

I will motivate the smarter machine learning problem by using various data examples. Then I formulate the learning problem as a graph clustering problem. One major step is to build up a similarity/dissimilarity matrix or adjacency matrix A among the given data. One approach is the so-called a diffusion map, which is a major tool for the dimension reduction problem in statistics. In addition to the image data sets, we shall explain a tooth surface data set. For this data set, we shall use the fiber bundle of tooth surfaces for building an adjacency matrix which is more accurate. The other major step is to find the clusters from the graph Laplacian of the adjacency matrix. We shall explain our sparse solution methods for computing the clusters. Many numerical results will be shown to demonstrate the usefulness of the study.