

Math 420, Spring 2019 Eighth Team Homework

Implement the Laplacian Eigenmap and the Local Linear Embedding (LLE) algorithms, and run them on your project data set.

Specifically, implement and run:

1. Laplacian Eigenmap data embedding for target dimension $d = 2$;
2. LLE dimension reduction after Laplacian Eigenmap data embedding:
 - (a) First run the Laplacian Eigenmap data embedding algorithm to create a geometric graph $\{x_1, \dots, x_n\} \subset \mathbb{R}^N$ with $N = 10$;
 - (b) Then implement and run the dimension reduction LLE algorithm on the this geometric graph to reduce dimension to $d = 2$; use $K = 2d = 4$.

Regarding LLE: Note the W matrix at step 2.1 is the matrix whose (i, j) elements were computed at 1.5. This is NOT the weight matrix loaded from your data set!