#Importing data from Excel

library(readxl)

SmartWatch <- read\_excel("C:/Users/jisukim2/Downloads/Cluster Analysis DAT Data.xlsx")

View(SmartWatch)

#Finding the optimal number of clusters through Eigenvalues

#Install package cluster and factoextra. And use the libraries

install.packages("factoextra")

library(factoextra)

fviz\_nbclust(SmartWatch, kmeans, method = "wss")

#After cluster=3, the additional loss of information is very less, which is the optimal number of clusters

#Finding the optimal number of clusters through K means clustering

k <- kmeans(SmartWatch, centers = 4, nstart = 10)

str(k)

#Optimal number ofclusters is 4. Sizes of the cluster are 407, 514, 276 and 1103.

#Getting segment means for K means clustering and saving the output to excel file

segment\_means <- k$centers

segment\_means <- round(segment\_means, digits = 2)

cluster <- c(1: 4)

Final <- data.frame(cluster, segment\_means)

write.csv(Final, file = "C:/Users/jisukim2/Downloads/DAT Output.csv")

#CLUSTER DENDOGRAM

# Compute hierarchical clustering and cut into 4 clusters

res <- hcut(SmartWatch, k = 4, stand = TRUE)

# Visualize

fviz\_dend(res, rect = TRUE, cex = 0.5,

 k\_colors = c("#00AFBB","#2E9FDF", "#E7B800", "#FC4E07"))