**Principal Component Analysis on River/Non-River Satellite Image**

**MIT2019090, Vishal Kumar**

**Introduction:**

Principal component Analysis can be used for many purposes we found some of them are to decrease the computational complexity and measure of the covariance between the images. PCA reduces the complexity of computation when there is large number of database of images. These principal components of the Eigen vector of this covariance matrix when concatenated and converted gives the Eigen faces. These Eigen faces are the ghostly faces of the trained set of faces form a face space. This distance gives the location of the image in the Eigen space, which is taken as the output matched image.

**Dataset Used:**

4 Satellite images of Hooghly River.

**Steps to be followed:**

1. Dimensionality Reduction:

Find the Covariance matrix for 4-dimensional feature vector (R, G, B, I)

being considered 512 \*512 size image for taking feature values for all the

Image band.

1. Compute the Eigen Vector and Eigen Value of the Covariance
2. For each Eigen value of the covariance matrix the corresponding Eigen vector has to be computed for R, G, B and I band Image.
3. Apply Linear Transformation

**Testing:**

If sum of the Eigen values = Sum of the variance (Diagonal element of covariance matrix) of the covariance matrix then the Eigen values for the corresponding covariance matrix is correct.

**Results:**

