1. Hands-On Introduction

In this hands-on, we will use one of the deep graph neural network framework, [DGL](https://github.com/dmlc/dgl), to build three classical GNN model, and training at three small data. After this hands-on, you will know how to build a simple GNN model and doing the training task at small data. Please read the following content for more detail.

1. DGL
   1. Introduction

Deep Graph Library (DGL) is a Python package built for easy implementation of graph neural network model family, on top of existing DL frameworks (currently supporting PyTorch, MXNet and TensorFlow). It offers a versatile control of message passing, speed optimization via auto-batching and highly tuned sparse matrix kernels, and multi-GPU/CPU training to scale to graphs of hundreds of millions of nodes and edges.  
For more information, please refer to their [official github page](https://github.com/dmlc/dgl) and [document](https://docs.dgl.ai/index.html).

* 1. Basic usage tutorial

Before starting the tutorial, please prepare your environment by these [steps](https://docs.dgl.ai/install/index.html), and we’ll use pytorch as the backend.

After prepared DGL and deep learning backend, please clone [KDD20 hands-on](https://github.com/dglai/KDD20-Hands-on-Tutorial) and run five “ipynb” files in “3-basics” folder to learn the basic usage of DGL. You can also follow the complete tutorial in DGL’s [official user guide](https://docs.dgl.ai/guide/index.html#) if you are available.

* 1. Tasks

In this section please, you need to build three classical GNN model, including **GCN**, **GraphSAGE**, **GAT**. You can use the layers which already implemented by dgl. It is welcome to refer to the [official examples](https://github.com/dmlc/dgl/tree/master/examples).

Then, we want to perform node classification in semi-supervised manner. For the dataset, please practice three classical citation dataset, including Cora, Citeseer and Pubmed. You can refer [here](https://docs.dgl.ai/api/python/dgl.data.html#dgl.data.CoraGraphDataset) for the example to load the data.

You will notice that, in this hands-on, we only consider the full graph training. We’ll learn how to do stochastic training in the following hands-on.

For the testing accuracy in this hands-on, please try to achieve the following scores.

| Model | Cora acc. | Citeseer acc. | Pubmed acc. |
| --- | --- | --- | --- |
| GCN | 0.81 | 0.7 | 0.78 |
| GraphSAGE | 0.81 | 0.7 | 0.77 |
| GAT | 0.82 | 0.71 | 0.77 |