## ECE 532 Course Project Update 2

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# Human Activity Recognition with Smartphones Sensors

https://github.com/HungTran114/ECE532\_Course-Project

**1. Project Progress**:

Dataset: “Human Activity Recognition Using Smartphones” from UCI Repository, 10929 rows of data with 563 attributes, multiclass classification into 6 different activities performed (walking, walking upstairs, walking downstairs, sitting, standing, laying)

In the Update 1, I was struggling with linear regression for multiclass classification. Turn out, that is not a good way to do it.

To complete the attempt to use linear regression with ridge regression, I vary the value of lambda from (10^-10 to 10^10). However, best result that I got from any of the 6 one-vs-all classification is 20%. (My data is normalized)

So, I found out that multi-class classification, logistic regression is a much better way instead of linear regression by applying it repeatedly as one-vs-all classification, because logistic regression predict results that are interpreted as class probabilities.

I am studying sklearn package to build logistic regression and SVM model.

I am planning to use PCA from sklearn to pick out meaningful features. Then potentially build a logistic regression model from the new matrix created by PCA.

Also, I am reseaching the GridSearchCV function of sklearn package to understand how to tune hyperparameter.

I have updated the files on my GitHub.

Going ahead, my plan will be:

- Finish up and understand logistic regression and SVM using sklearn

- Neural network: I think this will fit well with the non-linearity nature of my dataset.

**2. Project timeline:**

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| **Semester week** | **Date** | **Tasks** |
| 8 | 10/22 | Topic proposal |
| 11 |  |  |
| 12 | 11/17 | Project Update 1 - Linear regression |
| 13 |  | Linear regression |
| 14 | 12/1 | Project Update 2 – SVM + Logistic regression |
| 15 |  | Neural networks - initiated |
| 16 |  | Final Reports due |