Human Activity Recognition with Smartphones

(Recordings of 30 study participants performing activities of daily living)

In an experiment with a group of 30 volunteers within an age bracket of 19 to 48 years, each person performed six activities (WALKING, WALKING UPSTAIRS, WALKING DOWNSTAIRS, SITTING, STANDING, LAYING) wearing a smartphone (Samsung Galaxy S II) on the waist. The experiments have been video-recorded to label the data manually.

The obtained dataset has been randomly partitioned into two sets, where 70% of the volunteers was selected for generating the training data and 30% the test data.

Attribute information

For each record in the dataset the following is provided:

- Triaxial acceleration from the accelerometer (total acceleration) and the estimated body acceleration.
- Triaxial Angular velocity from the gyroscope.
- A 561-feature vector with time and frequency domain variables.
- Its activity labels.
- An identifier of the subject who carried out the experiment.

Train a tree classifier to predict the labels from the test data set using the following approaches:

- (a) a (simple) tree approach,
- (b) a random forest approach and
- (c) a logistic regression.
- (d) KnN approach

Examine the result by reporting the accuracy rates of all approach on both the testing and training data set. Compare the results using the Gini and Entropy index. Which approach would you recommend and why?

- Perform feature selection and repeat the previous step. Does your accuracy improve?
- Plot two graph showing accuracy bar score of all the approaches taken with and without feature selection

Please make a proper report on this project and submit soft copy to Forsk official email id.

It should atleast contain the following SECTIONS:

- Cover page
- Certificate on Forsk letter head
- Acknowledgement
- Abstract
- List of Figures
- Table of contents
- Introduction
- Background theory/Motivation
- Methodology:

  Details of sensors used in dataset

  Data Pre-processing /Data Munging

  Brief discussion on Regression methods

  Detailed Discussion on Classification methods used with code snippets

  Data Visualization.

- Result Analysis
- Conclusion.
- Reference [OPTIONAL]
- ANNEXTURE [WILL CONTAIN THE CODE HERE, don't include lengthy codes in the main part of the report, use code snippets for specific sections]

(Also include the code.py file along with the report in zip folder)