Centrality measures and Graph Algorithms on Java
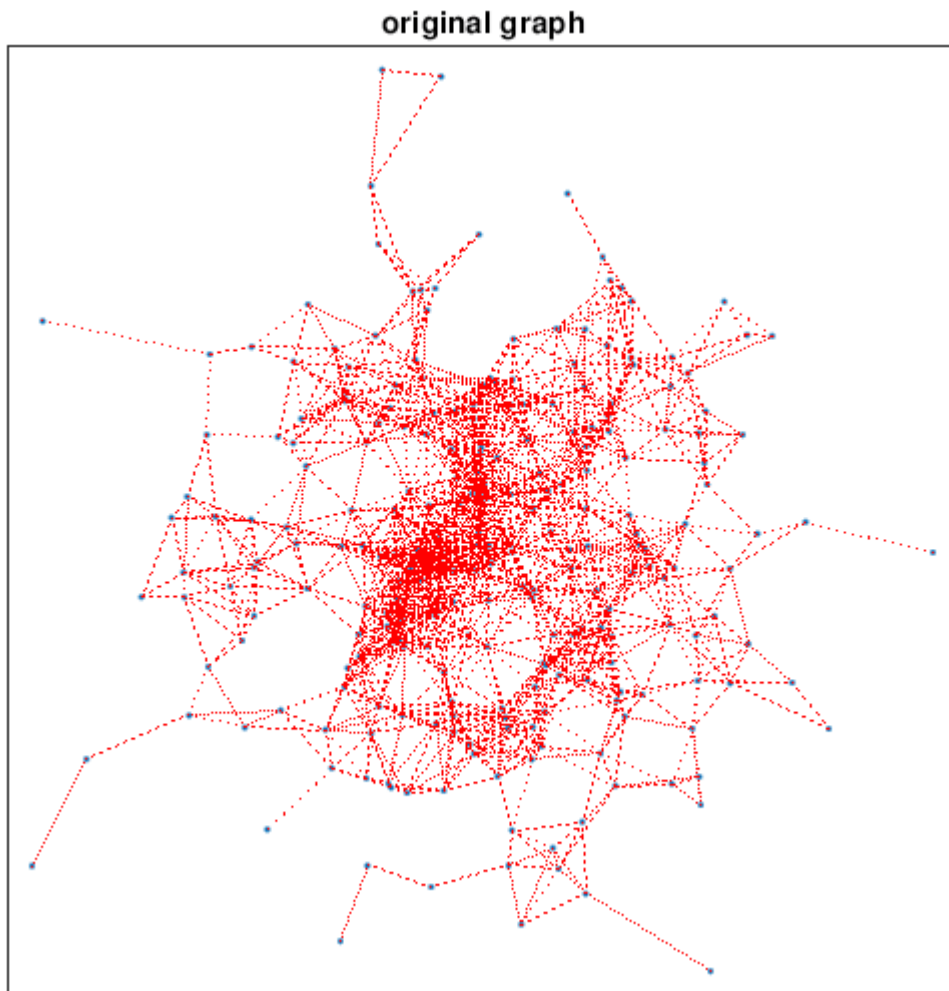
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25 November,2017

1   Introduction

We are analyzing different centrality measures of graphs. Centrality measures help us to localize most important nodes. With neural networks seeming to be in rise and many more applications on different kind of networks a correct analysis of them is becoming very important.

2   Analysis

original graph

Our first graph shows us a network with 250 vertices, they are very close in the center of the graph and by the time we go further the concentration is lesser.
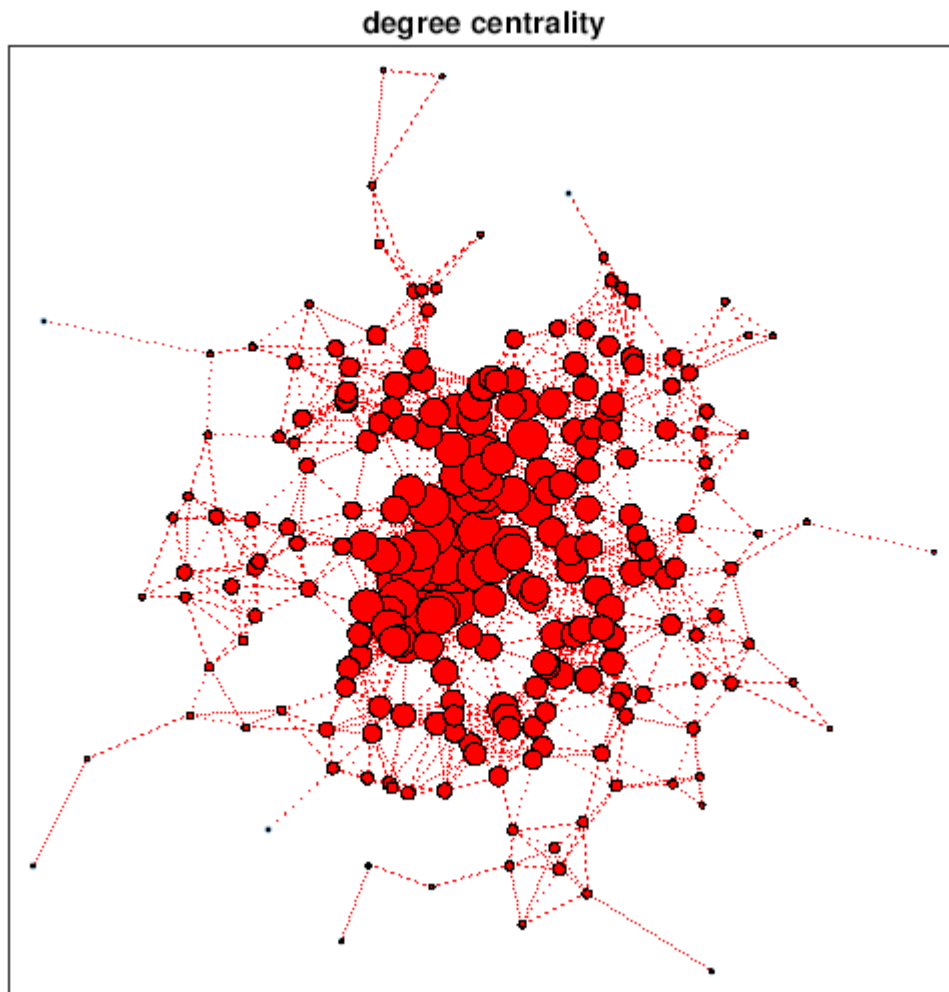
degree centrality

With the degree centrality analysis we can conclude that the nodes that are in the inner part of the network are the ones with the larger amount of connections, the ones on the outermost parts have a much lesser number of connections.

closeness centrality
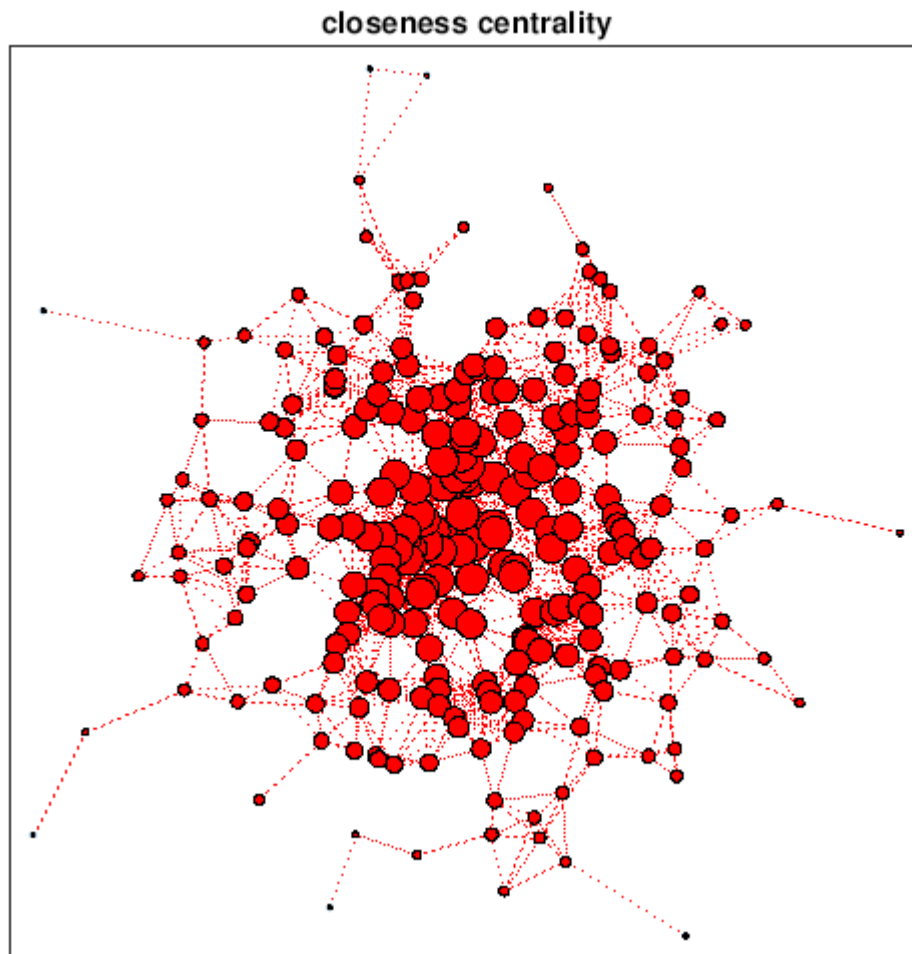
On the other hand the measure of closeness centrality is the inverse of the average distance to the other nodes, it is reasonable that the vertices on the innermost part are the one with a bigger closeness centrality.

betweenness centrality
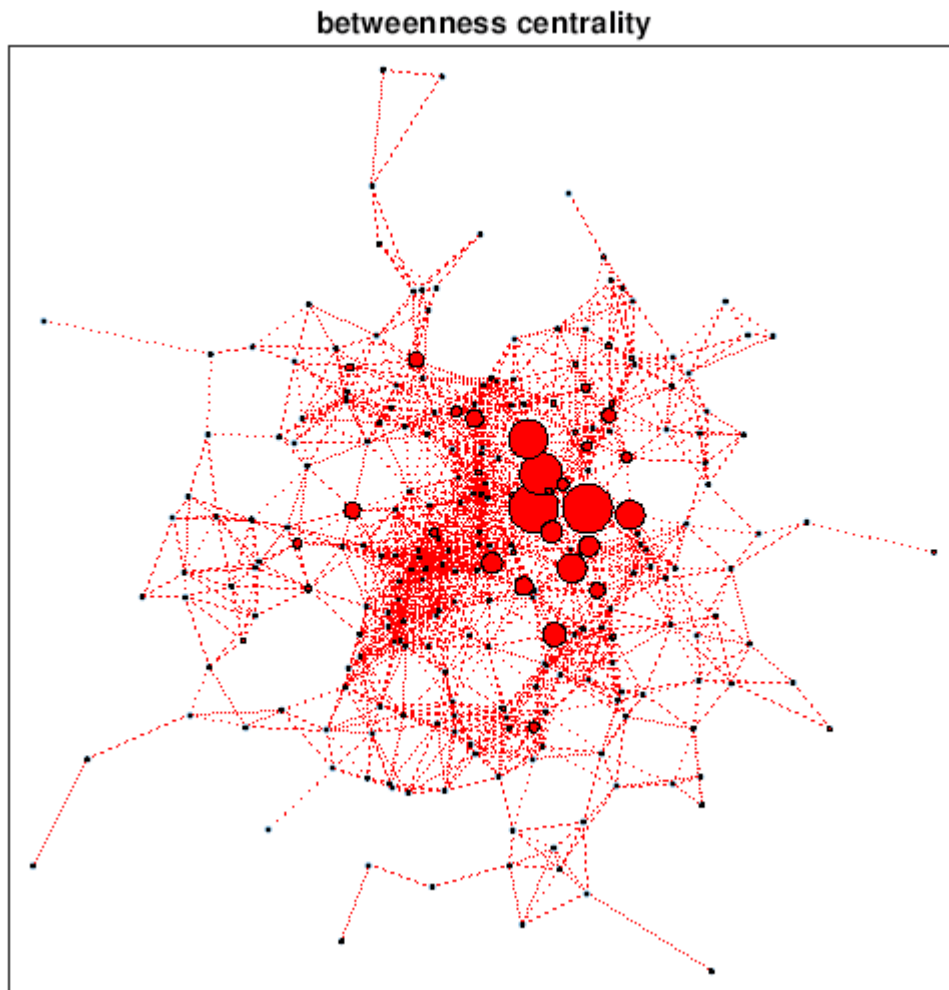
Lastly we can see the betweenness centrality. We can see that the vertices that are more traversed by an efficient paths are located on the right side, these mean that they should be the ones with a largest importance because they are going to be traversed a lot of times.