**Learn to use support vector machines**

**All students:**

1. Study [LibSVM for MATLAB](http://www.csie.ntu.edu.tw/~cjlin/libsvm/" \t "_blank). If after reading the [documentation](http://www.csie.ntu.edu.tw/~cjlin/papers/guide/guide.pdf) you still have any questions regarding LibSVM usage, I recommend on-line tutorials:  [Tutorial](http://openclassroom.stanford.edu/MainFolder/DocumentPage.php?course=MachineLearning&doc=exercises/ex7/ex7.html)
2. Use linear SVM to recognize the digits in the optdigits dataset. Use cross-validation to find SVM parameters.
3. **Bonus** Implement a GUI to draw a digit with the mouse on the screen. Use the classifier from step 3 to recognize the image (5 pts.)

**Hints:**

* use a [confusion matrix](https://en.wikipedia.org/wiki/Confusion_matrix) to express the accuracy of a multi-class classifier.
* use a [grid search procedure](http://www.csie.ntu.edu.tw/~cjlin/papers/guide/guide.pdf) to find the SVM parameters
* use your favorite dimensionality reduction method to generate 3-4 reduced feature sets (e.g. with 64, 32, 16, 8, 4 dimensions)