**MCL Algorithm (MARKOV CLUSTER ALGORITHM):**

By definition of Clusters we can say they are internally dense and being separated by sparse regions. In graph clustering, random walk means walking from node to node and it is an important factor because of the density and sparsity. So the main motivation of MCL is that if you start walking randomly from one node to another, you should be able to move around in the same cluster rather than to cross different clusters. We can get the question like How could it record this information? It does this by just maintaining counter information (No of times that node has been visited) of each node by using some expansion and inflation process where they change values from 0 to 1 and vice versa based upon number of visits for that node.

This algorithm takes weighted graph as input. It can also take probability or chance of getting each node and matrices as inputs just as K-Means. It has Expansion and Inflation processes which are some powerful process of Markov clustering algorithm.

One of the limitations of MCL is, it is not suitable for hierarchical applications and there are some other papers and studies saying that this limitation can be used as an advantage by scaling the dendrograms to certain heights, but I didn’t go deeper through those studies.

And why I feel this algorithm is better than K-Means is because It doesn’t require any information about **number of clusters before starting the algorithm.** Random walks on graph are calculated using “Markov chains”.