

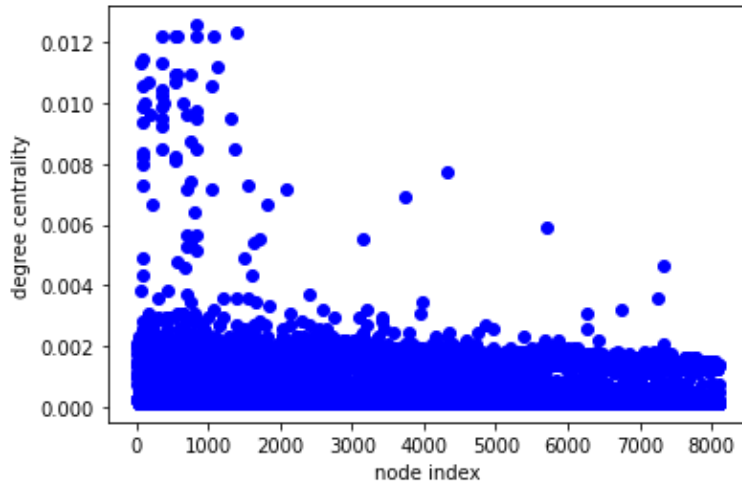
PART-1:-CENTRALITY OF NETWORK

1.Graph1:-p2p-Gnutella09.txt

1.1.Degree centrality

The node which has maximum degree centrality 822.

The node which has minimum degree centrality 18.

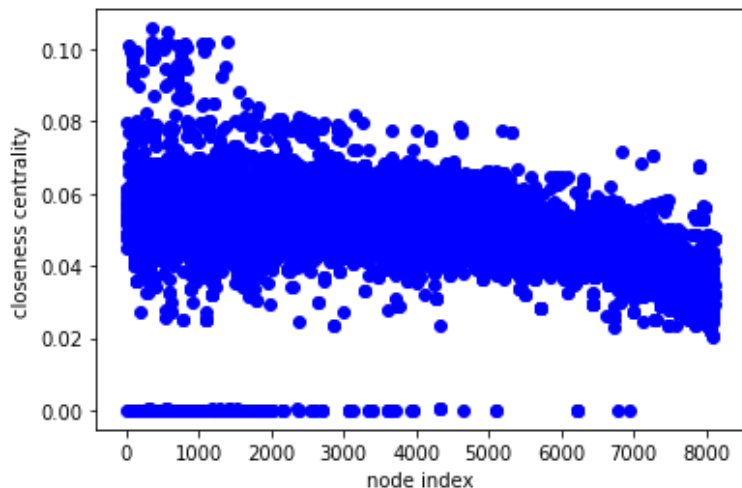


The above plot shows the node index(x-axis)vs degree centrality(y-axis).According to the plot there are very few nodes which are having degree centrality closer to 0.006.That means the graph is very much sparse.

1.2.Closeness centrality

The node which have maximum closeness centrality 351(starting from 0th node)

The node which have minimum closeness centrality 64.



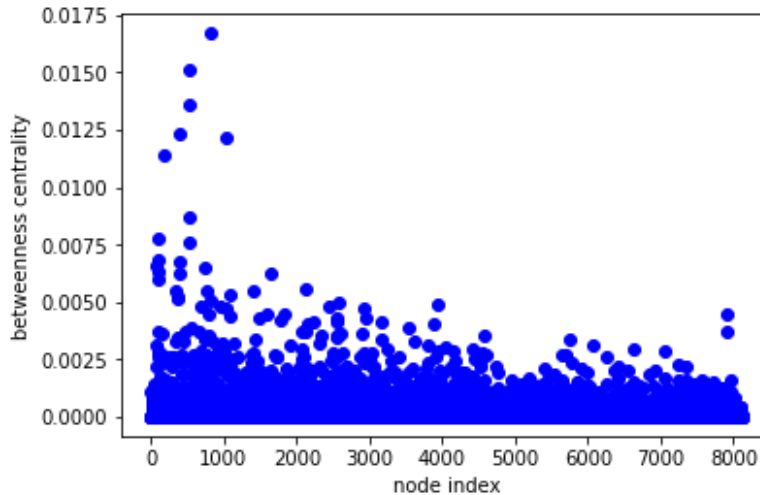
The above plot shows the node index(x-axis)vs closeness centrality(y-axis).According to the plot there are 96% of nodes which are having closeness centrality closer to

0.006. That means the 96% of nodes when they become central node gets closer to other nodes in graph.

1.3. Betweenness centrality

The node which has maximum betweenness centrality 822.

The node which has minimum betweenness centrality 1.

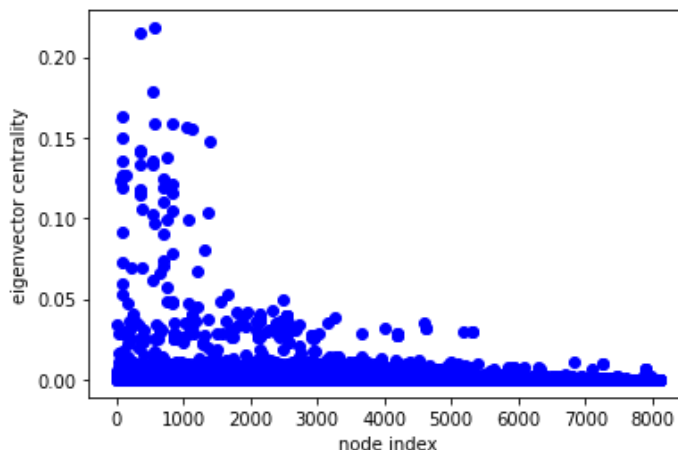


The above plot shows the node index(x-axis)vs betweenness centrality(y-axis). According to the plot there are very large number of nodes which are having betweenness centrality closer to 0.0035. That means very large number of nodes when becomes comes in shortest path to other pair of nodes comes less frequently.

1.4. Eigenvector centrality

The node which have maximum eigenvector centrality 563

The node which have of minimum eigenvector centrality 64



The above plot shows the node index(x-axis)vs eigenvector centrality(y-axis). According to the plot there are 30% of nodes which are having eigenvector centrality closer to

0.05. That means very few nodes have influence on the network with connection directly or indirectly and with high intensity..

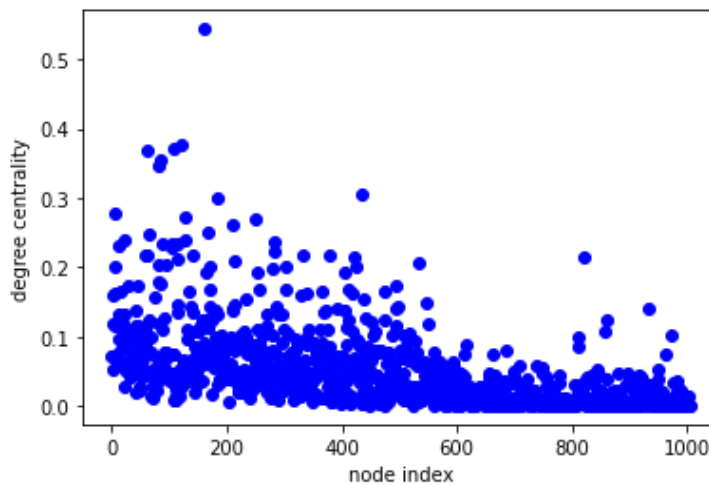
According to all centralities discussed above, the node with index 822 is the most important node in the network because degree and betweenness centralities of 822 are maximum.

2.Graph2:- email-Eu-core.txt

2.1 Degree centrality

The node which has maximum degree centrality 160.

The node which has minimum degree centrality 449.

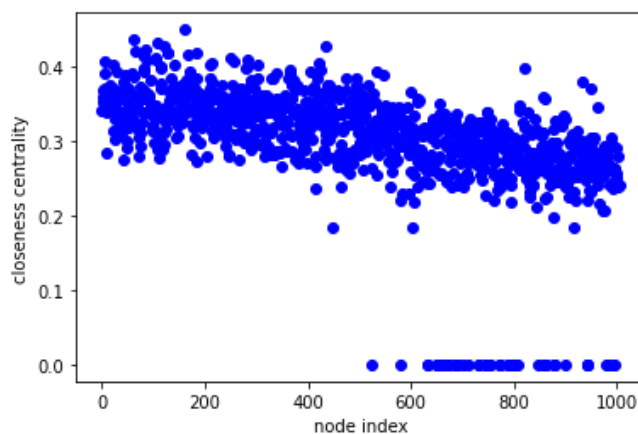


The above plot shows the node index(x-axis)vs degree centrality(y-axis).According to the plot there are very few nodes which are having degree centrality closer to 0.45 but degree centrality are closely related. That means the graph is dense.

2.2 Closeness centrality

The node which have maximum closeness centrality 160(starting from 0th node)

The node which has minimum closeness centrality 524.

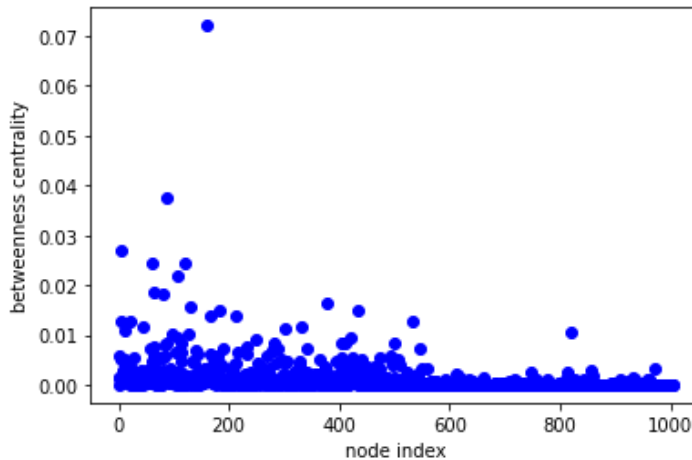


The above plot shows the node index(x-axis)vs closeness centrality(y-axis).According to the plot there are 50% of nodes which are having closeness centrality closer to 0.4.That means the 50% of nodes when they become central node gets closer to other nodes in graph.

2.3.Betweenness centrality

The node which has maximum betweenness centrality 160.

The node which has minimum betweenness centrality 1.

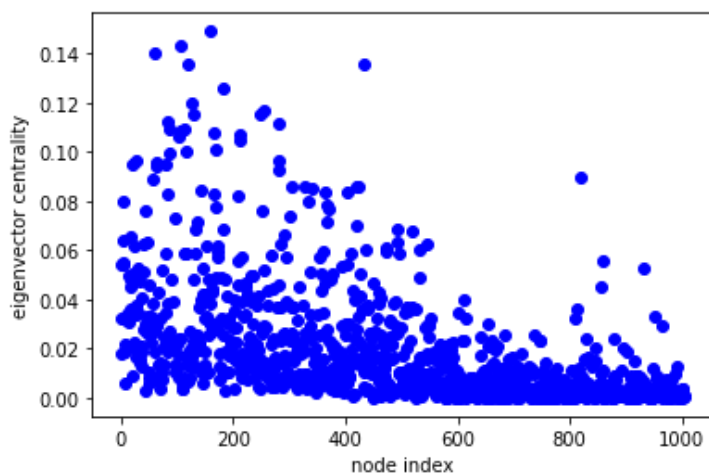


The above plot shows the node index(x-axis)vs betweenness centrality(y-axis).According to the plot there are very few nodes which are having closeness centrality closer to 0.02.That means very less number of nodes when becomes central node comes in shortest path between other pair of nodes less frequently.

2.4.Eigenvector centrality

The node which have maximum eigenvector centrality 160

The node which have minimum eigenvector centrality 524



The above plot shows the node index(x-axis)vs eigenvector centrality(y-axis).According to the plot there are very large number of nodes which are having eigenvector centrality closer to 0.06.That means very large of nodes have influence on the network with connection directly or indirectly.

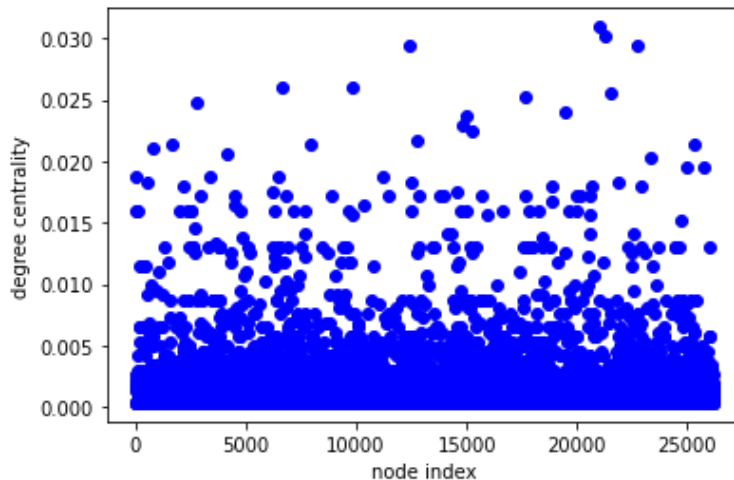
According to all centralities discussed above the node with index 160 is the most important node in the network because in all the centralities 160is the node with maximum centrality.

3.Graph3:- CA-GrQc.txt

3.1.Degree centrality

The node which has maximum degree centrality 21012

The node which has minimum degree centrality 24372

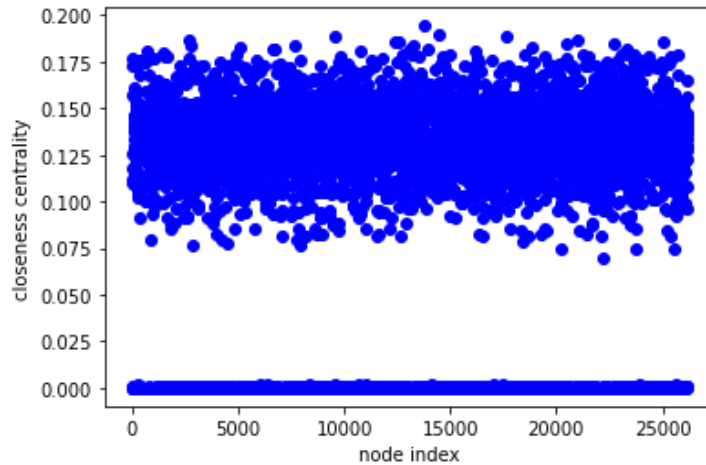


The above plot shows the node index(x-axis)vs degree centrality(y-axis).According to the plot there are very 97% of nodes which are having degree centrality closer to 0.001.That means the graph is very much sparse.

3.2.Closeness centrality

The node which has maximum closeness centrality 13801(starting from 0th node)

The node which has minimum closeness centrality 12295.

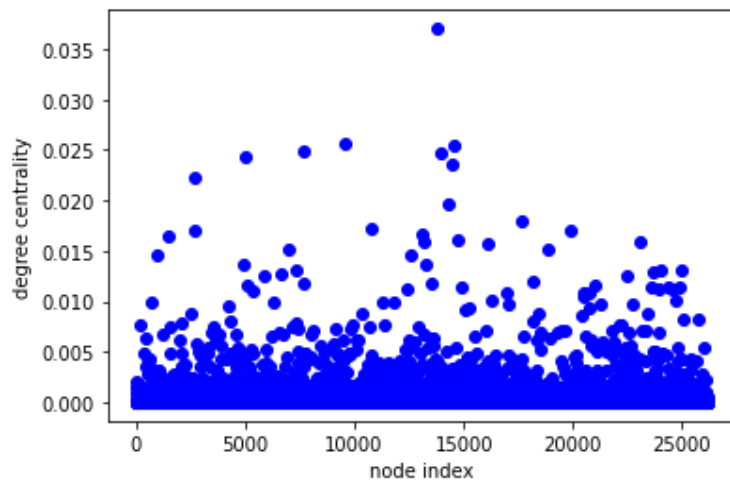


The above plot shows the node index(x-axis)vs closeness centrality(y-axis).According to the plot there are 70% of nodes which are having closeness centrality closer to 0.125. That means the 70% of nodes when they become central node gets closer to other nodes in graph.

3.3 Betweenness centrality

The node which has maximum betweenness centrality 13801.

The node which has minimum betweenness centrality 5233.

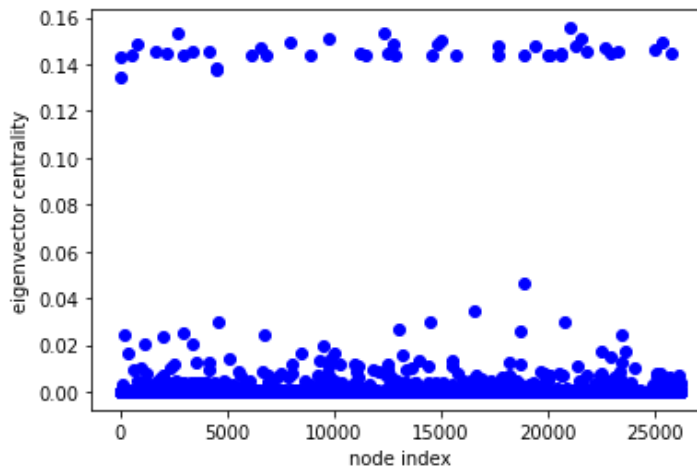


The above plot shows the node index(x-axis)vs betweenness centrality(y-axis).According to the plot there are very large number of nodes which are having betweenness centrality closer to 0.0010 and less closer to highest betweenness value. That means very large number of nodes when becomes comes in shortest path to other pair of nodes comes less frequently.

3.4.Eigenvector centrality

The node which have maximum eigenvector centrality 21012

The node which have minimum eigenvector centrality 16470



The above plot shows the node index(x-axis)vs eigenvector centrality(y-axis).According to the plot there are very large number of nodes which are having eigenvector centrality closer to 0.02 but some nodes whose eigenvector centrality is quite high closer to 0.14.That means very large number of nodes have less influence on the network with connection directly or indirectly..

According to the above discussion,we can note that two nodes are the most important node in the graph 21012 because the eigenvector and degree centrality of 21012 is maximum and the second node is 13801 because closeness and betweenness centrality of 13801 is maximum .

PART-2:-HITS and PAGE RANK

There two kinds of Web pages:

1.Authority: a Web page with good authoritative content on a specific topic.

2.Hub: a Web page pointing to many authoritative Web pages.

1.Graph1

1.1HITS

The node which has maximum hub score webpage 2070

The node which has minimum hub score webpage 1

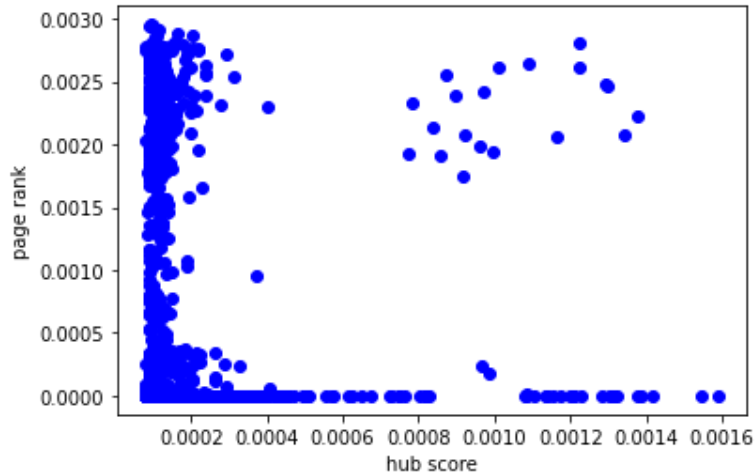
The node which has maximum authority score webpage 1074

The node which has minimum authority score webpage 64

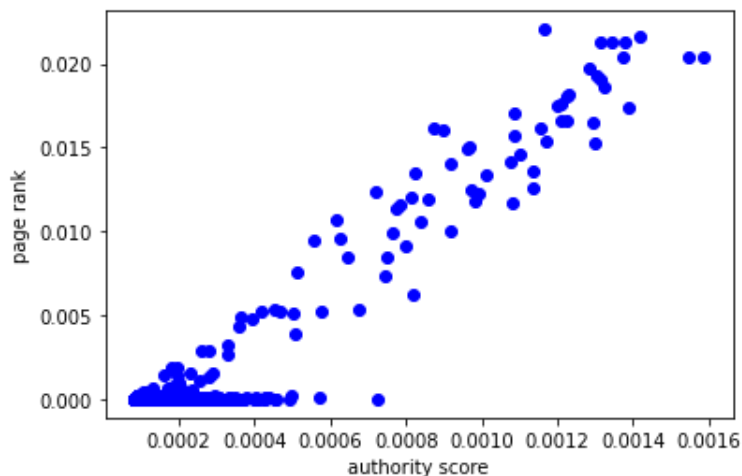
1.2Page rank

The node which has maximum page rank web page 351

The node which has minimum page rank web page 64



The above plot shows that hub score and page rank is indirectly proportional to each other. When hub score increases, the page rank decreases and vice-versa.



The above plot shows that authority score and page rank are directly proportional to each other. When authority score increases, the page rank also increases and vice-versa.

In conclusion, the same webpage or node acting as an authority cannot act as a hub because the page rank of the web page will decrease which indicates some nodes have to be authority and some have to be hub.

2.Graph2

2.1HITS

The node which has maximum hub score webpage 2070

The node which has minimum hub score webpage 1

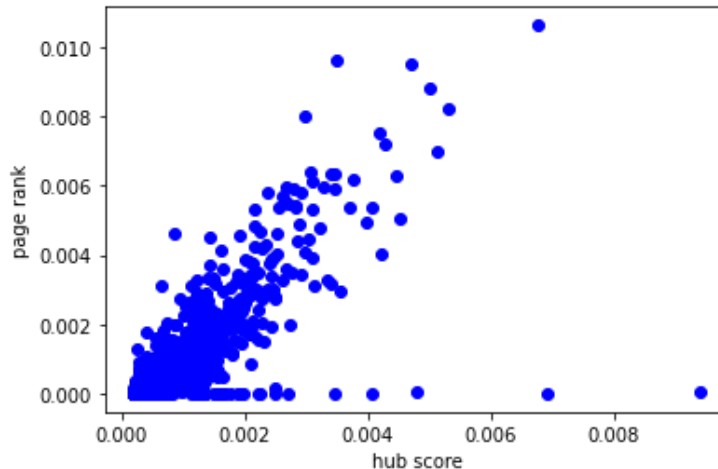
The node which has maximum authority score webpage 1074

The node which has minimum authority score webpage 64

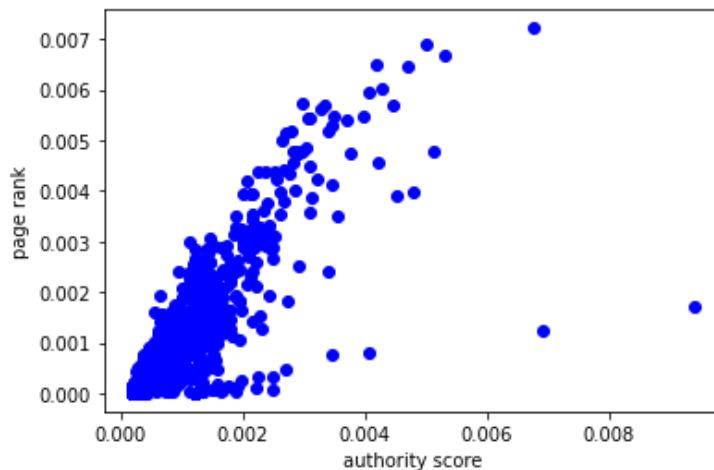
2.2Page rank

The node which has maximum page rank web page 1

The node which has minimum page rank web pages(0-13) 524, 750, 755, 790, 858, 863, 875, 879, 901, 941, 943, 944, 982, 995



The above plot shows that hub score and page rank is directly proportional to each other. When hub score increases, the page rank increases and vice-versa.



The above plot shows that authority score and page rank is directly proportional to each other. When authority score increases, the page rank increases and vice-versa. This plot is similar to the plot of hub score vs page rank discussed above for graph2.

In conclusion, the same webpage or node can act as an authority as well as hub which indicates there is a backlink present from authority to hub with same page rank.

3.Graph3

3.1HITS

The node which has maximum hub score webpage 21012

The node which has minimum hub score webpage 16470

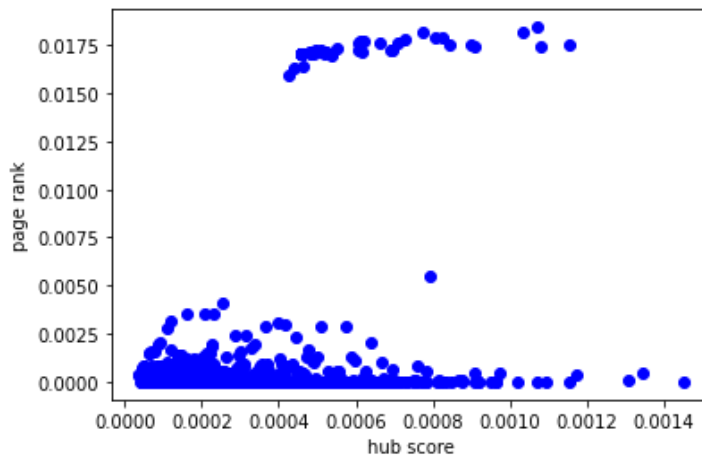
The node which has maximum authority score webpage 21012

The node which has minimum authority score webpage 16470

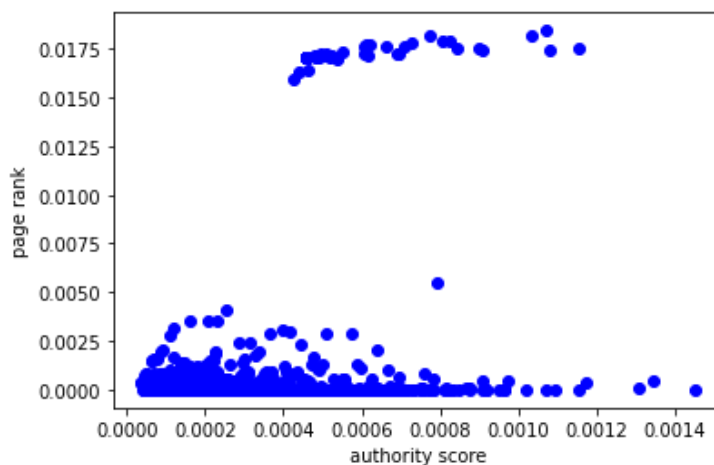
3.2Page rank

The node which has maximum page rank webpage: 14265

The node which has minimum page rank webpage: 4382



The above plot shows that hub score and page rank is directly proportional to each other. When hub score increases, the page rank increases and vice-versa.



The above plot shows that authority score and page rank is directly proportional to each other. When authority score increases, the page rank increases and vice-versa. This plot is similar to the plot of hub score vs page rank discussed above for graph3.

In conclusion, the same webpage or node can act as an authority as well as hub which indicates there is a backlink present from authority to hub.