Introduction to Machine Learning, Fall 2015 - Exercise session VI

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Intro

The only material I used are the slides. Did not discuss in a group, except mailed Amin about possible "typo" which wasn't one. I omitted the pen and paper exercises.

1 Problem 4 (Programming task)

1.1 k-means

1.1.1 Uset first 10 images as the initial cluster means

So when I run the k-means algorithm using **10 first images** as the initial means, I get the following means: And the classified digits follow:
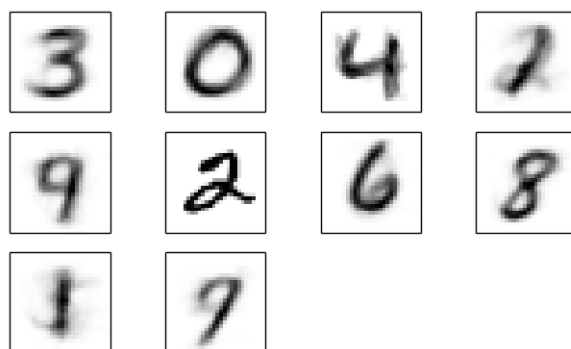
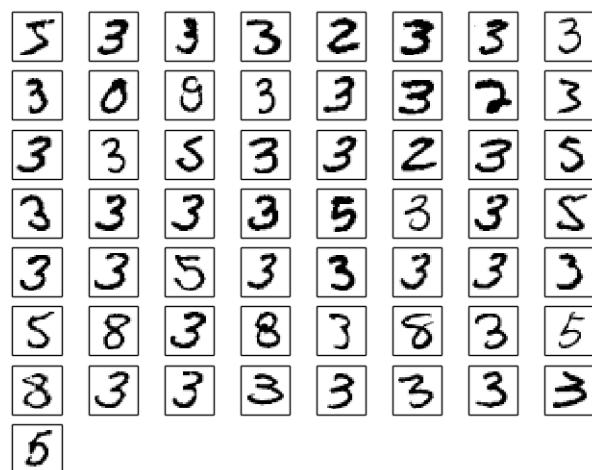Figure 1: First iteration cluster means
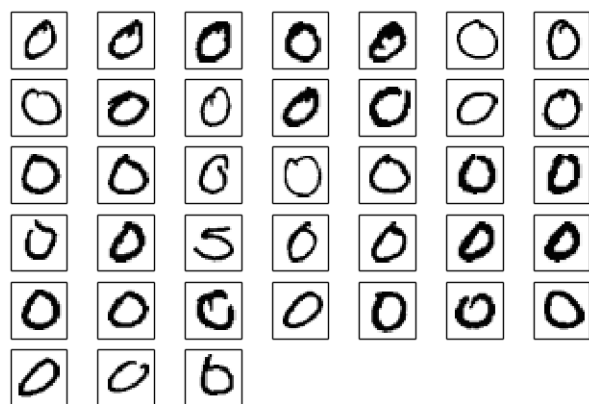

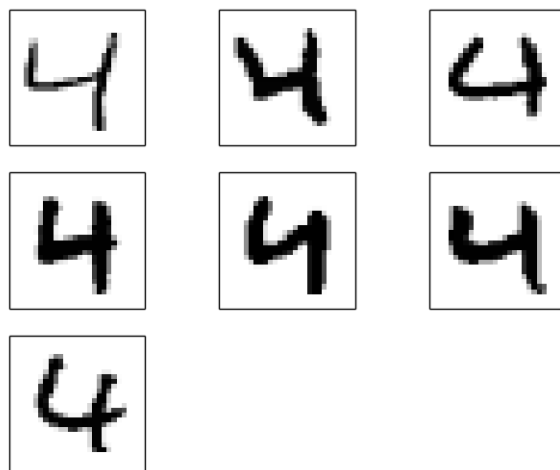Figure 2: Digits 0

Figure 3: Digits 1

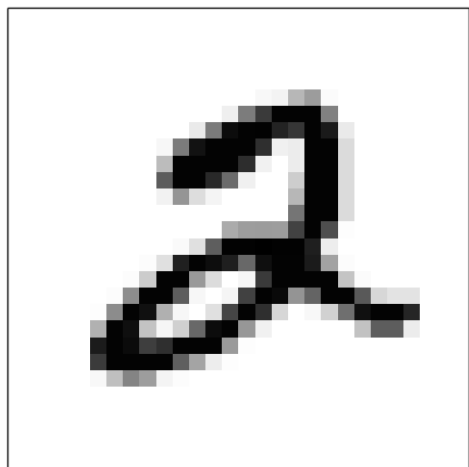Figure 4: Digits 2

Figure 5: Digits 3

Figure 6: Digits 4

Figure 7: Digits 5
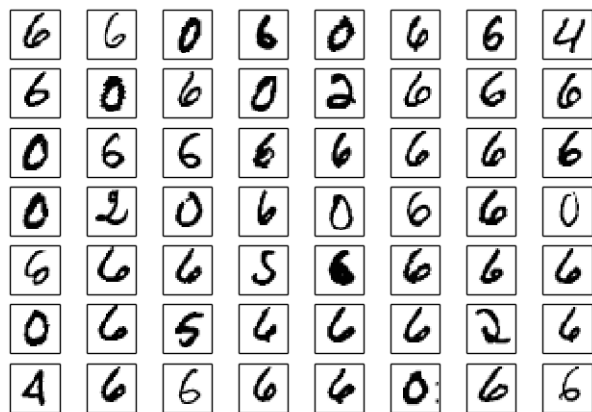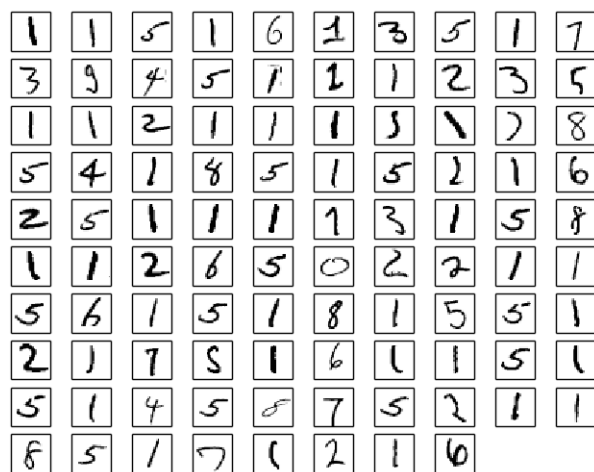

Figure 8: Digits 6
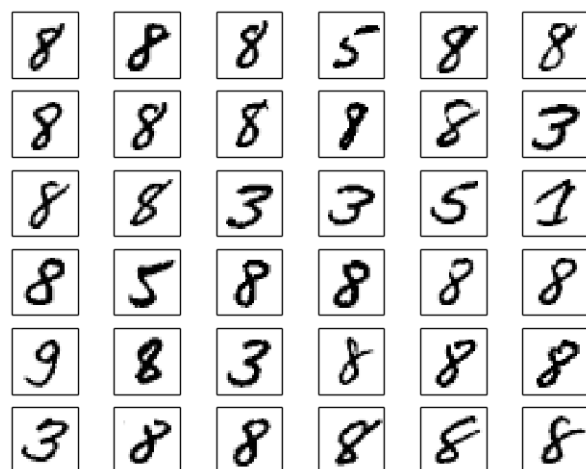
Figure 9: Digits 7

Figure 10: Digits 8

Figure 11: Digits 9

1.1.2 Use the first images with distinct digits

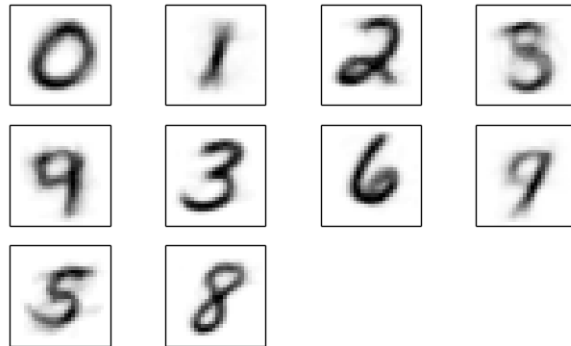Here, we used the first 10 **unique** digits as the initial cluster means.

Figure 12: Second iteration cluster means

The classified digits follow:

Obvously, the first iteration with non-unique digits as the initial cluster means perform rather poorly. The second iteration that uses distinct digit clusters improves on the latter, yet it is far from perfect.
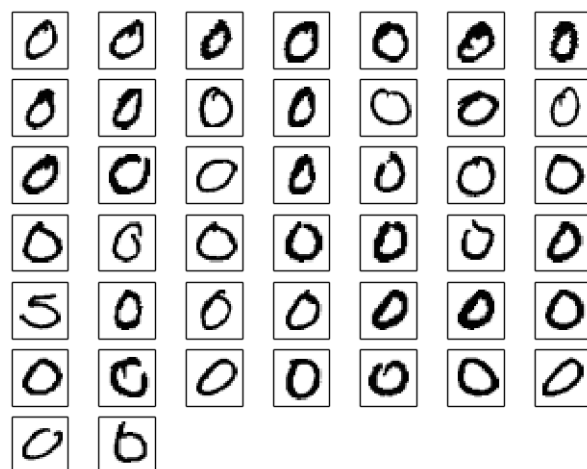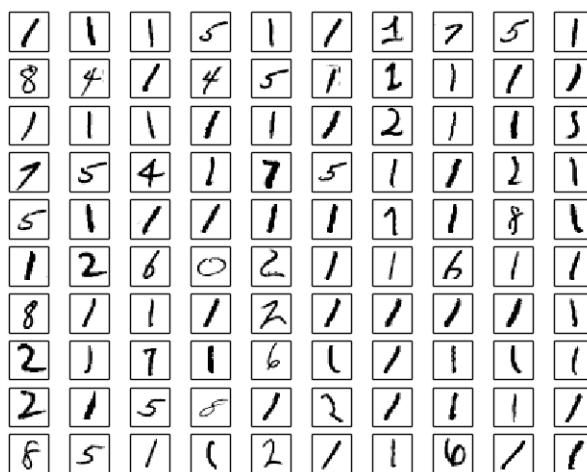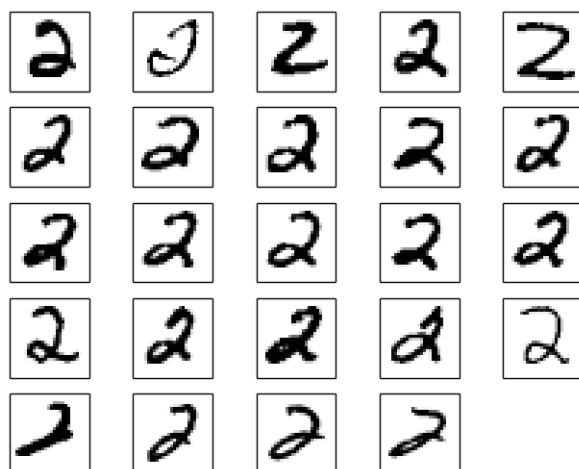
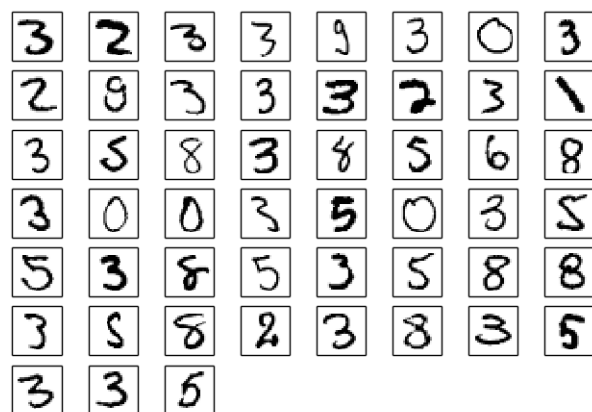Figure 13: Digits 0

Figure 14: Digits 1

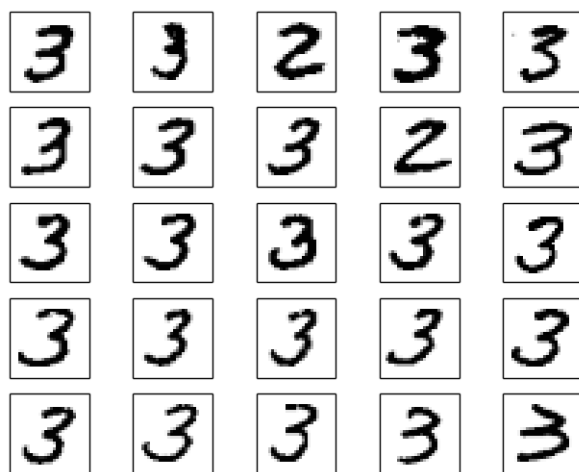Figure 15: Digits 2

Figure 16: Digits 3
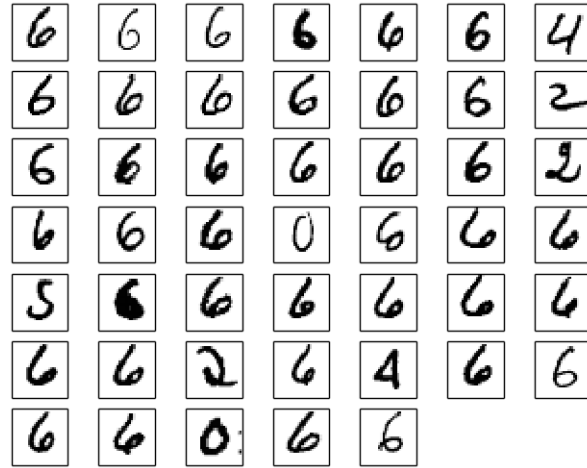
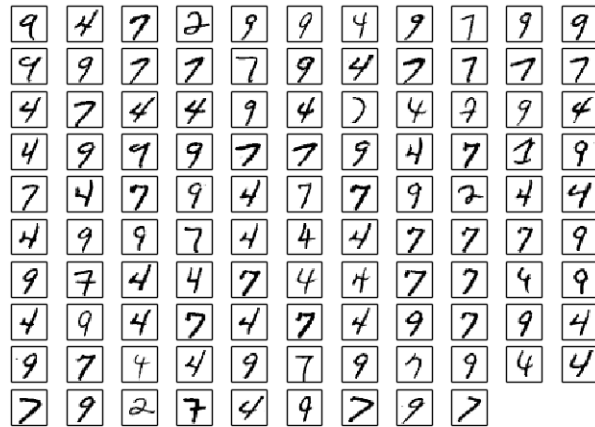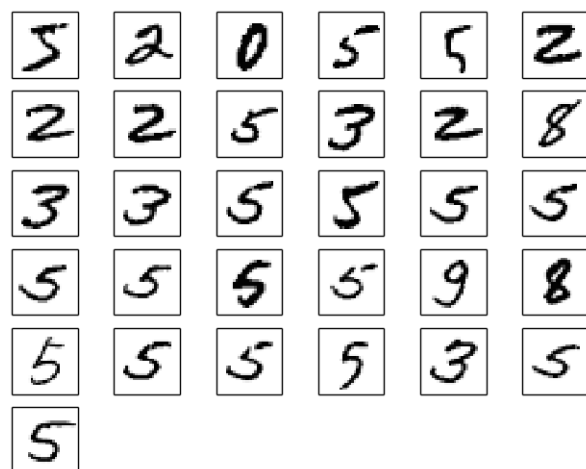Figure 17: Digits 4

Figure 18: Digits 5

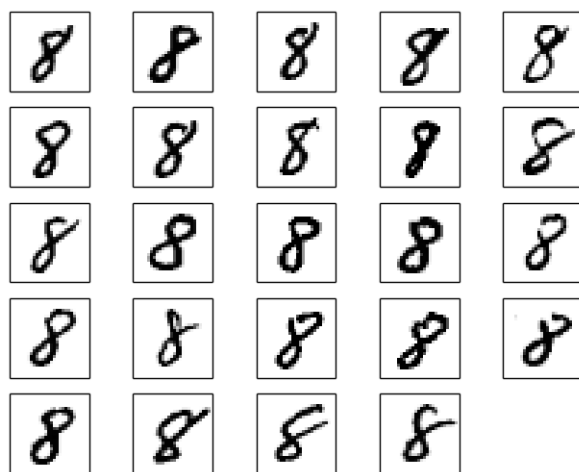Figure 19: Digits 6

Figure 20: Digits 7

Figure 21: Digits 8

Figure 22: Digits 9