BiLARF Installation Guide (CUDA 11.8, Python 3.10)

This document provides step-by-step instructions for installing BiLARF on a system equipped with **CUDA 11.8**, **Python 3.10**, and **Conda**.

1. Create & Activate Conda Environment

```
conda create --name bilarf_310 python=3.10 -y
conda activate bilarf_310
```

2. Install Dependencies

If you have a `requirements.txt`:

```
pip install -r requirements.txt
```

Otherwise, install essential libraries manually:

```
pip install numpy absl_py accelerate gin_config imageio
imageio[ffmpeg] \
            matplotlib mediapy opencv_contrib_python
opencv_python Pillow \
            trimesh pymeshlab xatlas plyfile rawpy ninja
scipy scikit-image \
            scikit-learn tensorboard tensorboardX tqdm
tensorly
```

3. Install PyTorch (CUDA 11.8)

```
pip install torch==2.0.0+cu118 torchvision==0.15.1+cu118
torchaudio==2.0.1+cu118 \
    -f https://download.pytorch.org/whl/torch_stable.html
```

4. Install GCC & G++ (from conda-forge)

```
conda install -c conda-forge gcc_linux-64 gxx_linux-64 -y
```

5. Set Compiler Environment Variables

```
export CC=$CONDA_PREFIX/bin/x86_64-conda-linux-gnu-gcc
export CXX=$CONDA_PREFIX/bin/x86_64-conda-linux-gnu-g++
```

(Optional) To persist these in your `~/.bashrc`:

```
echo 'export CC=$CONDA_PREFIX/bin/x86_64-conda-linux-gnu-
gcc' >> ~/.bashrc
echo 'export CXX=$CONDA_PREFIX/bin/x86_64-conda-linux-gnu-
g++' >> ~/.bashrc
```

6. Verify GCC Version

```
$CC --version
```

You should see something like:

```
x86_64-conda-linux-gnu-gcc (Anaconda gcc) 11.x
```

7. Install gridencoder (Inside BiLARF Repo)

Change directory to the location of the BiLARF repository with `gridencoder/`:

```
cd /path/to/bilarf
pip install ./gridencoder
```

If a precompiled wheel fails to install properly:

```
pip install --no-build-isolation --no-binary :all: ./
gridencoder
```

8. Set LD_LIBRARY_PATH for CUDA + Conda Libraries

```
export LD_LIBRARY_PATH=$CONDA_PREFIX/lib:/shared/centos7/
cuda/11.8/lib64:\
/shared/centos7/nodejs/14.15.4/lib:/shared/centos7/
anaconda3/2022.05/lib:$LD_LIBRARY_PATH
```

(Optional) Persist in your `~/.bashrc`:

```
echo 'export LD_LIBRARY_PATH=$CONDA_PREFIX/lib:/shared/
centos7/cuda/11.8/lib64:/shared/centos7/nodejs/14.15.4/
```

```
lib:/shared/centos7/anaconda3/2022.05/lib:$LD_LIBRARY_PATH'
>> ~/.bashrc
source ~/.bashrc
```

9. Test the Installation

```
python -c "import gridencoder; print('gridencoder imported
successfully')"
```

You should see:

```
gridencoder imported successfully
```

10. (Optional) PyTorch Geometric Modules

Example for installing `torch-scatter`:

```
CUDA=cu118
pip install torch-scatter -f https://data.pyg.org/whl/
torch-2.0.0+${CUDA}.html
```

Usage

Once installed, you can run BiLARF scripts (e.g. `train_render.sh`):

```
conda activate bilarf_310
bash train_render.sh
```

Make sure the environment variables `CC`, `CXX`, and `LD_LIBRARY_PATH` remain properly set.