## INFO 7390: Advances in Data Sciences and Architecture

**Report**

## Load Titanic dataset along with Test data

train\_data <- read.csv("./datasets/train.csv")  
test\_data <- read.csv("./datasets/test.csv")

## Exploring the data

str(train\_data)

## 'data.frame': 891 obs. of 12 variables:  
## $ PassengerId: int 1 2 3 4 5 6 7 8 9 10 ...  
## $ Survived : int 0 1 1 1 0 0 0 0 1 1 ...  
## $ Pclass : int 3 1 3 1 3 3 1 3 3 2 ...  
## $ Name : Factor w/ 891 levels "Abbing, Mr. Anthony",..: 109 191 358 277 16 559 520 629 417 581 ...  
## $ Sex : Factor w/ 2 levels "female","male": 2 1 1 1 2 2 2 2 1 1 ...  
## $ Age : num 22 38 26 35 35 NA 54 2 27 14 ...  
## $ SibSp : int 1 1 0 1 0 0 0 3 0 1 ...  
## $ Parch : int 0 0 0 0 0 0 0 1 2 0 ...  
## $ Ticket : Factor w/ 681 levels "110152","110413",..: 524 597 670 50 473 276 86 396 345 133 ...  
## $ Fare : num 7.25 71.28 7.92 53.1 8.05 ...  
## $ Cabin : Factor w/ 148 levels "","A10","A14",..: 1 83 1 57 1 1 131 1 1 1 ...  
## $ Embarked : Factor w/ 4 levels "","C","Q","S": 4 2 4 4 4 3 4 4 4 2 ...

head(train\_data)

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

tail(train\_data)

## PassengerId Survived Pclass Name  
## 886 886 0 3 Rice, Mrs. William (Margaret Norton)  
## 887 887 0 2 Montvila, Rev. Juozas  
## 888 888 1 1 Graham, Miss. Margaret Edith  
## 889 889 0 3 Johnston, Miss. Catherine Helen "Carrie"  
## 890 890 1 1 Behr, Mr. Karl Howell  
## 891 891 0 3 Dooley, Mr. Patrick  
## Sex Age SibSp Parch Ticket Fare Cabin Embarked  
## 886 female 39 0 5 382652 29.125 Q  
## 887 male 27 0 0 211536 13.000 S  
## 888 female 19 0 0 112053 30.000 B42 S  
## 889 female NA 1 2 W./C. 6607 23.450 S  
## 890 male 26 0 0 111369 30.000 C148 C  
## 891 male 32 0 0 370376 7.750 Q

## 

## Age column have some missing values

summary(train\_data$Age)

## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's   
## 0.42 20.12 28.00 29.70 38.00 80.00 177

## Imputing the missing values from Age columns as replace them with mean

train\_data$Age[is.na(train\_data$Age)] <- mean(train\_data$Age, na.rm = TRUE)  
summary(train\_data$Age)

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 0.42 22.00 29.70 29.70 35.00 80.00

## Age and Fare columns in test data is also missing, so we fix them by replacing with mean

summary(test\_data$Age)

## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's   
## 0.17 21.00 27.00 30.27 39.00 76.00 86

summary(test\_data$Fare)

## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's   
## 0.000 7.896 14.450 35.630 31.500 512.300 1

test\_data$Age[is.na(test\_data$Age)] <- mean(test\_data$Age, na.rm = TRUE)  
test\_data$Fare[is.na(test\_data$Fare)] <- mean(test\_data$Fare, na.rm = TRUE)  
  
summary(test\_data$Age)

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 0.17 23.00 30.27 30.27 35.75 76.00

summary(test\_data$Fare)

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 0.000 7.896 14.450 35.630 31.500 512.300

## 

## Survived column is integer class type

class(train\_data$Survived)

## [1] "integer"

levels(as.factor(train\_data$Survived))

## [1] "0" "1"

## Converting it to factor with yes and no level

head(train\_data$Survived)

## [1] 0 1 1 1 0 0

train\_data$Survived <- ifelse(train\_data$Survived == 1, "yes", "no")  
train\_data$Survived <- as.factor(train\_data$Survived)  
head(train\_data$Survived)

## [1] no yes yes yes no no   
## Levels: no yes

class(train\_data$Survived)

## [1] "factor"

library(rpart)

table(as.factor(train\_data$Survived))

##   
## no yes   
## 549 342

train\_data$Survived <- as.factor(train\_data$Survived)  
str(train\_data$Survived)

## Factor w/ 2 levels "no","yes": 1 2 2 2 1 1 1 1 2 2 ...

prop.table(table(train\_data$Survived))

##   
## no yes   
## 0.6161616 0.3838384

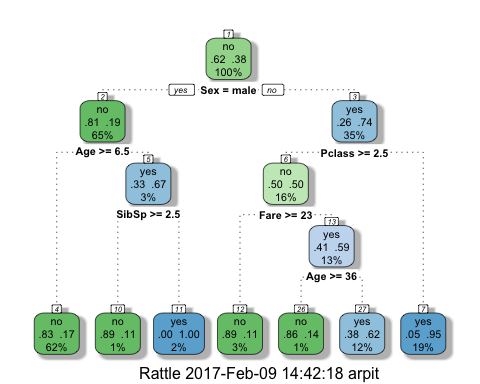
## 

## Identity columns like passenger id, name, cabin ignored for predictor variables

tree <- rpart(formula = Survived ~ Sex+Age+SibSp+Parch+Fare+Embarked+Pclass,  
 data = train\_data,  
 method = "class")  
  
library(rattle)

## Rattle: A free graphical interface for data mining with R.  
## Version 4.1.0 Copyright (c) 2006-2015 Togaware Pty Ltd.  
## Type 'rattle()' to shake, rattle, and roll your data.

library(rpart.plot)  
library(RColorBrewer)  
fancyRpartPlot(tree)



## 

## Now predicting the Survival status for test data

test\_data$Survived <- as.factor(c("yes","no"))  
test\_data$Survived <- predict(tree, test\_data, type="class")  
  
table(test\_data$Survived)

##   
## no yes   
## 272 146

prop.table(table(test\_data$Survived))

##   
## no yes   
## 0.6507177 0.3492823

### Conclusion

* After loading the data, summary shows that Age columns have some missing value, so I replaced them with the mean of Age.
* Survived column was integer type so for classification I converted it to the Factor also set the labeled it with "Yes" and "No" values for 1 and 0 respectively.
* The identity variables like Passenger Id and Name are not considered in the predictor variables.
* The generated Decision Tree shows that Survival Rate. At the top node, 62% passengers have died, and 38% have survived. 100% of the sample is used here as shown in the top node.
* The first Split is based on Sex, if person is male then check left.
* For males, 81% of them died as compare to 19% who survived.
* For females, on right side, "yes" is voted for survival, 74% are survived and 26% died. We can conclude, more females are survived as compare to males.
* Same process will follow for other branches in the tree.
* From prediction we say that the our model did Good for Test data because number of people died is 65% and 35% survived which is close to the Trained data numbers.