Regression:

```
Below are the correlations between each feature and the ERP attribute
The correlation for MYCT is 0.2878055352402867
The correlation for MMIN is 0.8231129282552626
The correlation for MMAX is 0.9041796959295092
The correlation for CACH is 0.6874281228463884
The correlation for CHMIN is 0.6100937548491207
The correlation for CHMAX is 0.6062812184884323
[4, 3, 5, 6, 9]
The performance for testing set

MAE is 39.88905999126099
MSE is 4503.719157333607
RMSE is 67.10975456171485
```

```
Number of components to keep at least 85% variance: 25
Centers of the Clusters:
[[ 5.14164015e+00 6.15133810e+00 -1.25756483e+00 3.49101956e-02
   7.10196544e+00 4.33565716e+00 -1.05084091e+00 -1.01247869e+00
   2.61892678e+00 2.74428147e-02 -1.48927023e+00 -9.14137505e-01
  -7.59777812e-01 5.18814592e-01 -9.72145540e-01 -9.01508036e-01
  -6.67508618e-01 4.87886532e-01 3.72022265e-01 -1.08832703e+00
  4.87580048e-02 -9.65493319e-02 -5.23869670e-02 1.20844997e+00
  -6.10347289e-02]
 [-1.60616067e+00 1.63245971e+00 1.99347954e-01 2.89807630e+00
   6.12700456e-01 -3.43668073e-01 2.12974683e+00 -3.38778385e-01
  -4.56327616e-01 -1.22880854e-01 3.64910227e-01 3.19739040e-01
  6.54646446e-01 1.80976760e-01 3.75321915e-02 1.66773756e-01
  -2.39713769e-01 -3.01745149e-01 3.38864016e-01 3.01459498e-02
  -2.49241359e-01 1.09484132e-01 -4.92217902e-02 4.30660989e-02
  -1.89967159e-01]
 [-4.21376426e-01 7.60928897e-01 2.47181373e+00 -2.64209310e-01
  -1.08262436e+00 -9.07055344e-02 -1.16300629e-01 2.52742590e-01
   1.30763157e+00 -8.02787146e-01 -1.78200811e-01 1.71197839e-01
  -2.49373572e-01 -3.21394101e-01 2.84806257e-01 2.49231081e-01
  2.75183659e-02 -7.33014653e-03 9.58795378e-02 -1.77040798e-01
   3.53256626e-01 -7.54535987e-03 -9.11255209e-02 1.01282323e-01
   2.17337976e-01]
 [ 1.26395480e+00 -3.90129148e+00 1.12355753e+00 -4.64229871e-02
   1.18271282e+00 -4.88371517e-01 -3.30830365e-01 -1.86018606e+00
   1.02280866e-01 -5.33308419e-01 6.66801224e-01 -1.19499636e-02
  -2.10653079e-03 3.77287862e-01 -2.36830678e-01 -1.61275318e-02
  2.93261723e-01 -6.46633462e-02 -1.06024990e-01 2.38208678e-01
  -7.16771666e-02 1.15085502e-01 7.07533737e-02 9.80820852e-02
  -1.11557677e-01]
 [-1.91969400e+00 -1.12323460e-01 -2.21224972e+00 -1.34122222e+00
  -3.18844145e-01 4.63202362e-02 1.93200656e-01 -4.27221380e-01
   1.59087495e-01 1.40315502e-01 -1.46156293e-01 4.16715536e-01
  -1.25844464e-02 2.52833807e-01 1.10513453e-01 -1.03261909e-01
  1.24780740e-02 1.21939258e-01 -1.05985173e-01 -5.64396441e-02
  1.07674865e-01 -1.50688040e-01 -1.82956247e-01 3.82279085e-02
  -3.08661836e-021
 [ 1.61475370e+00 -1.94877333e+00 -3.03060210e+00 1.66206411e+00
  -5.68067336e-01 -6.15207621e-02 -8.32922980e-01 1.38107224e+00
  4.95351786e-01 -5.03019298e-01 -4.33987905e-01 -6.75446696e-01
   2.15796812e-01 -3.26899055e-01 -1.28359305e-01 1.38734010e-01
  -2.28964645e-02 -3.74454637e-01 4.78726685e-01 1.80944968e-01
  -5.80027374e-02 2.99468938e-01 3.57346013e-01 1.21195572e-01
   1.13396519e-01]
 [ 4.72289748e-01 3.48913405e+00 5.43564599e-01 3.03785405e-01
  -3.59090992e-01 -1.28813034e+00 -2.06660500e+00 -4.99047759e-01
  -5.52430514e-01 7.18483893e-01 3.45607562e-01 2.68708410e-01
   2.15229299e-01 -2.24746204e-02 3.93914091e-02 -4.57102117e-02
   5.64513906e-02 -8.17957925e-02 -6.67333315e-02 2.66362897e-01
  -4.95590024e-01 -5.29274598e-02 1.34195924e-01 -2.31140665e-01
  -2.54136645e-01]
```

```
[-3.90056372e+00 -1.38825220e+00 2.04172787e+00 -2.47946219e-01
   1.55341893e+00
                 9.69247583e-01 -4.07681219e-01 1.76875861e+00
  -7.89297506e-01
                  3.37035769e-01 -1.10101717e-01 -5.44581940e-01
  -3.71904149e-01 -1.65533285e-01 -7.26358433e-02 -2.42181382e-02
  2.02144174e-02 3.14061249e-02 -1.87697266e-01 -4.43013195e-02
                                 1.39021226e-01 -2.93207581e-01
  -1.98571256e-01 -1.74205607e-01
  8.12849907e-02]
 [ 2.52853253e+00
                  1.83674444e+00 -6.80112791e-02 -3.10157412e+00
  -5.05923224e-01
                  9.41020334e-02 2.30085610e+00
                                                 1.68614526e-01
                                  7.32899596e-01 -9.73583347e-01
  -6.38068702e-01 -1.44627257e-01
  -2.82271109e-02 -1.09938519e+00 -1.86340333e-01 -1.99794515e-01
  4.38296212e-02
                 7.46597515e-02 -4.96877539e-01 1.09705920e-01
                  5.29419361e-01 3.82321700e-01 -1.00684381e-01
  -4.18096961e-03
   1.37716314e-02]
 [ 4.68632743e+00 -7.04260291e-01
                                  1.15512868e+00
                                                  8.89324305e-01
  -1.00216470e+00
                 5.62591455e-01 2.80808833e-01 3.33723692e-01
  -1.25491254e+00
                  1.11783549e+00 -4.56822258e-01
                                                 2.13892325e-01
  -1.80675518e-01
                  4.42031584e-01 -1.33376790e-02 -6.76908246e-02
  -1.24151676e-01 4.26455047e-01 -1.26682917e-01 -2.08788511e-01
  3.29894133e-01 -2.75555014e-01 -3.65452177e-01 -1.35439162e-01
   1.27785823e-01]]
/home/cole/Desktop/COSC311/Homework3/Clustering.py:47: RuntimeWarning:
  labels[mask] = mode(digits.target[mask])[0]
0.7095158597662772
cole@cole-IdeaPad-Gaming-3-15ACH6:~/Desktop/COSC311/Homework3$
```

Heat Map:

