Scraping arxiv for an Author network

STEP 1:

Python code to create a social network of Authors.
An adjacency matrix is created with relation between an Author to all the other authors represented.

```
#!/usr/bin/env python3
# -*- coding: utf-8 -*-
"""
Created on Tue Sep 18 21:46:36 2018

@author: ronak
"""
import arxivscraper
import pandas as pd
import numpy as np

scraper =
arxivscraper.Scraper(category='stat',date_from='2017-07-21',date_until='2017-08-10',t=10,
filters={'categories':['stat.ap'],'abstract':['learning']})
output = scraper.scrape()

cols = ('id', 'title', 'categories', 'abstract', 'doi', 'created', 'updated', 'authors')
df = pd.DataFrame(output,columns=cols)

adjacency_list = {}
def add_to_adList(auth_list):
    for authors in auth_list:
        for author in authors:
            if author not in adjacency_list:
                adjacency_list[author] = [x for x in authors if x != author]
            else:
                temp = [x for x in authors if x != author] + adjacency_list[author]
                temp = list(set(temp))
                adjacency_list[author] = temp
add_to_adList(df['authors'].tolist())

auth_lookup = {}
for key in adjacency_list:
    auth_lookup[key] = list(adjacency_list.keys()).index(key)

n = len(adjacency_list)
adj_matrix = np.zeros((n, n))
np.fill_diagonal(adj_matrix,0)

for author in adjacency_list:
        auth_idx = auth_lookup[author]
        for peer in adjacency_list[author]:
```

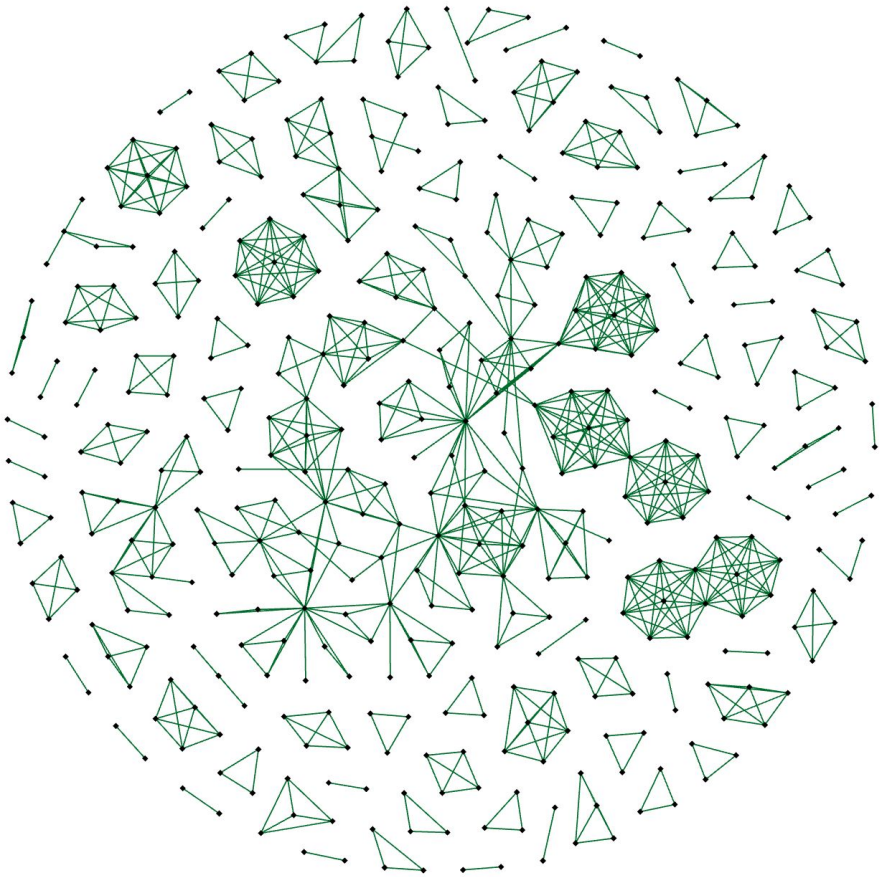
```
            peer_idx = auth_lookup[peer]
            adj_matrix[auth_idx, peer_idx] = 1

df = pd.DataFrame(adj_matrix)
df.to_csv('dataMatrix.csv')
```

OUTPUT:

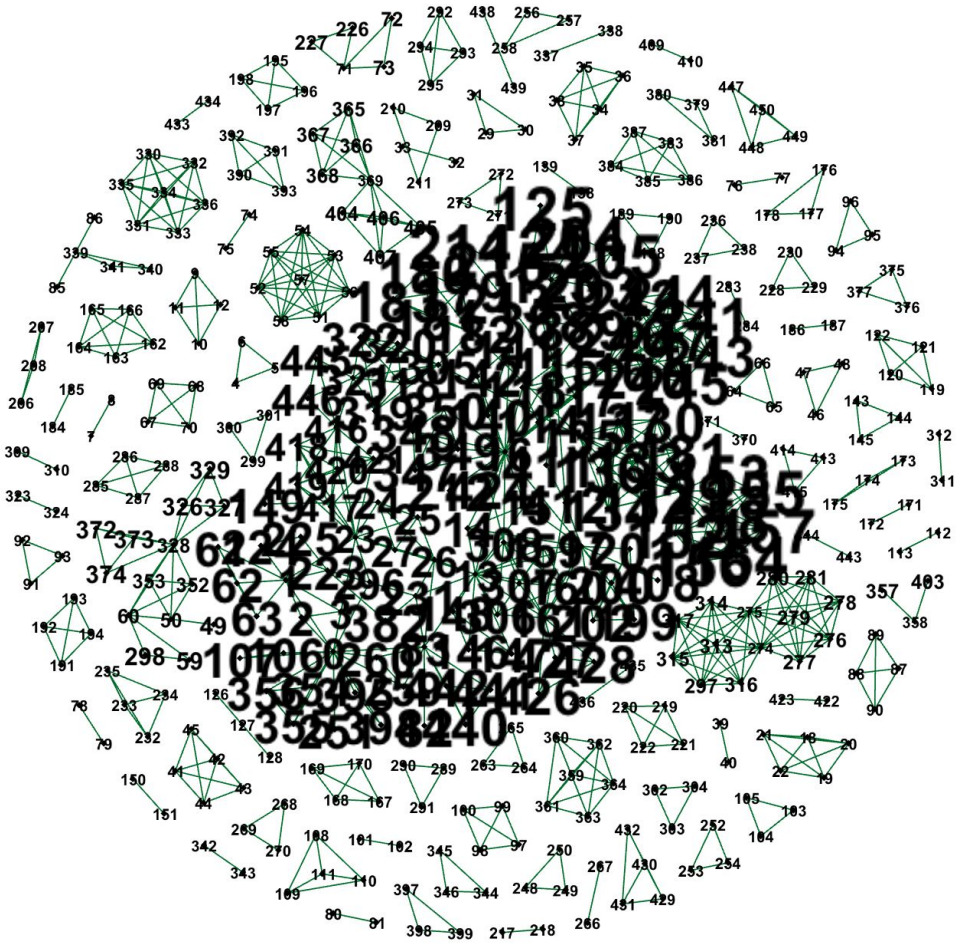
```
In [15]: runfile('/Users/ronak/Documents/Dev/Projects/SMM/Scraping/output2.py', wdir='/Users/
ronak/Documents/Dev/Projects/SMM/Scraping')
Reloaded modules: arxivscraper
http://export.arxiv.org/oai2?
verb=ListRecords&from=2017-07-21&until=2017-08-10&metadataPrefix=arXiv&set=stat
fetching up to  1000 records...
fetching is completed in 6.6 seconds.
Total number of records 168
```

STEP 2:

An undirected graph with Authors as the nodes is created using GEPHI.
The Undirected graph below has 434 Nodes and 783 edges.

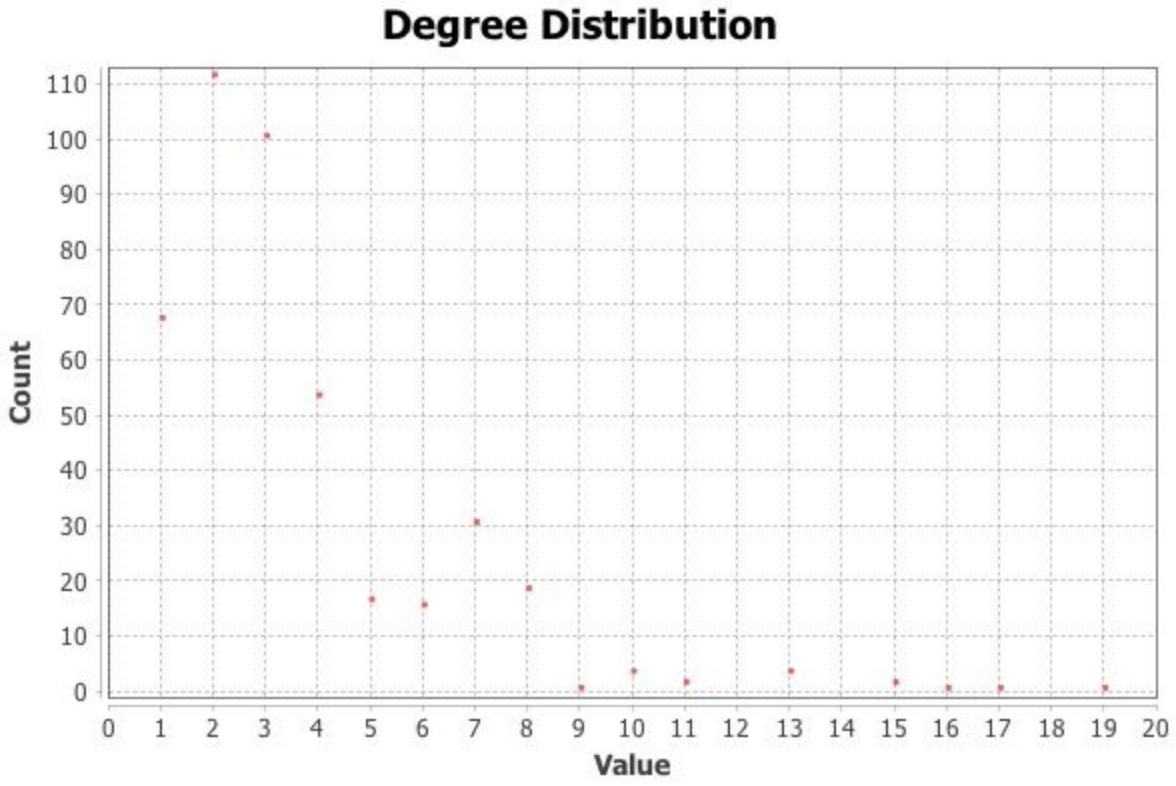


The graph shown below is the same graph as above marked with its NODE LABELS.



Degree Distribution

Average Degree: 3.608

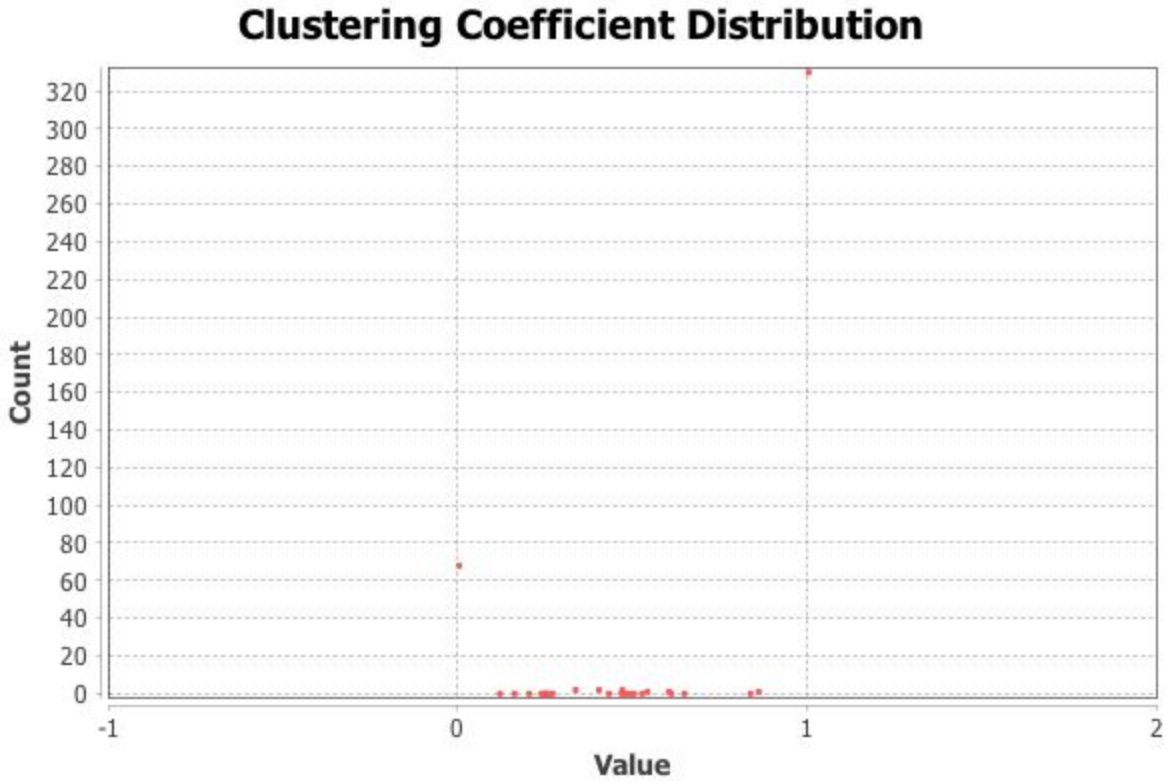


Clustering Coefficient

Average Clustering Coefficient: 0.945

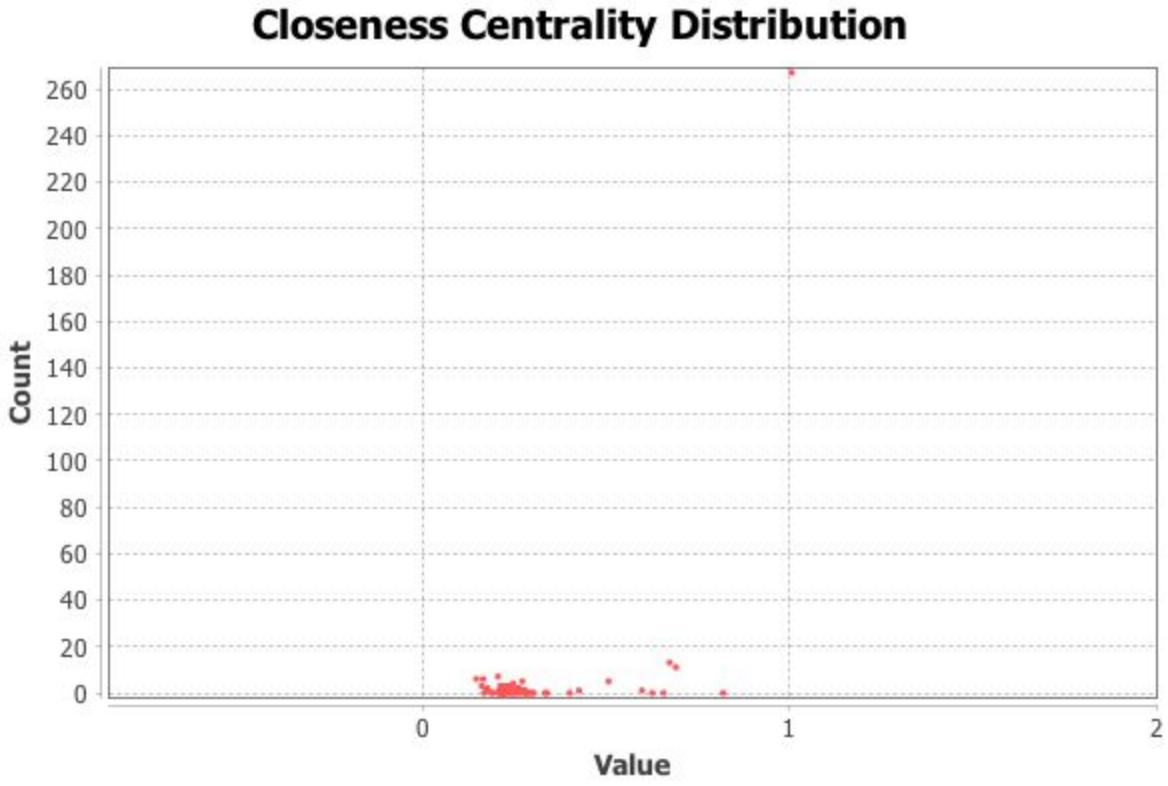
Total triangles: 866

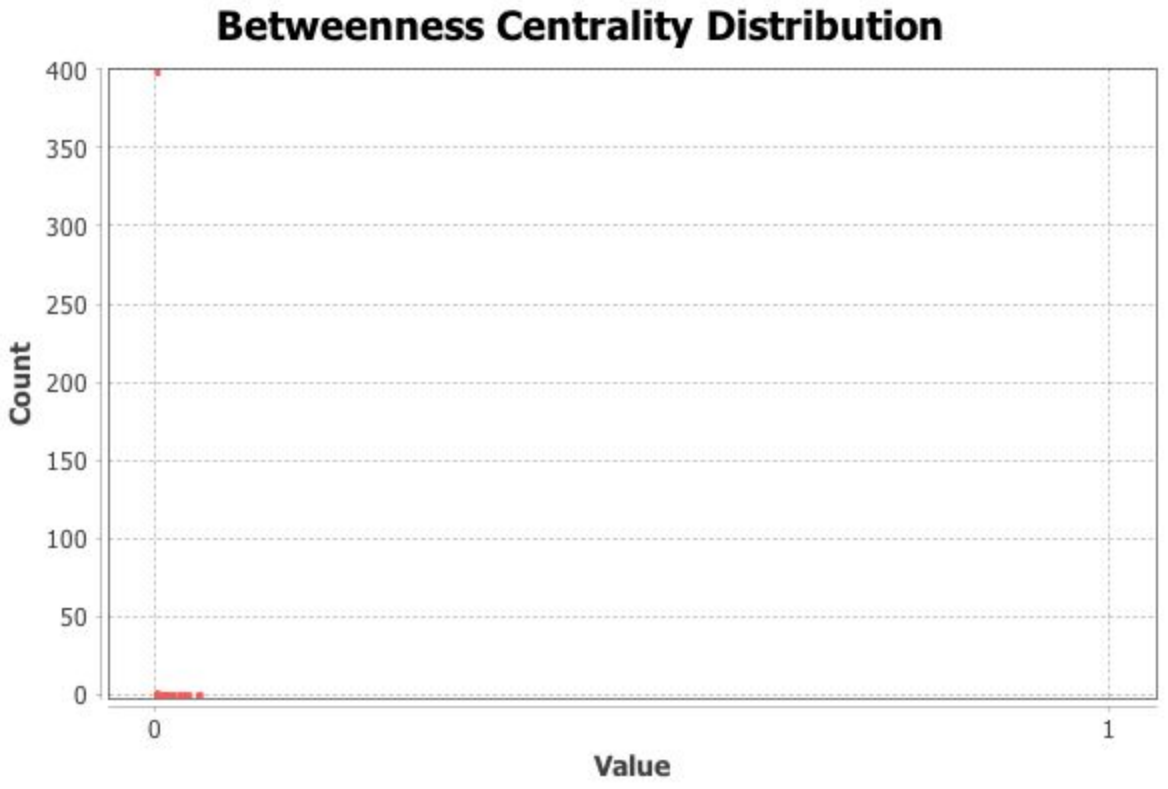
The Average Clustering Coefficient is the mean value of individual coefficients.



Graph Distance Measures

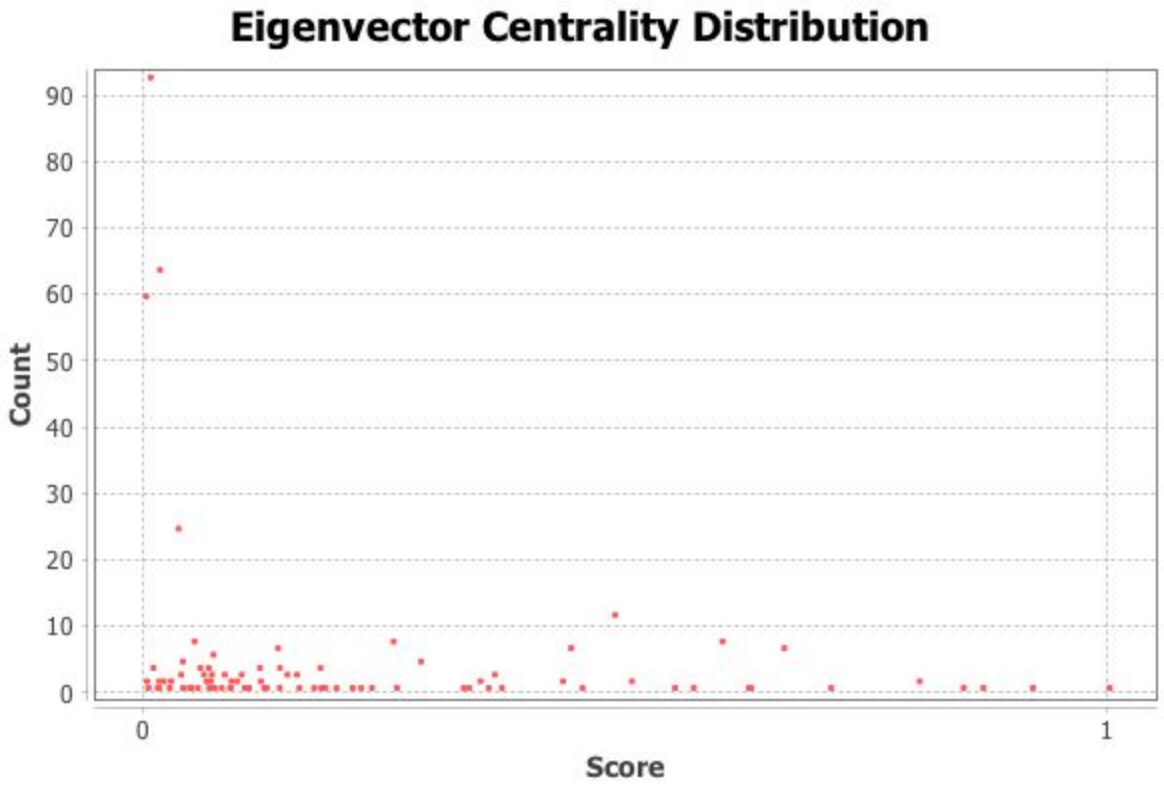
Network Interpretation: Undirected
Diameter: 11
Radius: 1
Average Path length: 4.564521862779951





EigenVector Centrality Distribution

Network Interpretation: undirected
Number of iterations: 100
Sum change: 0.05811811065010382



Modularity Distribution

Modularity: 0.925
Modularity with resolution: 0.925
Number of Communities: 96