Practical Machine Learning Class (Coursera) HAR Clustering Model/Analysis using Random Forest
==========

This is the submission RMD for predicting the actual test set (PML-testing.csv. This is based on training the model as in PML_Project.Rmd

Load the test data

```
library(caret)

## Loading required package: lattice
## Loading required package: ggplot2

setwd("~/My Training/PML")

currentTrainPath = 'train.RData'
currentTestPath = 'test.RData'


modFit<-readRDS(currentTrainPath)
tst = read.csv('pml-testing.csv',header=T)
```

Data Cleanup and Feature Addition

```
data<-tst

data<-data[which(data$new_window=="no"),]
```

Delete all columns containing NA

```
rmcol<-array()
j<-1
for (i in 1:ncol(data)) {
  if ((sum(is.na(data[,i])) > 0) | (sum(data[,i] == "") > 0)) {
    rmcol[j]<-i
    j<-j+1
  }
}

data<-data[,-rmcol]
rm(rmcol)

tm<-unlist(lapply(strsplit(as.character(data$cvtd_timestamp)," "),
function(x) x[2]))
time<-(lapply(strsplit(tm,":"),function(x) {return
(round((as.numeric(x[1])) + round(as.numeric(x[2])/60)))}))
```

```
data$cvtd_timestamp =
factor(NA,levels=c('midnight','morning','noon','afternoon','evening'))

data$cvtd_timestamp[time>22 | time<=6] <- 'midnight'
data$cvtd_timestamp[time>6 & time<=10] <- 'morning'
data$cvtd_timestamp[time>10 & time <= 13] <- 'noon'
data$cvtd_timestamp[time>13 & time <= 18] <- 'afternoon'
data$cvtd_timestamp[time>18 & time <= 22] <- 'evening'

rm(tm,time)
```

Predict the actual test set

```
library(caret)



nam<-names(data)
valCols<-
c(which(nam=="accel_dumbbell_x"),which(nam=="magnet_dumbbell_x"),which
(nam=="magnet_dumbbell_y"),which(nam=="magnet_dumbbell_z"),which(nam==
"roll_forearm"),which(nam=="pitch_forearm"),which(nam=="yaw_forearm"),
which(nam=="total_accel_forearm"),which(nam=="gyros_forearm_x"),which(
nam=="gyros_forearm_y"),which(nam=="gyros_forearm_z"),which(nam=="acce
l_forearm_x"),which(nam=="accel_forearm_y"),which(nam=="accel_forearm_
z"),which(nam=="magnet_forearm_x"),which(nam=="magnet_forearm_y"),whic
h(nam=="magnet_forearm_z"),which(nam=="classe"))

data_b<-data
prediction<-predict(modFit,data[,valCols])
```

```
## Loading required package: randomForest
## randomForest 4.6-7
## Type rfNews() to see new features/changes/bug fixes.
```

```
data$classe<-prediction
nam<-names(data)

finCols<-
c(which(nam=="accel_dumbbell_x"),which(nam=="magnet_dumbbell_x"),which
(nam=="magnet_dumbbell_y"),which(nam=="magnet_dumbbell_z"),which(nam==
"roll_forearm"),which(nam=="pitch_forearm"),which(nam=="yaw_forearm"),
which(nam=="total_accel_forearm"),which(nam=="gyros_forearm_x"),which(
nam=="gyros_forearm_y"),which(nam=="gyros_forearm_z"),which(nam=="acce
l_forearm_x"),which(nam=="accel_forearm_y"),which(nam=="accel_forearm_
z"),which(nam=="magnet_forearm_x"),which(nam=="magnet_forearm_y"),whic
h(nam=="magnet_forearm_z"),which(nam=="classe"))
```

```
data[,finCols]
```

```
##    accel_dumbbell_x magnet_dumbbell_x magnet_dumbbell_y
magnet_dumbbell_z
## 1                21               523               -528
-56
## 2              -153              -502                388
-36
## 3              -141              -506                349
41
## 4               -51              -576                238
53
## 5               -18              -424                252
312
## 6              -138              -543                262
96
## 7              -145              -484                354
97
## 8              -140              -515                350
53
## 9                 0              -519                348
-32
## 10               -7              -531                321
-164
## 11               -4              -556                280
-23
## 12             -149              -539                293
67
## 13               27              -328                271
363
## 14             -139              -523                337
46
## 15             -159              -511                323
85
## 16               43              -284                311
368
## 17               14               484               -558
-19
## 18              -20              -527                329
-77
## 19               22               505               -537
-86
## 20              185               272                403
340
##    roll_forearm pitch_forearm yaw_forearm total_accel_forearm
## 1         141.0         49.30       156.0                33
## 2         109.0        -17.60       106.0                39
## 3         131.0        -32.60        93.0                34
## 4           0.0          0.00         0.0                43
```

```
## 5        -176.0         -2.16       -47.9                   24
## 6         150.0          1.46        89.7                   43
## 7         155.0         34.50       152.0                   32
## 8        -161.0         43.60       -89.5                   47
## 9          15.5        -63.50      -139.0                   36
## 10         13.2         19.40      -105.0                   24
## 11        137.0         -9.41       104.0                   46
## 12        138.0        -19.90        70.5                   36
## 13        176.0         16.70       -38.5                   23
## 14         53.1        -46.20       159.0                   33
## 15        152.0         26.50      -168.0                   24
## 16       -176.0         16.20       -42.2                   25
## 17         79.4         -2.60       109.0                   30
## 18       -173.0         49.80      -133.0                   25
## 19       -164.0         59.30      -149.0                   23
## 20        173.0         19.20       -83.2                   21
##    gyros_forearm_x gyros_forearm_y gyros_forearm_z accel_forearm_x
## 1             0.74           -3.34           -0.59            -110
## 2             1.12           -2.78           -0.18             212
## 3             0.18           -0.79            0.28             154
## 4             1.38            0.69            1.80             -92
## 5            -0.75            3.10            0.80             131
## 6            -0.88            4.26            1.35             230
## 7            -0.53            1.80            0.75            -192
## 8             0.63           -0.74            0.49            -151
## 9             0.03            0.02           -0.02             195
## 10            0.02            0.13           -0.07            -212
## 11            0.05            0.05            0.11              -3
## 12           -0.02            0.83            0.38             182
## 13            0.00           -4.69           -1.26             149
## 14            0.02            0.00            0.03             232
## 15            0.64           -5.97           -1.05             -18
## 16           -0.31           -3.45           -0.66             161
## 17            0.10           -0.06            0.18             144
## 18           -0.75            4.14            0.95            -129
## 19           -1.06            2.79            0.67            -148
## 20           -1.01            3.18            1.26              41
##    accel_forearm_y accel_forearm_z magnet_forearm_x
magnet_forearm_y
## 1              267            -149             -714
419
## 2              297            -118             -237
791
## 3              271            -129              -51
698
## 4              406             -39             -233
783
## 5              -93             172              375
-
787
## 6              322            -144             -300
```

```
800
## 7               170            -175              -678
284
## 8              -331            -282              -109             -
619
## 9               204            -217                 0
652
## 10               98              -7              -403
723
## 11              405            -203              -248
720
## 12              263            -148                32
648
## 13               46             167               456             -
677
## 14              106            -198               123
555
## 15               43            -226              -540             -
155
## 16              -61             171               532             -
775
## 17              201            -154              -146
756
## 18              -29            -202              -500             -
232
## 19               21            -172              -614              -
46
## 20             -100             179                70             -
703
##    magnet_forearm_z classe
## 1               617      B
## 2               873      A
## 3               783      B
## 4               521      A
## 5                91      A
## 6               884      E
## 7               585      D
## 8               -32      B
## 9               469      A
## 10              512      A
## 11              438      B
## 12              702      C
## 13               29      B
## 14              648      A
## 15              389      E
## 16              114      E
## 17              708      A
## 18              329      B
## 19              471      B
## 20               74      B
```