**Assignment# 2**

Consider the following 30 examples, 15 from each class, blue and yellow.

| *Pattern Id* | $x_1$ | $x_2$ | $x_3$ | $x_4$ | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|---|---|---|---|
| 1 | 77.60 | 136 | 9.65 | 12.60 | 65.55 | 166 | 9.29 | 11.30 |
| 2 | 83.45 | 177 | 9.76 | 13.10 | 67.10 | 132 | 9.52 | 11.70 |
| 3 | 76.20 | 164 | 10.52 | 13.90 | 66.25 | 173 | 9.88 | 12.10 |
| 4 | 80.30 | 185 | 9.76 | 12.50 | 80.45 | 155 | 11.19 | 13.80 |
| 5 | 82.30 | 187 | 9.77 | 13.40 | 78.30 | 202 | 10.78 | 13.30 |
| 6 | 86.00 | 171 | 9.25 | 13.00 | 77.80 | 155 | 10.86 | 14.00 |
| 7 | 90.50 | 211 | 9.75 | 12.90 | 79.20 | 161 | 10.68 | 14.30 |
| 8 | 81.50 | 158 | 10.38 | 13.60 | 82.65 | 158 | 10.64 | 12.20 |
| 9 | 79.75 | 176 | 9.31 | 12.00 | 79.85 | 156 | 10.83 | 13.70 |
| 10 | 86.85 | 175 | 10.23 | 14.20 | 67.30 | 157 | 9.78 | 11.80 |
| 11 | 72.90 | 139 | 10.29 | 12.90 | 70.65 | 173 | 9.97 | 12.20 |
| 12 | 73.50 | 124 | 9.68 | 12.00 | 67.15 | 159 | 9.99 | 12.30 |
| 13 | 86.85 | 149 | 10.33 | 13.50 | 80.85 | 160 | 10.47 | 12.70 |
| 14 | 89.15 | 224 | 9.70 | 13.00 | 81.80 | 162 | 10.87 | 13.90 |
| 15 | 78.05 | 149 | 9.63 | 12.60 | 81.15 | 178 | 11.07 | 13.80 |

A) Perform Principle Component Analysis (PCA) for the above data and generate Eigen vectors.

B) Generate Two dimensional and Three dimensional representation of the data.

C) Plot the scatter plots to compares the features after reduction: feature1 vs feature2, feature1 vs feature3, feature2 v feature3

D) Also perform inverse transformation to get original data and find Mean Square Error as discussed in class.