Weekly Report (11/25/16)

Progress this week:

1) **Read the paper** *Improved spectral method of detecting community structure based on PCA*.The main idea of this paper is to determine the segmentation effect by PCA processing of the adjacent matrix. Finally, the small adjustments of results to prevent excessive segmentation.

2) **Spectral clustering**. In multivariate statistics and the clustering of data, spectral clustering techniques make use of the spectrum (eigenvalues) of the similarity matrix of the data to perform dimensionality reduction before clustering in fewer dimensions. The similarity matrix is provided as an input and consists of a quantitative assessment of the relative similarity of each pair of points in the data set.

3) **A trivial reflection**. 2012 NPAR'best paper Combining Sketch and Tone for Pencil Drawing Production. Implementation of A Neural Algorithm of Artistic Style. A method to transfer the style of one image to the subject of another image. What we need to do is: enter the original image, enter the style diagram, and then wait. Neural network can extract the characteristics of the picture, same as matrix. Our previous matrix deformations can help neural networks better identify features in images. In other words, you can use the matrix to solve the exact problem, the neural network can do the same.

Plan next week:

1) read paper:Combining Sketch and Tone for Pencil Drawing Production.
2) A Neural Algorithm of Artistic Style.
3) For the inspection of similar-pooling.

This week's results:

I am trying to solve the input problems of different specifications of the network. We know that CNN neural network's convolution layer and the pool layer can transfer the image feature. Based on this feature, I would like to using **similar-pooling** to solve the problem of great differences in scale. While using the **convolution** to solve the question about small adjustment of input image.

Here, define **similar-pooling**. The difference with the max-pooling method is that, after each layer, we need to adjust the value. After all, there are only 0 and 1 in our adjacent matrix. The following two sets of contrast charts are used to show how well our approach preserves image information. Including dense networks and sparse networks.
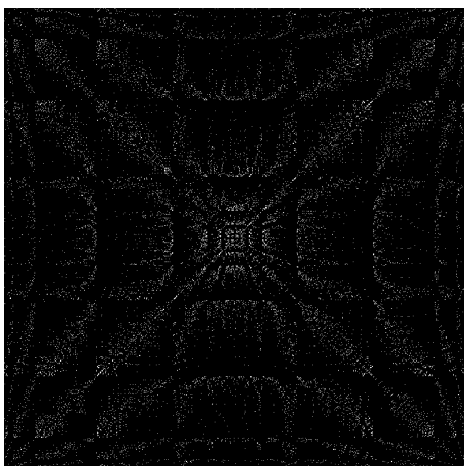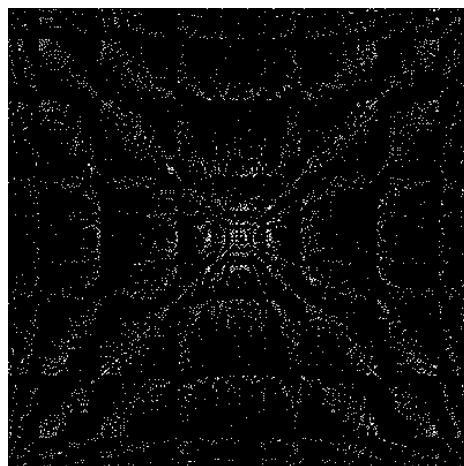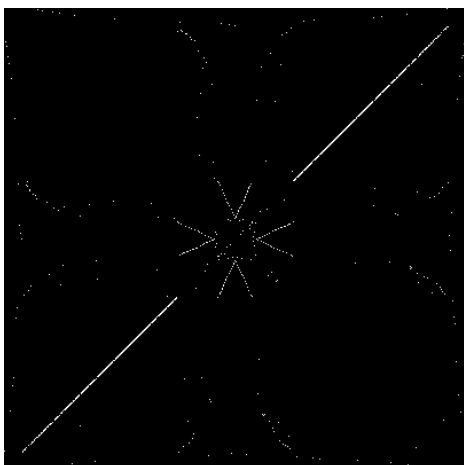
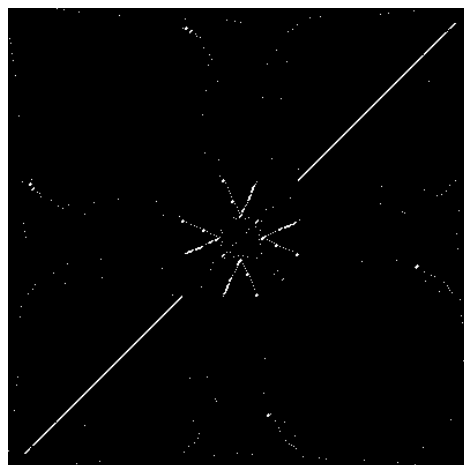(a) 800*800 image   (b) 400*400 image

Figure 1: dense networks

(a) 800*800 image   (b) 400*400 image

Figure 2: sparse networks