Our artifact can be executed in the environment with or without GPUs.

Environment without GPUs

- Docker: Because our artifact is based on Docker, Docker should be installed to reproduce the results.

```
$ curl https://get.docker.com | sh \
  && sudo systemctl --now enable docker
```

- Pull the image

```
$ docker pull djhao/icse_docker:newest
```

Because of the dataset and conda environment, the size of the image is around 9 GB.

- Run the image as a container using CPU

```
$ docker run -it djhao/icse_docker:newest
```

- After you finish the reproduction, you can type the `exit` command to exit the container. Then you can execute the following command to remove the image.

```
$ docker image rm djhao/icse_docker:newest
```

Environment with GPUs

- NVIDIA Docker: If you want to execute the artifact in the environment with GPUs, besides Docker, you also need to install NVIDIA Docker. The installation guide of NVIDIA Docker is on https://docs.nvidia.com/datacenter/cloud-native/container-toolkit/install-guide.html and the steps are as follows.

```
$ distribution=$(. /etc/os-release;echo $ID$VERSION_ID) \
   && curl -s -L https://nvidia.github.io/nvidia-docker/gpgkey | sudo apt-key add - \
   && curl -s -L https://nvidia.github.io/nvidia-docker/$distribution/nvidia-
docker.list | sudo tee
   /etc/apt/sources.list.d/nvidia-docker.list
$ sudo apt-get update
$ sudo apt-get install -y nvidia-docker2
$ sudo systemctl restart docker
```

You can execute the following command to run a container,

```
$ docker run -it --gpus all ubuntu:20.04
```

and execute `nvidia-smi` to see the GPU information. If you can get the following output, NVIDIA Docker is installed successfully.

```
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 460.84       Driver Version: 460.84       CUDA Version: 11.2     |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|                               |                      |               MIG M. |
|===============================+======================+======================|
|   0  GeForce RTX 3090    On   | 00000000:04:00.0 Off |                  N/A |
| 30%   22C    P8    20W / 350W |      0MiB / 24268MiB |      0%      Default |
|                               |                      |                  N/A |
+-------------------------------+----------------------+----------------------+
|   1  GeForce RTX 3090    On   | 00000000:05:00.0 Off |                  N/A |
| 30%   24C    P8    28W / 350W |      0MiB / 24268MiB |      0%      Default |
|                               |                      |                  N/A |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                                  |
|  GPU   GI   CI        PID   Type   Process name                  GPU Memory |
|        ID   ID                                                   Usage      |
|=============================================================================|
|  No running processes found                                                 |
+-----------------------------------------------------------------------------+
```

- Pull the image

```
$ docker pull djhao/icse_docker:newest
```

- Run the image as a container using all GPUs

```
$ docker run -it --gpus all djhao/icse_docker:newest
```

or using the specified GPUs, such as 0, 1 in the following command

```
$ docker run -it --gpus '"device=0,1"' djhao/icse_docker:newest
```

- After you finish the reproduction, you can type the `exit` command to exit the container. Then you can execute the following command to remove the image.

```
$ docker image rm djhao/icse_docker:newest
```