```r
library(plyr)

#reading Data and assiging colnames.
dataTbl <- read.table(file="./Data/ml-100k/u.data")
colnames(dataTbl) <- c("user_id", "item_id", "rating", "timestamp")

#dropping timestamp column
dataTbl <- subset(dataTbl, select = -c(timestamp) )

## preparing userTbl
userTbl <- read.table(file="./Data/ml-100k/u.user", sep =",")


#assign names to columns for ease of processing
colnames(userTbl) <- c("user_id", "age" , "gender","occupation", "zip_code")


#dropping zip code - decided not useful for me
userTbl <- subset(userTbl, select = -c(zip_code)


##preparing genreTbl - will be used later to fill in genre fields (rather than the numeric ID)
##"Childern's" quote character needs to be ignored
genreTbl <- read.table(file="./Data/ml-100k/u.genre", sep = "|", quote = "" )


##preparing itemTbl
##URLS will mess up parsing due to use of quote charaters
itemTbl <- read.table(file="./Data/ml-100k/u.item", sep ="|", quote = "")


#create vector used to assign names in for columns:
genreVect <- as.vector(genreTbl[["V1"]])

#change Childern's to childerns to prevent errors
genreVect[genreVect %in% "Children\'s"] <- "Childrens"


#assign names to columns for ease of processing
colnames(itemTbl) <- c(c("item_id", "movie_title", "release_date", "video_release_date",
                         "IMDb_URL"), genreVect)

#drop video_release_date (seems to not be filled) and URL from table
itemTbl <- subset(itemTbl, select = -c(IMDb_URL, video_release_date))

#fix dates field
itemTbl$release_date <- as.Date(itemTbl$release_date, "%d-%b-%Y")

##create unified table
#merge itemTbl
unifiedTbl <- merge(dataTbl, itemTbl)
unifiedTbl <- subset(unifiedTbl, select = -c(item_id) )
```

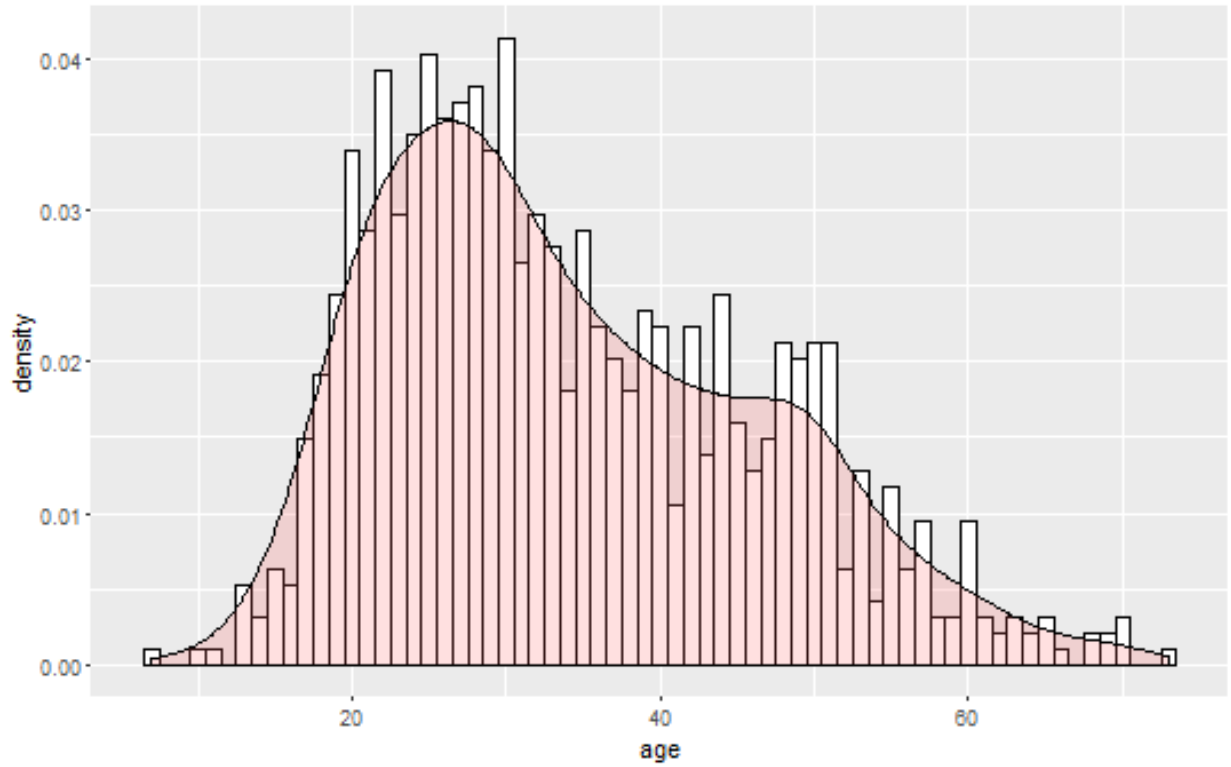
```r
#merge userTbl and remove user_id
unifiedTbl <- merge(unifiedTbl, userTbl)

#turns out there are duplicate rows (rows with a unique user_id and movie title)
unifiedTbl <- unique(unifiedTbl)


##function to create a single genre field, applying "multiple" to movies with
##multiple genres because I may want the genre fields as a single variable for
##ease of processing
##function assumes x will contain a single factor/row
##intended use with ddply
createGenreFieldSingle <- function(x){
  #temporarally remove variables to make looping easier,
  tempDat <- subset(x, select = -c(user_id, rating, movie_title,
                                   release_date, age, gender, occupation))
  count <- 0
  genre <- "unknown" #unknown genre is default

  #some movies are have multiple rating from same user!
  #check if there are muliple rows in x
  if(nrow(x) > 1){
    #set tempDat to only have one row
    tempDat <- head(tempDat, n = 1)
  }

  for (i in names(tempDat)){
    if(tempDat[i] == 1){
      count <- count + 1
      genre <- i
    }
  }
  if(count > 1){
    genre <- "multiple"
  }
  names(genre) <- "genre"
  return(genre)
}

#will remove elements where user had voted twice for the same movie (THIS IS REALLY SLOW)
genreDat <- ddply(unifiedTbl, ~user_id + movie_title, createGenreFieldSingle)


unifiedTblSingle <- merge(genreDat, unifiedTbl)


#keep only stuff I need
unifiedTblSingle <- subset(unifiedTblSingle, select =
                             c(user_id, movie_title, rating, genre,
                               release_date, age, gender, occupation) )

#output table as csv file
write.csv(unifiedTblSingle, "./Data/unifiedMLData.csv", row.names = FALSE)
```

```
#create file with possible muliple files added

##function to create potentially multiple values or rows
##intended use with ddply
createGenreFieldMultiple <- function(x){
  #temporarally remove variables to make looping easier,
  tempDat <- subset(x, select = -c(user_id, rating, movie_title,
                                   release_date, age, gender, occupation))
  genreItem <- data.frame()

  #some movies are have multiple rating from same user!
  #check if there are muliple rows in x
  if(nrow(x) > 1){
    #set tempDat to only have one row
    tempDat <- head(tempDat, n = 1)
  }

  for (i in names(tempDat)){
    if(tempDat[i] == 1){
      genreItem<- rbind(genreItem,i)
    }
    genreItem<- rbind(genreItem, NA)
  }
  names(genreItem) <- "genre"
  return(genreItem)
}


unifiedTblMulti <- ddply(unifiedTbl, ~movie_title , createGenreFieldMultiple)




#remove all NA
unifiedTblMulti <- na.omit(unifiedTblMulti)

#clean and remerge
unifiedTblMulti <- merge(unifiedTblMulti, ddply(unifiedTbl, ~movie_title + user_id,
                                                summarize, release_date))
unifiedTblMulti <- merge(unifiedTblMulti, unifiedTbl)

#some element re-added have no genre at all - removing from data
unifiedTblMulti <- unifiedTblMulti[unifiedTblMulti$genre != "1",]

unifiedTblMulti <- subset(unifiedTblMulti,
                          select = c(user_id, movie_title, genre, rating,
                                     release_date, age, gender, occupation) )


write.csv(unifiedTblMulti, "./Data/unifiedMLDataMulti.csv", row.names = FALSE)
```

Lets get a feel of the dataset with respect to the profession within the dataset Lets look at:

1).Total numbers of each profession that contributed to the dataset
2).Gender bias in each profession
3).How old each profession tends to be
4).How the professions tend to rank movies

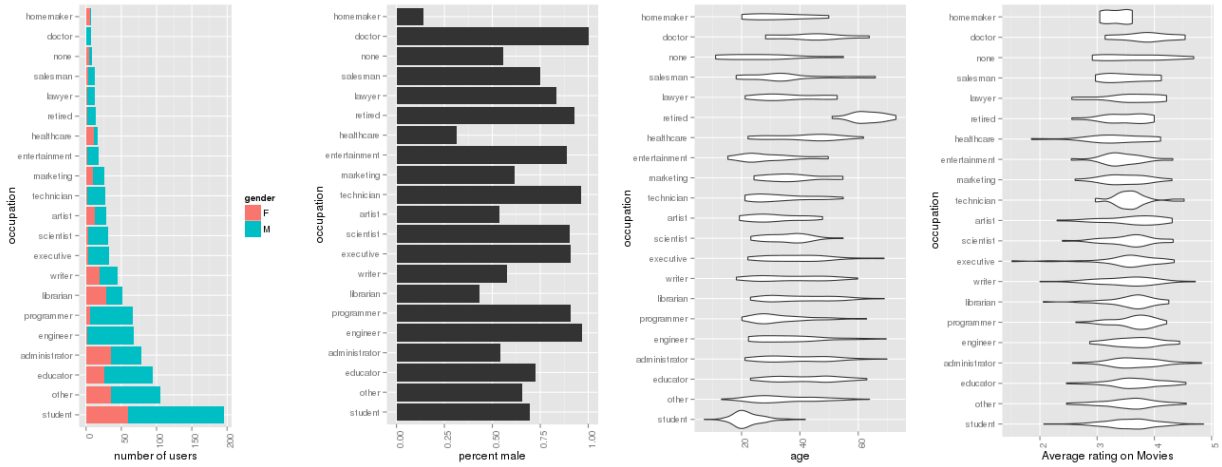
```
library(ggplot2)
library(plyr)
library(RColorBrewer)
library(grid)

# load single genre file
mlDat <- read.csv("./Data/unifiedMLData.csv")
mlDat$release_date <- as.Date(mlDat$release_date, "%Y-%m-%d")

# load multi genre file
mlDat_multi <- read.csv("./Data/unifiedMLDataMulti.csv")




##Age Plot

# prepare table for analysis of users
mlDat_user <- ddply(mlDat, ~user_id + age + gender + occupation, summarize,
    mean_rating = mean(rating))
agePlot <- ggplot(mlDat_user, aes(age)) + geom_histogram(aes(y = ..density..),
    binwidth = 1, colour = "black", fill = "white")
agePlot <- agePlot + geom_density(alpha = 0.2, fill = "#FF6666")
print(agePlot)
```




```
## User Plot

# sorts by number of users
userPlot <- ggplot(mlDat_user, aes(x = reorder(occupation, occupation, function(x) -length(x)),
    fill = gender)) + geom_bar()
# fix axis
userPlot <- userPlot + theme(axis.text.x = element_text(angle = 90, hjust = 1))
userPlot <- userPlot + ylab("number of users") + xlab("occupation")
# flip axis to make professions easier to read
userPlot <- userPlot + coord_flip()

ggsave(filename = "userPlot.pdf")

#Gender Plot
gender_dat <- ddply(mlDat_user, ~occupation, summarize, perc_male = (length(gender[gender ==
    "M"])/length(gender)), counts = -length(user_id))

# sorts by number of users
genderPlot <- ggplot(gender_dat, aes(x = reorder(occupation, counts), perc_male)) +
    geom_bar(stat = "identity")
# fix axis
genderPlot <- genderPlot + theme(axis.text.x = element_text(angle = 90, hjust = 1))
genderPlot <- genderPlot + ylab("percent male") + xlab("occupation")
# flip axis to make professions easier to read
genderPlot <- genderPlot + coord_flip()

ggsave(filename = "genderPlot.pdf")
```

```
##AgePlot
agePlot <- ggplot(mlDat_user, aes(x = reorder(occupation, occupation, function(x) -length(x)),
    age)) + geom_violin()
# fix axis
agePlot <- agePlot + theme(axis.text.x = element_text(angle = 90, hjust = 1))
agePlot <- agePlot + ylab("age") + xlab("occupation")
# flip axis to make professions easier to read
agePlot <- agePlot + coord_flip()

# for plotting for age information
agePlot <- ggplot(mlDat_user, aes(x = reorder(occupation, occupation, function(x) -length(x)),
    age)) + geom_violin()
# fix axis
agePlot <- agePlot + theme(axis.text.x = element_text(angle = 90, hjust = 1))
agePlot <- agePlot + ylab("age") + xlab("occupation")
# flip axis to make professions easier to read
agePlot <- agePlot + coord_flip()

ggsave(filename = "agePlot.pdf")


# for plotting rating trends
rankPlot <- ggplot(mlDat_user, aes(x = reorder(occupation, occupation, function(x) -length(x)),
    mean_rating)) + geom_violin()
# fix axis
rankPlot <- rankPlot + theme(axis.text.x = element_text(angle = 90, hjust = 1))
rankPlot <- rankPlot + ylab("Average rating on Movies") + xlab("occupation")
# flip axis to make professions easier to read
rankPlot <- rankPlot + coord_flip()

ggsave(filename = "rankPlot.pdf")
```

```
# for printing figures adjacent to eachother
vplayout <- function(x, y) viewport(layout.pos.row = x, layout.pos.col = y)
grid.newpage()
pushViewport(viewport(layout = grid.layout(1, 4)))
print(userPlot, vp = vplayout(1, 1))
print(genderPlot, vp = vplayout(1, 2))
print(agePlot, vp = vplayout(1, 3))
print(rankPlot, vp = vplayout(1, 4))
```



Observations:

1). There are very few doctors and homemakers, we probably can't say anything about these groups with very much confidence
2). Students have a very low average age in contrast to the retired. Although these stand out the most, the rest have some divergence; for example average programmer is younger then the average healthcare worker. 3). Males make up of more of our sample. Some professions like engineering (rather unsurprisingly) are completely male dominated. 4). The professions do not rank things evenly. Some appear more picky; for example executives seem to sometime rank movies very low and healthcare workers seem to have a very low average rating.