median,...**).

**print** : A boolean value (**TRUE/FALSE**). This provide an option for users to print result.

The full syntax usage:

```
data1 <- c(4,5,6,5,6,5,6,4,6,5,6,4,5,4,5,6)
ctapply(data1, np=TRUE, print=TRUE, options = 3)
```

```
## OPTION: 3
```

```
##
## Call:
## lm(formula = log(cost/fuel) ~ log(output) + I(log(output)^2) +
##     log(labor/fuel) + log(capital/fuel), data = electricdata)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.43550 -0.13369  0.01093  0.12171  1.12369
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -3.711506   0.689013  -5.387 2.64e-07 ***
## log(output)    0.130496   0.059302   2.201  0.02926 *
## I(log(output)^2) 0.051788   0.005059  10.237 < 2e-16 ***
## log(labor/fuel)  0.462589   0.158102   2.926  0.00395 **
## log(capital/fuel) 0.071738   0.146109   0.491  0.62413
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3094 on 154 degrees of freedom
## Multiple R-squared:  0.9583, Adjusted R-squared:  0.9572
## F-statistic: 884.7 on 4 and 154 DF,  p-value: < 2.2e-16
```

## Who should use this package

Why use **ctapply**? Use **ctapply** to quickly summarize data and identify what looks normal and what looks odd. The distribution of a variable shows what values the variable takes and how often the variable takes these values.

Analytics in a true sense is leveraged only through visualizations. R, as a statistical tool, offers strong visualization capabilities. So, the numerous options associated with charts is what makes them special. Each of the charts has its own application and the chart should be studied prior to applying it to a problem.