



# Qualitative Activity Recognition

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## Synopsis

The Qualitative Activity Recognition of Weight Lifting Exercises study (available at <http://groupware.les.inf.puc-rio.br/public/papers/2013.Velloso.QAR-WLE.pdf> (<http://groupware.les.inf.puc-rio.br/public/papers/2013.Velloso.QAR-WLE.pdf>)) investigates three aspects that pertain to qualitative activity recognition - specifying correct execution, detecting execution mistakes, and providing feedback to the user. People regularly quantify how much of a particular activity they do but they rarely quantify how well they do it. In this project we will use data from accelerometers on the belt, forearm, arm, and dumbbell of 6 participants who were asked to perform barbell lifts correctly and incorrectly in 5 different ways. Our objective is to develop a machine learning model to predict the manner in which they did the exercise.

The “classe” variable in the training set is what we will predict. Participants were asked to perform one set of 10 repetitions of the Unilateral Dumbbell Biceps Curl in five different fashions: exactly according to the specification (Class A), throwing the elbows to the front (Class B), lifting the dumbbell only halfway (Class C), lowering the dumbbell only halfway (Class D) and throwing the hips to the front (Class E). Class A corresponds to the specified execution of the exercise, while the other 4 classes correspond to common mistakes.

## Data Sources

The training data for this project are available here:

<https://d396qusza40orc.cloudfront.net/predmachlearn/pml-training.csv>  
(<https://d396qusza40orc.cloudfront.net/predmachlearn/pml-training.csv>)

The test data are available here:

<https://d396qusza40orc.cloudfront.net/predmachlearn/pml-testing.csv>  
(<https://d396qusza40orc.cloudfront.net/predmachlearn/pml-testing.csv>)

The data for this project come from this source:

<http://web.archive.org/web/20161224072740/http://groupware.les.inf.puc-rio.br/har>  
(<http://web.archive.org/web/20161224072740/http://groupware.les.inf.puc-rio.br/har>)

## Data Processing

```
# Load libraries  
library(caret)
```

```
## Loading required package: lattice
```