Manual: GELPA\_OCD folder contains the source code files for the algorithm proposed in the paper. The folder includes five files and a code manual document.

1. 03Real\_Datasets folder: This folder contains six real datasets used in the paper.
2. 03Real\_Datasets\_Output folder: This folder contains the community partition results using the GELPA-OCD algorithm on real datasets. It records the community partition details and EQ evaluation metrics for each datasets.
3. 04LFR\_networks folder: This folder contains a manually generated network datasets consisting of four sets of networks from folders A, B, C, and D. These four folders contain LFR1 to LFR25 artificial networks. The LFR1 folder contains real community files and corresponding edge files in the network. The community.dat file is a real community file, where each line represents a node and the community to which the node belongs. This also applies to folders LFR2 to LFR25.
4. 04LFR\_results folder: This folder contains the community partition results using the GELPA-OCD algorithm on artificial networks. It corresponds to the community partition results and NMI evaluation metrics for the four groups of networks in the 04LFR\_networks folder. The fourth group D folder also includes the advanced\_metrics.txt file, which is the result file for the F1 metric. This file evaluates the quality of overlapping nodes in the community partition results of the GELPA-OCD algorithm on artificial networks.
5. GELPA-OCD\_Code folder: This folder contains the source code files for GELPA-OCD. It includes six Python files:

* evaluate.py: Code for EQ evaluation metrics
* evaluate\_on\_lfr.py: Code for NMI evaluation metrics
* graph\_embedding.py: Graph embedding file, preprocessing code for datasets
* label\_propagation.py: Main code for GELPA-OCD algorithm, specifically the label propagation rules
* node\_importance.py: Node importance code
* main.py: Main function file
* F1-score.py: This is a code file for the F1 evaluation metric.