#### Codebook for course project for Getting and Cleaning Data

This codebook has been written based on the feature description of the original problem set data and reuses much of that material.

#### **Background information:**

The features selected for this database come from the accelerometer and gyroscope 3-axial raw signals tAcc-XYZ and tGyro-XYZ. These time domain signals (prefix 't' to denote time) were captured at a constant rate of 50 Hz. Then they were filtered using a median filter and a 3rd order low pass Butterworth filter with a corner frequency of 20 Hz to remove noise. Similarly, the acceleration signal was then separated into body and gravity acceleration signals (tBodyAcc-XYZ and tGravityAcc-XYZ) using another low pass Butterworth filter with a corner frequency of 0.3 Hz.

Subsequently, the body linear acceleration and angular velocity were derived in time to obtain Jerk signals (tBodyAccJerk-XYZ and tBodyGyroJerk-XYZ). Also the magnitude of these three-dimensional signals were calculated using the Euclidean norm (tBodyAccMag, tGravityAccMag, tBodyAccJerkMag, tBodyGyroMag, tBodyGyroJerkMag).

Finally a Fast Fourier Transform (FFT) was applied to some of these signals producing fBodyAcc-XYZ, fBodyAccJerk-XYZ, fBodyGyro-XYZ, fBodyAccJerkMag, fBodyGyroMag, fBodyGyroJerkMag. (Note the 'f' to indicate frequency domain signals).

These signals were used to estimate variables of the feature vector for each pattern:

'-XYZ' is used to denote 3-axial signals in the X, Y and Z directions.

tBodyAcc-XYZ

tGravityAcc-XYZ tBodyAccJerk-XYZ

tBodyGyro-XYZ

tBodyGyroJerk-XYZ

tBodyAccMag

tGravityAccMag

tBodyAccJerkMag

tBodyGyroMag

tBodyGyroJerkMag

fBodyAcc-XYZ

fBodyAccJerk-XYZ

fBodyGyro-XYZ

fBodyAccMag

fBodyAccJerkMag

fBodyGyroMag

fBodyGyroJerkMag

Two of the set of variables that were estimated from these signals are (additional variables in the input set have been omitted):

mean(): Mean value std(): Standard deviation

Additional vectors obtained by averaging the signals in a signal window sample. These are used on the angle() variable:

gravityMean tBodyAccMean tBodyAccJerkMean tBodyGyroMean tBodyGyroJerkMean

## **Output description:**

The output file contains 180 rows and 81 columns. The columns are as described below:

## subjectId

- Number between 1 and 30 (inclusive)
- Indicates subject that observation pertains to

# activityName

- Character
- One of (WALKING, WALKING\_UPSTAIRS, WALKING\_DOWNSTAIRS, SITTING, STANDING, LAYING)

The following 79 variables are mean values of the MEAN and STD readings in the test and training files in the original data set. These values are normalized and in the range [-1, 1].

04.5	Mean value of the Time Body Acceleration signal mean value
meanOf.tBodyAcc.mean.X	along X axis
	Mean value of the Time Body Acceleration signal mean value
meanOf.tBodyAcc.mean.Y	along Y axis
	Mean value of the Time Body Acceleration signal mean value
meanOf.tBodyAcc.mean.Z	along Z axis
	Mean value of the Time Gravity Acceleration signal mean value
meanOf.tGravityAcc.mean.X	along X axis
-	Mean value of the Time Gravity Acceleration signal mean value
meanOf.tGravityAcc.mean.Y	along Y axis
	Mean value of the Time Gravity Acceleration signal mean value
meanOf.tGravityAcc.mean.Z	along Z axis
	Mean value of the Time Body Acceleration Jerk signal mean value
meanOf.tBodyAccJerk.mean.X	along X axis
,	Mean value of the Time Body Acceleration Jerk signal mean value
meanOf.tBodyAccJerk.mean.Y	along Y axis
	Mean value of the Time Body Acceleration Jerk signal mean value
meanOf.tBodyAccJerk.mean.Z	along Z axis
,	Mean value of the Time Body Gyroscopic signal mean value
meanOf.tBodyGyro.mean.X	along X axis
, ,	Mean value of the Time Body Gyroscopic signal mean value
meanOf.tBodyGyro.mean.Y	along Y axis
	Mean value of the Time Body Gyroscopic signal mean value
meanOf.tBodyGyro.mean.Z	along Z axis
	Mean value of the Time Body Gyroscopic Jerk signal mean value
meanOf.tBodyGyroJerk.mean.X	along X axis
,.,	Mean value of the Time Body Gyroscopic Jerk signal mean value
meanOf.tBodyGyroJerk.mean.Y	along Y axis
,.,	Mean value of the Time Body Gyroscopic Jerk signal mean value
meanOf.tBodyGyroJerk.mean.Z	along Z axis
	Mean value of the Time Body Acceleration signal magnitude
meanOf.tBodyAccMag.mean	mean value
	Mean value of the Time Gravity Acceleration signal magnitude
meanOf.tGravityAccMag.mean	mean value
	Mean value of the Time Body Acceleration Jerk signal magnitude
meanOf.tBodyAccJerkMag.mean	mean value
meanOf.tBodyGyroMag.mean	Mean value of the Time Body Gyroscopic signal magnitude mean
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	value
	Mean value of the Time Body Gyroscopic Jerk signal magnitude
meanOf.tBodyGyroJerkMag.mean meanOf.fBodyAcc.mean.X	mean value
	Mean value of the Frequency Body Acceleration signal mean
	value along X axis
	<u> </u>
maan Of fDady Asa maan V	Mean value of the Frequency Body Acceleration signal mean
meanOf.fBodyAcc.mean.Y	value along Y axis
	Mean value of the Frequency Body Acceleration signal mean
meanOf.fBodyAcc.mean.Z	value along Z axis
0.00	Mean value of the Frequency Body Acceleration signal mean
meanOf.fBodyAcc.meanFreq.X	frequency value along X axis
	Mean value of the Frequency Body Acceleration signal mean
meanOf.fBodyAcc.meanFreq.Y	frequency value along Y axis
	Mean value of the Frequency Body Acceleration signal mean
meanOf.fBodyAcc.meanFreq.Z	frequency value along Z axis
	Mean value of the Frequency Body Acceleration Jerk signal mean
meanOf.fBodyAccJerk.mean.X	value along X axis
	Mean value of the Frequency Body Acceleration Jerk signal mean
meanOf.fBodyAccJerk.mean.Y	value along Y axis
•	Mean value of the Frequency Body Acceleration Jerk signal mean
meanOf.fBodyAccJerk.mean.Z	value along Z axis
,	Mean value of the Frequency Body Acceleration Jerk signal mean
meanOf.fBodyAccJerk.meanFreq.X	frequency value along X axis
	Mean value of the Frequency Body Acceleration Jerk signal mean
meanOf.fBodyAccJerk.meanFreq.Y	frequency value along Y axis
mountain raq. i	Mean value of the Frequency Body Acceleration Jerk signal mean
meanOf.fBodyAccJerk.meanFreq.Z	frequency value along Z axis
mounombody/ locoonkinodin roq.2	Mean value of the Frequency Body Gyroscopic signal mean value
meanOf.fBodyGyro.mean.X	along X axis
meanon body Cyrolinean.x	Mean value of the Frequency Body Gyroscopic signal mean value
meanOf.fBodyGyro.mean.Y	along Y axis
meanon body Cyrolinean. 1	Mean value of the Frequency Body Gyroscopic signal mean value
meanOf.fBodyGyro.mean.Z	along Z axis
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meanOf.fBodyGyro.meanFreq.X	Mean value of the Frequency Body Gyroscopic signal mean
meanor.ibouyGyro.meanFreq.A	frequency value along X axis
maanOf fDadyOvra maanFrag V	Mean value of the Frequency Body Gyroscopic signal mean
meanOf.fBodyGyro.meanFreq.Y	frequency value along Y axis
mann Of fined (C) we mann From 7	Mean value of the Frequency Body Gyroscopic signal mean
meanOf.fBodyGyro.meanFreq.Z	frequency value along Z axis
and the distance of the distan	Mean value of the Frequency Body Acceleration signal magnitude
meanOf.fBodyAccMag.mean	mean value
Of the dealers of the second	Mean value of the Frequency Body Acceleration signal magnitude
meanOf.fBodyAccMag.meanFreq	mean frequency value
0170 1 0 1 1 1 1 1 1	Mean value of the Frequency Body Body Acceleration Jerk signal
meanOf.fBodyBodyAccJerkMag.mean	magnitude mean value
	Mean value of the Frequency Body Body Acceleration Jerk signal
meanOf.fBodyBodyAccJerkMag.meanFreq	magnitude mean frequency value
meanOf.fBodyBodyGyroMag.mean	Mean value of the Frequency Body Body Gyroscopic signal
	magnitude mean value
	Mean value of the Frequency Body Body Gyroscopic signal
meanOf.fBodyBodyGyroMag.meanFreq	magnitude mean frequency value
	Mean value of the Frequency Body Body Gyroscopic Jerk signal
meanOf.fBodyBodyGyroJerkMag.mean	magnitude mean value
, .,.,	Mean value of the Frequency Body Body Gyroscopic Jerk signal
meanOf.fBodyBodyGyroJerkMag.meanFreq	magnitude mean frequency value
meanOf.tBodyAcc.std.X	Mean value of the Time Body Acceleration signal std deviation
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	value along X axis
	Mean value of the Time Body Acceleration signal std deviation
meanOf.tBodyAcc.std.Y	value along Y axis
	Mean value of the Time Body Acceleration signal std deviation
meanOf.tBodyAcc.std.Z	value along Z axis
	Mean value of the Time Gravity Acceleration signal std deviation
meanOf.tGravityAcc.std.X	value along X axis
meanor.toravityAcc.stu.A	Mean value of the Time Gravity Acceleration signal std deviation
meanOf.tGravityAcc.std.Y	value along Y axis
	Mean value of the Time Gravity Acceleration signal std deviation
meanOf.tGravityAcc.std.Z	value along Z axis
	Mean value of the Time Body Acceleration Jerk signal std
meanOf.tBodyAccJerk.std.X	deviation value along X axis
modificition y tooloritista.	Mean value of the Time Body Acceleration Jerk signal std
meanOf.tBodyAccJerk.std.Y	deviation value along Y axis
•	Mean value of the Time Body Acceleration Jerk signal std
meanOf.tBodyAccJerk.std.Z	deviation value along Z axis
•	Mean value of the Time Body Gyroscopic signal std deviation
meanOf.tBodyGyro.std.X	value along X axis
• •	Mean value of the Time Body Gyroscopic signal std deviation
meanOf.tBodyGyro.std.Y	value along Y axis
	Mean value of the Time Body Gyroscopic signal std deviation
meanOf.tBodyGyro.std.Z	value along Z axis
	Mean value of the Time Body Gyroscopic Jerk signal std deviation
meanOf.tBodyGyroJerk.std.X	value along X axis
	Mean value of the Time Body Gyroscopic Jerk signal std deviation
meanOf.tBodyGyroJerk.std.Y	value along Y axis
	Mean value of the Time Body Gyroscopic Jerk signal std deviation
meanOf.tBodyGyroJerk.std.Z	value along Z axis
	Mean value of the Time Body Acceleration signal magnitude std
meanOf.tBodyAccMag.std	deviation value
	Mean value of the Time Gravity Acceleration signal magnitude std
meanOf.tGravityAccMag.std	deviation value
000	Mean value of the Time Body Acceleration Jerk signalmagnitude
meanOf.tBodyAccJerkMag.std	std deviation value
or an Of tD and O make and the	Mean value of the Time Body Gyroscopic signal magnitude std
meanOf.tBodyGyroMag.std	deviation value
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meanOf.tBodyGyroJerkMag.std	std deviation value
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meanOf.fBodyAcc.std.X	deviation value along X axis
maanOf fDadyAss atd V	Mean value of the Frequency Body Acceleration signal std
meanOf.fBodyAcc.std.Y	deviation value along Y axis
maanOf fDadyAss atd 7	Mean value of the Frequency Body Acceleration signal std
meanOf.fBodyAcc.std.Z	deviation value along Z axis  Mean value of the Frequency Body Acceleration Jerk signal std
meanOf fRodyAcc lark and Y	deviation value along X axis
meanOf.fBodyAccJerk.std.X	Mean value of the Frequency Body Acceleration Jerk signal std
meanOf.fBodyAccJerk.std.Y	deviation value along Y axis
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modificial de la constant de la cons	Mean value of the Frequency Body Gyroscopic signal std
meanOf.fBodyGyro.std.X	deviation value along X axis
modification body cytologicals	Mean value of the Frequency Body Gyroscopic signal std
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	deviation value along Z axis
man Of the division and	Mean value of the Frequency Body Acceleration signal magnitude
meanOf.fBodyAccMag.std	std deviation value
	Mean value of the Frequency Body Body Acceleration Jerk signal
meanOf.fBodyBodyAccJerkMag.std	magnitude std deviation value
	Mean value of the Frequency Body Body Gyroscopic signal
meanOf.fBodyBodyGyroMag.std	magnitude std deviation value
	Mean value of the Frequency Body Body Gyroscopic Jerk signal
meanOf.fBodyBodyGyroJerkMag.std	magnitude std deviation value