

Part 1: k-Means Clustering

Iteration: 1

Reconstruction Error: 78.94506582597728

Iteration: 2

Reconstruction Error: 78.94084142614601



elbow_k: 3

Accuracy: 0.96

Confusion matrix:

```
[[50 0 0]
```

```
 [ 0 48 2]
```

```
 [ 0 4 46]]
```

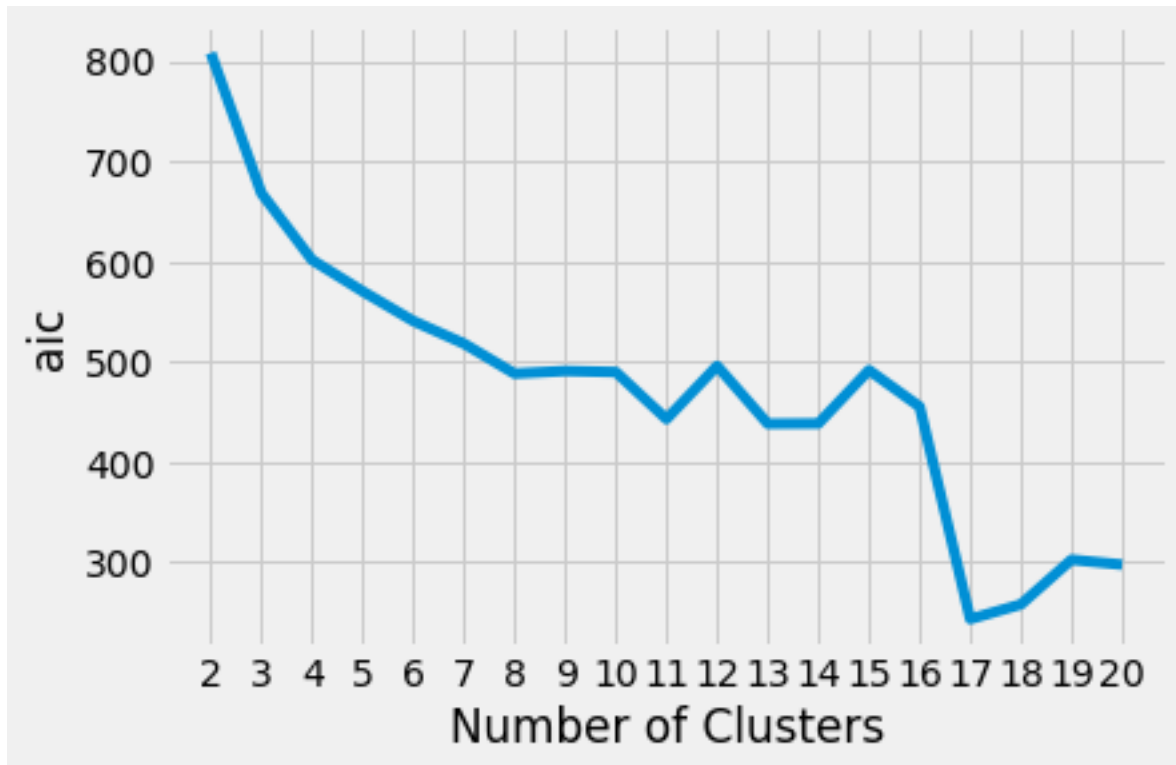
Part 2: Gaussian Mixture Model GMM Clustering

Iteration: 1

-1.2068844892768014

Iteration: 3

-1.2068646267476602



aic_elbow_k: 11

Cannot calculate Accuracy Score because the number of classes is not the same as the number of clusters

Confusion Matrix:

```
[[ 0 22 0 0 0 28 0 0 0 0 0]
```

```
[ 0 0 12 0 4 0 19 11 0 4 0]
```

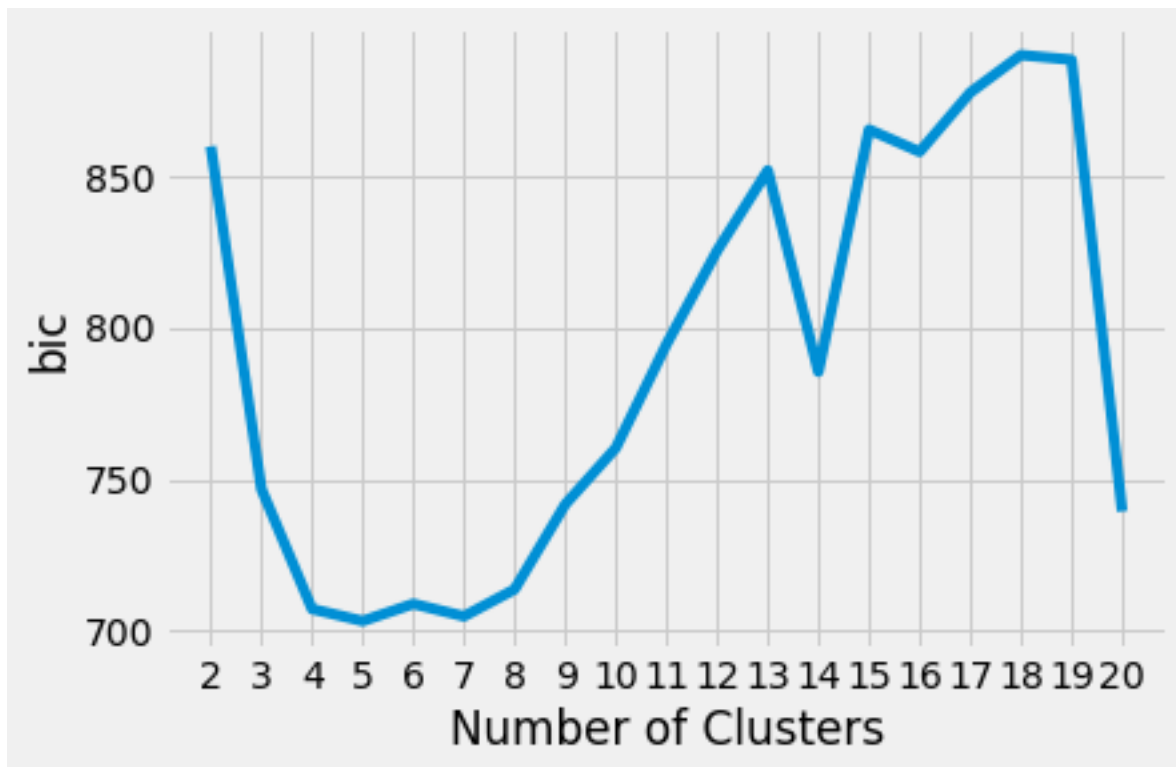
```
[ 2 0 1 7 15 0 0 0 19 0 6]
```

```
[ 0 0 0 0 0 0 0 0 0 0 0]
```

```
[ 0 0 0 0 0 0 0 0 0 0 0]
```

```
[ 0 0 0 0 0 0 0 0 0 0 0]
```

```
[0 0 0 0 0 0 0 0 0 0 0]
[0 0 0 0 0 0 0 0 0 0 0]
[0 0 0 0 0 0 0 0 0 0 0]
[0 0 0 0 0 0 0 0 0 0 0]
[0 0 0 0 0 0 0 0 0 0 0]]
```



bic_elbow_k: 14

Cannot calculate Accuracy Score because the number of classes is not the same as the number of clusters

Confusion Matrix:

```
[[16 0 0 0 0 0 8 7 0 19 0 0 0 0]
 [ 0 4 16 0 14 0 0 0 0 0 3 7 0 6]
 [ 0 13 0 15 1 2 0 0 9 0 1 0 9 0]
 [ 0 0 0 0 0 0 0 0 0 0 0 0 0 0]]
```

```
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]
[ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0]]
```

For k = 3

Accuracy: 0.9066666666666666

Confusion matrix:

```
[[50 0 0]
```

```
[ 0 50 0]
```

```
[ 0 14 36]]
```