UK Bank Customer Analysis

Hitesh Bhamre

2022-12-23

Dataset

Notes: The dataset is taken from a UK Bank's database. It includes details of their customer. The dataset contains 9 variables and 4014 rows. The data was processed using in R studio and the following steps were performed.

Loading Packages

```
library(psych)
library(tidyr)
library(lubridate)
library(dplyr)
library(tidyverse)
library(ggplot2)
library(plotrix)
library(plotly)
```

Import Data

```
setwd("D:\\R Project\\UK_Bank_Customer")
bank = read.csv("UK_Bank_Customer.csv")
```

```
View(bank)
head(bank)
```

```
##   Customer.ID    Name Surname Gender Age           Region Job.Classification
## 1           1   Simon   Walsh   Male  21          England       White Collar
## 2           2 Jasmine  Miller Female  34 Northern Ireland        Blue Collar
## 3           3    Liam   Brown   Male  46          England       White Collar
## 4           4  Trevor    Parr   Male  32            Wales       White Collar
## 5           5 Deirdre Pullman Female  38          England        Blue Collar
## 6           6     Ava Coleman Female  30            Wales        Blue Collar
##       Date.Joined Balance
## 1 January 5, 2015     367
## 2 January 6, 2015     319
## 3 January 7, 2015     146
## 4 January 8, 2015     321
## 5 January 9, 2015     165
## 6 January 9, 2015     283
```

Exploratory Data Analysis

```
dim(bank)
```

```
## [1] 4014    9
```

```
str(bank)
```

```
## 'data.frame':    4014 obs. of  9 variables:
##  $ Customer.ID       : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ Name              : chr  "Simon" "Jasmine" "Liam" "Trevor" ...
##  $ Surname           : chr  "Walsh" "Miller" "Brown" "Parr" ...
##  $ Gender            : chr  "Male" "Female" "Male" "Male" ...
##  $ Age               : int  21 34 46 32 38 30 34 48 NA 42 ...
##  $ Region            : chr  "England" "Northern Ireland" "England" "Wales" ...
##  $ Job.Classification: chr  "White Collar" "Blue Collar" "White Collar" "White Collar" ...
##  $ Date.Joined       : chr  "January 5, 2015" "January 6, 2015" "January 7, 2015" "January 8, 2015" ...
##  $ Balance           : int  367 319 146 321 165 283 361 433 39 113 ...
```

```
describe(bank)
```

```
##                     vars    n    mean      sd median trimmed     mad min  max
## Customer.ID            1 4014 2007.50 1158.89 2007.5 2007.50 1487.79   1 4014
## Name*                  2 4014   85.23   49.39   85.0   84.88   63.75   1  172
## Surname*               3 4014   75.26   42.99   75.5   75.25   54.11   1  150
## Gender*                4 4014    1.54    0.50    2.0    1.55    0.00   1    2
## Age                    5 3999   38.60    9.83   37.0   38.21   10.38  15   64
## Region*                6 4014    2.00    1.16    1.0    1.88    0.00   1    4
## Job.Classification*    7 4014    2.23    0.84    2.0    2.28    1.48   1    3
## Date.Joined*           8 4014  170.54   90.07  188.5  173.02  113.42   1  307
## Balance                9 4014  250.76  140.85  248.5  249.92  178.65  10  500
##                     range  skew kurtosis    se
## Customer.ID          4013  0.00    -1.20 18.29
## Name*                 171  0.04    -1.17  0.78
## Surname*              149  0.00    -1.16  0.68
## Gender*                 1 -0.16    -1.98  0.01
## Age                    49  0.35    -0.42  0.16
## Region*                 3  0.50    -1.38  0.02
## Job.Classification*     2 -0.44    -1.43  0.01
## Date.Joined*          306 -0.21    -1.30  1.42
## Balance               490  0.04    -1.19  2.22
```

```
summary(bank)
```

```
##   Customer.ID       Name             Surname             Gender         
##  Min.   :   1   Length:4014        Length:4014        Length:4014       
##  1st Qu.:1004   Class :character   Class :character   Class :character  
##  Median :2008   Mode  :character   Mode  :character   Mode  :character  
##  Mean   :2008                                                           
##  3rd Qu.:3011                                                           
##  Max.   :4014                                                           
##                                                                         
##       Age          Region          Job.Classification Date.Joined       
##  Min.   :15.0   Length:4014        Length:4014        Length:4014       
##  1st Qu.:31.0   Class :character   Class :character   Class :character  
##  Median :37.0   Mode  :character   Mode  :character   Mode  :character  
##  Mean   :38.6                                                           
##  3rd Qu.:45.0                                                           
##  Max.   :64.0                                                           
##  NA's   :15                                                             
##     Balance     
##  Min.   : 10.0  
##  1st Qu.:130.0  
##  Median :248.5  
##  Mean   :250.8  
##  3rd Qu.:371.0  
##  Max.   :500.0  
## 
```

Data Cleansing

Change column Names

```
bank <- rename(bank, Customer_ID = Customer.ID,
               Job_Classification = Job.Classification,
               Date = Date.Joined,
               Deposit = Balance,
               First_Name = Name,
               Last_Name = Surname)
```

```
head(bank)
```

```
##   Customer_ID First_Name Last_Name Gender Age           Region
## 1           1      Simon     Walsh   Male  21          England
## 2           2    Jasmine    Miller Female  34 Northern Ireland
## 3           3       Liam     Brown   Male  46          England
## 4           4     Trevor      Parr   Male  32            Wales
## 5           5    Deirdre   Pullman Female  38          England
## 6           6        Ava   Coleman Female  30            Wales
##   Job_Classification            Date Deposit
## 1       White Collar January 5, 2015     367
## 2        Blue Collar January 6, 2015     319
## 3       White Collar January 7, 2015     146
## 4       White Collar January 8, 2015     321
## 5        Blue Collar January 9, 2015     165
## 6        Blue Collar January 9, 2015     283
```

Change Datatype

Notes: Changing Datatype of Date Variable (char) into Date format

```
bank$Date <- strptime(bank$Date, "%B %d, %Y")
```

```
class(bank$Date)
```

```
## [1] "POSIXlt" "POSIXt"
```

Checking NA Values

```
sum(is.na(bank$Age))
```

```
## [1] 15
```

Replace NA values with Age mean base on gender

```
bank$Age[is.na(bank$Age)]=
  mean((bank$Age[bank$Gender == "Male"]),na.rm=TRUE)
bank$Age[is.na(bank$Age)]=
  mean((bank$Age[bank$Gender == "Female"]),na.rm=TRUE)
```

```
sum(is.na(bank$Age))
```

```
## [1] 0
```

Extract Month From Date

```
bank$Month <- lubridate::month(bank$Date,
                               label = TRUE,
                               abbr = TRUE)
```

```
head(bank)
```

```
##   Customer_ID First_Name Last_Name Gender Age           Region
## 1           1      Simon     Walsh   Male  21          England
## 2           2    Jasmine    Miller Female  34 Northern Ireland
## 3           3       Liam     Brown   Male  46          England
## 4           4     Trevor      Parr   Male  32            Wales
## 5           5    Deirdre   Pullman Female  38          England
## 6           6        Ava   Coleman Female  30            Wales
##   Job_Classification       Date Deposit Month
## 1       White Collar 2015-01-05     367   Jan
## 2        Blue Collar 2015-01-06     319   Jan
## 3       White Collar 2015-01-07     146   Jan
## 4       White Collar 2015-01-08     321   Jan
## 5        Blue Collar 2015-01-09     165   Jan
## 6        Blue Collar 2015-01-09     283   Jan
```

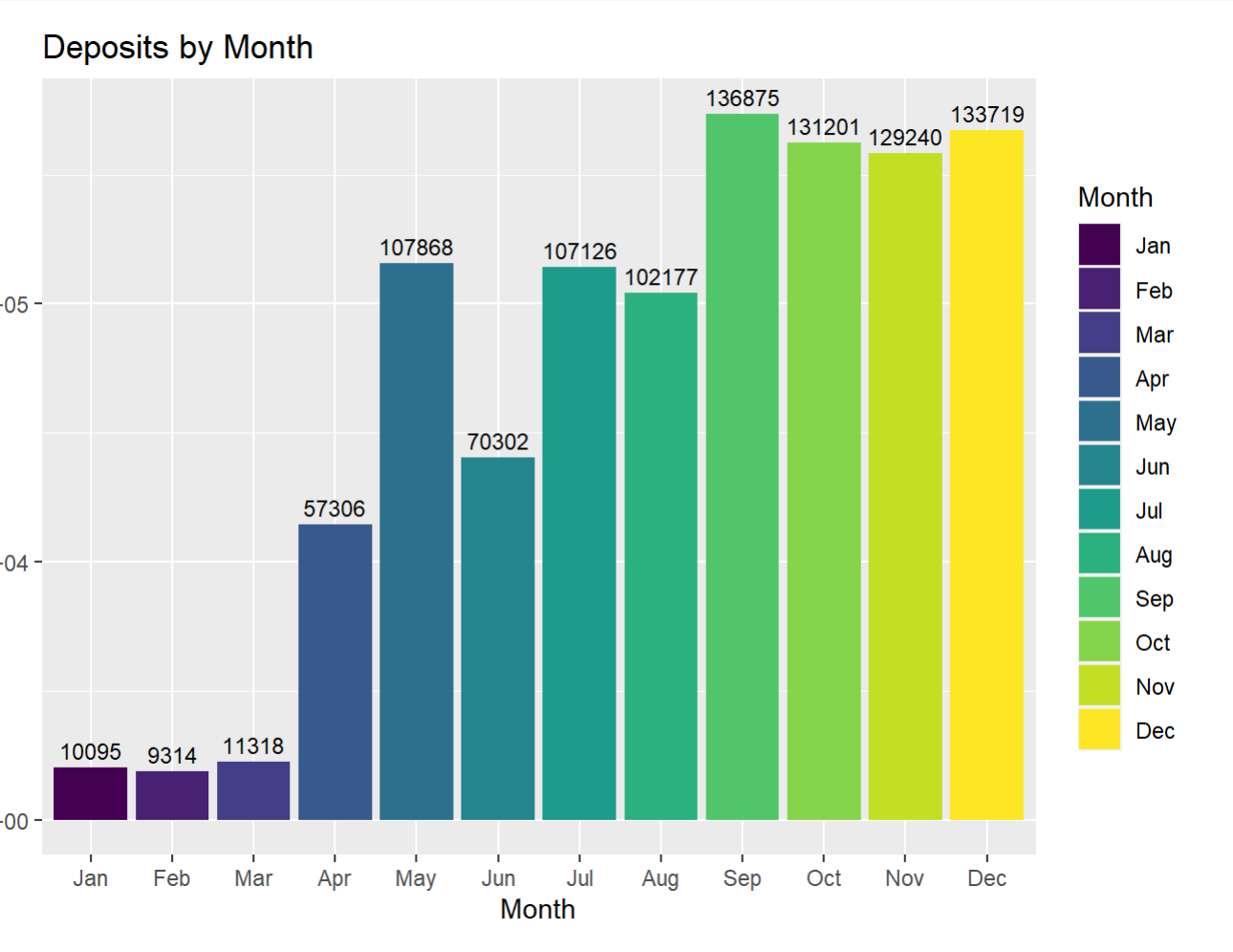
Visualization Analysis

Total Deposit by Month

```
month_group <- aggregate(Deposit ~ Month, bank, sum)
```

```
bar_chart_month <- ggplot(month_group,
                          aes(Month, Deposit,
                           fill = Month))+
                   geom_bar(stat="identity")+
                   geom_text(aes(label = Deposit),
                   position=position_dodge(width=0.5),
                   vjust=-0.50,
                   size = 3)+
                   theme_grey()+
                   ggtitle("Deposits by Month")
```

```
bar_chart_month
```

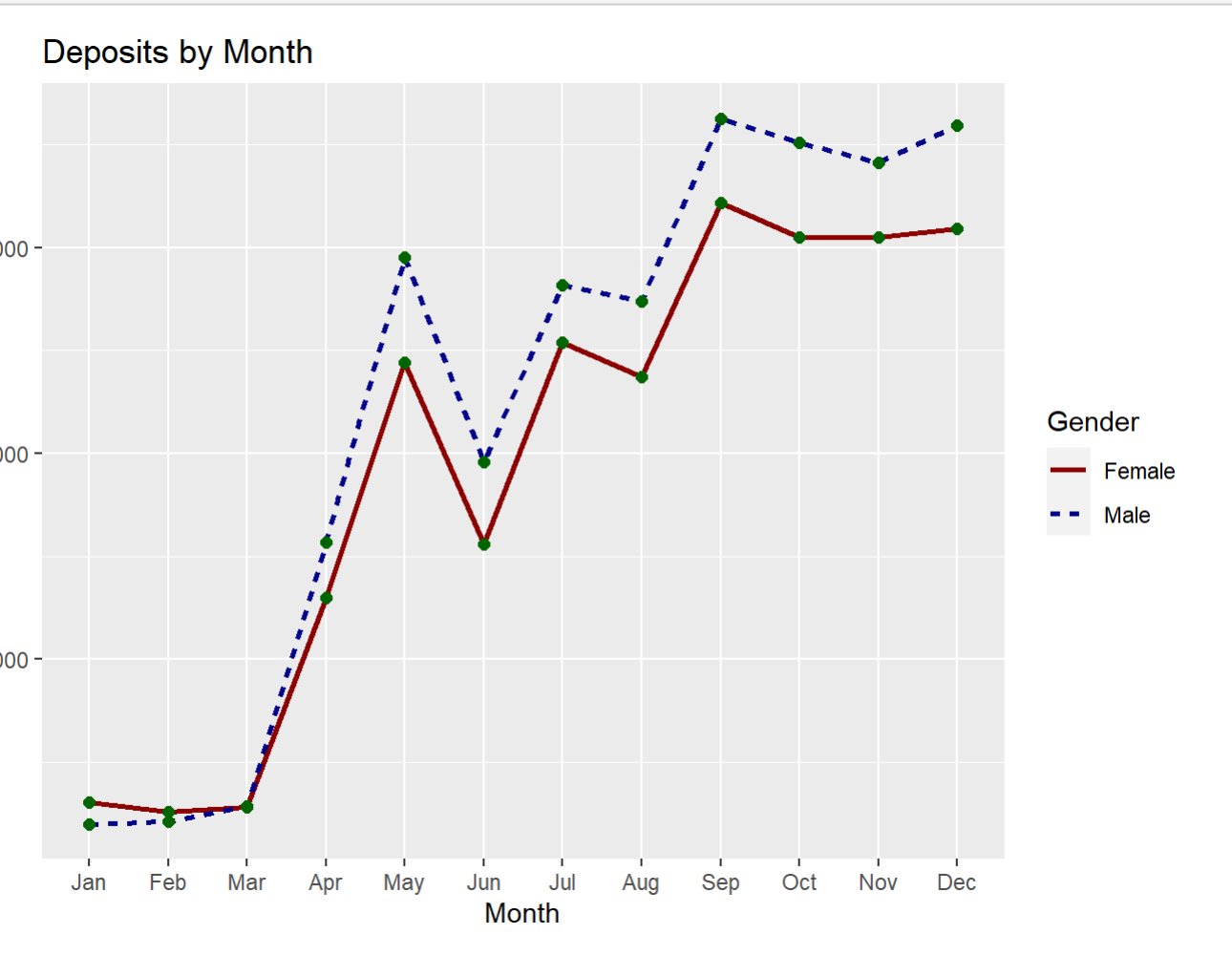


Deposits by Gender

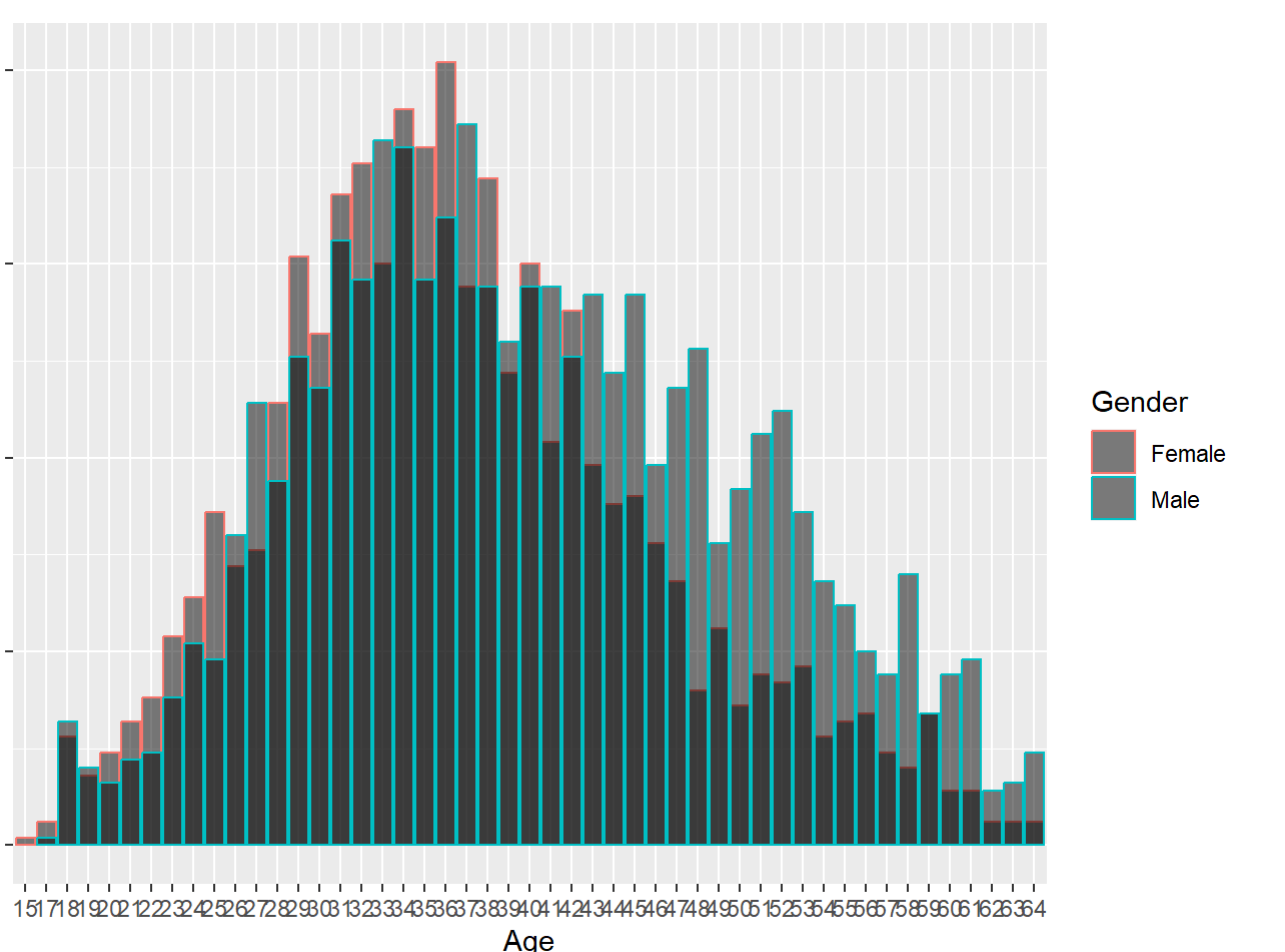
```
gender_group <- aggregate(Deposit ~ Gender+Month, bank, sum)
```

```
line_chart_month <- ggplot(gender_group, aes(x = Month,
                                             y = Deposit,
                                             group = Gender)) +
                    geom_line(aes(color = Gender,
                                  linetype = Gender),
                                  size = 1) +
                    scale_color_manual(values = c("darkred",
                                                  "darkblue"))+
                    ggtitle("Deposits by Month")+
                    geom_point(size = 2, color = "darkgreen")
```

```
line_chart_month
```



Deposits by Age

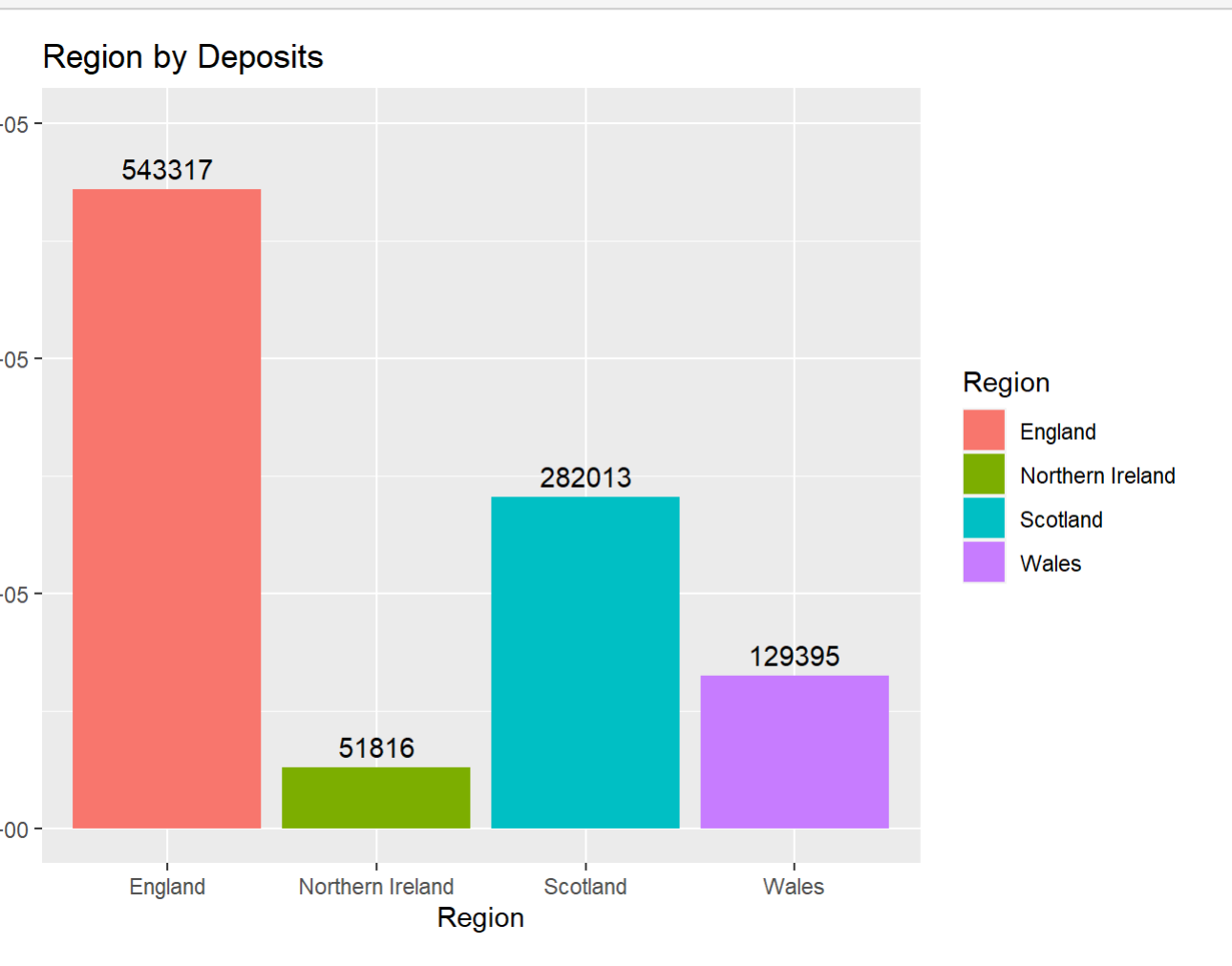


Total Deposits by Region

```
Region_group <- aggregate(Deposit ~ Region, bank, sum)
```

```
bar_region <- ggplot(Region_group,
                     aes(Region, Deposit,
                     fill = Region))+
              geom_bar(stat="identity")+
              geom_text(aes(label = Deposit),
                        position=position_dodge(width=0.5),
                       vjust=-0.50)+
              ggtitle("Region by Deposits")+
              ylim(0,600000)
```

```
bar_region
```



Job Classification

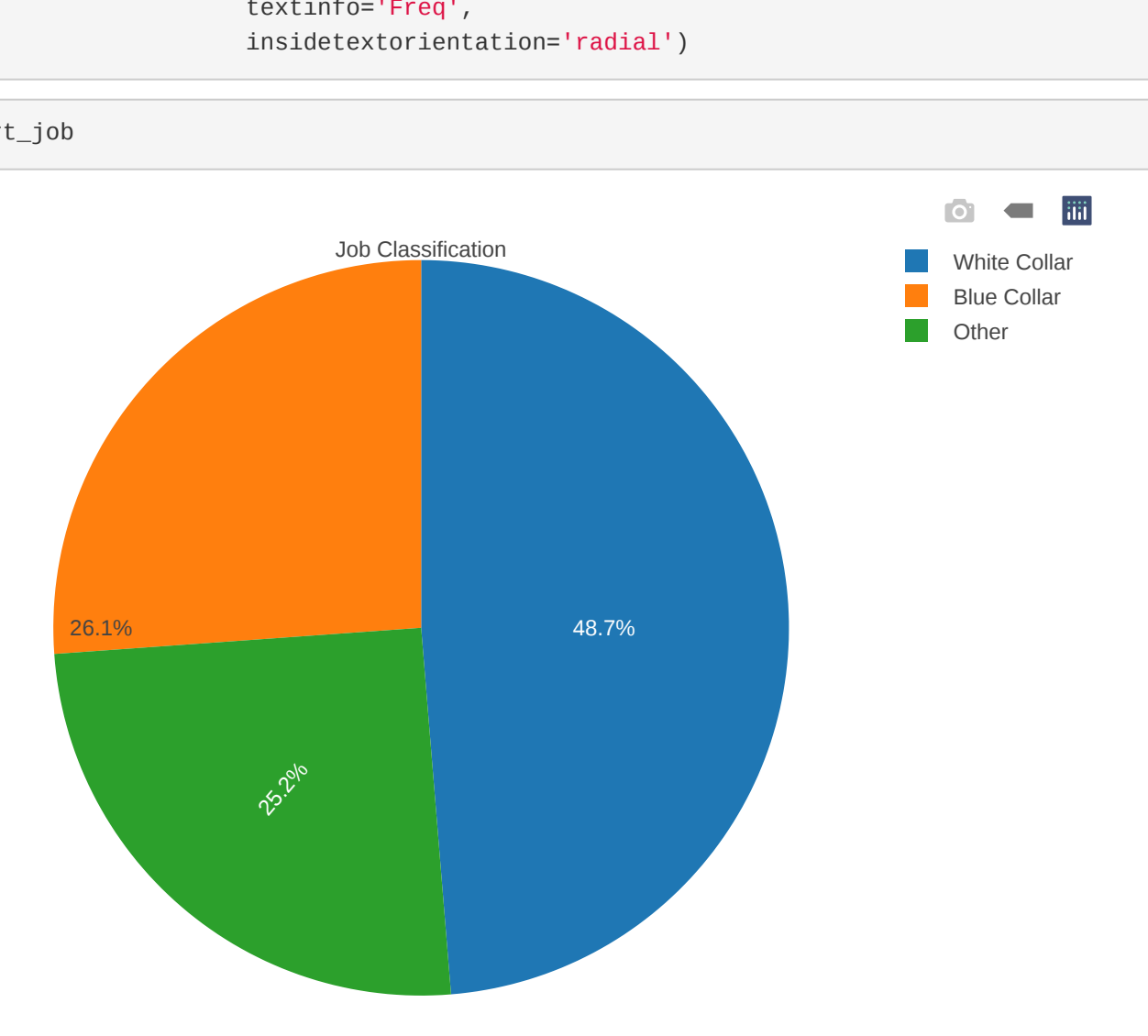
```
jc_table <- table(bank$Job_Classification)
```

```
job <- as.data.frame(jc_table)
```

```
job<- rename(job, Job_Category = Var1)
```

```
pie_chart_job <- plot_ly(data = job, title="Job Classification",
                         type='pie', labels= ~Job_Category,
                         values= ~Freq,
                         textinfo='Freq',
                         insidetextorientation='radial')
```

```
pie_chart_job
```



Deposits by Job Classification

```
jc_group <- as.data.frame(aggregate(Deposit ~ Job_Classification, bank, sum))
```

```
bar_job <- ggplot(jc_group,
                  aes(x=Job_Classification,
                      y=Deposit,
                      fill = Deposit))+
           geom_bar(stat="identity")+
           geom_text(aes(label = Deposit),
                     position=position_dodge(width=0.5),
                     vjust=-0.50)+
           ggtitle("Job Category by Deposits")+
           ylim(0,550000)
```

```
bar_job
```