In [44]:
```
import sys, os
import tensorflow as tf
import numpy as np
import matplotlib.pyplot as plt
import sklearn as sk
print("Python:", sys.version.splitlines()[0])
```

```
Python: 3.11.5 | packaged by Anaconda, Inc. | (main, Sep 11 2023, 13:26:23) [MSC v.19
16 64 bit (AMD64)]
```

In [45]:
```
!pip install tensorflow tensorflow-gpu opencv-python matplotlib
```

```
Requirement already satisfied: tensorflow in c:\users\dell\downloads\anaconda\lib\sit
e-packages (2.16.1)
Collecting tensorflow-gpu
  Downloading tensorflow-gpu-2.12.0.tar.gz (2.6 kB)
  Preparing metadata (setup.py): started
  Preparing metadata (setup.py): finished with status 'error'
```

```
  error: subprocess-exited-with-error

  × python setup.py egg_info did not run successfully.
  │ exit code: 1
  ╰─> [44 lines of output]
      Traceback (most recent call last):
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\requirements.py", line 35, in __init__
          parsed = _parse_requirement(requirement_string)
                   ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\_parser.py", line 64, in parse_requirement
          return _parse_requirement(Tokenizer(source, rules=DEFAULT_RULES))
                 ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\_parser.py", line 82, in _parse_requirement
          url, specifier, marker = _parse_requirement_details(tokenizer)
                                   ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\_parser.py", line 126, in _parse_requirement_details
          marker = _parse_requirement_marker(
                   ^^^^^^^^^^^^^^^^^^^^^^^^^^
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\_parser.py", line 147, in _parse_requirement_marker
          tokenizer.raise_syntax_error(
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\_tokenizer.py", line 165, in raise_syntax_error
          raise ParserSyntaxError(
      setuptools.extern.packaging._tokenizer.ParserSyntaxError: Expected end or semic
olon (after name and no valid version specifier)
          python_version>"3.7"
                         ^

      The above exception was the direct cause of the following exception:

      Traceback (most recent call last):
        File "<string>", line 2, in <module>
        File "<pip-setuptools-caller>", line 35, in <module>
        File "C:\Users\DELL\AppData\Local\Temp\pip-install-x6gif8l1\tensorflow-gpu_0f
4d7c46e7934ba684167cbd8cdf83ac\setup.py", line 40, in <module>
          setuptools.setup()
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\__init__.
py", line 106, in setup
          _install_setup_requires(attrs)
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\__init__.
py", line 77, in _install_setup_requires
          dist.parse_config_files(ignore_option_errors=True)
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\dist.py",
line 900, in parse_config_files
          self._finalize_requires()
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\dist.py",
line 597, in _finalize_requires
          self._move_install_requirements_markers()
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\dist.py",
line 637, in _move_install_requirements_markers
          inst_reqs = list(_reqs.parse(spec_inst_reqs))
                      ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
        File "C:\Users\DELL\Downloads\anaconda\Lib\site-packages\setuptools\_vendor\p
ackaging\requirements.py", line 37, in __init__
          raise InvalidRequirement(str(e)) from e
```

```
      setuptools.extern.packaging.requirements.InvalidRequirement: Expected end or se
micolon (after name and no valid version specifier)
          python_version>"3.7"
                        ^
      [end of output]

  note: This error originates from a subprocess, and is likely not a problem with pi
p.
error: metadata-generation-failed

× Encountered error while generating package metadata.
╰─> See above for output.

note: This is an issue with the package mentioned above, not pip.
hint: See above for details.
```

In [46]:
```
!pip list
```

Package	Version
absl-py	2.3.1
aiobotocore	2.5.0
aiofiles	22.1.0
aiohttp	3.8.5
aioitertools	0.7.1
aiosignal	1.2.0
aiosqlite	0.18.0
alabaster	0.7.12
anaconda-anon-usage	0.4.2
anaconda-catalogs	0.2.0
anaconda-client	1.12.1
anaconda-cloud-auth	0.1.3
anaconda-navigator	2.5.0
anaconda-project	0.11.1
anyio	3.5.0
appdirs	1.4.4
argon2-cffi	21.3.0
argon2-cffi-bindings	21.2.0
arrow	1.2.3
astroid	2.14.2
astropy	5.1
asttokens	2.0.5
astunparse	1.6.3
async-timeout	4.0.2
atomicwrites	1.4.0
attrs	22.1.0
Automat	20.2.0
autopep8	1.6.0
Babel	2.11.0
backcall	0.2.0
backports.functools-lru-cache	1.6.4
backports.tempfile	1.0
backports.weakref	1.0.post1
bcrypt	3.2.0
beautifulsoup4	4.12.2
binaryornot	0.4.4
black	0.0
bleach	4.1.0
bokeh	3.2.1
boltons	23.0.0
botocore	1.29.76
Bottleneck	1.3.5
brotlipy	0.7.0
certifi	2023.7.22
cffi	1.15.1
chardet	4.0.0
charset-normalizer	2.0.4
click	8.0.4
cloudpickle	2.2.1
clyent	1.2.2
colorama	0.4.6
colorcet	3.0.1
comm	0.1.2
conda	23.7.4
conda-build	3.26.1
conda-content-trust	0.2.0
conda_index	0.3.0
conda-libmamba-solver	23.7.0

conda-pack	0.6.0
conda-package-handling	2.2.0
conda_package_streaming	0.9.0
conda-repo-cli	1.0.75
conda-token	0.4.0
conda-verify	3.4.2
constantly	15.1.0
contourpy	1.0.5
cookiecutter	1.7.3
cryptography	41.0.3
cssselect	1.1.0
cycler	0.11.0
cytoolz	0.12.0
daal4py	2023.1.1
dask	2023.6.0
datasets	2.12.0
datashader	0.15.2
datashape	0.5.4
debugpy	1.6.7
decorator	5.1.1
defusedxml	0.7.1
diff-match-patch	20200713
dill	0.3.6
distributed	2023.6.0
docstring-to-markdown	0.11
docutils	0.18.1
entrypoints	0.4
et-xmlfile	1.1.0
executing	0.8.3
fastjsonschema	2.16.2
filelock	3.9.0
flake8	6.0.0
Flask	2.2.2
flatbuffers	25.2.10
fonttools	4.25.0
fqdn	1.5.1
frozenlist	1.3.3
fsspec	2023.4.0
future	0.18.3
gast	0.6.0
gensim	4.3.0
glob2	0.7
google-pasta	0.2.0
greenlet	2.0.1
grpcio	1.74.0
h5py	3.14.0
HeapDict	1.0.1
holoviews	1.17.1
huggingface-hub	0.15.1
hvplot	0.8.4
hyperlink	21.0.0
idna	3.4
imagecodecs	2023.1.23
imageio	2.26.0
imagesize	1.4.1
imbalanced-learn	0.10.1
importlib-metadata	6.0.0
incremental	21.3.0
inflection	0.5.1
iniconfig	1.1.1

```
intake                        0.6.8
intervaltree                  3.1.0
ipykernel                     6.25.0
ipython                       8.15.0
ipython-genutils              0.2.0
ipywidgets                    8.0.4
isoduration                   20.11.0
isort                         5.9.3
itemadapter                   0.3.0
itemloaders                   1.0.4
itsdangerous                  2.0.1
jaraco.classes                3.2.1
jedi                          0.18.1
jellyfish                     1.0.1
Jinja2                        3.1.2
jinja2-time                   0.2.0
jmespath                      0.10.0
joblib                        1.2.0
json5                         0.9.6
jsonpatch                     1.32
jsonpointer                   2.1
jsonschema                    4.17.3
jupyter                       1.0.0
jupyter_client                7.4.9
jupyter-console               6.6.3
jupyter_core                  5.3.0
jupyter-events                0.6.3
jupyter-server                1.23.4
jupyter_server_fileid         0.9.0
jupyter_server_ydoc           0.8.0
jupyter-ydoc                  0.2.4
jupyterlab                    3.6.3
jupyterlab-pygments           0.1.2
jupyterlab_server             2.22.0
jupyterlab-widgets            3.0.5
kaleido                       0.2.1
keras                         3.11.2
keyring                       23.13.1
kiwisolver                    1.4.4
lazy_loader                   0.2
lazy-object-proxy             1.6.0
libarchive-c                  2.9
libclang                      18.1.1
libmambapy                    1.5.1
linkify-it-py                 2.0.0
llvmlite                      0.40.0
lmdb                          1.4.1
locket                        1.0.0
lxml                          4.9.3
lz4                           4.3.2
Markdown                      3.4.1
markdown-it-py                2.2.0
MarkupSafe                    2.1.1
matplotlib                    3.7.2
matplotlib-inline             0.1.6
mccabe                        0.7.0
mdit-py-plugins               0.3.0
mdurl                         0.1.0
menuinst                      1.4.19
mistune                       0.8.4
```

mkl-fft	1.3.8
mkl-random	1.2.4
mkl-service	2.4.0
ml-dtypes	0.3.2
more-itertools	8.12.0
mpmath	1.3.0
msgpack	1.0.3
multidict	6.0.2
multipledispatch	0.6.0
multiprocess	0.70.14
munkres	1.1.4
mypy-extensions	1.0.0
namex	0.1.0
navigator-updater	0.4.0
nbclassic	0.5.5
nbclient	0.5.13
nbconvert	6.5.4
nbformat	5.9.2
nest-asyncio	1.5.6
networkx	3.1
nltk	3.8.1
notebook	6.5.4
notebook_shim	0.2.2
numba	0.57.1
numexpr	2.8.4
numpy	1.26.4
numpydoc	1.5.0
opencv-python	4.11.0.86
openpyxl	3.0.10
opt_einsum	3.4.0
optree	0.17.0
packaging	23.1
pandas	2.0.3
pandocfilters	1.5.0
panel	1.2.3
param	1.13.0
paramiko	2.8.1
parsel	1.6.0
parso	0.8.3
partd	1.4.0
pathlib	1.0.1
pathspec	0.10.3
patsy	0.5.3
pep8	1.7.1
pexpect	4.8.0
pickleshare	0.7.5
Pillow	9.4.0
pip	25.2
pkce	1.0.3
pkginfo	1.9.6
platformdirs	3.10.0
plotly	5.9.0
pluggy	1.0.0
ply	3.11
poyo	0.5.0
prometheus-client	0.14.1
prompt-toolkit	3.0.36
Protego	0.1.16
protobuf	4.25.8
psutil	5.9.0

ptyprocess	0.7.0
pure-eval	0.2.2
py-cpuinfo	8.0.0
pyarrow	11.0.0
pyasn1	0.4.8
pyasn1-modules	0.2.8
pycodestyle	2.10.0
pycosat	0.6.4
pycparser	2.21
pyct	0.5.0
pycurl	7.45.2
pydantic	1.10.8
pyDes	2.0.1
PyDispatcher	2.0.5
pydocstyle	6.3.0
pyerfa	2.0.0
pyflakes	3.0.1
Pygments	2.15.1
PyJWT	2.4.0
pylint	2.16.2
pylint-venv	2.3.0
pyls-spyder	0.4.0
PyNaCl	1.5.0
pyodbc	4.0.34
pyOpenSSL	23.2.0
pyparsing	3.0.9
PyQt5	5.15.7
PyQt5-sip	12.11.0
PyQtWebEngine	5.15.4
pyrsistent	0.18.0
PySocks	1.7.1
pytest	7.4.0
python-dateutil	2.8.2
python-dotenv	0.21.0
python-json-logger	2.0.7
python-lsp-black	1.2.1
python-lsp-jsonrpc	1.0.0
python-lsp-server	1.7.2
python-slugify	5.0.2
python-snappy	0.6.1
pytoolconfig	1.2.5
pytz	2023.3.post1
pyviz-comms	2.3.0
PyWavelets	1.4.1
pywin32	305.1
pywin32-ctypes	0.2.0
pywinpty	2.0.10
PyYAML	6.0
pyzmq	23.2.0
QDarkStyle	3.0.2
qstylizer	0.2.2
QtAwesome	1.2.2
qtconsole	5.4.2
QtPy	2.2.0
queuelib	1.5.0
regex	2022.7.9
requests	2.31.0
requests-file	1.5.1
requests-toolbelt	1.0.0
responses	0.13.3

```
rfc3339-validator             0.1.4
rfc3986-validator             0.1.1
rich                          14.1.0
rope                          1.7.0
Rtree                         1.0.1
ruamel.yaml                   0.17.21
ruamel-yaml-conda             0.17.21
s3fs                          2023.4.0
safetensors                   0.3.2
scikit-image                  0.20.0
scikit-learn                  1.3.0
scikit-learn-intelex          20230426.121932
scipy                         1.11.1
Scrapy                        2.8.0
seaborn                       0.12.2
Send2Trash                    1.8.0
service-identity              18.1.0
setuptools                    68.0.0
sip                           6.6.2
six                           1.16.0
smart-open                    5.2.1
sniffio                       1.2.0
snowballstemmer               2.2.0
sortedcontainers              2.4.0
soupsieve                     2.4
Sphinx                        5.0.2
sphinxcontrib-applehelp       1.0.2
sphinxcontrib-devhelp         1.0.2
sphinxcontrib-htmlhelp        2.0.0
sphinxcontrib-jsmath          1.0.1
sphinxcontrib-qthelp          1.0.3
sphinxcontrib-serializinghtml 1.1.5
spyder                        5.4.3
spyder-kernels                2.4.4
SQLAlchemy                    1.4.39
stack-data                    0.2.0
statsmodels                   0.14.0
sympy                         1.11.1
tables                        3.8.0
tabulate                      0.8.10
TBB                           0.2
tblib                         1.7.0
tenacity                      8.2.2
tensorboard                   2.16.2
tensorboard-data-server       0.7.2
tensorflow                    2.16.1
tensorflow-intel              2.16.1
tensorflow-io-gcs-filesystem  0.31.0
termcolor                     3.1.0
terminado                     0.17.1
text-unidecode                1.3
textdistance                  4.2.1
threadpoolctl                 2.2.0
three-merge                   0.1.1
tifffile                      2023.4.12
tinycss2                      1.2.1
tldextract                    3.2.0
tokenizers                    0.13.2
toml                          0.10.2
tomlkit                       0.11.1
```

```
toolz                          0.12.0
tornado                        6.3.2
tqdm                           4.65.0
traitlets                      5.7.1
transformers                   4.32.1
Twisted                        22.10.0
twisted-iocpsupport            1.0.2
typing_extensions              4.7.1
tzdata                         2023.3
uc-micro-py                    1.0.1
ujson                          5.4.0
Unidecode                      1.2.0
uri-template                   1.3.0
urllib3                        1.26.16
w3lib                          1.21.0
watchdog                       2.1.6
wcwidth                        0.2.5
webcolors                      24.11.1
webencodings                   0.5.1
websocket-client               0.58.0
Werkzeug                       2.2.3
whatthepatch                   1.0.2
wheel                          0.38.4
widgetsnbextension             4.0.5
win-inet-pton                  1.1.0
wrapt                          1.14.1
xarray                         2023.6.0
xlwings                        0.29.1
xxhash                         2.0.2
xyzservices                    2022.9.0
y-py                           0.5.9
yapf                           0.31.0
yarl                           1.8.1
ypy-websocket                  0.8.2
zict                           2.2.0
zipp                           3.11.0
zope.interface                 5.4.0
zstandard                      0.19.0
```

In [ ]:
```
import tensorflow as tf
import os
```

In [7]:
```
import tensorflow as tf

print(tf)  # <-- two underscores before & after
```

```
<module 'tensorflow' (<_frozen_importlib_external.NamespaceLoader object at 0x0000019
00E216250>)>
```

In [10]:
```
import tensorflow as tf
print(tf.__file__)
```

```
None
```

In [11]:
```
import cv2
import imghdr
```

```
C:\Users\DELL\AppData\Local\Temp\ipykernel_33588\4232469594.py:2: DeprecationWarning:
'imghdr' is deprecated and slated for removal in Python 3.13
  import imghdr
```

In [12]:
```
data_dir = 'data'
```

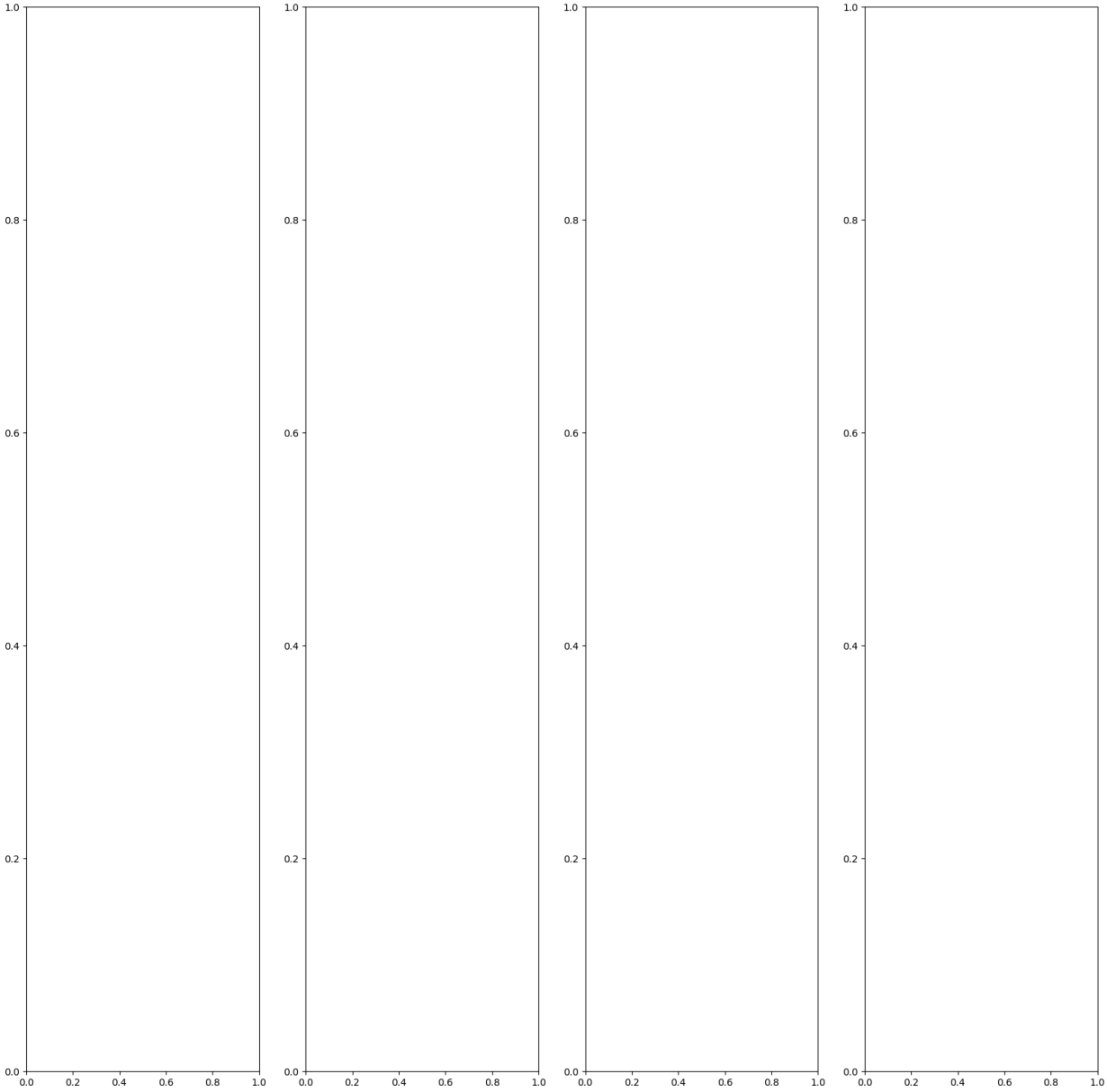
In [13]:
```
image_exts = ['jpeg','jpg', 'bmp', 'png']
```

In [19]:
```
import numpy as np
from matplotlib import pyplot as plt
```

In [25]:
```
fig, ax = plt.subplots(ncols=4, figsize=(20,20))
for idx, img in enumerate(batch[0][:4]):
    ax[idx].imshow(img.astype(int))
    ax[idx].title.set_text(batch[1][idx])
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[25], line 2
      1 fig, ax = plt.subplots(ncols=4, figsize=(20,20))
----> 2 for idx, img in enumerate(batch[0][:4]):
      3     ax[idx].imshow(img.astype(int))
      4     ax[idx].title.set_text(batch[1][idx])

NameError: name 'batch' is not defined
```



In [31]:
```
import cv2
```

In [35]:
```
img = cv2.imread('07-120104-happy_people_are_not_nice_people.jpg')
plt.imshow(img)
plt.show()
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
Cell In[35], line 2
      1 img = cv2.imread('07-120104-happy_people_are_not_nice_people.jpg')
----> 2 plt.imshow(img)
      3 plt.show()

File c:\Users\DELL\Downloads\anaconda\Lib\site-packages\matplotlib\pyplot.py:2695, in
imshow(X, cmap, norm, aspect, interpolation, alpha, vmin, vmax, origin, extent, inter
polation_stage, filternorm, filterrad, resample, url, data, **kwargs)
   2689 @_copy_docstring_and_deprecators(Axes.imshow)
   2690 def imshow(
   2691         X, cmap=None, norm=None, *, aspect=None, interpolation=None,
   2692         alpha=None, vmin=None, vmax=None, origin=None, extent=None,
   2693         interpolation_stage=None, filternorm=True, filterrad=4.0,
   2694         resample=None, url=None, data=None, **kwargs):
-> 2695     __ret = gca().imshow(
   2696         X, cmap=cmap, norm=norm, aspect=aspect,
   2697         interpolation=interpolation, alpha=alpha, vmin=vmin,
   2698         vmax=vmax, origin=origin, extent=extent,
   2699         interpolation_stage=interpolation_stage,
   2700         filternorm=filternorm, filterrad=filterrad, resample=resample,
   2701         url=url, **({"data": data} if data is not None else {}),
   2702         **kwargs)
   2703     sci(__ret)
   2704     return __ret

File c:\Users\DELL\Downloads\anaconda\Lib\site-packages\matplotlib\__init__.py:1446,
in _preprocess_data.<locals>.inner(ax, data, *args, **kwargs)
   1443 @functools.wraps(func)
   1444 def inner(ax, *args, data=None, **kwargs):
   1445     if data is None:
-> 1446         return func(ax, *map(sanitize_sequence, args), **kwargs)
   1448     bound = new_sig.bind(ax, *args, **kwargs)
   1449     auto_label = (bound.arguments.get(label_namer)
   1450                   or bound.kwargs.get(label_namer))

File c:\Users\DELL\Downloads\anaconda\Lib\site-packages\matplotlib\axes\_axes.py:566
3, in Axes.imshow(self, X, cmap, norm, aspect, interpolation, alpha, vmin, vmax, orig
in, extent, interpolation_stage, filternorm, filterrad, resample, url, **kwargs)
   5655 self.set_aspect(aspect)
   5656 im = mimage.AxesImage(self, cmap=cmap, norm=norm,
   5657                       interpolation=interpolation, origin=origin,
   5658                       extent=extent, filternorm=filternorm,
   5659                       filterrad=filterrad, resample=resample,
   5660                       interpolation_stage=interpolation_stage,
   5661                       **kwargs)
-> 5663 im.set_data(X)
   5664 im.set_alpha(alpha)
   5665 if im.get_clip_path() is None:
   5666     # image does not already have clipping set, clip to axes patch

File c:\Users\DELL\Downloads\anaconda\Lib\site-packages\matplotlib\image.py:701, in _
ImageBase.set_data(self, A)
    697 self._A = cbook.safe_masked_invalid(A, copy=True)
    699 if (self._A.dtype != np.uint8 and
    700         not np.can_cast(self._A.dtype, float, "same_kind")):
--> 701     raise TypeError("Image data of dtype {} cannot be converted to "
    702                     "float".format(self._A.dtype))
    704 if self._A.ndim == 3 and self._A.shape[-1] == 1:
```

```
    705     # If just one dimension assume scalar and apply colormap
    706     self._A = self._A[:, :, 0]

TypeError: Image data of dtype object cannot be converted to float
```