CS489 Assignment 4

3.)

a.)

HMM	Mixture Of Gaussians
Pi = 0 1 0 **Theta** = 0.8785 0.1144 0.0750 0.0888 0.8408 0.1250 0.0327 0.0448 0.8000 (data is arranged Theta(c1|c2) = Theta(c1,c2)) **Gaussian Data for class1** ans = 3.0631 0.9567 ans = 1.3799 0.5063 0.5063 1.1100 (mean followed by variance matrix) **Gaussian Data for class2** ans = 2.0330 2.0797 ans = 1.0053 0.1630 0.1630 0.7812 (mean followed by variance matrix) **Gaussian Data for class3** ans = 0.8952 2.8185 ans = 1.0792 0.8376 0.8376 1.8418 (mean followed by variance matrix)	**Pi** = 0.4340 0.4060 0.1600 **Mean for class1** ans = 3.0631 0.9567 **Mean for class2** ans = 2.0330 2.0797 **Mean for class3** ans = 0.8952 2.8185 **SIG** = 1.1797 0.4199 0.4199 1.0936 (variance matrix)

b.)

HMM	Mixture Of Gaussians
right = 407 wrong = 93 accuracy = 0.8140	right = 367 wrong = 133 accuracy = 0.7340

The HMM model outperforms the Mixture of Gaussians model by 81.40% to 73.40%. This suggests that there is some correlation between consecutive measurements (they are not independent). The HMM model can account for this correlation, while the Mixture of Gaussians Model cannot.

c.)

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right = 443
wrong = 57
accuracy = 0.8860
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Monitoring resulted in an accuracy of 81.40%, while the joint classification resulted in an accuracy of 88.60%. Thus, the joint classification resulted in a higher accuracy. In this case, the joint classification takes into account all inputs (x values) when predicting the outputs (y values). Thus, it is better able to predict the output classes compared to monitoring (which just considers the data seen up to a certain point) especially when the measurements are correlated.