

Report Task 1

student number: s1728470

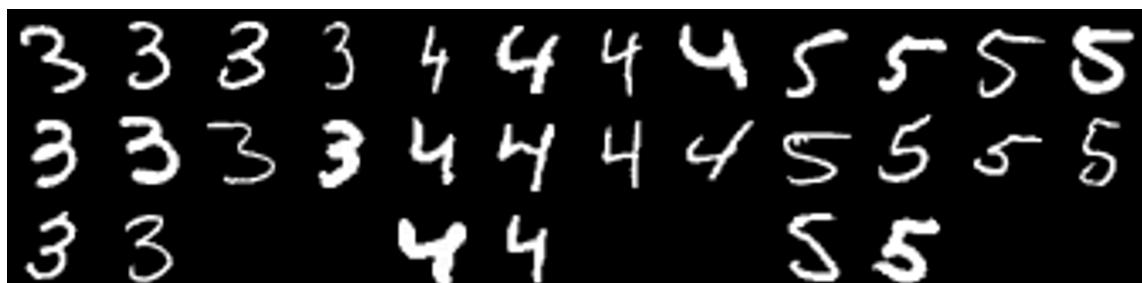
Task 1.1 Images of the first ten samples for each class:



(a) Class 1

(b) Class 2

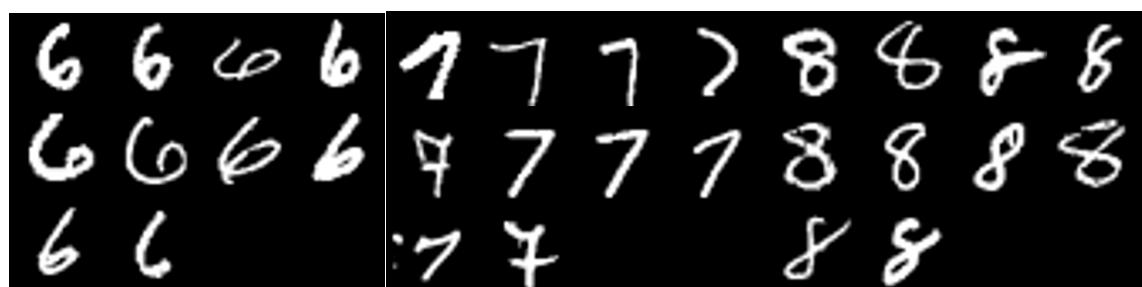
(c) Class 3



(d) Class 4

(e) Class 5

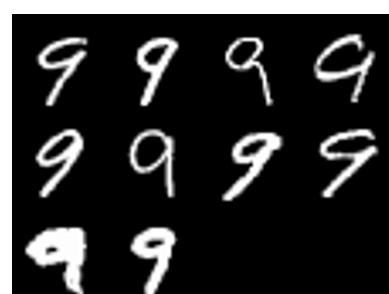
(f) Class 6



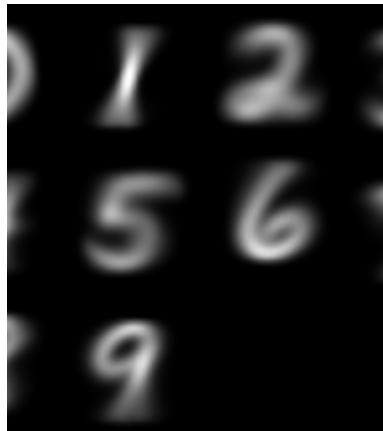
(g) Class 7

(h) Class 8

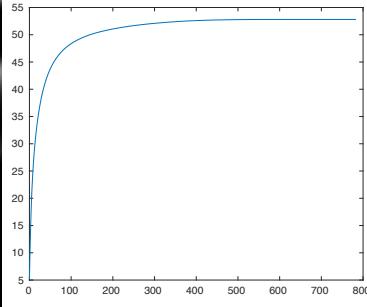
(i) Class 9



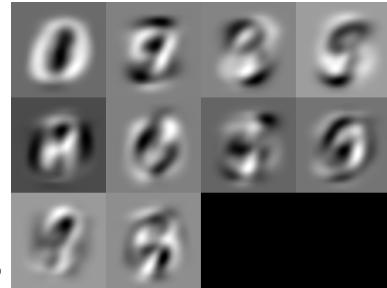
(j) Class 10



(a) 1.2: Images of the mean vectors for Class 1 to Class 10

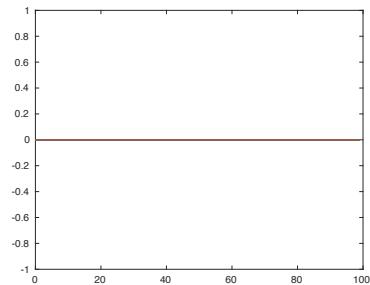


(b) 1.3: Cumulative variance

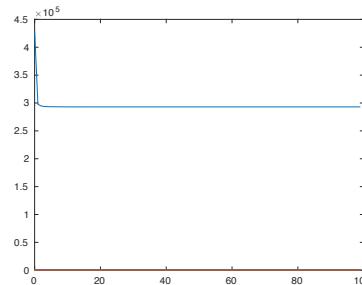


(c) 1.4: Images of first ten principal components

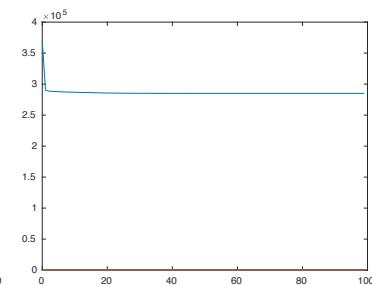
Task 1.5 Figures:



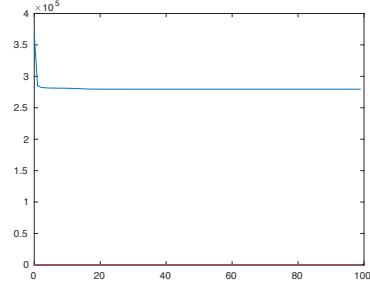
(d) SSE vs iteration number for $k=1$



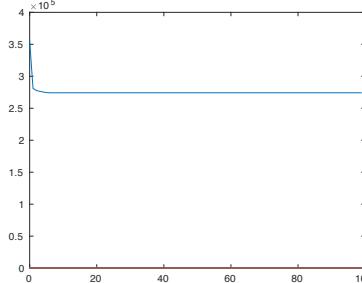
(e) SSE vs iteration number for $k=2$



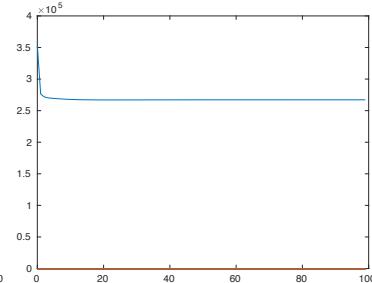
(f) SSE vs iteration number for $k=3$



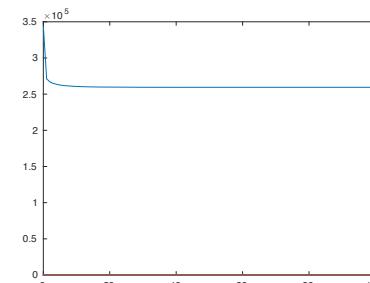
(g) SSE vs iteration number for $k=4$



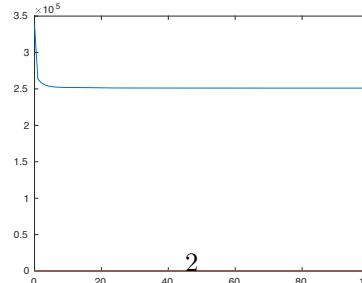
(h) SSE vs iteration number for $k=5$



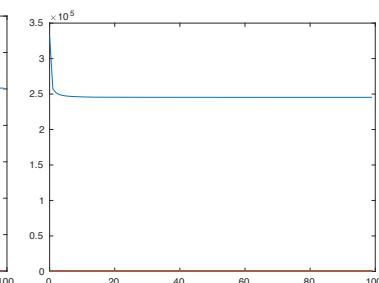
(i) SSE vs iteration number for $k=7$



(j) SSE vs iteration number for $k=10$

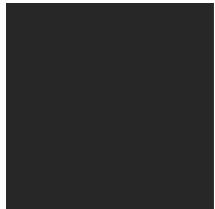


2

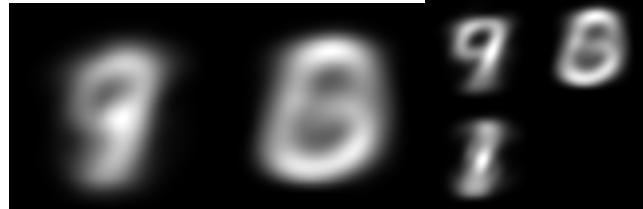


(k) SSE vs iteration number for $k=15$ (l) SSE vs iteration number for $k=20$

Task 1.6 Image of cluster centres for:



(a) k=1



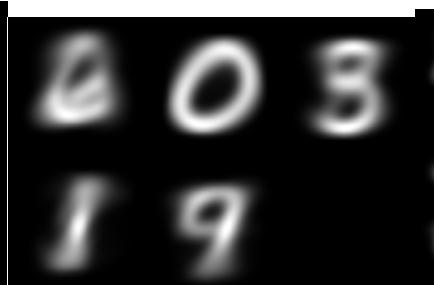
(b) k=2



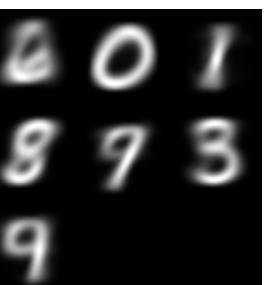
(c) k=3



(d) k=4



(e) k=5



(f) k=7

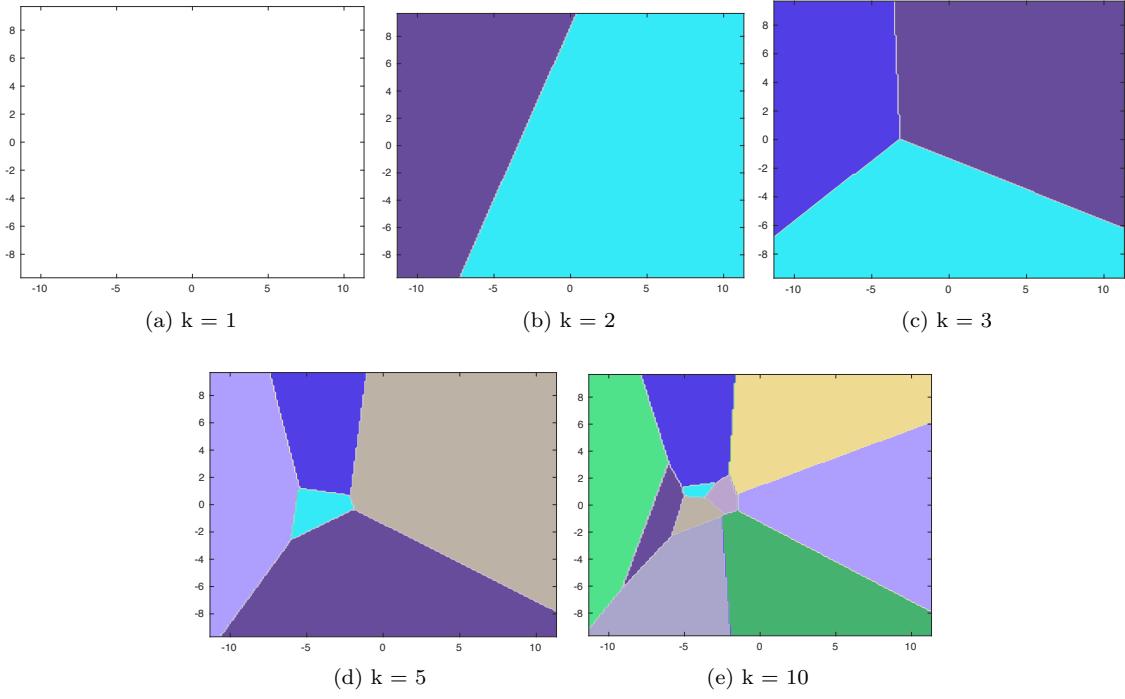


(g) k=10

(h) k=15

(i) k=20

Task 1.7 Cross-section image of cluster regions for:



Task 2.3

(f) Class-wise Gaussian distributions on the plane of first two principal components



Task 2.6

(g) Cross-section image of decision regions with Gaussian classifiers