**CSCI 5521: Homework 2 Solution**

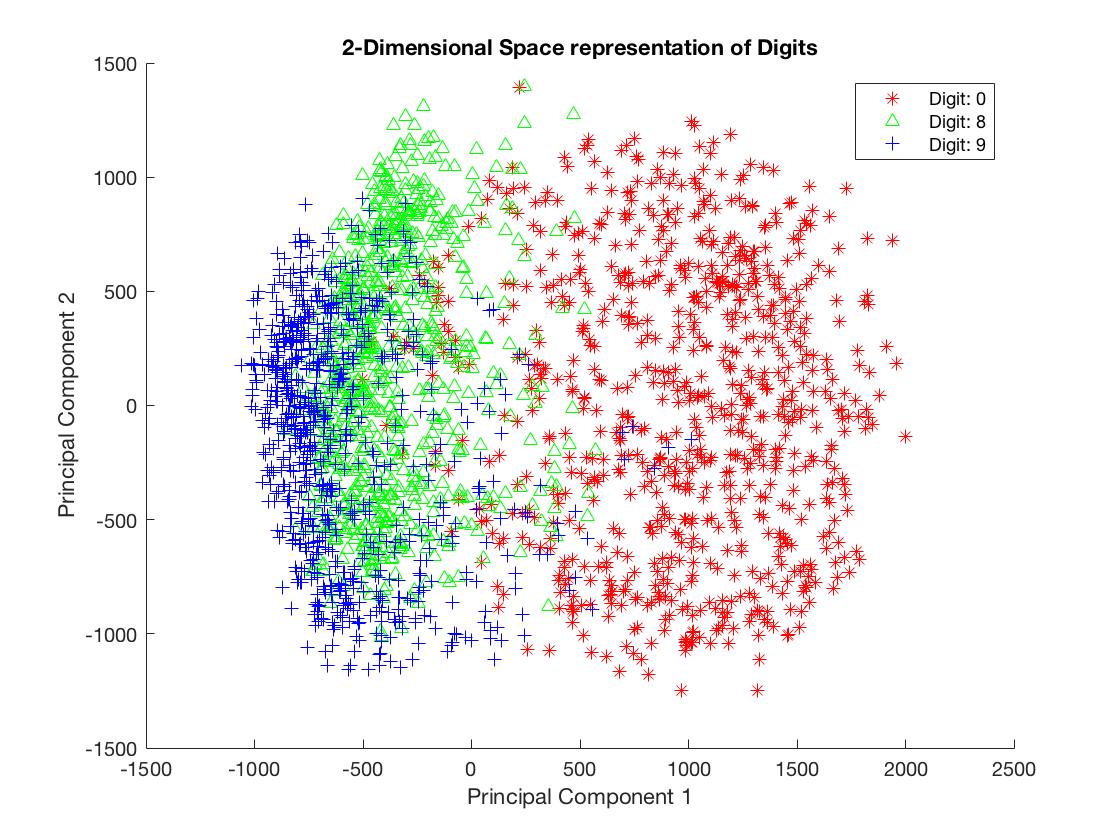
1.  For the solution to our first problem, we build a MATLAB script that implements PCA on the MNIST data set. We implement the following functions to plot features from class 8 or 9 in a 2-D space using PCA. For obtaining this plot, we use q1.m which utilizes our own

Figure 1: Scatter plot of the Principal Components of class 0, 8 and 9

utilizes another file that we have submitted – mypca. We have implemented our own PCA algorithm in this file. We use the inbuilt svd function provided by MATLAB to calculate two principal components for data with class labels 0, 8 and 9 from our training set.

1. For our solution to problem 2, we implement our own LDA algorithm to compute LDA projections from the PCA projections we obtain. We get PCA projections from

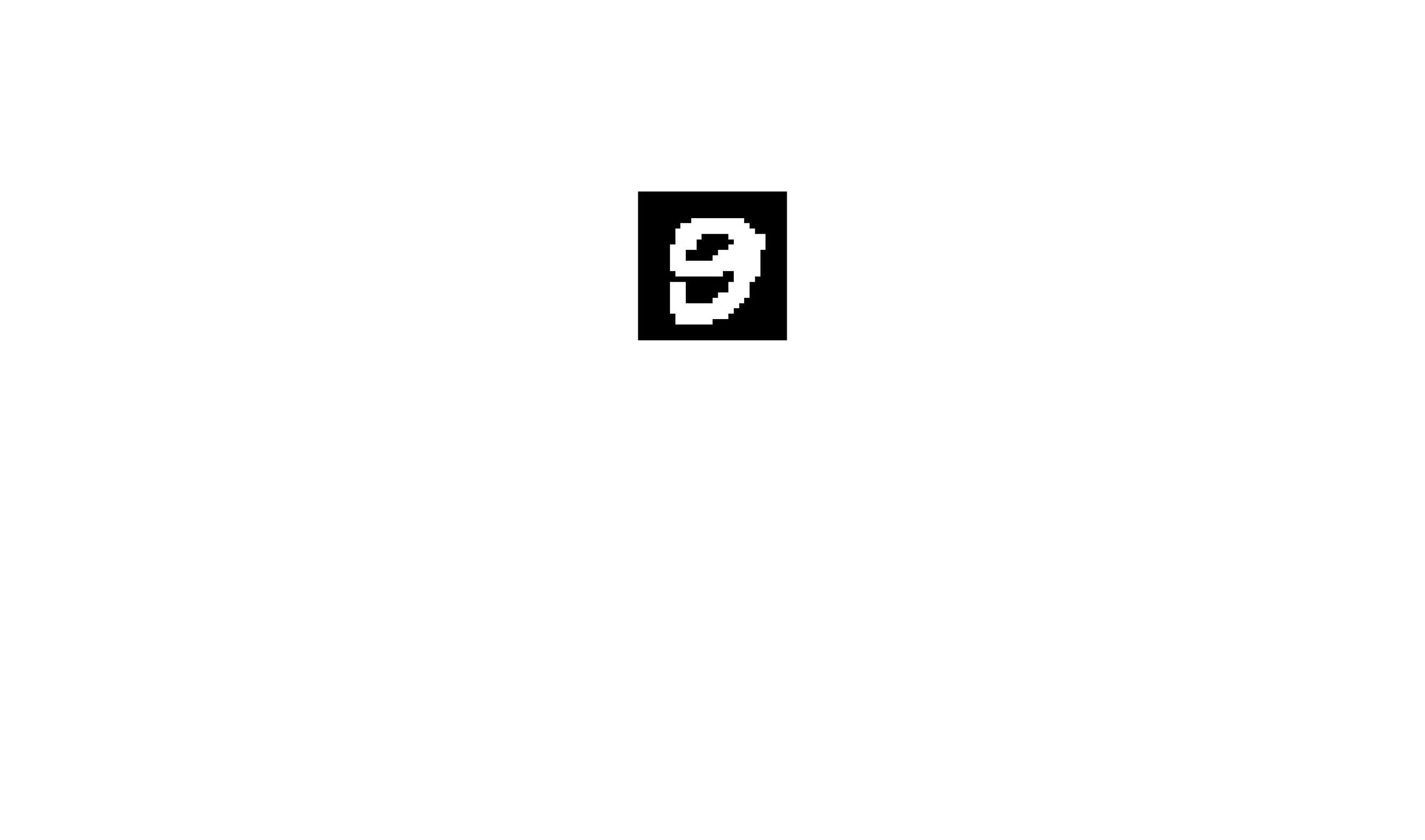
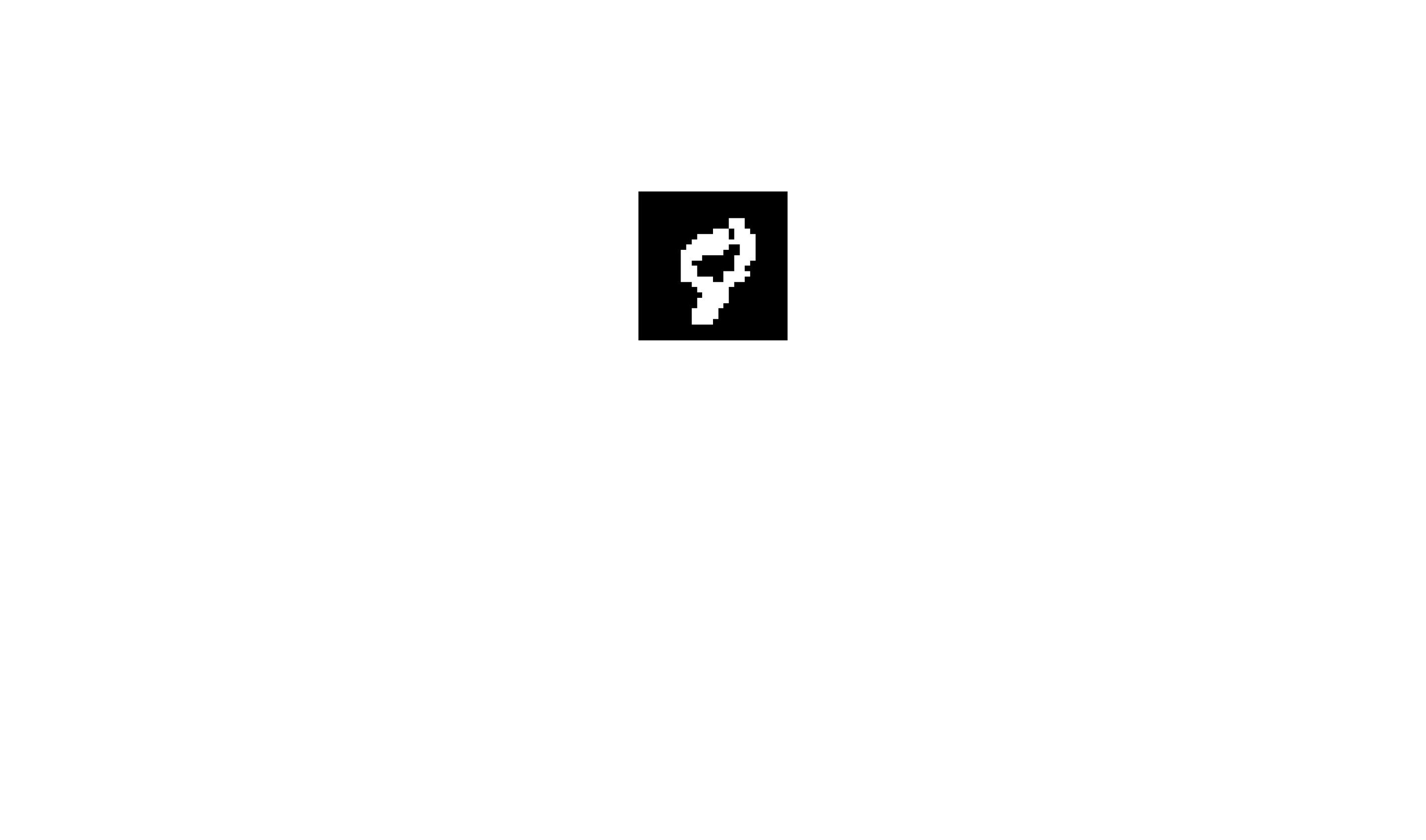


Figure 2: Most misclassified 8 -2D - LDA classifier

Figure 3: Most misclassified 9 -2D - LDA classifier

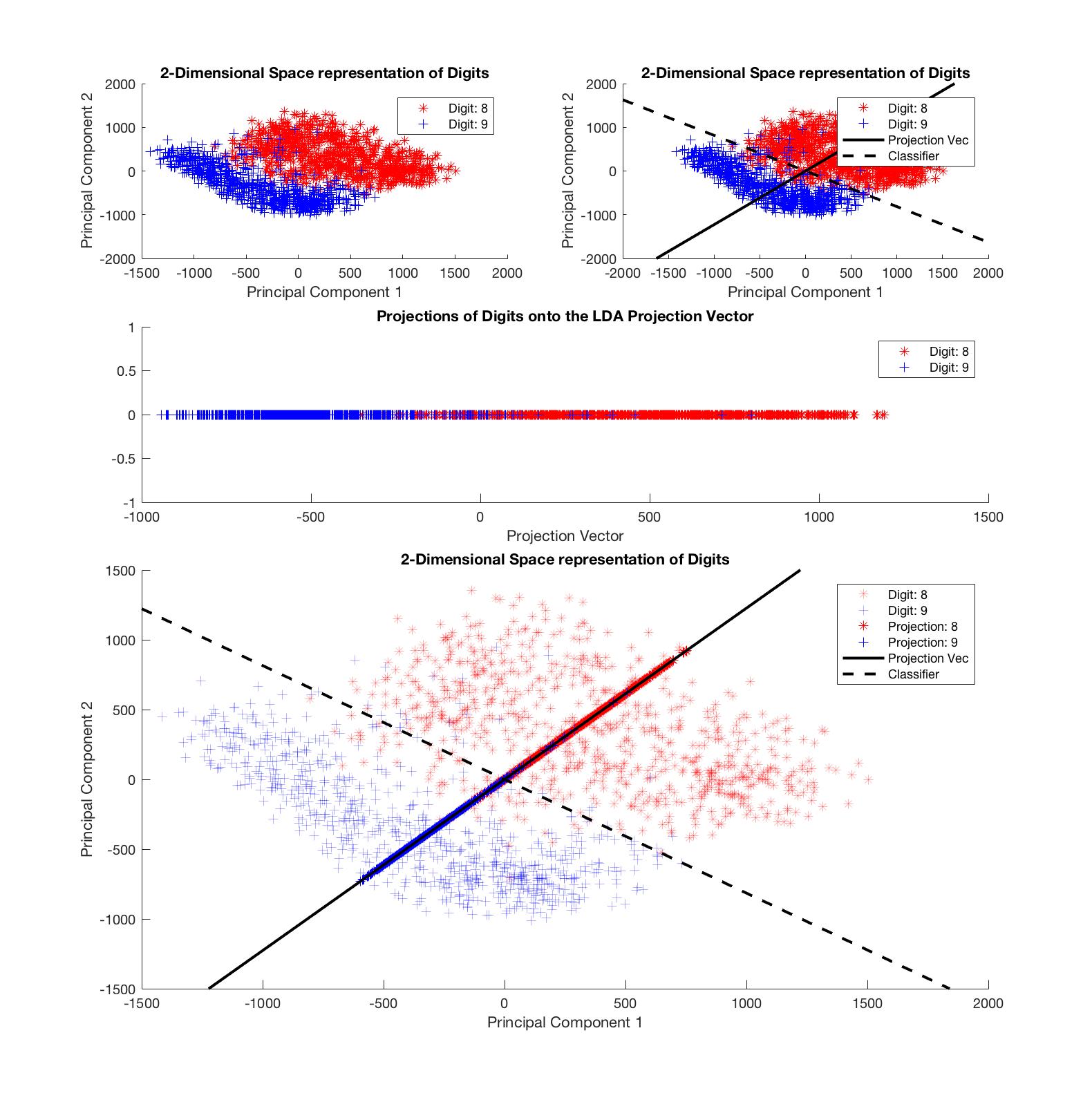


Figure 4: Scatter plot with LDA vector and classifier vector

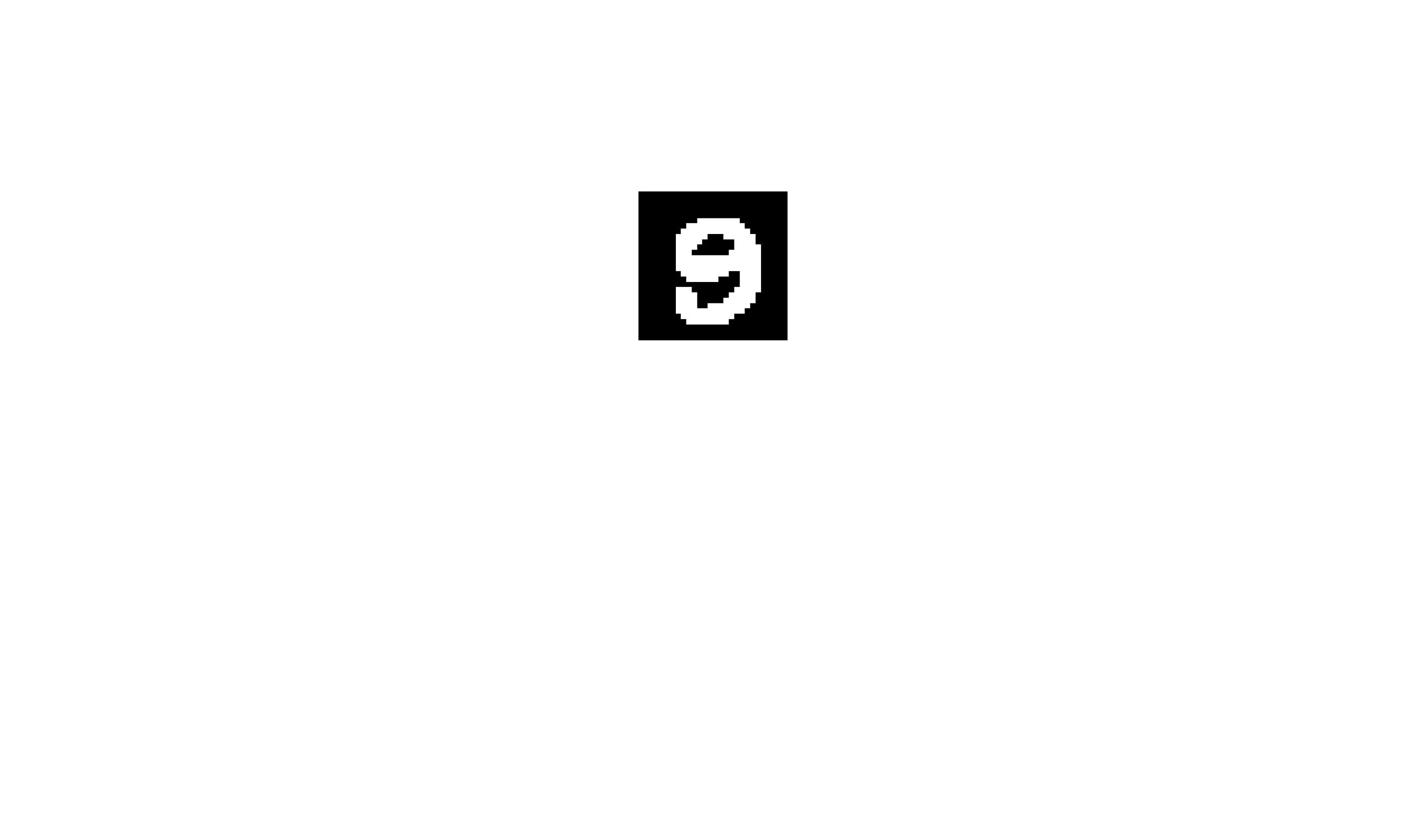


Figure 6: Most misclassified nine - multidimensional LDA

Figure 5: Most misclassified eight - multidimensional LDA