

Figure 1. Boxplot of differences between patient mean values.





Figure 3. Consensus clustering for K=3 clusters.





Figure 4. Silhouettes of clustering results.





Figure 5. Heatmaps for K= 3 clusters, sample order is not necessarily the same (see below).

Table 1. Clustering co-occurrence matrix.

|  |  |  |  |
| --- | --- | --- | --- |
|  | HPC Cluster Label | | |
| Matlab Cluster Label | 1 | 44 | 0 |
| 42 | 6 | 6 |
| 2 | 16 | 45 |

Table 2. Comparison of global means and standard deviations between the Matlab and HPC pipelines.

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature Name** | **% Diff. Mean** | **% Diff. Stdev** | |
| AREA | 0.58906 | 6.3641 |
| PERIMETER | 4.7067 | 16.2346 |
| ECCENTRICITY | 4.9668 | 3.9886 |
| CIRCULARITY | 6.9478 | 6.9769 |
| MAJOR\_AXIS | 3.2642 | 13.0304 |
| MINOR\_AXIS | 13.1318 | 4.4974 |
| EXTENT\_RATIO | 6.3886 | 23.6245 |
| MEAN\_INTENSITY | 99.7194 | 99.851 |
| MAX\_INTENSITY | 99.7785 | 99.8687 |
| MIN\_INTENSITY | 99.7003 | 99.6784 |
| STD\_INTENSITY | 99.8247 | 99.7538 |
| ENTROPY | 84.9998 | 53.1292 |
| ENERGY | 44.9596 | 49.5075 |
| SKEWNESS | 177.8584 | 2.7384 |
| KURTOSIS | 8.9636 | 11.3996 |
| MEAN\_GRADIENT\_MAGNITUDE | 99.8391 | 99.7722 |
| STD\_GRADIENT\_MAGNITUDE | 99.8558 | 99.8112 |
| ENTROPY\_GRADIENT\_MAGNITUDE | 88.6607 | 57.9051 |
| ENERGY\_GRADIENT\_MAGNITUDE | 54.6379 | 66.9596 |
| SKEWNESS\_GRADIENT\_MAGNITUDE | 17.8624 | 18.7298 |
| KURTOSIS\_GRADIENT\_MAGNITUDE | 12.5234 | 31.8181 |
| SUM\_CANNY\_PIXEL | 36.6193 | 35.6927 |
| MEAN\_CANNY\_PIXEL | 61.0943 | 18.6475 |
| CYTO\_H\_MeanIntensity | 0.073685 | 4.5027 |
| CYTO\_H\_MeanMedianDifferenceIntensity | 1.2466 | 5.238 |
| CYTO\_H\_MaxIntensity | 0.000258 | 9.4621 |
| CYTO\_H\_MinIntensity | 6.0471 | 3.5321 |
| CYTO\_H\_StdIntensity | 1.4371 | 6.8763 |
| CYTO\_H\_Entropy | 66.7916 | 75.1542 |
| CYTO\_H\_Energy | 0.14673 | 1.2769 |
| CYTO\_H\_Skewness | 2.938 | 9.5125 |
| CYTO\_H\_Kurtosis | 9.7306 | 13.344 |
| CYTO\_H\_MeanGradMag | 1.9741 | 0.56706 |
| CYTO\_H\_StdGradMag | 2.0571 | 0.68514 |
| CYTO\_H\_EntropyGradMag | 97.5766 | 98.6416 |
| CYTO\_H\_EnergyGradMag | 65.0132 | 31.0153 |
| CYTO\_H\_SkewnessGradMag | 2.8513 | 2.6498 |
| CYTO\_H\_KurtosisGradMag | 3.3773 | 24.3983 |
| CYTO\_H\_SumCanny | 49.0876 | 50.9622 |
| CYTO\_H\_MeanCanny | 68.5604 | 15.7466 |
| CYTO\_E\_MeanIntensity | 0.087887 | 0.23582 |
| CYTO\_E\_MeanMedianDifferenceIntensity | 1.9746 | 1.1838 |
| CYTO\_E\_MaxIntensity | 0.16044 | 0.23214 |
| CYTO\_E\_MinIntensity | 0.70817 | 0.28537 |
| CYTO\_E\_StdIntensity | 0.19456 | 0.42667 |
| CYTO\_E\_Entropy | 71.9881 | 69.8096 |
| CYTO\_E\_Energy | 0.075366 | 3.1899 |
| CYTO\_E\_Skewness | 2.3494 | 0.015947 |
| CYTO\_E\_Kurtosis | 0.53344 | 1.7625 |
| CYTO\_E\_MeanGradMag | 0.78234 | 0.82755 |
| CYTO\_E\_StdGradMag | 0.49064 | 0.48828 |
| CYTO\_E\_EntropyGradMag | 98.7219 | 93.8283 |
| CYTO\_E\_EnergyGradMag | 96.7296 | 20.2072 |
| CYTO\_E\_SkewnessGradMag | 0.56349 | 0.11411 |
| CYTO\_E\_KurtosisGradMag | 0.61173 | 0.64153 |
| CYTO\_E\_SumCanny | 50.1815 | 48.3742 |
| CYTO\_E\_MeanCanny | 60.6488 | 5.5247 |
| CYTO\_G\_MeanIntensity | 99.8299 | 99.8915 |
| CYTO\_G\_MeanMedianDifferenceIntensity | 99.6841 | 99.908 |
| CYTO\_G\_MaxIntensity | 99.8604 | 99.8781 |
| CYTO\_G\_MinIntensity | 99.7369 | 99.7499 |
| CYTO\_G\_StdIntensity | 99.9103 | 99.8781 |
| CYTO\_G\_Entropy | 83.1699 | 35.2225 |
| CYTO\_G\_Energy | 74.8668 | 79.0206 |
| CYTO\_G\_Skewness | 68.6674 | 19.4411 |
| CYTO\_G\_Kurtosis | 21.9444 | 60.5971 |
| CYTO\_G\_MeanGradMag | 99.9149 | 99.8946 |
| CYTO\_G\_StdGradMag | 99.9117 | 99.8803 |
| CYTO\_G\_EntropyGradMag | 89.1015 | 58.3918 |
| CYTO\_G\_EnergyGradMag | 77.6403 | 80.9301 |
| CYTO\_G\_SkewnessGradMag | 24.8202 | 41.7084 |
| CYTO\_G\_KurtosisGradMag | 34.376 | 67.0796 |
| CYTO\_G\_SumCanny | 55.4888 | 50.5344 |
| CYTO\_G\_MeanCanny | 62.3936 | 5.7985 |
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