Setting Up Earth2MIP: A Step-By-Step Guide

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1. Set up your virtual environment. You may use venv, conda, whatever you prefer. To ensure your virtual environment is set up correctly, run the commands

```
which python3
which pip
```

   which should each return a path to your virtual environemnt.

2. Make sure pip, setuptools, and wheel is up to date.

```
pip install --upgrade pip setuptools wheel
```

3. Clone the earth2mip repository and traverse to it.

```
git clone https://github.com/NVIDIA/earth2mip
cd earth2mip
```

4. Install all requirements. This may take a while to run.

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

5. Install additional packages.

```
pip install ruamel.yaml
```

6. Download the files necessary to run the model. Replace `[link]` with this link.

```
wget '[link]'
unzip fcnv2_sm.zip
```

   This folder includes files `global_means.npy`, `global_stds.npy`, `weights.tar`, and `metadata.json`. All of these files are required to load the model later. These means and stds are used if the model uses the ERA5 dataset, which was used to train the model. Store the original npy files in a separate folder, because you will need them if you want to rescale the output to match the ERA5 dataset distributions. If you use your own custom data, make sure to replace these npy files with means and stds that match your custom data. This is automatically done during the forecast generation in `random_mode_pipeline.py`.

7. Now try running `test_earth2mip.py`.

   ```
   python3 /your/path/to/test_earth2mip.py
   ```

   Make sure to replace the file path with your own. You may encounter the following errors. They can be fixed by editing the earth2mip package.

   (a) `No module named 'apex'`

   In earth2mip/networks/fcnv2/sfnonet, replace the line `from apex.normalization import FusedLayerNorm` with `FusedLayerNorm = nn.LayerNorm`. This completely avoids needing the apex package at all. This error should not occur if you have an NVIDIA GPU available to use.

   (b) `WeightsUnpickler Error`

   In earth2mip/networks/fcnv2_sm.py, on line 155, add `weights_only=False` to the arguments in the `torch.load(...)` function.

8. If `test_earth2mip.py` ran successfully, you may try running either of the pipeline scripts `noise_mode_pipeline.py` or `random_mode_pipeline.py` after setting up the `config.py` file.

   Enjoy forecasting with Earth-2 MIP!