MTDS 5113 – Fundamentals of Data Science

Assignment

Heart Disease Prediction System R-Programming Report

Faculty of Information and Communication Technology

Department of Intelligent Computing and Analytics

Master of Technology (Data Science & Analytics)

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Introduction

A heart is the organ of all livings beings which plays a significant role in blood pumping to the rest of the organs by medium of blood vessels of the circulatory system, heart disease is deathly disease which is so close to all the several diseases affecting the heart and it is allocated to a large number of medical conditions related to the heart.

Doctor knowledge is to allocate the mass to each characteristic and is having a high tendency on disease prediction. It looks practical to service the knowledge and experience of various specialists composed in data towards support the diagnosis process. It also specifies healthcare professionals an additional source of knowledge for making choices. The accumulation of huge quantity of health care data and that need to proceed out to conceal imperceptible information for effective decision making.

Actually, treatment of heart disease is very expensive and most of the patient can't afford it, by providing effective treatment this will surely help to reduce the cost of treatment to the patients. Researchers have been using algorithms and other techniques to assist health care professionals to diagnose of heart disease.

The Dataset has 13 column which are: age, sex, chest pain type (4 values), resting blood pressure, serum cholestoral in mg/dl, fasting blood sugar > 120 mg/dl, resting electrocardiographic results (values 0,1,2), maximum heart rate achieved, exercise induced angina, oldpeak = ST depression induced by exercise relative to rest, the slope of the peak exercise ST segment, number of major vessels (0-3) colored by flourosopy, thal: 3 = normal; 6 = fixed defect; 7 = reversable defect.

Summary of the dataset

```
> summary(heart)
      age             sex               cp           trestbps          chol            fbs              restecg      
 Min.   :29.00   Min.   :0.0000   Min.   :0.000   Min.   : 94.0   Min.   :126.0   Min.   :0.0000   Min.   :0.0000  
 1st Qu.:47.50   1st Qu.:0.0000   1st Qu.:0.000   1st Qu.:120.0   1st Qu.:211.0   1st Qu.:0.0000   1st Qu.:0.0000  
 Median :55.00   Median :1.0000   Median :1.000   Median :130.0   Median :240.0   Median :0.0000   Median :1.0000  
 Mean   :54.37   Mean   :0.6832   Mean   :0.967   Mean   :131.6   Mean   :246.3   Mean   :0.1485   Mean   :0.5281  
 3rd Qu.:61.00   3rd Qu.:1.0000   3rd Qu.:2.000   3rd Qu.:140.0   3rd Qu.:274.5   3rd Qu.:0.0000   3rd Qu.:1.0000  
 Max.   :77.00   Max.   :1.0000   Max.   :3.000   Max.   :200.0   Max.   :564.0   Max.   :1.0000   Max.   :2.0000  
    thalach          exang           oldpeak          slope             ca              thal           target      
 Min.   : 71.0   Min.   :0.0000   Min.   :0.00   Min.   :0.000   Min.   :0.0000   Min.   :0.000   Min.   :0.0000  
 1st Qu.:133.5   1st Qu.:0.0000   1st Qu.:0.00   1st Qu.:1.000   1st Qu.:0.0000   1st Qu.:2.000   1st Qu.:0.0000  
 Median :153.0   Median :0.0000   Median :0.80   Median :1.000   Median :0.0000   Median :2.000   Median :1.0000  
 Mean   :149.6   Mean   :0.3267   Mean   :1.04   Mean   :1.399   Mean   :0.7294   Mean   :2.314   Mean   :0.5446  
 3rd Qu.:166.0   3rd Qu.:1.0000   3rd Qu.:1.60   3rd Qu.:2.000   3rd Qu.:1.0000   3rd Qu.:3.000   3rd Qu.:1.0000  
 Max.   :202.0   Max.   :1.0000   Max.   :6.20   Max.   :2.000   Max.   :4.0000   Max.   :3.000   Max.   :1.0000  
```

Figure 1

The below graph shows the ratio of Male and Female which on this graph you will automatically see that male have angina which is a type of chest pain caused by reduced blood flow to the heart. So, the rate of Heart Disease is higher for Male.

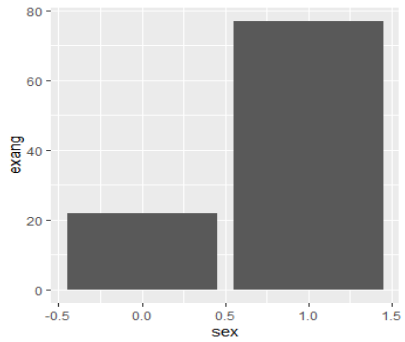

Figure 2

The below graph shows the age of the people mostly to be suffering from the angina which is a type of chest pain caused by reduced blood flow to the heart. From the graph the age that are prompt the disease are 50 years to 60 years.

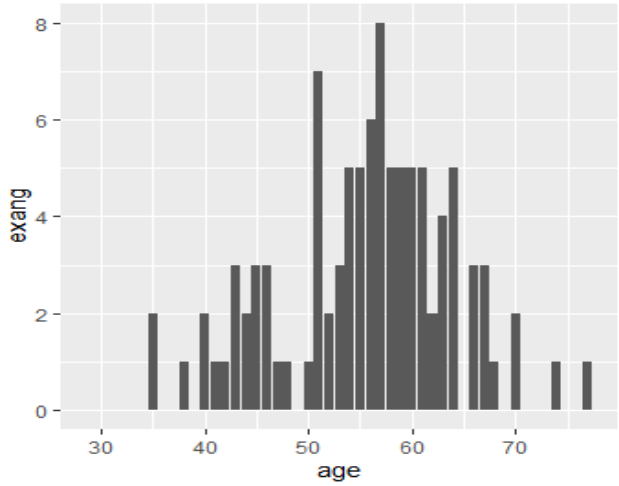

Figure 3

Based on the below graph it shows that the number of people with abnormal heart are more than the number of people with normal heart. If we continue furthering our analysis, we will continues to discover relevant parameters causing the disease.

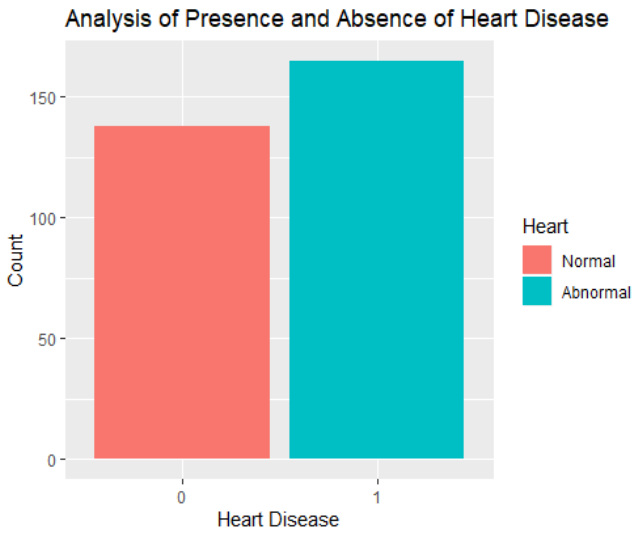

Figure 4

The below graph is a representation for the above graph 0 means Female and 1 means Male, based on that we observed the count of male more than the female patients. The ratio is be 2:1 and the disease is more rampant to female as compared with male. Initially the disease depend on its factors such as heart rate, blood pressure etc.

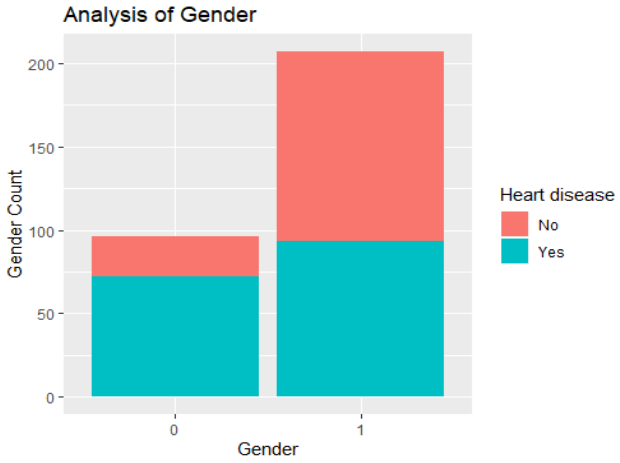

Figure 5

The below graph explain about the patients have been experiencing typical chest pain typed angina.

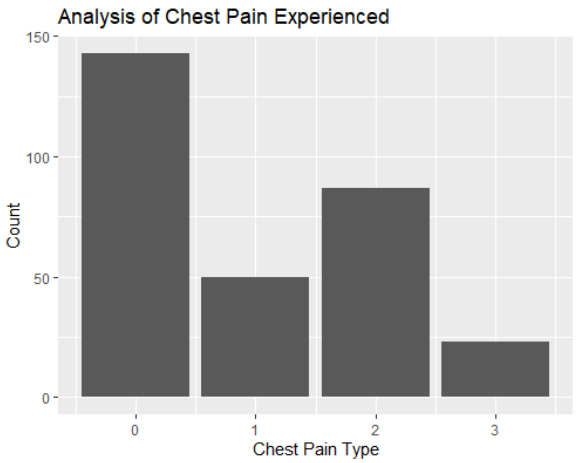

Figure 6

The below graph represent actually we can observed that the patient with angina chest pain has the least chance of heart disease, but others have a highest rate to suffer from the disease.

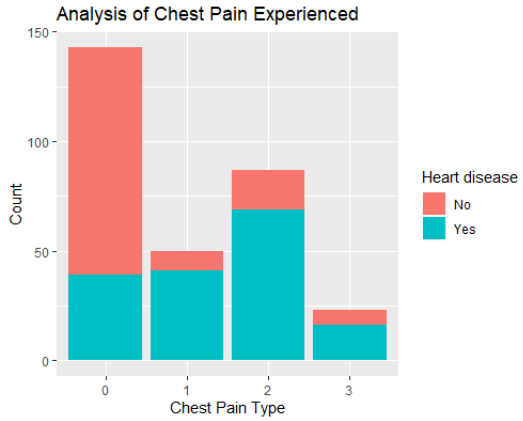

Figure 7

The graph below show what happens when your heart when blood supply is blocked or interrupted by a fatty substances in the coronary arteries. It appears logical the more major vessels is a good thing and consequently will reduce the probability of having the disease.

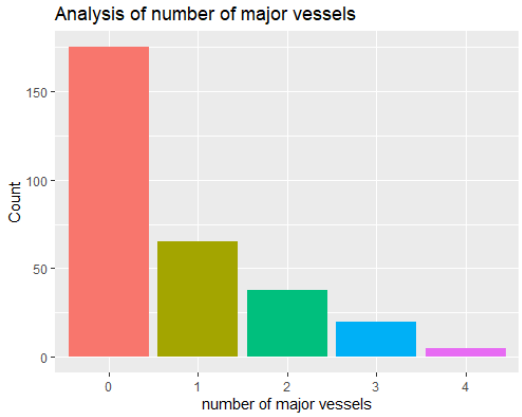

Figure 8

The below graph shows the analysis of the data that is now normally distributed, the observation shows that outliers are present in the data.

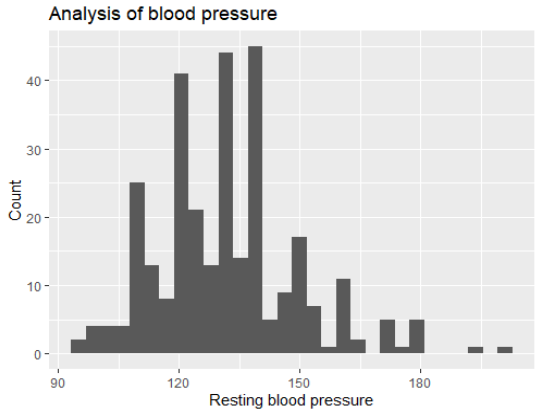

Figure 9

The below graph is after we removing the outliers. The range between 90 – 140, we can observed that the highest population that have blood pressure.

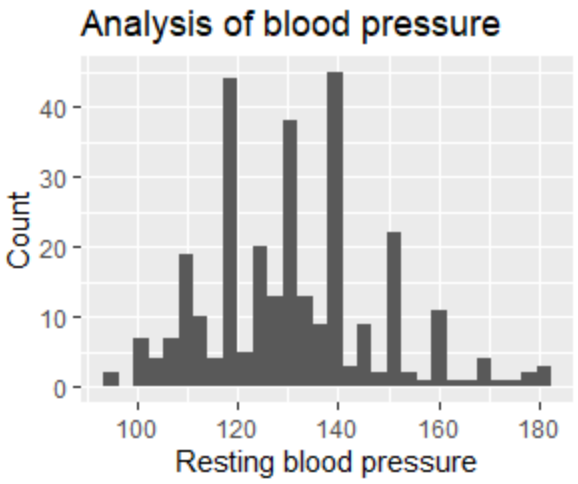

Figure 10

The below graph observing the patients that have the disease irrespective of the value of the blood pressure.

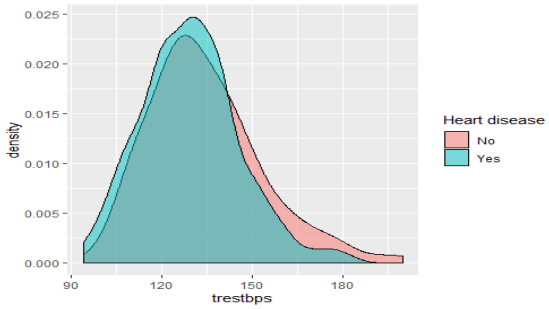

Figure 10

The graph below shows that as the value of heart rate increases the chances of having abnormal heart increases.

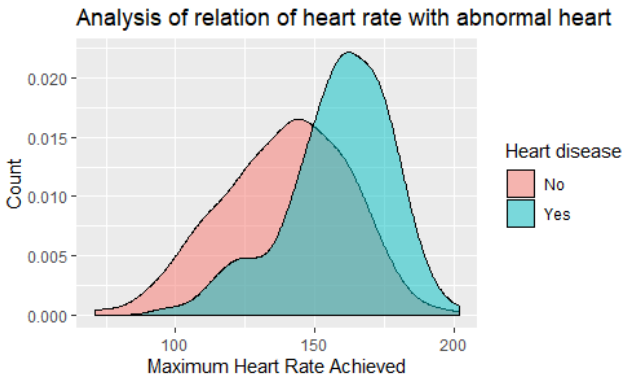

Figure 11

The graph below shows that as the value of heart rate increases the chances of having a heart abnormal heart increases.

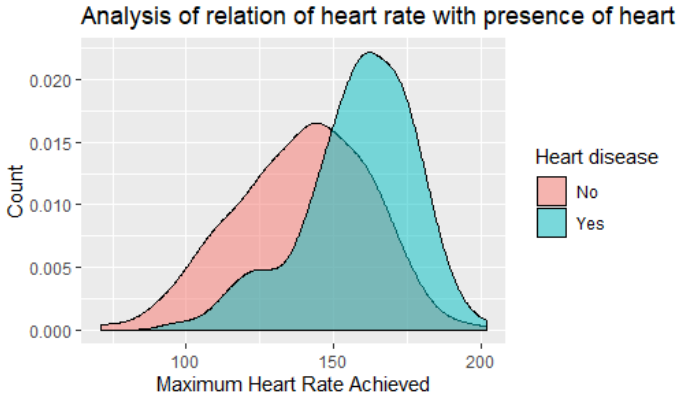

Figure 12

The graph below shows the observation almost equal number of patients lies in the flat and down slope

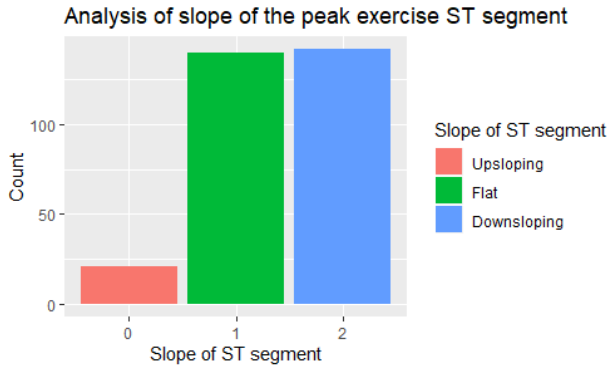

Figure 13

The graph below shows the patients with down slope have higher rate of having abnormal heart compared to the flat slope.

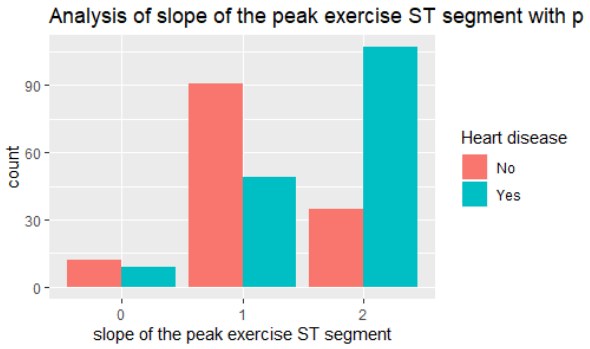

Figure14