REPORT

**Human activity recognition *with* smart phone**

* Now the **world is running in a busy schedule**. In this way of leading their lives **the man is** **not having enough time for taking care about their health**. Now the world is running towards the technology and the human beings and all are very busy in their works.
* And this the reason why I choose this project for my work. And I create a dataset about the humans pulse data and by that data my **model will calculate the human health** and my model will **show their physical fitness at that situation.**
* In this **way the human beings will know about their health** and they will take care about their lives and that is the motive behind this project.
* The **dataset containing the different activities with a smartphone to the waists of 30 persons**. The **data is recorded with the help of sensors** (accelerometer and Gyroscope) in that smartphone.

***Importing dataset using Pandas library:***

*The dataset contain the columns:*

* *'tBodyAcc-mean()-X'*
* *'tBodyAcc-mean()-Y'*
* *'tBodyAcc-mean()-Z'*

*'***tBodyAcc-std()-X', 'tBodyAcc-std()-Y', 'tBodyAcc-std()-Z',**

**'tBodyAcc-mad()-X', 'tBodyAcc-mad()-Y', 'tBodyAcc-mad()-Z',**

**'tBodyAcc-max()-X',**

**...**

**'fBodyBodyGyroJerkMag-kurtosis()', 'angle(tBodyAccMean,gravity)',**

**'angle(tBodyAccJerkMean),gravityMean)',**

**'angle(tBodyGyroMean,gravityMean)',**

**'angle(tBodyGyroJerkMean,gravityMean)', 'angle(X,gravityMean)',**

**'angle(Y,gravityMean)', 'angle(Z,gravityMean)', 'subject', 'Activity'],**

**dtype='object', length=563)**

* *The data is recorded By using the sensors(Gyroscope and accelerometer) in a smartphone, they have captured '3-axial linear acceleration'(*tAcc-XYZ*) from accelerometer and '3-axial angular velocity' (*tGyro-XYZ*) from Gyroscope with several variations.*

***Data preprocessing****:*

* *The* ***cleaning and processing*** *on the dataset.*
* *Data preprocessing is* ***performed on the dataset****.*

***Splitting the dataset:***

* *The readings from****70% of the volunteers were taken as training*** *data****and remaining 30% subject recordings were taken for test data.***
* **6 Activities:**

1. Walking
2. Walking Upstairs
3. Walking Downstairs
4. Standing
5. Sitting
6. Lying.

* we will remove the commas and brackets to out features so that we can apply directly.
* save our data to csv file for future prediction .

**Analysis:**

* For the prediction **there are 2 types of activities**:
* **Static and dynamic** ,
* Static activity: The **Static activity does not depend on motion information** . those are:standing, sit, liedown
* Dynamic activity: The **dynamic activities depends on motion information**, those are: Walking, WalkingUpstairs,WalkingDownstairs.
* Ploting dist plot graph for the stationary and moving activities.
* Plot boxplot for the activities and Acceleration magnitude mean. prefix t means time.
* If tAccMean is < -0.8 then the Activities are either Standing or Sitting or Laying.
* If tAccMean is > -0.6 then the Activities are either Walking or WalkingDownstairs or WalkingUpstairs.
* If tAccMean > 0.0 then the Activity is WalkingDownstairs.
* We can classify 75% the Acitivity labels with some errors.
* Plot boxplot for the angleXgravityMean and the activity.
* In this angleXgravityMean of the lying activity is > 0 and for the other activities angleXgravityMean<0.

**Required modules:**

* import itertools
* import pandas as pd
* import numpy as np
* import matplotlib.pyplot as plt
* from sklearn.metrics import confusion\_matrix
* %matplotlib inline
* from IPython.display import Markdown, display
* from datetime import datetime
* for Logistic Regression:(modules need to import):
* from sklearn import linear\_model
* from sklearn import metrics
* from sklearn.model\_selection import GridSearchCV

**Train the dataset:**

* fit the model with x\_train and y\_train.

**Test the dataset** (predict human activity):

* And test with the x\_test.

**Conclusion:**

* The model is predicting the Human Activity Recognition with smart phone.