

Assignment 3

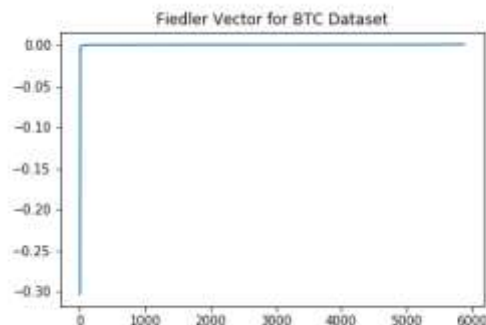
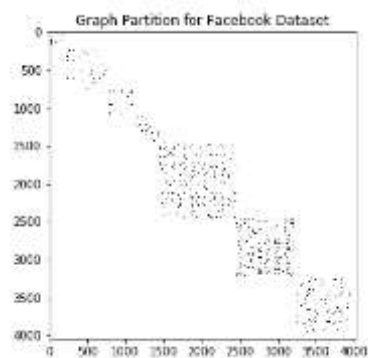
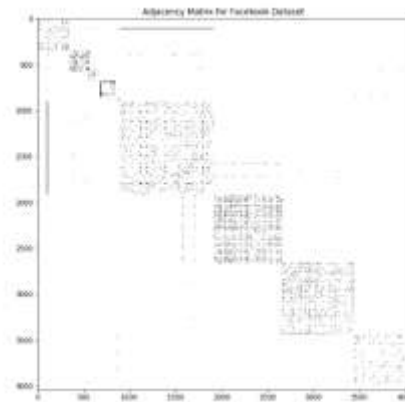
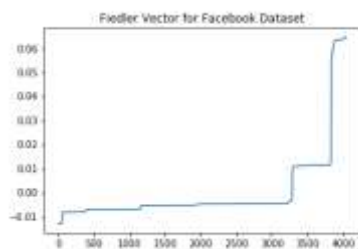
Community Detection

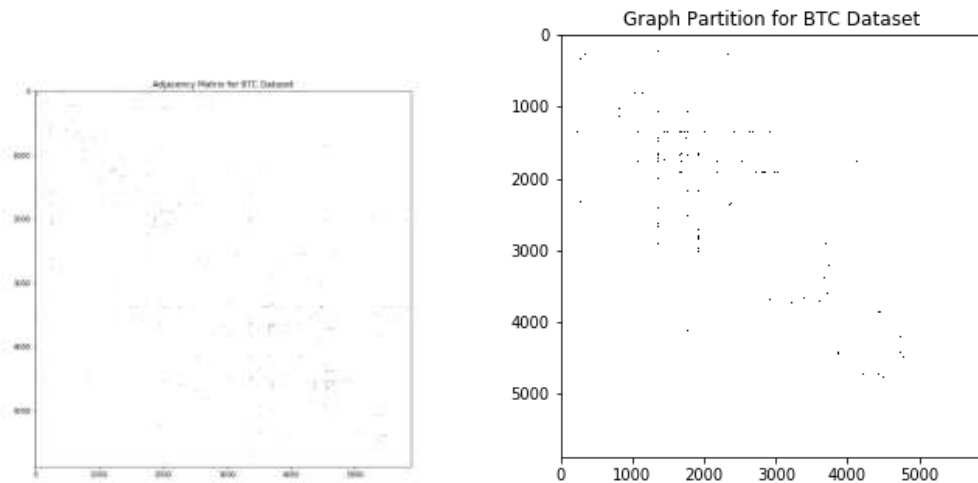
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Implementation:

Q1. After Calculating the Laplacian matrix from the adjacency matrix and degree matrix, i.e., $L = D - A$ where D is the degree matrix and A is the adjacency matrix, I calculated the eigen values and their respective eigen vectors. Then I sorted the eigen values along with their eigen vectors and took the first non-zero eigen values and their respective eigen vector. This eigen vector is the Fiedler vector. After that based on the components of the Fiedler vector, we assigned the nodes with 0 or 1 community. Thus, we got the graph_partition.

Output:





Q2. There are some methods for stopping criteria. One of them is based on nodesize of the new community. If the nodesize of the new community is below a threshold, we don't do decomposition anymore.

Another one is based on the maximum eigen value gap. $\Delta = \text{abs}(\lambda_k - \lambda_{k-1})$. Here the k value decides the number of clusters.

Q3.

