Modelling and Analysis of Complex Networks

Exercise 5

Due: 13:00 on Oct. 25, 2024

The maximum score of this assignment is: **16 points**. Please submit the assignment in any readable data format (.txt, .doc, .pdf, .md ...) and submit the assignment before the deadline. If you have additional information concerning your answers, please also upload the document to the Moodle, or include the link to the document in your answers (e.g., link to your Github repository). Please indicate your team number in your submission.

Now let's explore more about the two datasets we have: Facebook-Ego and Twitter-Ego. The following questions can be answered with the help of Snap.py and NetworkX. You may also use other packages to deal with the problem. Please answer the following questions on both of the networks you have and submit your ready-to-run code. **$2 \times 2 + 2 + 3 \times 2 + 4 = 16$ points)**

(a) Please choose ten nodes from either dataset, and return a SubGraph View of the subgraphs induced on the chosen ten nodes.

(b) Please list three algorithms for community detection.

(c) Please choose one of the datasets, and utilize all of the algorithms listed in (b) to detect communities in the dataset. Please plot graphs to show the communities (mark nodes with different colors / draw communities unions....).

(d) What are the differences between the community detection results shown in (c)? What are the possible reasons?