CS 6375.001 MACHINE LEARNING
Project Status Report
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In this project, we aim at making a complete analysis of the TITANIC dataset to find what sorts of people were more likely to survive the shipwreck.

The Dataset - TITANIC

The TITANIC dataset is taken from an active Kaggle Competition and the link of which is given below:

https://www.kaggle.com/c/titanic/data?train.csv

- Number of attributes = 11 (including the class attribute)
- Number of instances = 891
- The attributes are the following:
  1. *Survival* – 0 if not survived and 1 if survived
  2. Pclass – Passenger Class (1 - Upper, 2 - Middle and 3 – Lower class)
  3. Name – Name of the passenger
  4. Sex – Gender of the passenger
  5. Age – Age of the passenger
  6. Sibsp – Number of siblings/spouses aboard
  7. Parch – Number of Parents/Children aboard
  8. Ticket – Ticket Number
  9. Fare – Ticket fare
  10. Cabin – Cabin number
  11. Embarked – Port of Embarkation (C, Q and S)

Here is the snapshot of the data:

```
> head(train)
  PassengerId Survived Pclass                                                 Name    Sex Age SibSp Parch
1           1        0      3                              Braund, Mr. Owen Harris   male  22     1     0
2           2        1      1 Cumings, Mrs. John Bradley (Florence Briggs Thayer) female  38     1     0
3           3        1      3                               Heikkinen, Miss. Laina female  26     0     0
4           4        1      1       Futrelle, Mrs. Jacques Heath (Lily May Peel) female  35     1     0
5           5        0      3                             Allen, Mr. William Henry   male  35     0     0
6           6        0      3                                     Moran, Mr. James   male  NA     0     0
            Ticket     Fare Cabin Embarked
1        A/5 21171   7.2500              S
2         PC 17599 71.2833   C85        C
3 STON/O2. 3101282   7.9250              S
4           113803 53.1000  C123        S
5           373450   8.0500              S
6           330877   8.4583              Q
```

Techniques

We planned to apply the following techniques on the data to complete the required analysis –

1. Artificial Neural Network
2. Boosting
3. Random Forest

Experimental Methodology

- We employ the following procedure in our project –
  1. Pre-processing of the dataset
     - This step involves dealing with the NA values,
     - Selecting the attributes that influence the classification by observing the histograms and correlation plots,
     - Scaling the required attributes
  2. On the dataset
     - We perform each of the aforementioned techniques,
     - Also, vary the parameters and find the best one for the technique.
  3. We evaluate the techniques using the following metrics –
     - Accuracy
     - Precision
     - Recall
     - F-measure
  4. We plot the results that aid in comparing the performance of the classifiers.

Programming Language

- We plan to use **R** programming for the project.

Preliminary Results

We now present the result of the work we've done so far.

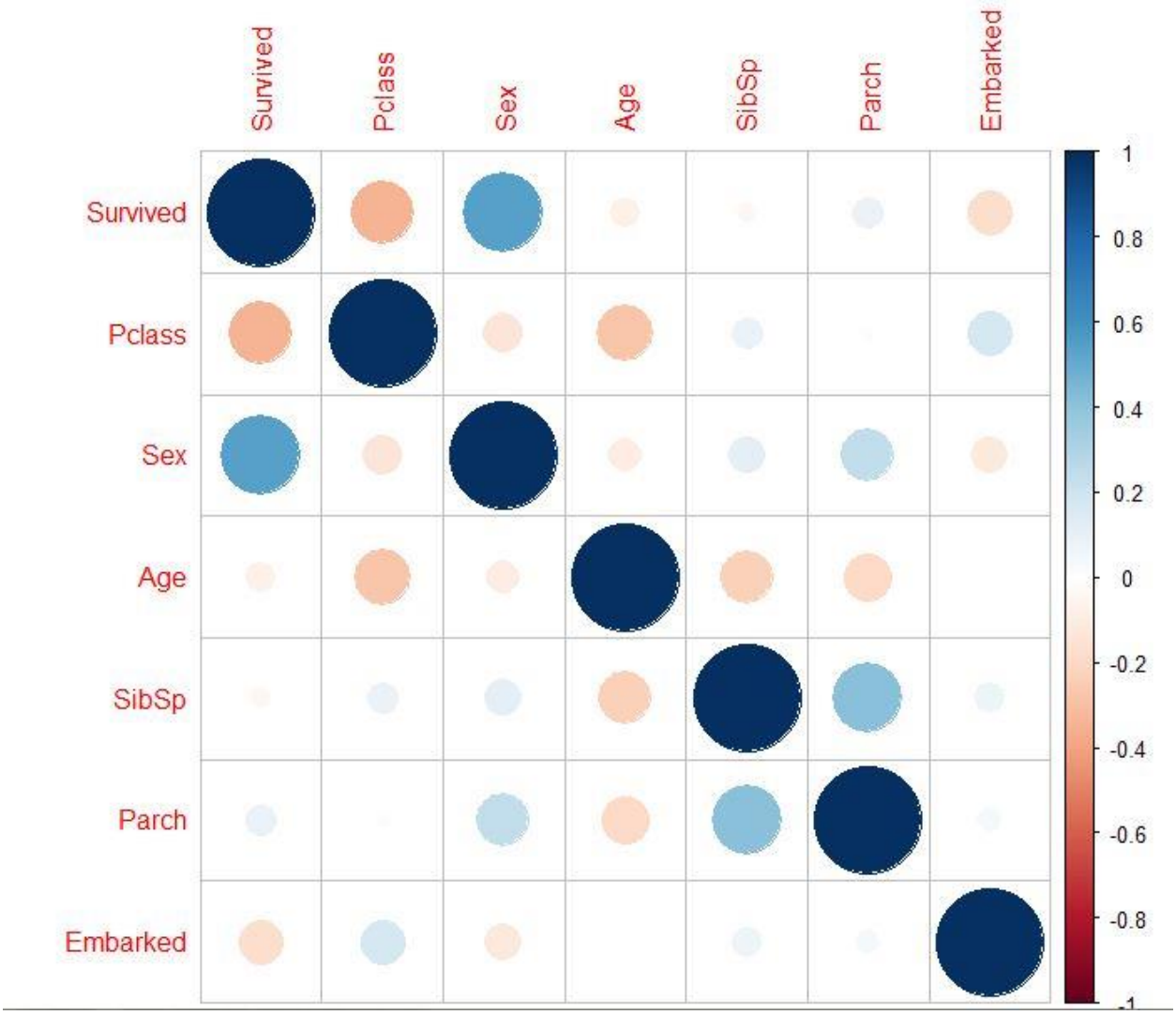
- We removed the following attributes (after initial examination of the dataset) from the dataset as they don't impact the result significantly –
  - Passenger Number (This is just a serial number)
  - Name (Passenger name has nothing to do with his/her survival)
  - Ticket Number
  - Ticket Fare
  - Cabin
- We categorized the AGE attribute into three different intervals as follows:
  - Category_1 – 18 and below (Children)
  - Category_2 – Between 19 and 40

- Category_3 – 41 and above

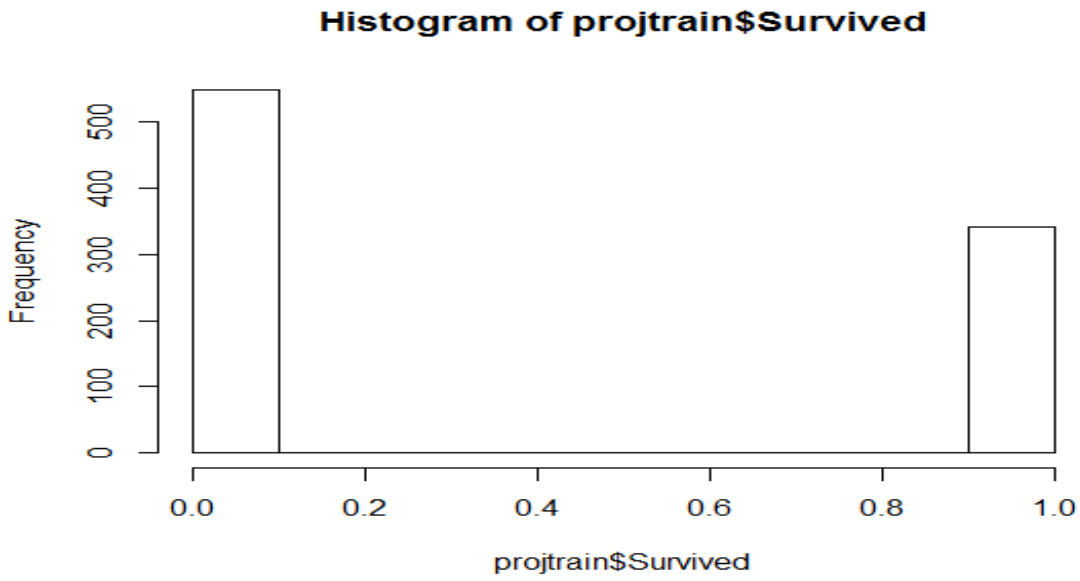
- The attribute SEX is labelled as follows:
  MALE – 1
  FEMALE – 2

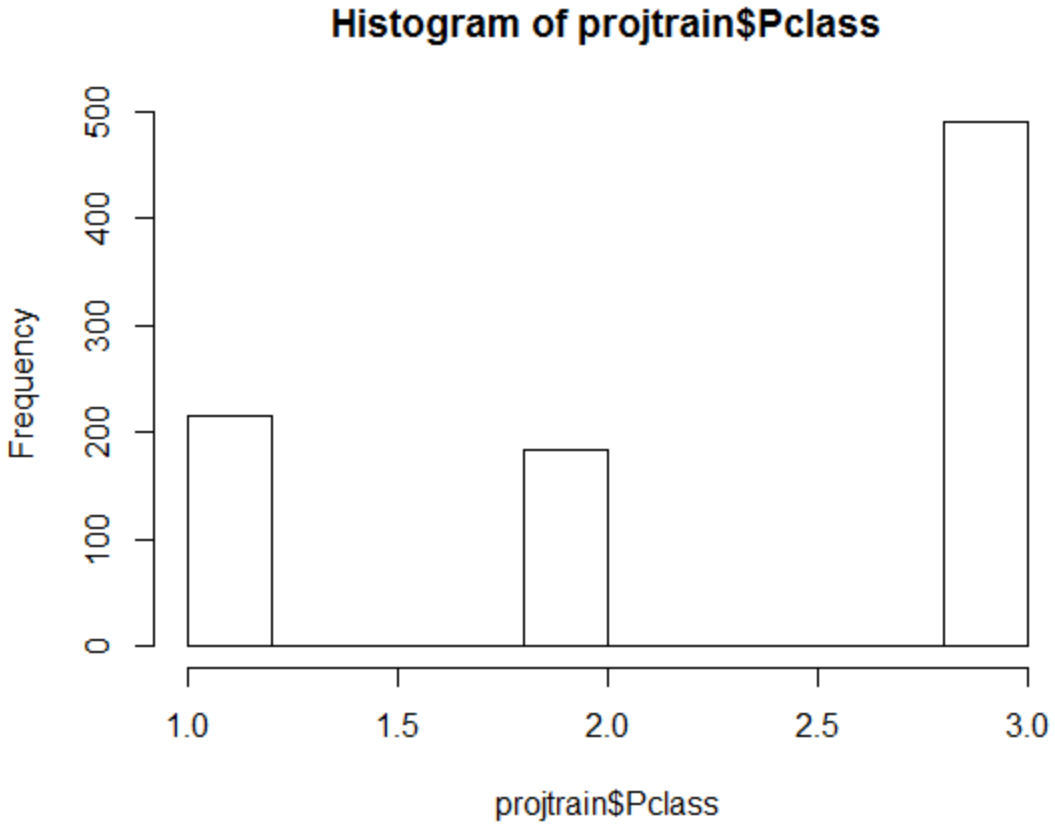
- We plotted the CORRPLOT which aids in identifying the correlation of the attributes with the class attribute.

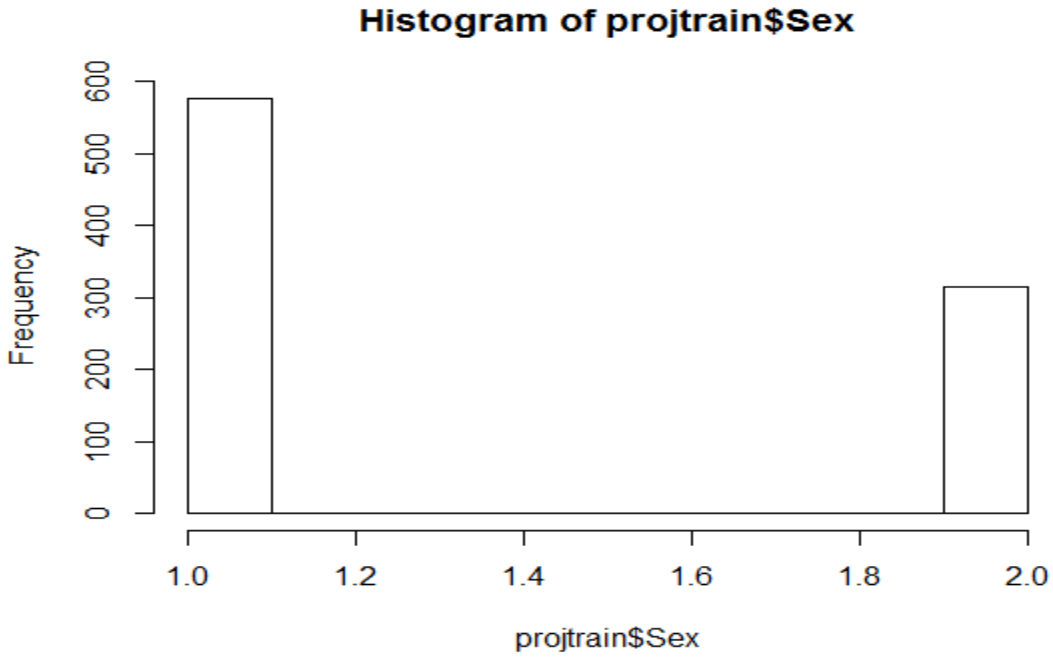
  The plot is as follows:

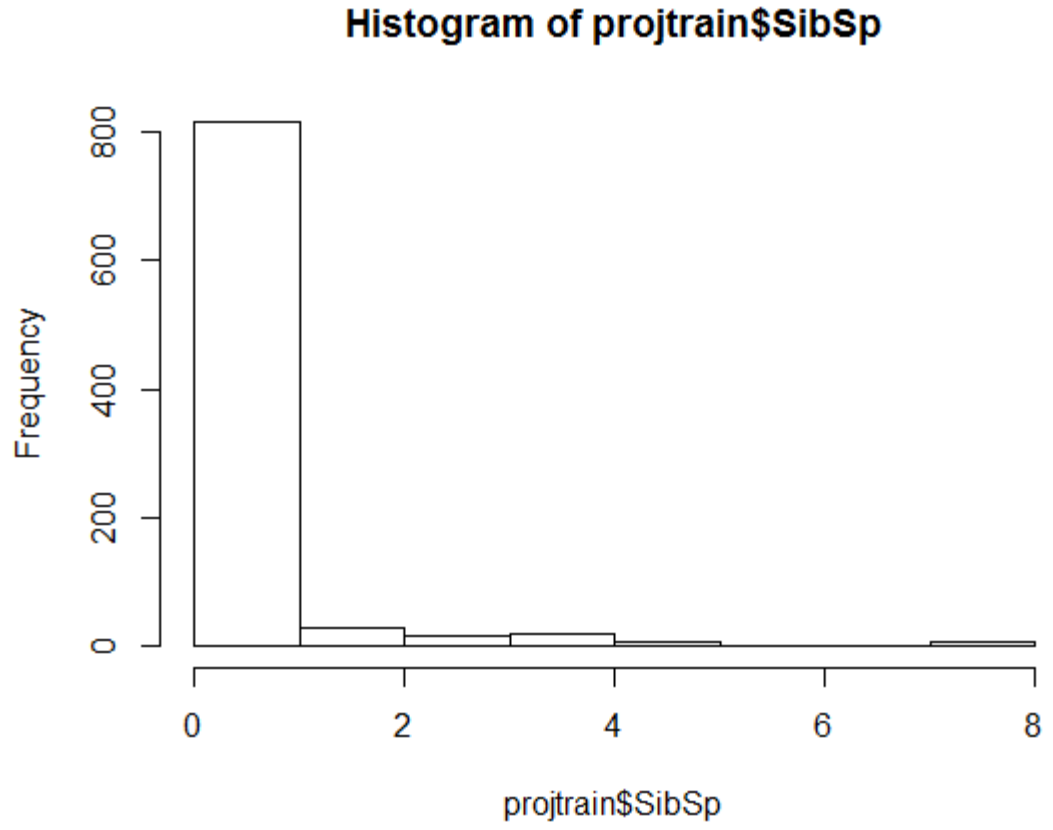


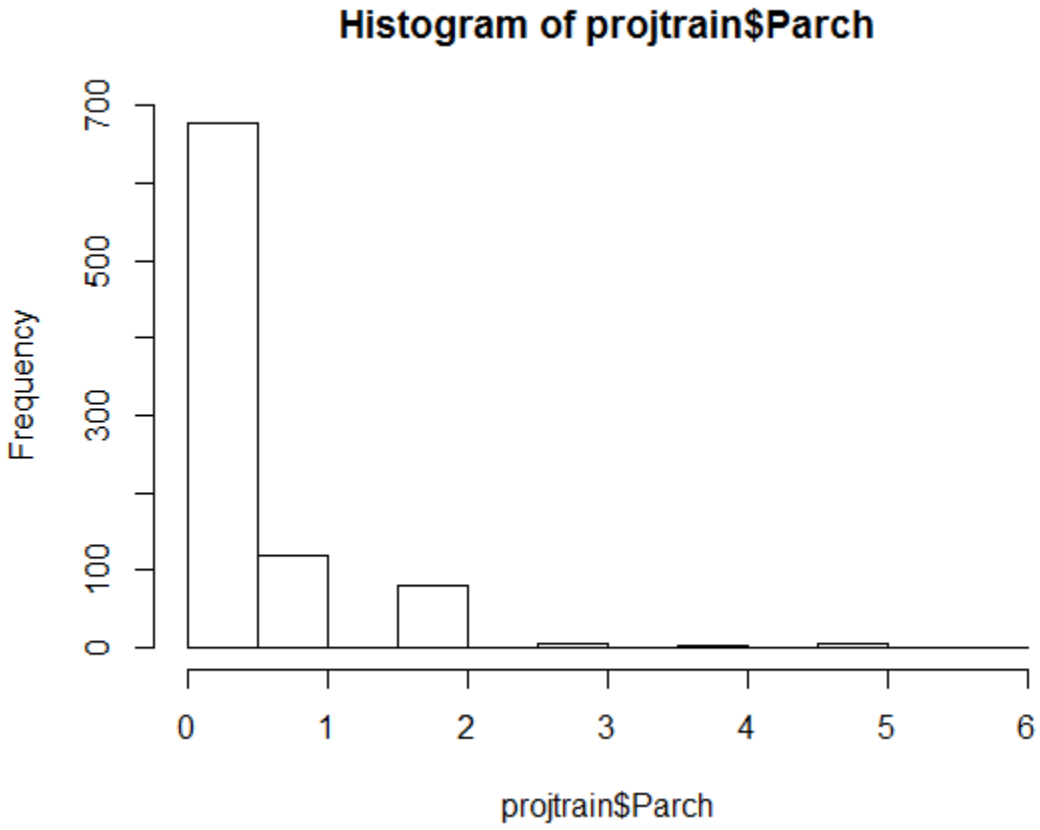
The histograms of the data are as follows:

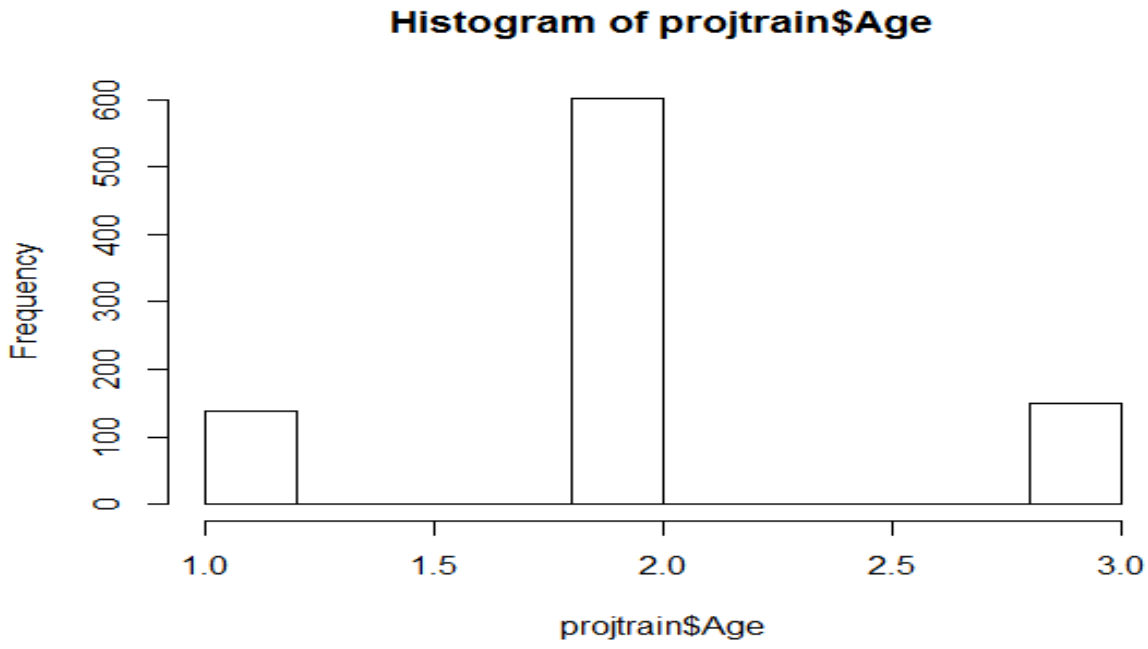





Histogram of projtrain$Sex
Frequency
0
100
200
300
400
500
600
1.0
1.2
1.4
1.6
1.8
2.0
projtrain$Sex


Histogram of projtrain$SibSp
Frequency
0
200
400
600
800
0
2
4
6
8
projtrain$SibSp


Histogram of projtrain$Parch
Frequency
0
100
300
500
700
0
1
2
3
4
5
6
projtrain$Parch


Histogram of projtrain$Age
Frequency
0
100
200
300
400
500
600
1.0
1.5
2.0
2.5
3.0
projtrain$Age

R – CODE

```
#Read the dataset
myData <-
read.csv("D:/Academics/Fall_2016/ML/Assignments/Project/train.csv")
View(myData)

#Pre-processing
projtrain <- myData
#Removing the attributes that are not required
projtrain <- projtrain[-c(1,4,9,10,11)]
View(projtrain)
head(projtrain)
summary(projtrain)

projtrain$Embarked <- as.numeric(projtrain$Embarked)
projtrain$Embarked
ageavg<-mean(na.omit(projtrain$Age))
ageavg
#Replacing the NAs in the age attribute with the average age value
projtrain[is.na(projtrain)]<-ageavg

projtrain[,3] = ifelse(projtrain[,3]=="male",1, 2)
projtrain[,4] = ifelse(projtrain[,4]<=18,1,
ifelse(projtrain[,4]<=40,2,3))

#Finding the correlation plot
library(corrplot)
p<-cor(projtrain)
corrplot(p,method = "circle")

#Plotting the Histograms
hist(projtrain$Survived)
hist(projtrain$Pclass)
hist(projtrain$Sex)
hist(projtrain$Age)
hist(projtrain$SibSp)
hist(projtrain$Parch)
hist(projtrain$embarked)
```