Modelling and Analysis of Complex Networks

Exercise 10

Due: 13:00 on Dec. 6, 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.

We would like to perform machine learning on our datasets. Now let's turn to the Facebook-Ego dataset. The following question can be answered with the help of NetworkX and pytorch / sklearn. You may also use other packages to deal with the problem. Please answer the following questions on the networks you have and submit your executable code. **(16 points)**

Similar as what we did in the last exercise, we would like to perform link prediction on the same set of edges. Please choose the same edges as those in last exercise as the target of link prediction, and train the model based on the rest of the edges. Different from the methods we used in previous exercise, please use node2vec / DeepWalk embeddings to perform the link prediction. The node2vec algorithm may refer to the implementation in Github: `https://github.com/eliorc/node2vec`, and DeepWalk may refer to `https://github.com/prateekjoshi565/DeepWalk`. Please output a report of the prediction accuracy, AUROC, precision and ROC curve.