Assignment 5

By Sam Robinson

1. The main difference between a SVM and a LMKL (<http://manikvarma.org/pubs/jose13.pdf)> (reference for the abbreviation is that a LMKL) looks to create a unique set of kernelsl that is learned from the data set. A SVM looks to create a kernel for each classifier in feature space and frequently uses known existing kernels to transform the data. A LMKL is more useful when the number of labels quickly outpaces the amount of data and a SVM is useful when there are fewer features. The computation complexity of an Support Vector Machine type model scales with the number of kernels so it makes sense to minimize the number of kernels needed to classify the data set.

SVM Uses: Sparse data sets with many classifiers. As a substitute for logistic regression in more complicated data sets. Dealing with text. Image segmentation.

LMKL Uses: Image detection, multiple input detection (Audio and video at once for instance)

1. The “best model” isn’t always the most accurate model. A linear kernel consistently created the best model while the other kinds of kernels never ended up in the best category.

I got an accuracy value of 0.9503546 with these parameters

best.tune(method = svm, train.x = as.matrix(veh\_raw[, 1:x\_cols - 1]), train.y = veh\_raw$CLASS, ranges = list(cost = cost\_vector,

type = type\_list, kernel = kernel\_list, gamma = gamma\_list))

Parameters:

SVM-Type: C-classification

SVM-Kernel: linear

cost: 0.5

gamma: 0.25

Number of Support Vectors: 225

( 116 109 )

Number of Classes: 2

Levels:

car noncar