Lab 4 : Community detection

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Community detection & evaluation

Igraph includes different functions for community detection. We focus in this lab studying the following four functions : : `cluster_edge_betweenness, cluster_walktrap, cluster_louvain, cluster_infomap`

1. Apply each of the above cited function to the following benchmark networks : `dolphins.gml, polblogs.gml, football.gml, karate.gml` and report the obtained performances by comparing obtained results with ground truth community structure provided in each benchmark network (see attribute `value` in each network). You use the function `compare(com1,com2,method="nmi")` to get the NMI distance between two community structures com1, com1.
2. Apply function `plot(com,g)` in order to plot the obtained community structures.
3. On each network, compare the different obtained community structures computed by each algorithm using both NMI and ARI indices. Comment on the results.
4. Compute the modularity of each computed community structure. Comment on the results.
   you can use function `modularity(com)` for moduarity computation
5. Apply the label propagation algorithm using `cluster_label_prop` function 10 times on each benchmark network. Report on the obtained results.
6. Develop an ensemble clustering function implementing the CSPA procedure.
7. Apply the developed ensemble clustering approach to merge results of execution of label propagation algorithme to each benchmark network. Comment on the obtained results.
8. Can you think on a way to enhance the output of the obtained results of the ensemble clustering approach ?