Computer Vision *CS 670, Fall 2016*

HW08: Decision trees, linear models

Hand in via moodle at: `https://moodle.umass.edu/course/view.php?id=33024`. Remember that only PDF submissions are accepted. We encourage using LaTeX to produce your writeups. See `hw00.tex` for an example of how to do so. You can make a `.pdf` out of the `.tex` by running "`pdflatex hw00.tex`".

1. How many decision trees are there with three binary attributes and two class labels? With four binary attributes?

2. Explain why the squared loss is not suitable for binary classification problems.

3. A common way to get rid of having to deal with the threshold separately on a perceptron is to add a new feature. This feature always has value one, and you learn a weight for it. Thus, if you have a 100 dimensional problem with a threshold, we solve it as a 101 dimensional problem with threshold at zero. Draw a picture for one dimensional data and a linear separator with a (non-zero) threshold and draw the corresponding picture for the same data, "lifted" into two dimensions, with the corresponding linear separator with threshold zero. (Please make sure that the two separators are actually equivalent!)