Final Project Info 250

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##Introduction

Heart disease is the leading cause of death for men, women and most people of all ethnic groups in the United States. According to the CDC, one Person dies every 36 seconds in the United States from Heart disease in the United States. There are a lot of factors that can affect the likelihood of someone developing heart disease. It is important to understand and analyze how strong the relationship is between heart disease and those various factors.

Through analyzing this dataset, I came across interesting relationships between different variables in this dataset that you can explore. The first visual you will see is a correlation heatmap with shows correlations for all the variables in this dataset. The second visual shows the relationship between Rest ECG and the likelihood of developing heart disease. The final visual shows you a distribution of the relationship between trestbps and heart disease for males and females (individually). I hope you can take away valuable insights from these visualizations and use it for preventative medicine!

This is a dataset from Cleveland Heart Disease taken from the UCI machine learning repository. The full dataset contains 76 attributes but the Kaggle dataset we will be using is a subset containing 14 attributes. This dataset has all the attribute information that helps in indicating the presence or absence of heart disease in a patient.

This dataset was created by the Cleveland Clinic Foundation by Robert Detrano, M.D., Ph.D. The donor is David W. Aha (aha '@' ics.uci.edu). The date that this dataset was donated is 1988-07- 01. This is patient data that comes from the Clinic Foundation database (HIPAA specific information like SSN, name and patient ID are removed from this dataset). All of this information and more details about the creators and donors can be found on the UCI Machine Learning Repository website: https://archive.ics.uci.edu/ml/datasets/heart+Disease

First, to provide you with the summary statistics and column names of the Data

```
##       age             sex               cp           trestbps    
##  Min.   :29.00   Min.   :0.0000   Min.   :0.000   Min.   : 94.0  
##  1st Qu.:47.50   1st Qu.:0.0000   1st Qu.:0.000   1st Qu.:120.0  
##  Median :55.00   Median :1.0000   Median :1.000   Median :130.0  
##  Mean   :54.37   Mean   :0.6832   Mean   :0.967   Mean   :131.6  
##  3rd Qu.:61.00   3rd Qu.:1.0000   3rd Qu.:2.000   3rd Qu.:140.0  
##  Max.   :77.00   Max.   :1.0000   Max.   :3.000   Max.   :200.0  
##       chol            fbs             restecg          thalach     
##  Min.   :126.0   Min.   :0.0000   Min.   :0.0000   Min.   : 71.0  
##  1st Qu.:211.0   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:133.5  
##  Median :240.0   Median :0.0000   Median :1.0000   Median :153.0  
##  Mean   :246.3   Mean   :0.1485   Mean   :0.5281   Mean   :149.6  
##  3rd Qu.:274.5   3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:166.0  
##  Max.   :564.0   Max.   :1.0000   Max.   :2.0000   Max.   :202.0
```

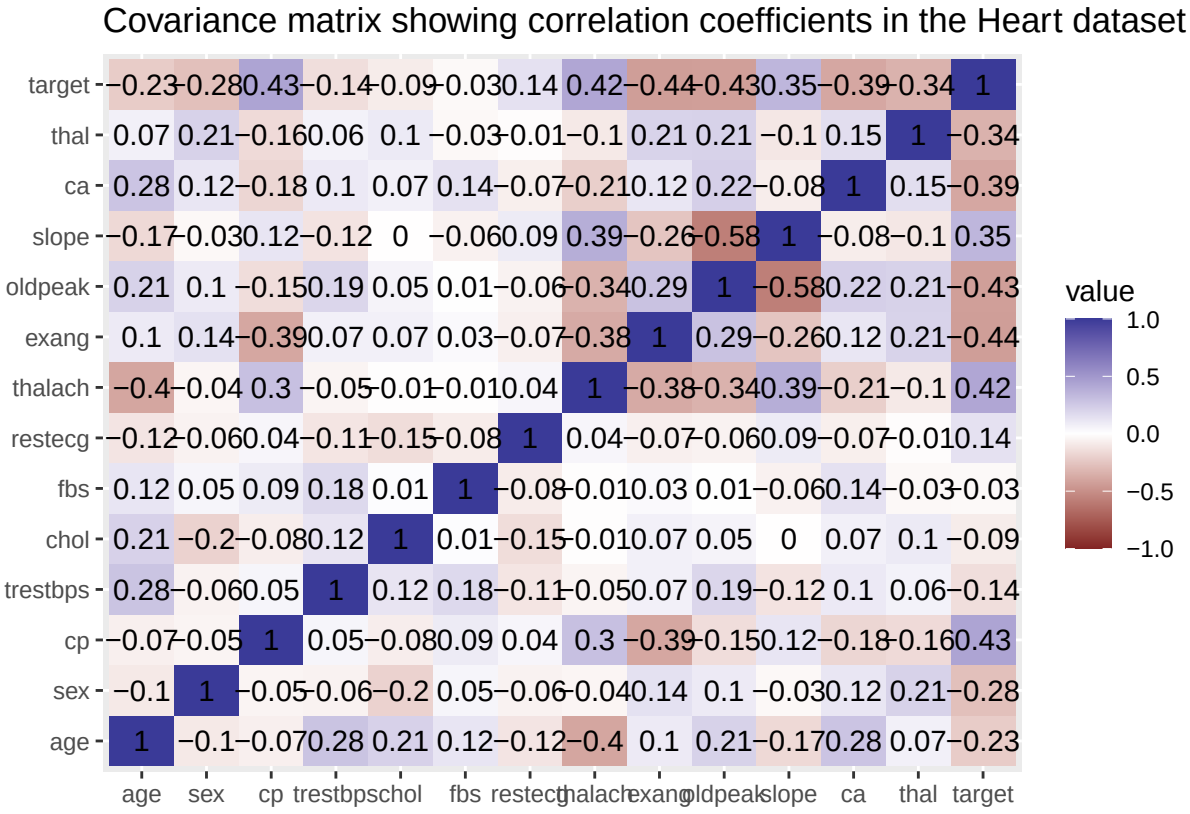
```
##      exang           oldpeak         slope             ca
##  Min.   :0.0000   Min.   :0.00   Min.   :0.000   Min.   :0.0000
##  1st Qu.:0.0000   1st Qu.:0.00   1st Qu.:1.000   1st Qu.:0.0000
##  Median :0.0000   Median :0.80   Median :1.000   Median :0.0000
##  Mean   :0.3267   Mean   :1.04   Mean   :1.399   Mean   :0.7294
##  3rd Qu.:1.0000   3rd Qu.:1.60   3rd Qu.:2.000   3rd Qu.:1.0000
##  Max.   :1.0000   Max.   :6.20   Max.   :2.000   Max.   :4.0000
##       thal           target
##  Min.   :0.000   Min.   :0.0000
##  1st Qu.:2.000   1st Qu.:0.0000
##  Median :2.000   Median :1.0000
##  Mean   :2.314   Mean   :0.5446
##  3rd Qu.:3.000   3rd Qu.:1.0000
##  Max.   :3.000   Max.   :1.0000
```

```
colnames(data)
```

```
##  [1] "age"      "sex"      "cp"       "trestbps" "chol"     "fbs"
##  [7] "restecg"  "thalach"  "exang"    "oldpeak"  "slope"    "ca"
## [13] "thal"     "target"
```

Results and Analysis

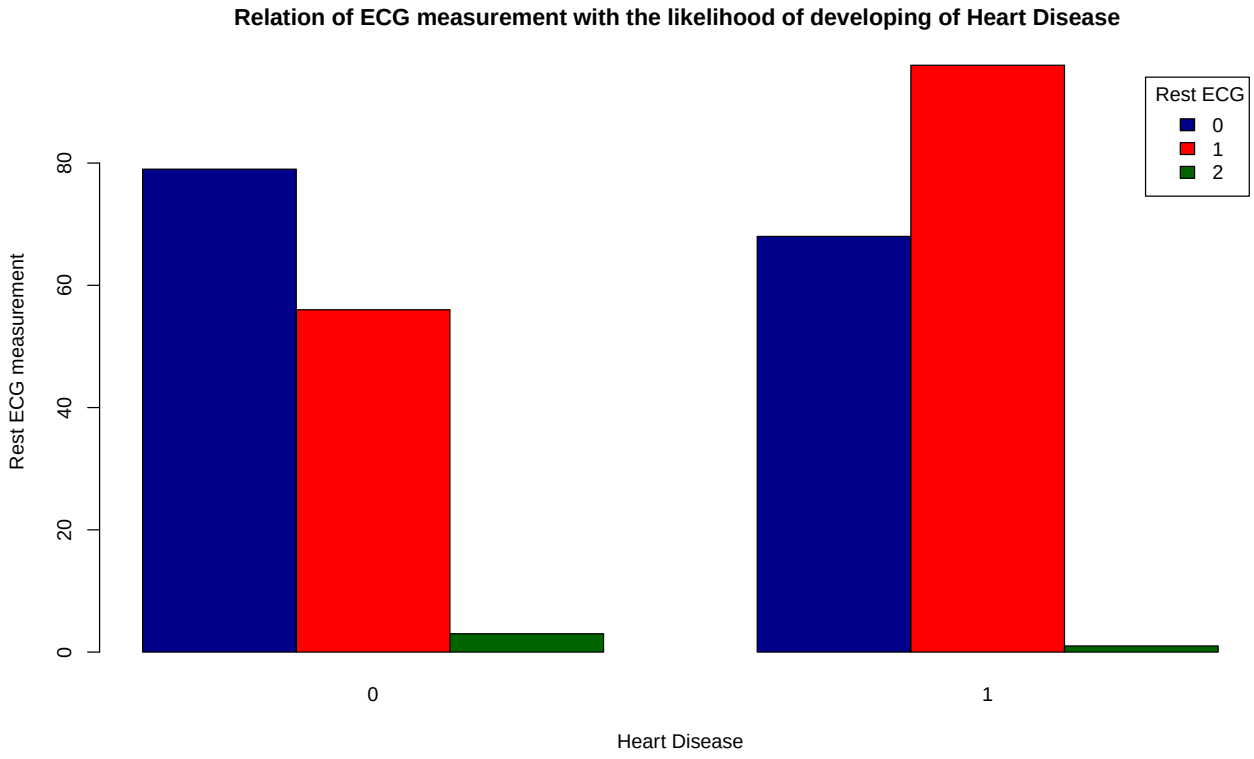
Correlation HeatMap



Analysis of the visual: As we can clearly see from the legend, the bluer the value, the higher the correlation and the closer to brown, the negative or lower the correlation. Looking at the correlation with the target

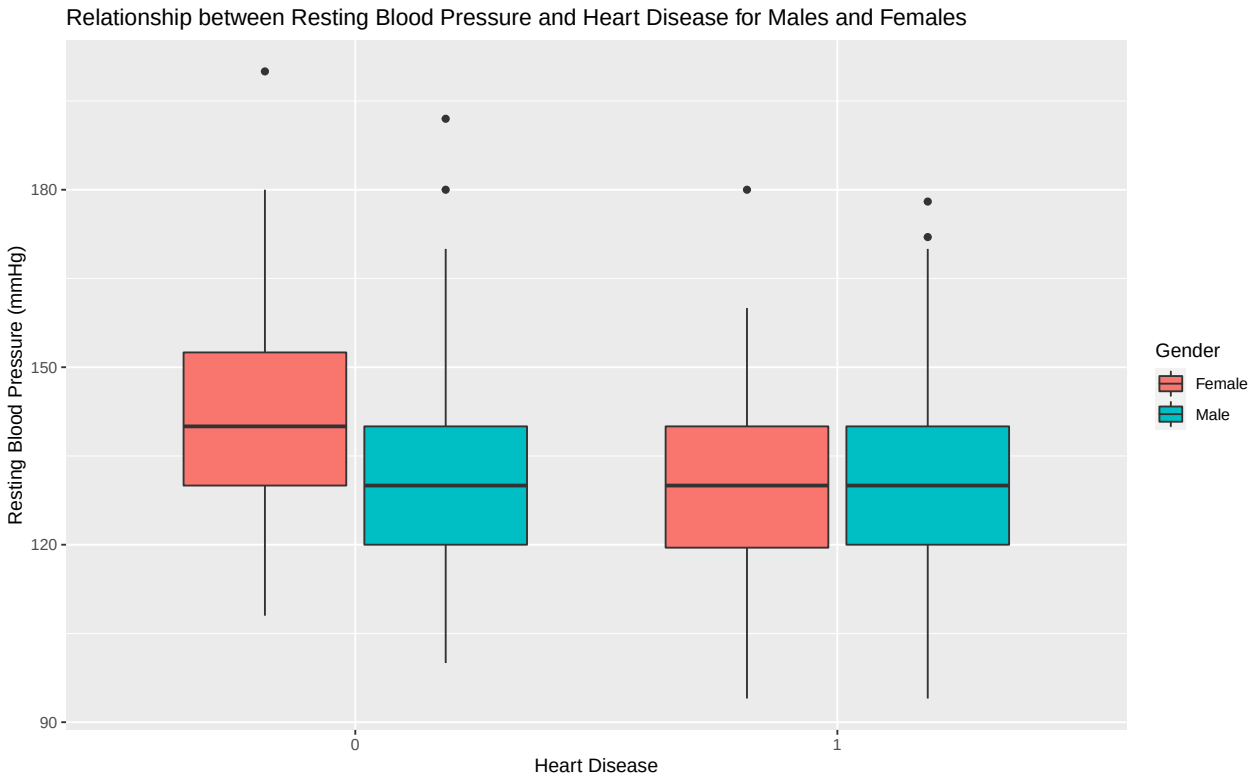
variable, cp (chest pain), thalach (max heart rate) and slope (peak exercise) have the highest correlations and rest ECG and cholesterol have the lowest correlations.

Barchart



Analysis: As we can recall, the value meaning of restecg are: Resting electrocardiographic measurement (0 = normal, 1 = having ST-T wave abnormality, 2 = showing probable or definite left ventricular hypertrophy by Estes' criteria). The above plot shows that a high number of patients not likely to suffer from heart diseases have restecg value 0 (normal) whereas a greater number of people have restecg value 1 in case of more likelihood of suffering from a heart disease

##Boxplot



Analysis: In the above Box plot between Target and tresbps and Gender, shows that Women have higher tresbps than men when we are looking at target variable 0, which is the likelihood of not developing heart disease, whereas men and women have almost equal tresbps in case of suffering from a heart diseases. Also, when target variable is 1 (getting heart disease), patients have a slightly lower tresbps in comparison to the patients who are not suffering from heart diseases (when target variable is 0).

Conclusion

Through examining the correlations between the different factors and variables that potentially affect the likelihood of getting heart disease, chest pain had the strong correlation and cholesterol had the lowest correlation. We also examined the relationship between Rest ECG and heart disease and found that having a Rest ECG of 1 gives a higher likelihood of getting heart disease as opposed to an Rest ECG of 0. Finally, we observed the relationship between blood pressure and heart disease for males and females. In conclusion, this analysis helps us understand more about the relationships of the different factors affecting heart disease and can hopefully spark deeper research which can be used for predictive analytics etc.