Users within 100 kms of Dublin office

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```
library("jsonlite")
```

```
## Warning: package 'jsonlite' was built under R version 3.4.3
```

Dataset Import

The user data in JSON format, stored in a text file(gistfile1.txt) is imported using the jsonlite library in R

```
#set the working directory
setwd("U:/IntercomTest")

# Retrieving the user data stored in JSON format
data<-stream_in(file("gistfile1.txt"))
```

```
## opening file input connection.
```

```
## Warning in readLines(con, n = pagesize, encoding = "UTF-8"): incomplete
## final line found on 'gistfile1.txt'
```

```
##
 Found 32 records...
 Imported 32 records. Simplifying...
```

```
## closing file input connection.
```

```
##      latitude user_id              name   longitude
## 1   52.986375      12  Christina McArdle   -6.043701
## 2    51.92893       1       Alice Cahill   -10.27699
## 3  51.8856167       2        Ian McArdle -10.4240951
## 4  52.3191841       3       Jack Enright  -8.5072391
## 5   53.807778      28   Charlie Halligan   -7.714444
## 6  53.4692815       7        Frank Kehoe   -9.436036
## 7  54.0894797       8        Eoin Ahearn    -6.18671
## 8   53.038056      26    Stephen McArdle   -7.653889
## 9     54.1225      27     Enid Gallagher   -8.143333
## 10 53.1229599       6    Theresa Enright  -6.2705202
## 11 52.2559432       9       Jack Dempsey  -7.1048927
## 12  52.240382      10 Georgina Gallagher   -6.972413
## 13 53.2451022       4          Ian Kehoe   -6.238335
## 14 53.1302756       5       Nora Dempsey  -6.2397222
## 15  53.008769      11   Richard Finnegan  -6.1056711
## 16 53.1489345      31         Alan Behan  -6.8422408
## 17         53      13       Olive Ahearn          -7
## 18  51.999447      14       Helen Cahill   -9.742744
## 19     52.966      15     Michael Ahearn      -6.463
## 20  52.366037      16         Ian Larkin   -8.179118
## 21  54.180238      17    Patricia Cahill   -5.920898
## 22 53.0033946      39        Lisa Ahearn  -6.3877505
## 23  52.228056      18         Bob Larkin   -7.915833
## 24  54.133333      24       Rose Enright   -6.433333
## 25     55.033      19        Enid Cahill      -8.112
## 26  53.521111      20       Enid Enright   -9.831111
## 27     51.802      21       David Ahearn      -9.442
## 28  54.374208      22    Charlie McArdle   -8.371639
## 29   53.74452      29      Oliver Ahearn    -7.11167
## 30  53.761389      30       Nick Enright     -7.2875
## 31  54.080556      23     Eoin Gallagher   -6.361944
## 32  52.833502      25        David Behan   -8.522366
```

Degree to Radian conversion

The latitude and longitude values of users address and Dublin office address are converted into radian using the below function

```
deg2rad <- function(deg) return(deg*pi/180)
# Converting the user's latitude and longitude from degree to radian
data$latitude <- deg2rad(as.numeric(data$latitude))
data$longitude <- deg2rad(as.numeric(data$longitude))
```

```
##     latitude user_id              name  longitude
## 1  0.9247867      12  Christina McArdle -0.1054825
## 2  0.9063308       1       Alice Cahill -0.1793673
## 3  0.9055748       2        Ian McArdle -0.1819348
## 4  0.9131420       3       Jack Enright -0.1484793
## 5  0.9391229      28   Charlie Halligan -0.1346424
## 6  0.9332150       7        Frank Kehoe -0.1646899
## 7  0.9440395       8        Eoin Ahearn -0.1079785
## 8  0.9256887      26    Stephen McArdle -0.1335856
## 9  0.9446158      27     Enid Gallagher -0.1421280
## 10 0.9271706       6    Theresa Enright -0.1094412
## 11 0.9120383       9       Jack Dempsey -0.1240038
## 12 0.9117667      10 Georgina Gallagher -0.1216916
## 13 0.9293023       4          Ian Kehoe -0.1088795
## 14 0.9272982       5       Nora Dempsey -0.1089037
## 15 0.9251776      11   Richard Finnegan -0.1065641
## 16 0.9276239      31         Alan Behan -0.1194196
## 17 0.9250245      13       Olive Ahearn -0.1221730
## 18 0.9075616      14       Helen Cahill -0.1700430
## 19 0.9244311      15     Michael Ahearn -0.1128006
## 20 0.9139598      16         Ian Larkin -0.1427525
## 21 0.9456235      17    Patricia Cahill -0.1033392
## 22 0.9250838      39        Lisa Ahearn -0.1114873
## 23 0.9115515      18         Bob Larkin -0.1381573
## 24 0.9448049      24       Rose Enright -0.1122828
## 25 0.9605070      19        Enid Cahill -0.1415811
## 26 0.9341196      20       Enid Enright -0.1715853
## 27 0.9041155      21       David Ahearn -0.1647940
## 28 0.9490090      22    Charlie McArdle -0.1461127
## 29 0.9380188      29      Oliver Ahearn -0.1241221
## 30 0.9383132      30       Nick Enright -0.1271909
## 31 0.9438838      23     Eoin Gallagher -0.1110369
## 32 0.9221186      25        David Behan -0.1487433
```

Geo distance calculation

Using Spherical Law of Cosines, the distance between two coordinates are calculated

```
# Function to calculate the geo distance between User's latitude/longitude and Dublin office
# using Spherical Law of Cosines
distance <- function(usrLong, usrLat) {
  officeLong=deg2rad(-6.257664) #Longitude of Intercom's Dublin office in degree
  officeLat<-deg2rad(53.339428) #Latitude of Intercom's Dublin office in degree
  R <- 6371 # Mean radius of Earth
  dist <- acos(sin(usrLat)*sin(officeLat) + cos(usrLat)*cos(officeLat) * cos(officeLong-usrLon
g)) * R
  return(dist) # Returning distance in kms
}
```

Distance of each user from Dublin office

The distacne of each user in the dataset is added to the dataset

```
# Adding column distance containing distance of the user from Intercom's Dublin office
data$distance<-distance(data$longitude, data$latitude)
```

```
##     latitude user_id              name  longitude  distance
## 1  0.9247867      12  Christina McArdle -0.1054825  41.76873
## 2  0.9063308       1       Alice Cahill -0.1793673 313.25563
## 3  0.9055748       2        Ian McArdle -0.1819348 324.37491
## 4  0.9131420       3       Jack Enright -0.1484793 188.95936
## 5  0.9391229      28   Charlie Halligan -0.1346424 109.37646
## 6  0.9332150       7        Frank Kehoe -0.1646899 211.17205
## 7  0.9440395       8        Eoin Ahearn -0.1079785  83.53253
## 8  0.9256887      26    Stephen McArdle -0.1335856  98.87460
## 9  0.9446158      27     Enid Gallagher -0.1421280 151.54302
## 10 0.9271706       6    Theresa Enright -0.1094412  24.08536
## 11 0.9120383       9       Jack Dempsey -0.1240038 133.26233
## 12 0.9117667      10 Georgina Gallagher -0.1216916 131.31804
## 13 0.9293023       4          Ian Kehoe -0.1088795  10.56694
## 14 0.9272982       5       Nora Dempsey -0.1089037  23.28732
## 15 0.9251776      11   Richard Finnegan -0.1065641  38.13757
## 16 0.9276239      31         Alan Behan -0.1194196  44.29082
## 17 0.9250245      13       Olive Ahearn -0.1221730  62.23170
## 18 0.9075616      14       Helen Cahill -0.1700430 278.20672
## 19 0.9244311      15     Michael Ahearn -0.1128006  43.72249
## 20 0.9139598      16         Ian Larkin -0.1427525 168.39718
## 21 0.9456235      17    Patricia Cahill -0.1033392  96.07860
## 22 0.9250838      39        Lisa Ahearn -0.1114873  38.35801
## 23 0.9115515      18         Bob Larkin -0.1381573 166.44809
## 24 0.9448049      24       Rose Enright -0.1122828  89.03103
## 25 0.9605070      19        Enid Cahill -0.1415811 223.63497
## 26 0.9341196      20       Enid Enright -0.1715853 237.57602
## 27 0.9041155      21       David Ahearn -0.1647940 274.79780
## 28 0.9490090      22    Charlie McArdle -0.1461127 180.15528
## 29 0.9380188      29      Oliver Ahearn -0.1241221  72.20179
## 30 0.9383132      30       Nick Enright -0.1271909  82.64285
## 31 0.9438838      23     Eoin Gallagher -0.1110369  82.69493
## 32 0.9221186      25        David Behan -0.1487433 161.36208
```

Users within 100 kms of Dublin office

Filtering users who are within 100kms of Intercom’s Dublin office. Sorting the list in the ascending order of User ID.

```
# Selecting only the user_id and name of the customers who live within 100 kms from Intercom's D
ublin office
data<-data[data$distance <= 100, c("user_id","name")]

# Putting the data in ascending order of user id
data <-data[order(data$user_id),]
```

```
##    user_id              name
## 13       4         Ian Kehoe
## 14       5      Nora Dempsey
## 10       6   Theresa Enright
## 7        8       Eoin Ahearn
## 15      11  Richard Finnegan
## 1       12 Christina McArdle
## 17      13      Olive Ahearn
## 19      15    Michael Ahearn
## 21      17   Patricia Cahill
## 31      23    Eoin Gallagher
## 24      24      Rose Enright
## 8       26   Stephen McArdle
## 29      29     Oliver Ahearn
## 30      30      Nick Enright
## 16      31        Alan Behan
## 22      39       Lisa Ahearn
```

Export user list to CSV

The CSV file containg the required data is stored in the working directory.

```
#Export the data into a CSV file
write.csv(data,file='usersWithin100kms.csv')
```