LETTERKENNY INSTITUTE OF TECHNOLOGY

ASSIGNMENT COVER SHEET

Lecturer's Name: **James Connolly**

Assessment Title: **Hypothesis Testing**

Work to be submitted to: **James Connolly**

Date for submission of work: **29-08-2018**

Place and time for submitting work: **3:00 pm**

To be completed by the Student

Student's Name: **PRATEEK PARASHER**

Class: **Msc in Big Data**

Subject/Module: **Data Science**

Word Count (where applicable): ____________________

I confirm that the work submitted has been produced solely through my own efforts.

Student's signature: **PRATEEK PARASHER** Date: **29/8/2018**

Notes

Penalties: The total marks available for an assessment is reduced by 15% for work submitted up to one week late. The total marks available are reduced by 30% for work up to two weeks late. Assessment work received more than two weeks late will receive a mark of zero. [Incidents of alleged plagiarism and cheating are dealt with in accordance with the Institute's Assessment Regulations.]

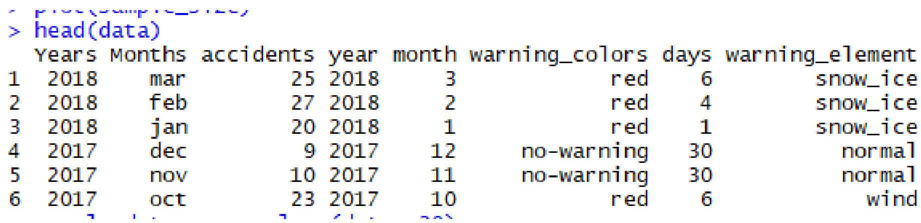
Plagiarism: Presenting the ideas etc. of someone else without proper acknowledgement (see section L1 paragraph 8).

Cheating: The use of unauthorised material in a test, exam etc., unauthorised access to test matter, unauthorised collusion, dishonest behaviour in respect of assessments, and deliberate plagiarism (see section L1 paragraph 8).

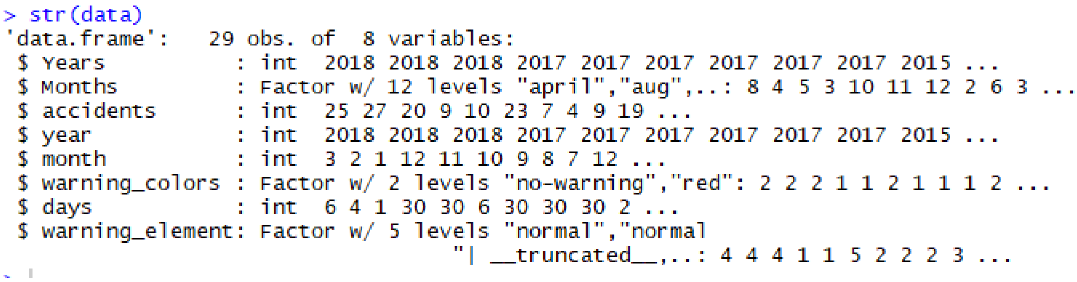
Continuous Assessment: For students repeating an examination, marks awarded for continuous assessment, shall normally be carried forward from the original examination to the repeat examination.

ABSTRACT: - Using statistical analysis I am interested to examine my dataset, but I am not thinking there must be some correlation between weather red warnings & road accidents. But I can't make that decision on my hypothesis or my assumption I need to perform statistical hypothesis analysis testing. I applied power test, t-test , correlation test. Correlation test is used to find the sample size to perform the power analysis with effect size of 0.5 with 80% certainty and no more than a 5% chance of inaccuracy. Then the sample of 29 records is used to do the power analysis. And the output of p-value is significantly high from 0.05. Therefore, this proves that the null hypothesis is true

DATA DESCRIPTION



```
> head(data)
  Years Months accidents year month warning_colors days warning_element
1  2018    mar        25 2018     3            red    6        snow_ice
2  2018    feb        27 2018     2            red    4        snow_ice
3  2018    jan        20 2018     1            red    1        snow_ice
4  2017    dec         9 2017    12     no-warning   30          normal
5  2017    nov        10 2017    11     no-warning   30          normal
6  2017    oct        23 2017    10            red    6            wind
```



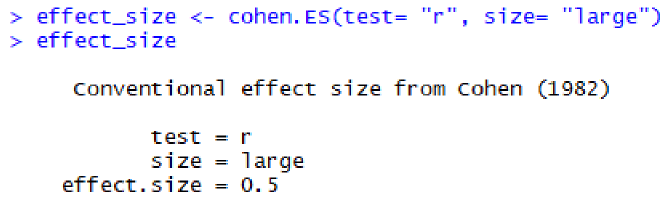
```
> str(data)
'data.frame':	29 obs. of  8 variables:
 $ Years          : int  2018 2018 2018 2017 2017 2017 2017 2017 2017 2015 ...
 $ Months         : Factor w/ 12 levels "april","aug",..: 8 4 5 3 10 11 12 2 6 3 ...
 $ accidents      : int  25 27 20 9 10 23 7 4 9 19 ...
 $ year           : int  2018 2018 2018 2017 2017 2017 2017 2017 2017 2015 ...
 $ month          : int  3 2 1 12 11 10 9 8 7 12 ...
 $ warning_colors : Factor w/ 2 levels "no-warning","red": 2 2 2 1 1 2 1 1 1 2 ...
 $ days           : int  6 4 1 30 30 6 30 30 30 2 ...
 $ warning_element: Factor w/ 5 levels "normal","normal
                                   "| __truncated__,..: 4 4 4 1 1 5 2 2 2 3 ...
```

Dataset containing year 2012-2018 data of road accident and red weather warning data with different -2 warning elements.

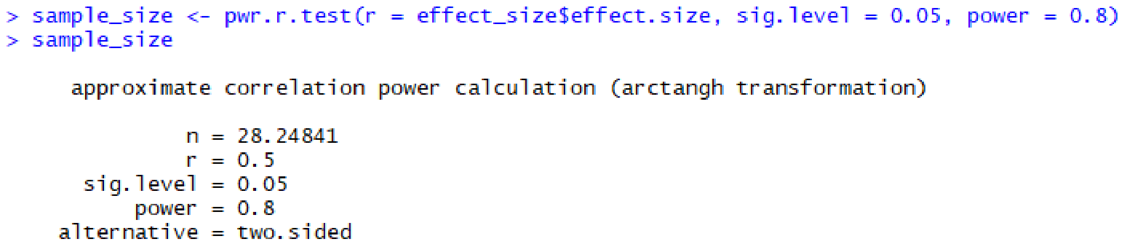
Type of data -> continuous
No. of sample -> two – sample
Hypothesis testing -> correlation

HYPOTHESIS TESTING

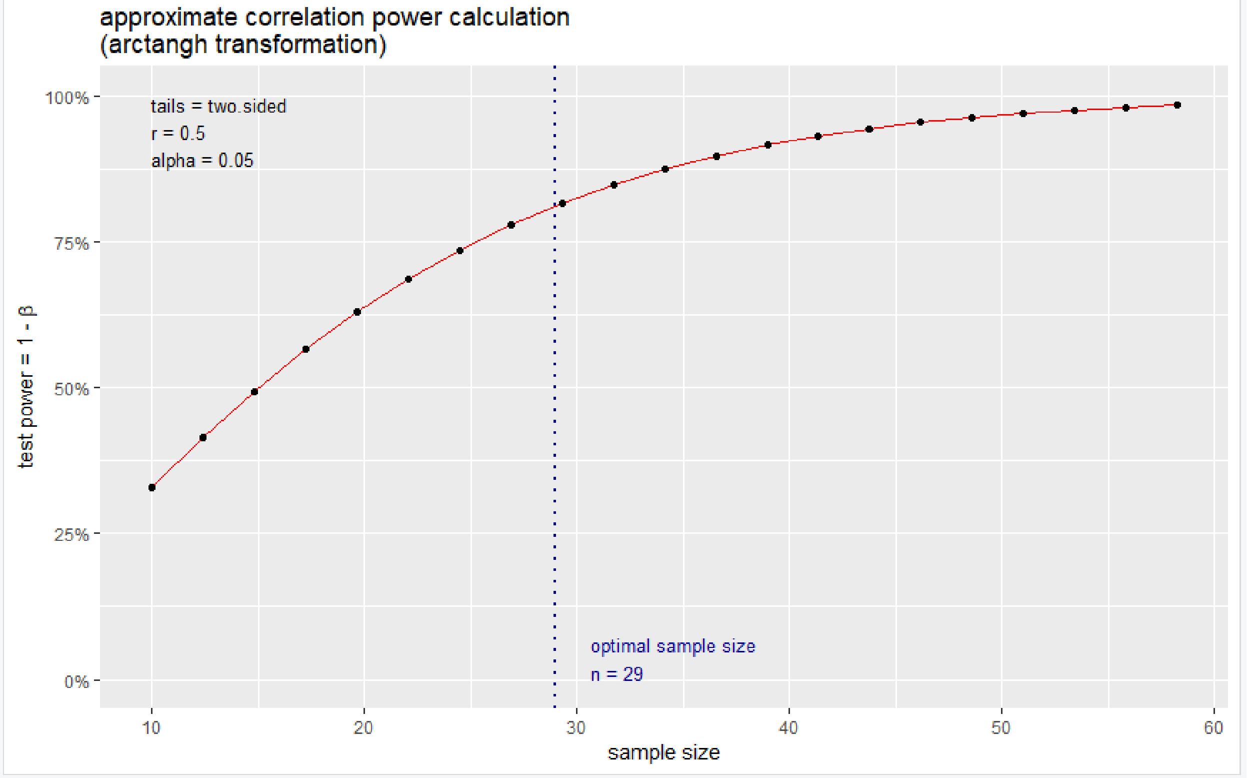
H0 = The road accident is not related to the red weather warnings
H1 = The road accident is related to the red weather warnings



```
> effect_size <- cohen.ES(test= "r", size= "large")
> effect_size

     Conventional effect size from Cohen (1982) 

           test = r
           size = large
    effect.size = 0.5
```

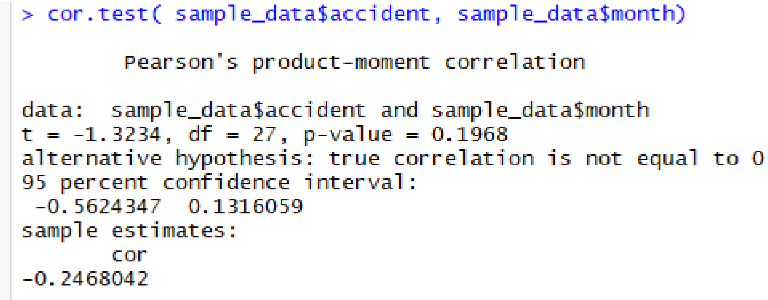


```
> sample_size <- pwr.r.test(r = effect_size$effect.size, sig.level = 0.05, power = 0.8)
> sample_size

     approximate correlation power calculation (arctangh transformation)

              n = 28.24841
              r = 0.5
      sig.level = 0.05
          power = 0.8
    alternative = two.sided
```



The results suggest that we need 29 records to detect an effect size of 0.5 with 80% certainty and no more than a 5% chance of inaccuracy.

RESULTS



```
> cor.test( sample_data$accident, sample_data$month)

        Pearson's product-moment correlation

data:  sample_data$accident and sample_data$month
t = -1.3234, df = 27, p-value = 0.1968
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.5624347  0.1316059
sample estimates:
       cor 
-0.2468042 
```

- P value is 0.1968 in that case we have less strict cut-offs, such as 0.10, requiring less evidence

The results are considered non-significant - fail to reject Ho.

result it is seen that p-value is significantly high from 0.05. Therefore, this proves that the null hypothesis is true which means that the alternate hypothesis is false. That is, there is a relation between road accidents and red weather warnings.

Conclusion :- From this hypothesis test, I am concluding that the red weather warnings is having relation with road accident. By this result my initial null hypothesis true and I will continue my prediction and further findings with alternative hypothesis.

GitHub Link :- https://github.com/prateekparasher/web_scrap