## ECE 532 Course Project Topic Proposals

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# Human Activity Recognition with Smartphones Sensors

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

**1. Project Dataset**:

I will use the dataset “Human Activity Recognition Using Smartphones” from UCI Repository (the .csv version is from Kaggle).

<https://archive.ics.uci.edu/ml/datasets/Smartphone-Based+Recognition+of+Human+Activities+and+Postural+Transitions>

<https://www.kaggle.com/uciml/human-activity-recognition-with-smartphones/version/2>

The dataset has 10929 rows of data with 563 attributes. The data has been randomly partitioned into two sets, where 70% of the volunteers was selected for generating the training data and 30% the test data.

The dataset was built from the recordings of 30 study participants performing activities of daily living while carrying a waist-mounted smartphone with embedded inertial sensors. *The objective is to classify activities into one of the six activities performed (walking, walking upstairs, walking downstairs, sitting, standing, laying)*.

Notes: The data has been pre-processing as followed:

Using the phone’s embedded accelerometer and gyroscope, the dataset captured 3-axial linear acceleration and 3-axial angular velocity at a constant rate of 50Hz.

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.

**2. Algorithms**:

The algorithms that I am planning to use with this dataset are:

- Support Vector Machines (SVM) for Multiclass Classification

- Neural networks

- Kernel based SVM

These algorithms will be trained on the training set and compare with each other based on the accuracy on the test set.

As of the moments, I will explore the dataset and see if I can use PCA to reduce the number of features in the dataset.

**3. Project timeline:**

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| **Semester week** | **Date** | **Tasks** |
| 8 | 10/22 | Topic proposal |
| 11 |  | SVM |
| 12 | 11/17 | Project Update 1 |
| 13 |  | Neural Networks |
| 14 | 12/1 | Project Update 2 |
| 15 |  | Kernel Based SVM |
| 16 |  | Final Reports due |