CS5691: Pattern Recognition and Machine Learning

Assignment #3

Team 34
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A) K-means and GMM

K-means Clustering

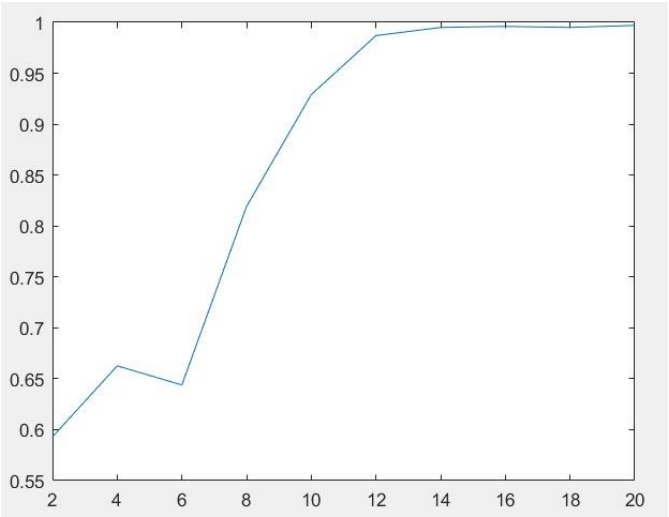

Fig: F1 score

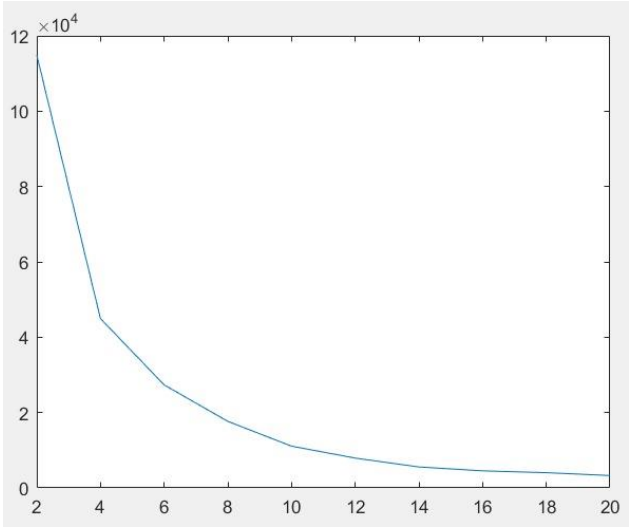

Fig: Error

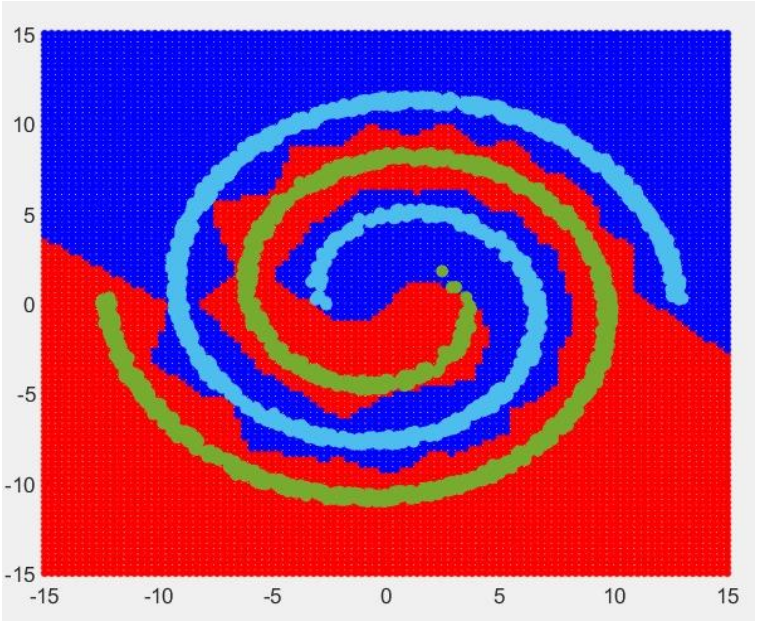

Fig: Decision boundary for K = 20

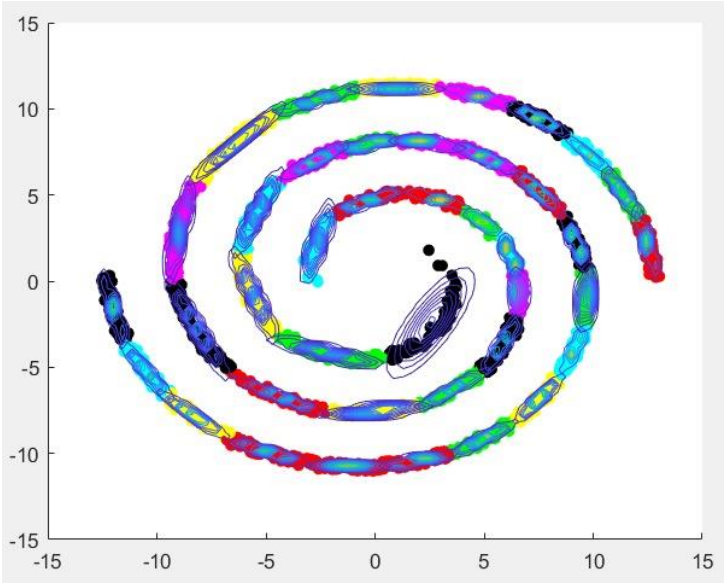

Fig: Contour plot for K=20

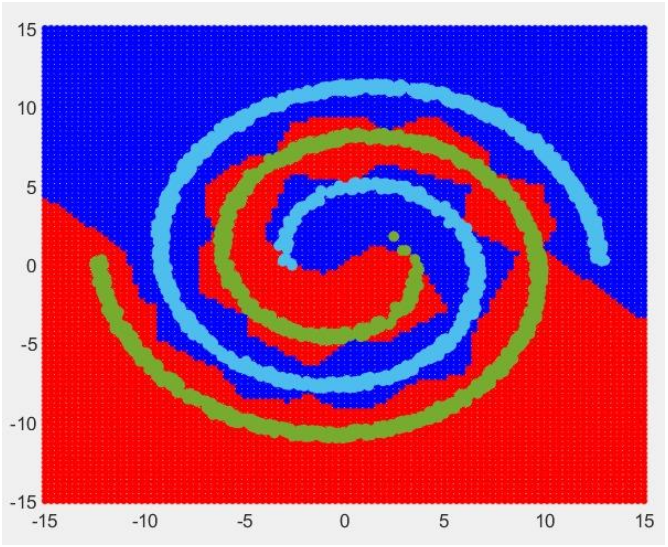

Fig: Decision boundary for K = 18

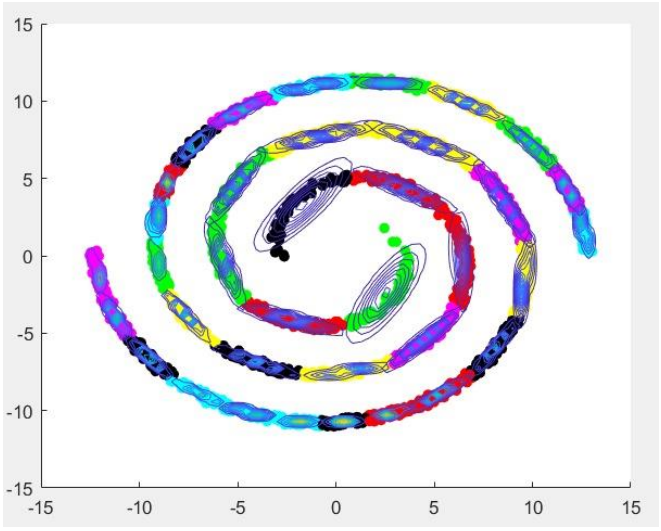

Fig: Contour plot for K=18

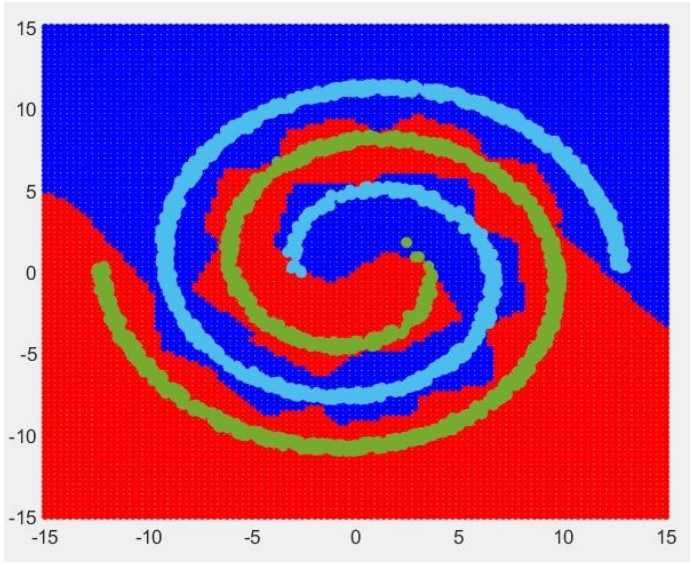

Fig: Decision boundary for K = 16

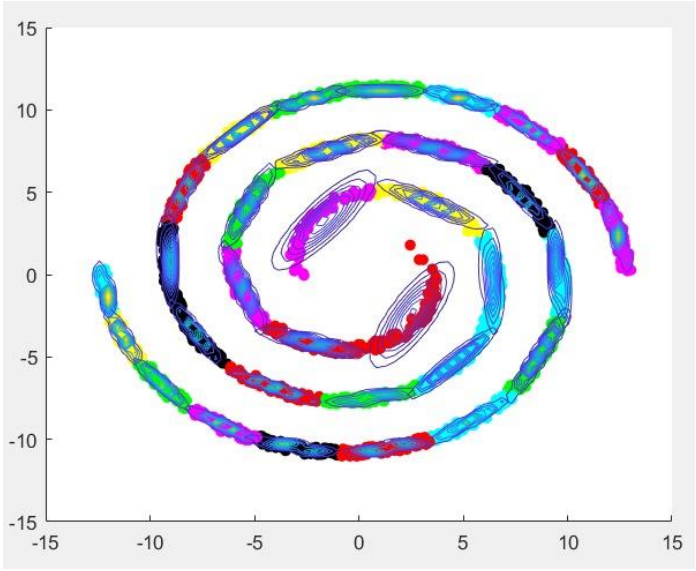

Fig: Contour plot for K=14

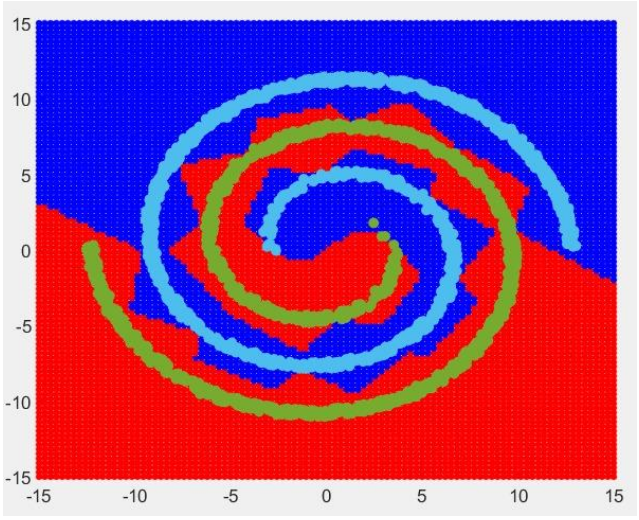

Fig: Decision boundary for K = 12

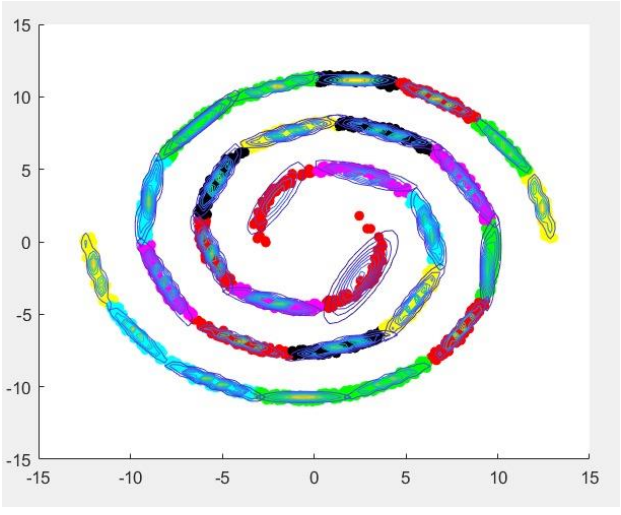

Fig: Contour plot for K=12

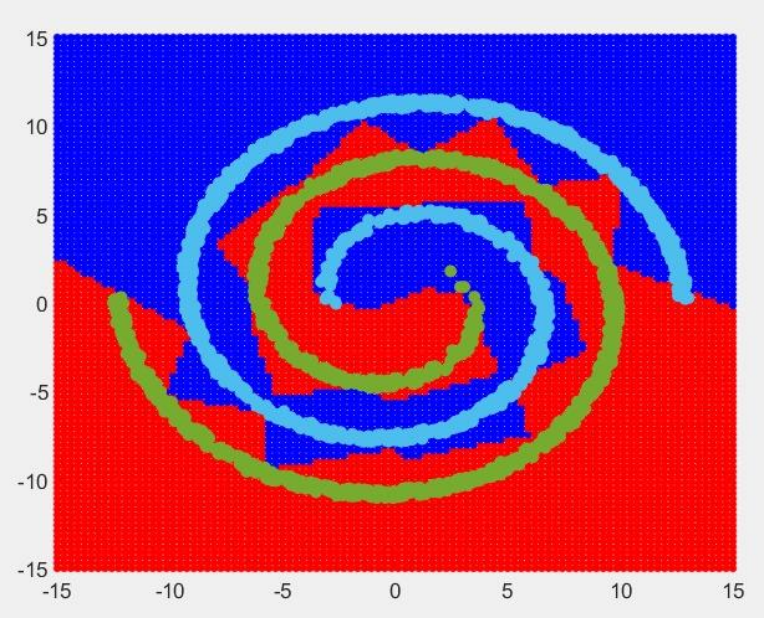

Fig: Decision boundary for K = 10

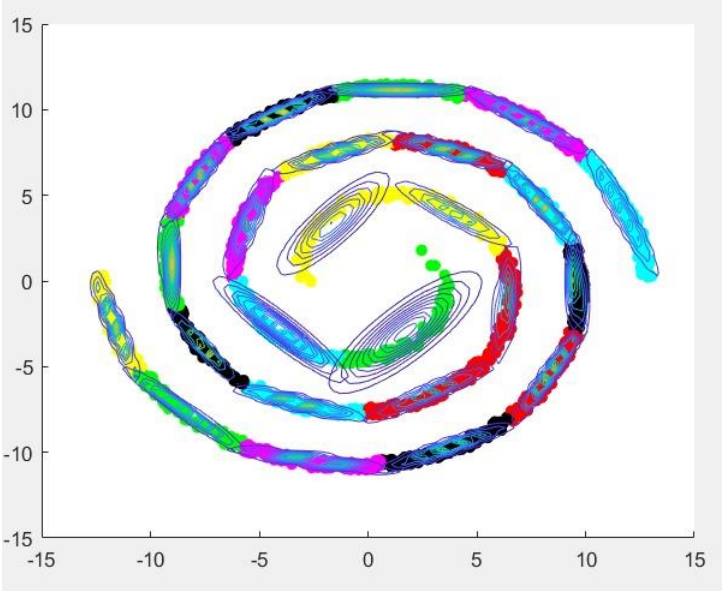

Fig: Contour plot for K=10

Confusion Matrix for K-means is saved as the variable confMat.

GMM

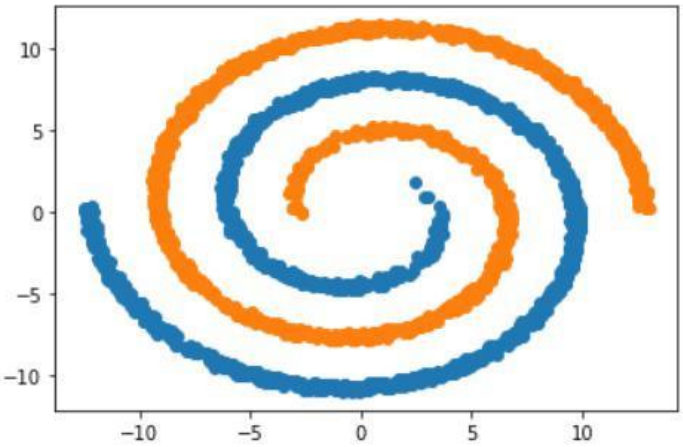

Fig: Raw data

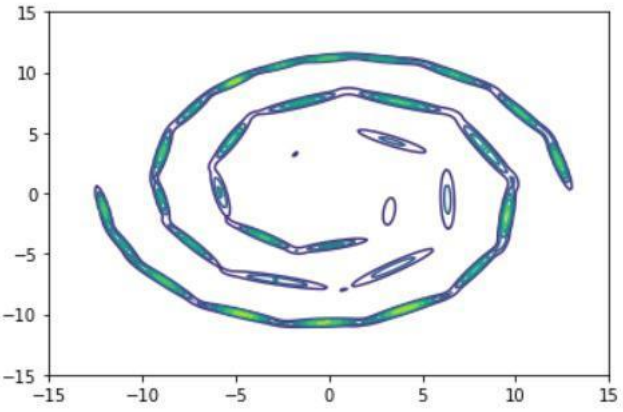

Fig: Contour plot for K=16

For GMM we found optimal value of K equal to 14, 15, 16 from K-means.

B) DTW and Discrete HMM

Isolated Spoken Digits

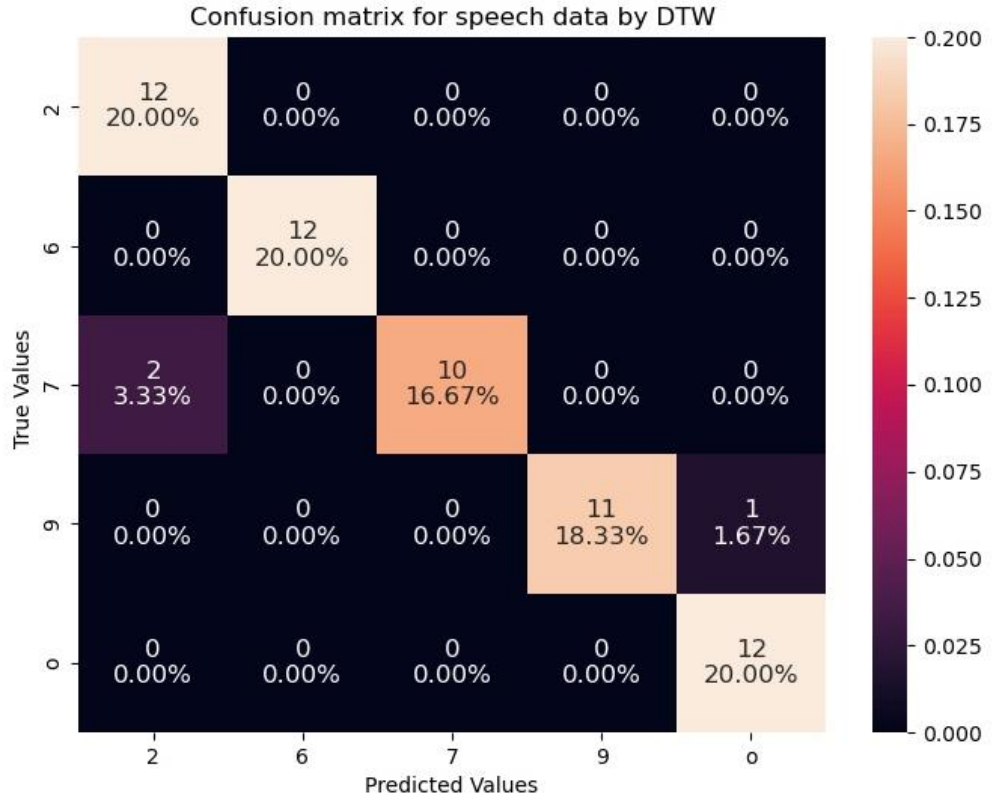

Fig: Confusion matrix for DTW applied on Isolated spoken digits

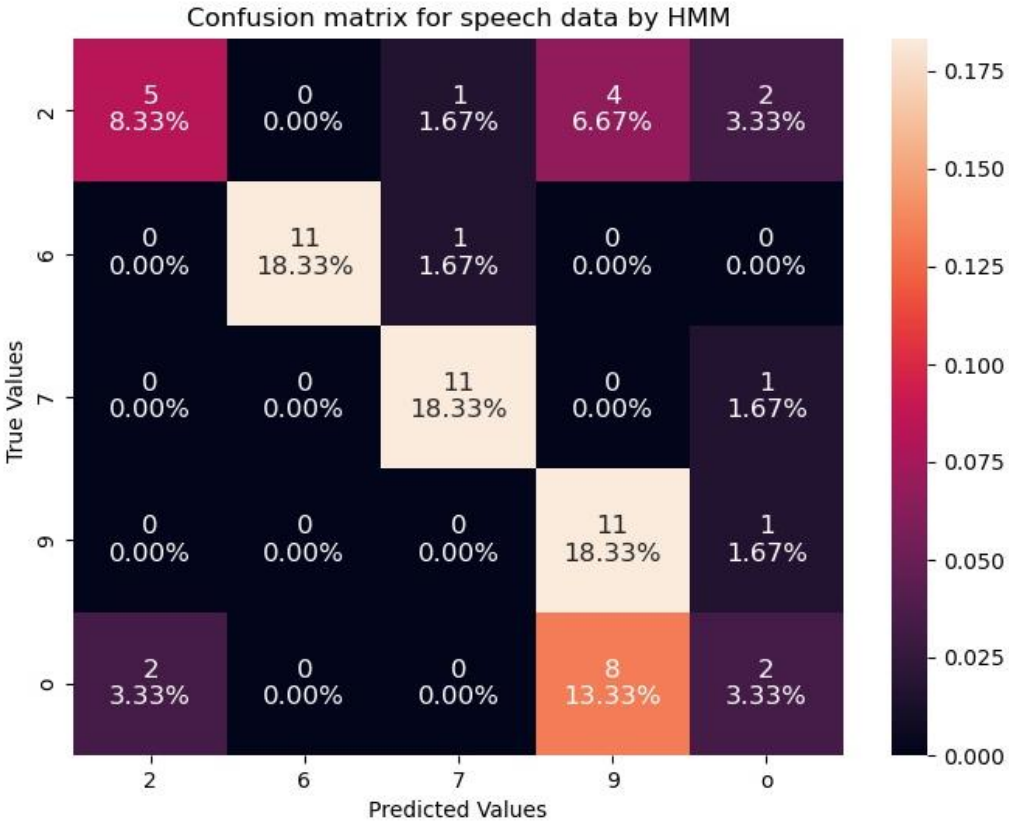

Fig: Confusion matrix for HMM applied on Isolated spoken digits

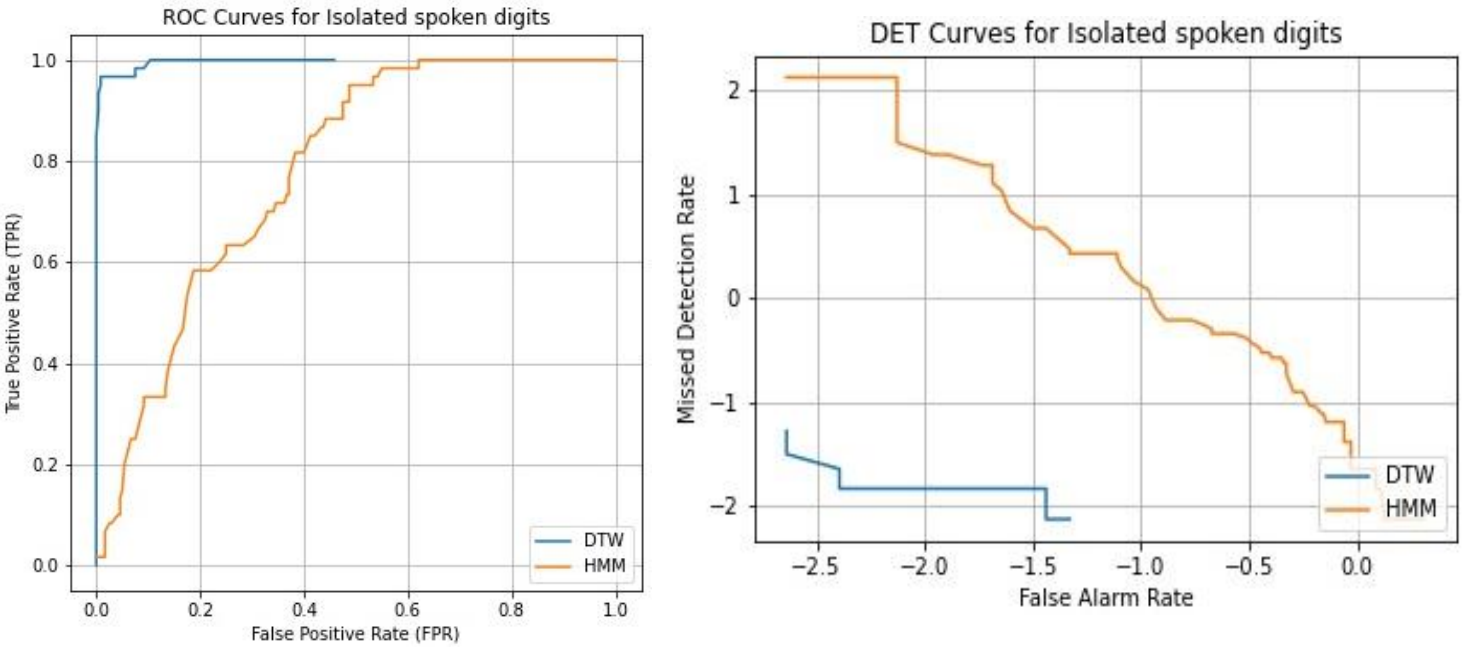

Fig: ROC & DET curves for Isolated spoken digits data. We can see that DTW is performing better than HMM

Online Handwritten Characters

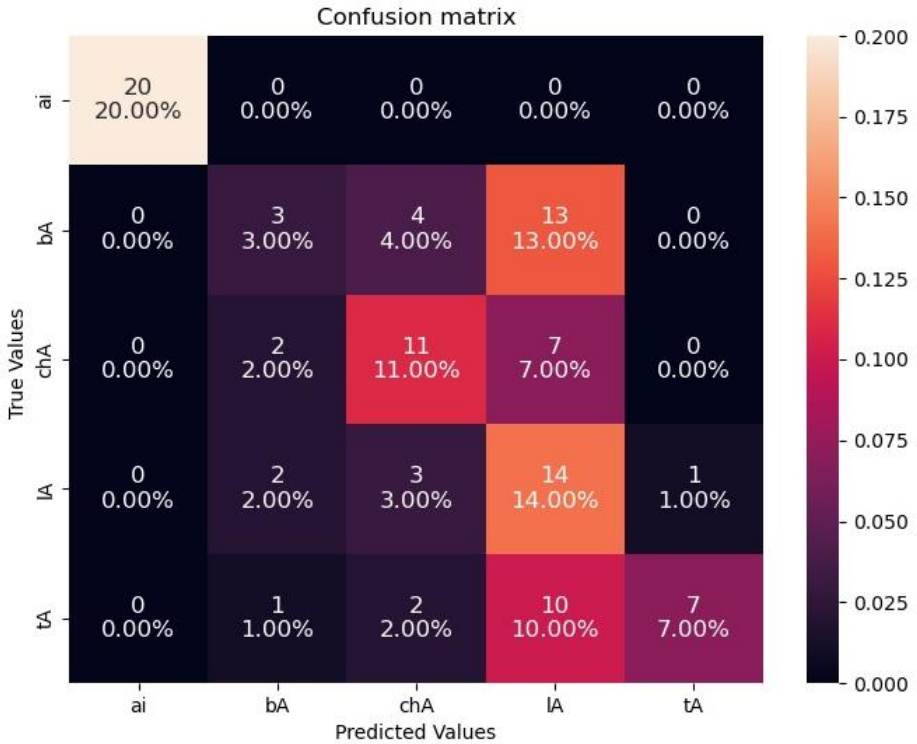

Fig: Confusion matrix for DTW applied on Handwritten characters

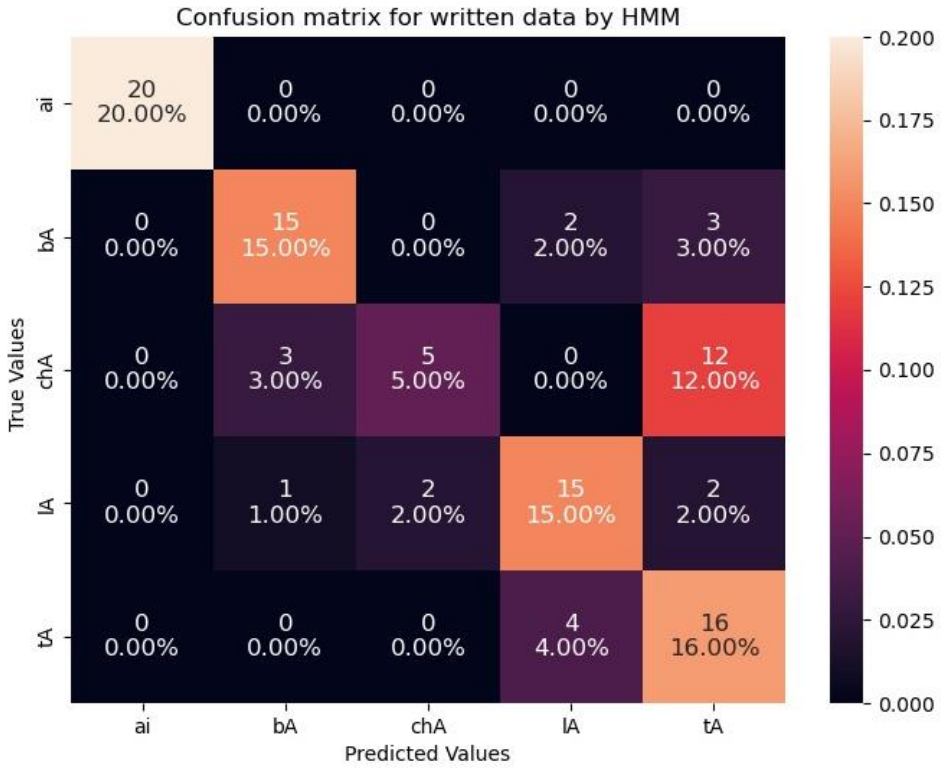

Fig: Confusion matrix for HMM applied on Handwritten characters

Fig: ROC & DET curves for Isolated spoken digits data.

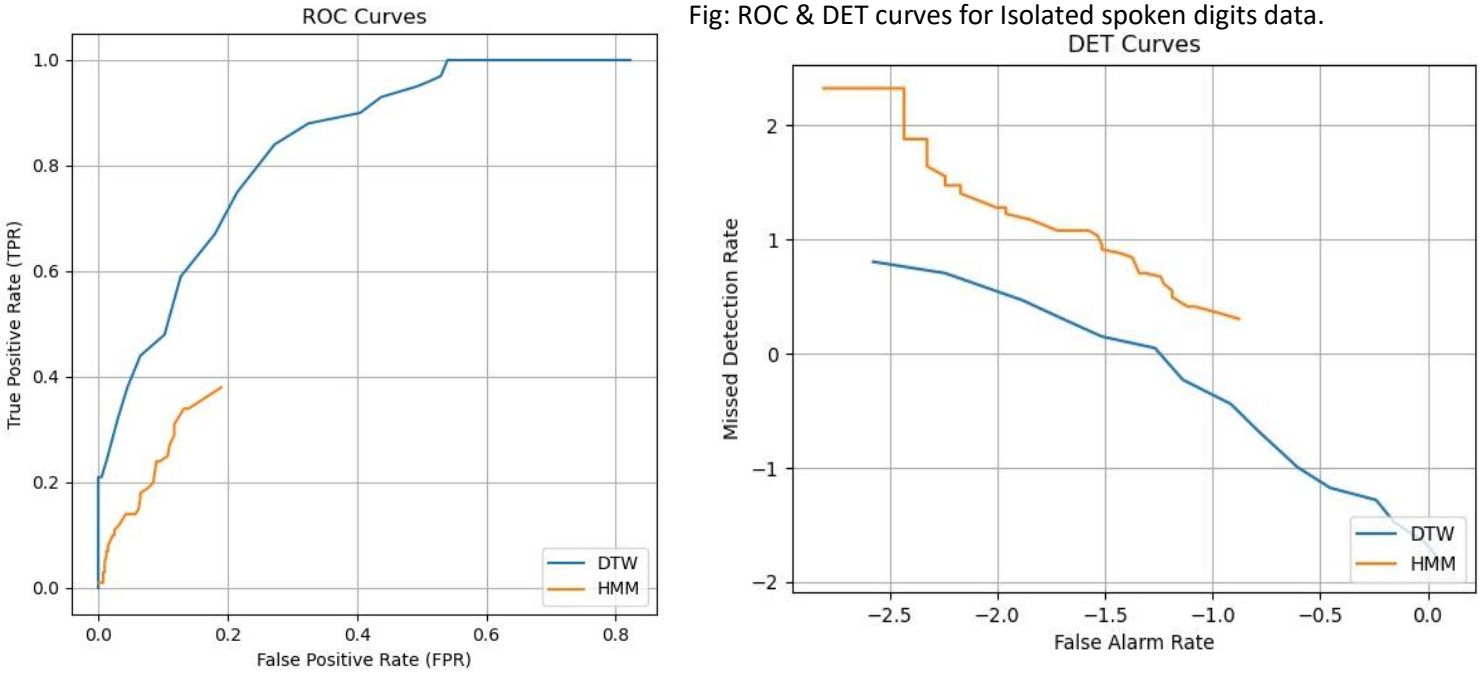

Fig: ROC & DET curves for Handwritten characters data. We can see that DTW is performing better than HMM