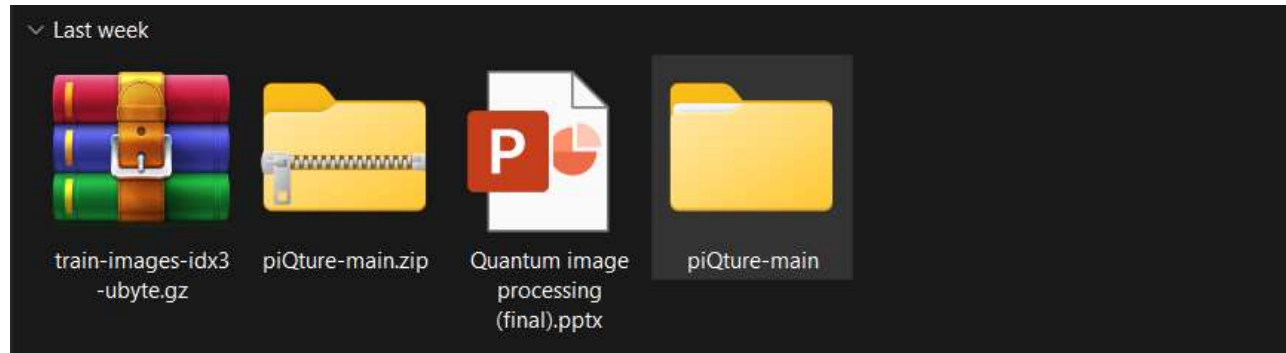


Installation Steps for piQture:

- ▶ 1. Download <https://github.com/SaashaJoshi/piQture> as a zip file
- ▶ 2. Extract this file.



- ▶ 3. Create Virtual environment

Microsoft Windows [Version 10.0.22631.4169]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DELL>cd C:\Users\DELL\Downloads\piQtire-main\piQtire-main

C:\Users\DELL\Downloads\piQtire-main\piQtire-main>python -m venv venv

C:\Users\DELL\Downloads\piQtire-main\piQtire-main>venv\Scripts\activate

(venv) C:\Users\DELL\Downloads\piQtire-main\piQtire-main>jupyter notebook

[I 2024-09-27 12:59:39.069 ServerApp] Extension package jupyter_lsp took 0.3305s to import

[I 2024-09-27 12:59:39.194 ServerApp] Extension package jupyter_server_terminals took 0.1166s to import

[I 2024-09-27 12:59:41.230 ServerApp] jupyter_lsp | extension was successfully linked.

[I 2024-09-27 12:59:41.230 ServerApp] jupyter_server_terminals | extension was successfully linked.

[I 2024-09-27 12:59:41.246 ServerApp] jupyterlab | extension was successfully linked.

[W 2024-09-27 12:59:41.262 JupyterNotebookApp] 'iopub_data_rate_limit' has moved from NotebookApp to ServerApp. This config will be passed to ServerApp. Be sure to update your config before our next release.

[W 2024-09-27 12:59:41.262 ServerApp] ServerApp.iopub_data_rate_limit config is deprecated in 2.0. Use ZMQChannelsWebsocketConnection.iopub_data_rate_limit.

[I 2024-09-27 12:59:41.262 ServerApp] notebook | extension was successfully linked.

[I 2024-09-27 12:59:41.938 ServerApp] notebook_shim | extension was successfully linked.

[I 2024-09-27 12:59:42.079 ServerApp] notebook_shim | extension was successfully loaded.

[I 2024-09-27 12:59:42.079 ServerApp] jupyter_lsp | extension was successfully loaded.

[I 2024-09-27 12:59:42.079 ServerApp] jupyter_server_terminals | extension was successfully loaded.

[I 2024-09-27 12:59:42.095 LabApp] JupyterLab extension loaded from C:\Users\DELL\Downloads\piQtire-main\piQtire-main\venv\Lib\site-packages\jupyterlab

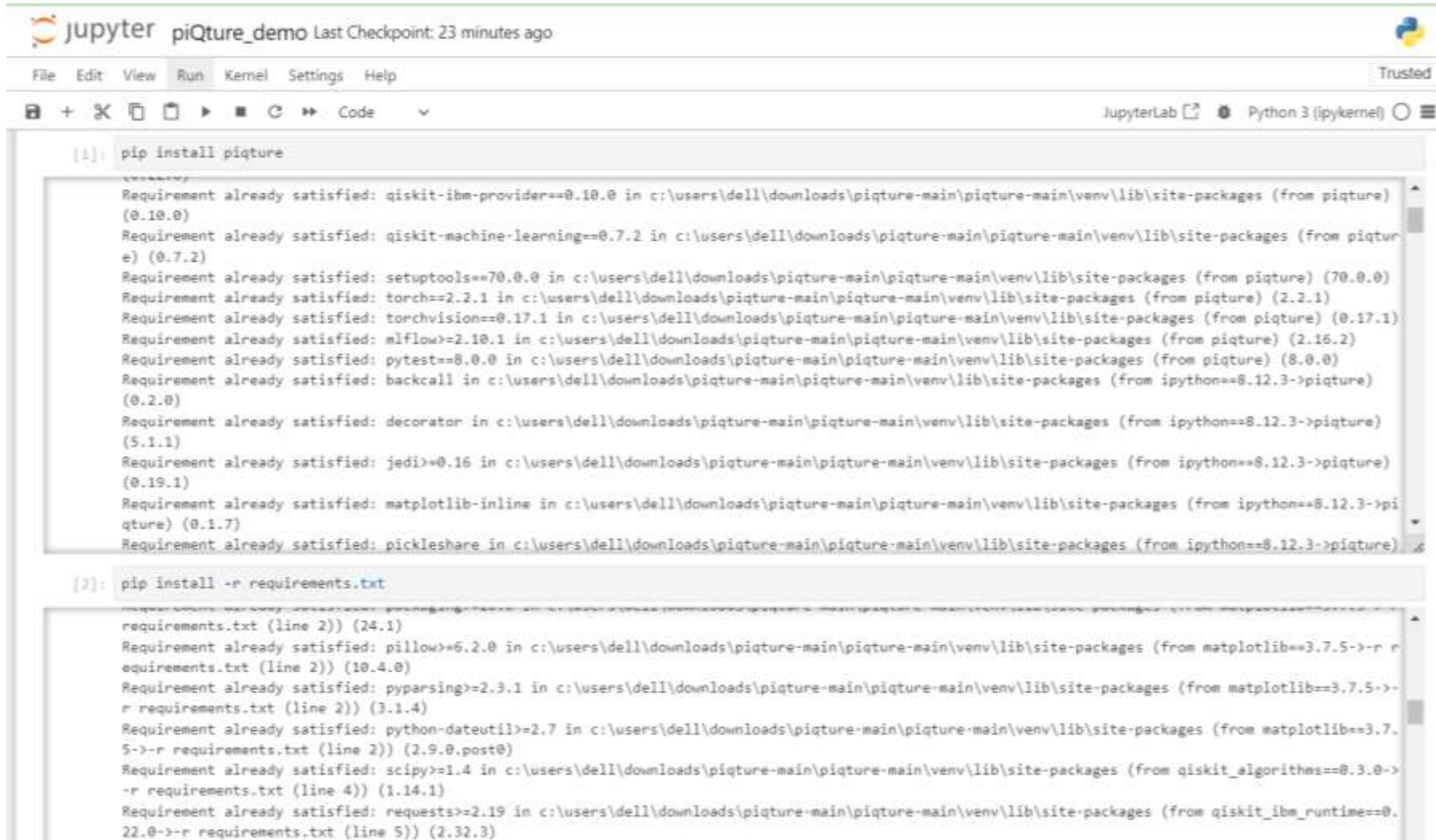
[I 2024-09-27 12:59:42.095 LabApp] JupyterLab application directory is C:\Users\DELL\Downloads\piQtire-main\piQtire-main\venv\share\jupyter\lab

[I 2024-09-27 12:59:42.095 LabApp] Extension Manager is 'pypi'.

[I 2024-09-27 12:59:42.329 ServerApp] jupyterlab | extension was successfully loaded.

4. Install the required dependencies:

- ▶ A. pip install piqtur
- ▶ B. pip install -r requirements.txt
- ▶ C. pip install -e .



The screenshot shows a JupyterLab window titled "piqtur_demo" with a "Trusted" status. The interface includes a menu bar (File, Edit, View, Run, Kernel, Settings, Help) and a toolbar with icons for file operations and code execution. The main area displays a code editor with two cells. The first cell contains the command `pip install piqtur`, and the second cell contains `pip install -r requirements.txt`. Both commands have been executed, resulting in a list of requirements that are already satisfied in the current environment.

```
[1]: pip install piqtur

Requirement already satisfied: qiskit-ibm-provider==0.10.0 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (0.10.0)
Requirement already satisfied: qiskit-machine-learning==0.7.2 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (0.7.2)
Requirement already satisfied: setuptools==70.0.0 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (70.0.0)
Requirement already satisfied: torch==2.2.1 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (2.2.1)
Requirement already satisfied: torchvision==0.17.1 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (0.17.1)
Requirement already satisfied: mlflow==2.10.1 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (2.16.2)
Requirement already satisfied: pytest==8.0.0 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from piqtur) (8.0.0)
Requirement already satisfied: backcall in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from ipython==8.12.3->piqtur) (0.2.0)
Requirement already satisfied: decorator in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from ipython==8.12.3->piqtur) (5.1.1)
Requirement already satisfied: jedi>=0.16 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from ipython==8.12.3->piqtur) (0.19.1)
Requirement already satisfied: matplotlib-inline in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from ipython==8.12.3->piqtur) (0.1.7)
Requirement already satisfied: pickleshare in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from ipython==8.12.3->piqtur)

[2]: pip install -r requirements.txt

requirements.txt (line 2)) (24.1)
Requirement already satisfied: pillow>=6.2.0 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from matplotlib==3.7.5->-r requirements.txt (line 2)) (10.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from matplotlib==3.7.5->-r requirements.txt (line 2)) (3.1.4)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from matplotlib==3.7.5->-r requirements.txt (line 2)) (2.9.0.post0)
Requirement already satisfied: scipy>=1.4 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from qiskit_algorithms==0.3.0->-r requirements.txt (line 4)) (1.14.1)
Requirement already satisfied: requests>=2.19 in c:\users\dell\downloads\piqtur-main\piqtur-main\venv\lib\site-packages (from qiskit_ibm_runtime==0.22.0->-r requirements.txt (line 5)) (2.32.3)
```

After installation, execute code

```
[3]: pip install -e .
```

```
Obtaining file:///C:/Users/DELL/Downloads/piQture-main/piQture-main
Installing build dependencies: started
Installing build dependencies: finished with status 'done'
Checking if build backend supports build_editable: started
Checking if build backend supports build_editable: finished with status 'done'
Getting requirements to build editable: started
Getting requirements to build editable: finished with status 'done'
Preparing editable metadata (pyproject.toml): started
Preparing editable metadata (pyproject.toml): finished with status 'done'
Requirement already satisfied: ipython==8.12.3 in c:\users\dell\downloads\piqture-main\piqture-main\venv\lib\site-packages (from piqture==0.1.1) (8.12.3)
Requirement already satisfied: matplotlib==3.7.5 in c:\users\dell\downloads\piqture-main\piqture-main\venv\lib\site-packages (from piqture==0.1.1) (3.7.5)
Requirement already satisfied: qiskit>=1.0.0 in c:\users\dell\downloads\piqture-main\piqture-main\venv\lib\site-packages (from piqture==0.1.1) (1.2.1)
Requirement already satisfied: qiskit-algorithms==0.3.0 in c:\users\dell\downloads\piqture-main\piqture-main\venv\lib\site-packages (from piqture==0.1.1) (0.3.0)
Requirement already satisfied: qiskit-ibm-runtime==0.22.0 in c:\users\dell\downloads\piqture-main\piqture-main\venv\lib\site-packages (from piqture==0.1.1) (0.22.0)
```

- Link for ineqr:

<https://github.com/SaashaJoshi/piQture-demos/blob/main/INEQR.ipynb>

- Execute this code:

```
[10]: import torch
      from piqtire.data_loader.mnist_data_loader import load_mnist_dataset
      from piqtire.embeddings.image_embeddings.ineqr import INEQR
```

```
[11]: # Resize images to 2x2
      img_size = 2
      train_dataset, test_dataset = load_mnist_dataset(img_size)

      # Retrieve a single image from the dataset
      image, label = train_dataset[187]
      image_size = tuple(image.squeeze().size())
```

```
[12]: # Change pixel values from tensor to list
      pixel_vals = (image * 255).round().to(torch.uint8)
      pixel_vals = pixel_vals.tolist()
      print("Label: ", label, "\nPixel values: ", pixel_vals)
```

```
Label: 2
Pixel values: [[53, 67], [74, 60]]]
```

```
[13]: embedding = INEQR(image_size, pixel_vals).ineqr()
      embedding.draw("mpl", style="iqp")
```

