Final Project of Machine Learning

**Overview**

In this project, you have opportunities to implement machine learning to practical applications.

You can download the data from the below hyperlinks. We advise you to focus on one of the four projects only. In each project, choose the possible ML method wisely, and explain why you used that method.

Projects can be done alone or in a group of 2 or 3 students. If you decide to do it as a group, please explain who contributed what.

**Note**

You should submit your final project by emailing it to fp@class.brml.org. The subject line must read "final project". If the subject line does not match, an error email is returned; otherwise, a positive ACK is replied. Automated deadline checking is implemented. The submission must be in before Feb. 8, 2014 (i.e., by Feb, 7, 23:59 CET). Please submit the following:

* a short "paper" describing what you did, describing the data, describing the method, and your results. Please keep it succinct, with the class teachers as readership in mind. It should contain plots describing your results. This paper must be submitted in PDF format.
* all software necessary to reproduce your results, i.e., also the methodologies to preprocess the data.

If you like you can give a short presentation (about 10-15 minutes)---by appointment only.

**We offer the following data sets:**  
**4) Wearable Computing: Classification of Body Postures and Movements (PUC-Rio) Data Set**  
The aim of this project set is to classify 5 classes (sitting-down, standing-up, standing, walking, and sitting) from 18 input values including human body information and accelerometer sensor reading from human joints. The data set contains 165,632 sample.

Make sure both training set and testing set contain every class. You can randomly choose a certain ratio, for instance 10%, from every class of data as the testing data set.   
  
Download Dataset at <https://drive.google.com/folderview?id=0B6aLdb4IRU5eMzI3UkVEWnBuYms&usp=sharing>

More information at <http://archive.ics.uci.edu/ml/datasets/Wearable+Computing%3A+Classification+of+Body+Postures+and+Movements+%28PUC-Rio%29>  
  
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**There are two types of projects that you can choose:**

*Type 1: Evaluation of a Single Machine Learning Algorithm*

* Select one Machine Learning algorithm of your choice
* Implement the algorithm in a language of your choice; we suggest Python
* For your implementation, identify particular parts of the code that are critical and try to find implementation variants that cope with the given restrictions.
* Given your implementation, optimize the classification/regression performance.
* Provide figures that explain your findings

*Type 2: Evaluation of Several Machine Learning Algorithms*

* Choose at least three Machine Learning Algorithms for evaluation
* Use an existing standard Machine Learning algorithm toolkit, such as WEKA for your experiments.
* Evaluate the regression/classification performance / model size trade-off. Investigate the tuning potential by adjusting the parameters of your selected algorithms.
* Provide figures that explain your findings