# Machine Learning Hand-in for Lecture 4

Group 985: Jakob G. Olesen, Mads Lindeborg Larsen, Sif Bjerre Lindby

September 20, 2023

## Report

From Figure 1 and Figure 2, it is clear that PCA is seemingly inferior in regard to discriminating between classes compared to LDA. PCA has difficulty distinguishing 5 (blue) from 8 (green). The below is based on training data.
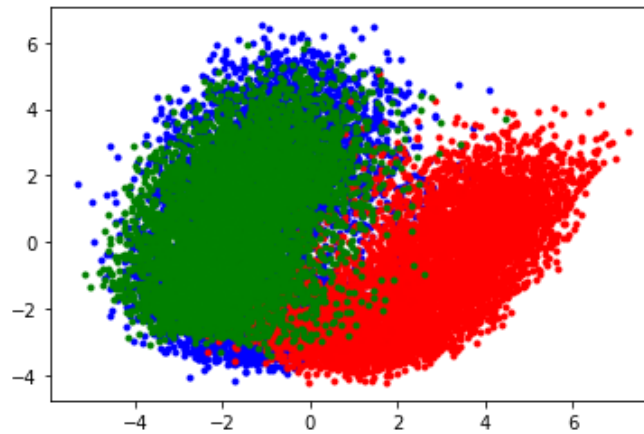


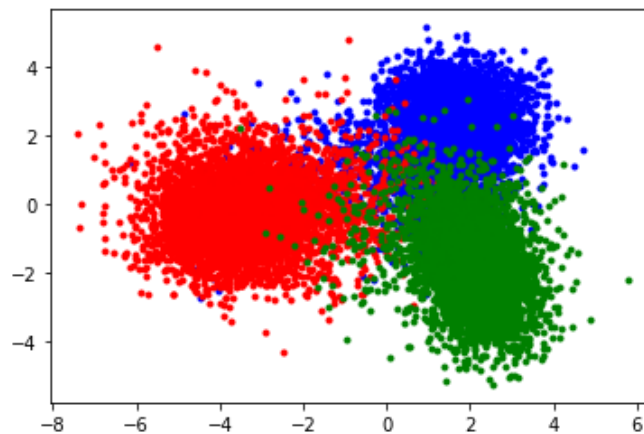**Figure 1:** Dimensionality reduced training data using PCA where blue = 5, red = 6, green = 8.



**Figure 2:** Dimensionality reduced training data using LDA, where blue = 5, red = 6, green = 8.

The percentages of correct classifications across the three classes and two methods are seen in Table 1. It is evident that while PCA has success in classifying 6, it fails in classifying (and distinguishing) 5 and 8 whereas LDA has success in classifying (and thus distinguishing) all three digits.

| Correct classifications [%] | 5 | 6 | 8 |
|:---:|:---:|:---:|:---:|
| PCA | 40.92 % | 93.63 % | 76.39 % |
| LDA | 93.05 % | 96.87 % | 93.43 % |

**Table 1:** Percentages of correct classifications across the three classes and two methods.