

IEOR 265 – Homework 2

Due Thursday, April 14, 2017 on bCourses

Tensor Regression

In this assignment, we are interested in applying tensor completion to predict redshift from photometric parameters.

1. Download the dataset:
http://astrostatistics.psu.edu/datasets/SDSS_quasar.html
2. Download the MATLAB code for tensor completion:
<http://ieor.berkeley.edu/~aaswani/plrt/>
3. Install MOSEK
<https://mosek.com/resources/downloads>
4. Request an Academic License for MOSEK
<https://mosek.com/resources/academic-license>
5. Apply tensor regression as follows:
 - Response Variable: Redshift (z)
 - Predictor Variables
 - the difference between brightness in the u (ultraviolet) band and that in the g (green) band ($u_mag - g_mag$)
 - the difference between brightness in the g (green) band and that in the r (red) band ($g_mag - r_mag$)
 - the difference between brightness in the i (more red) band and that in the z (even more red) band ($i_mag - z_mag$)
 - Transform (bin) the continuous predictors to create categorical predictors
 - Summarize the results of the algorithms
 - Apply and present cross-validation results
Split your data into training and testing with a 80% and 20% ratio.

k-Nearest Neighbors (KNN)

It turns out that tensor completion is not the best estimator for the problem at hand, and k-nearest neighbors (KNN) works well. Repeat your analysis applying KNN and summarize your results.