EnlightenGAN on AWS

AWS Setup

1. Login to https://aws.amazon.com with your credentials and you will be directed to the AWS Management Console page.
2. On the upper right-hand corner set your location as *Oregon* on the AWS Management Console page.
3. Go to Services, which can be found on the top menu bar, and click on EC2 from the Compute category in the drop-down menu.
4. Choose Instances from the left-side menu to start the process of launching an EC2 instance.
    a. Click on the **Launch Instance** blue button
    b. Select **Deep Learning Base AMI (Ubuntu 16.04)** as your AMI. ***Note:*** *You can select any machine of your choice that satisfies the requirements necessary to run EnlightenGAN.*
    c. Next, select **p2.8xlarge GPU instance** as your instance type. ***Note:*** *You can select any GPU instance of your choice. We chose this GPU instance type because EnlightenGAN requires at least 3 GPUs.*
    d. No other configurations are necessary so proceed to the final page by clicking on the **Review and Launch** blue button on the bottom, right-hand corner.
    e. Click on **Launch** and a prompt will appear directing you to either create a new key pair or choose an existing key pair to access your EC2 instance from your local system.
    f. Follow the instructions on the next prompt to access your instance.

EnlightenGAN Setup

The following instructions were written by referencing the original source of the code (https://github.com/TAMU-VITA/EnlightenGAN). Please note that since we did not train EnlightenGAN, the instructions below direct you to run If any errors result in the following the set of instructions, please refer to the original installation guide or contact us.

1. Execute the command **git clone https://github.com/TAMU-VITA/EnlightenGAN.git** in order to clone the source code directory.
2. Change the directory to EnlightenGAN by executing the following command: **cd EnlightenGAN**
3. In order to install the required packages to run EnlightenGAN, execute the following command: **pip install -r requirement.txt**
4. Download a VGG pretrained model from (https://drive.google.com/file/d/1IfCeihmPqGWJ0KHmH-mTMi_pn3z3Zo-P/view) and (https://drive.google.com/file/d/190BBev58S1QRS2nDKQR5Ijx04_GOJgW6/view) and place these models into a directory called model (**mkdir model**).

a. Use the scp command to transfer files between your local instance and AWS instance. ***Note:*** *You might be able to use the wget command directly from instance but the file that gets downloaded varies from system to system so its best to use the scp command.*

5. Since we won't be training EnlightenGAN, we will be using a pretrained model.
    a. In the EnlightenGAN folder, make a directory called checkpoints and within this directory create another directory called enlightening by executing the following commands.
        i. **mkdir checkpoints**
        ii. **mkdir ./checkpoints/enlightening**
    b. Create test directories by executing the following commands.
        i. **cd ..**
        ii. **mkdir test_dataset**
        iii. **mkdir ./test_dataset/testA**
        iv. **mkdir ./test_dataset/testB**
    c. You will be placing the images you want to test in the testA folder. The set of commands below will direct you on how to do this task. ***Note:*** *Before running inference, place at least one image in testB folder or else you will run into an error and won't be able to proceed.*
        i. Download the sample images that we provided on our github page. These set of images were sampled from the Exclusively Dark Dataset.
        ii. Use the scp command to transfer files between your system and the AWS instance.
            1. *You can also clone our github repository into the AWS instance and have access to the "SampleImages" folder so you wouldn't have to use the scp command*
        iii. **mv ./SampleImages/* ~/test_dataset/testA**
        iv. **cp ~/test_dataset/testA/2015_00661.jpg ~/test_dataset/testB**
            1. *You can use any sample image of your choice. Here we used the "2015_00661.jpg" sample image.*
    d. Execute the following command to run prediction of EnlightenGAN
        i. **cd EnlighenGAN**
        ii. **python scripts/script.py –predict**
    e. If the "python scripts/script.py –predict" produces the following error, please ignore it. ***Note:*** *The reason why the following error shows up is because we have not set up the visdom server. However, this should not affect you running EnlightenGAN.*

```
Exception in user code:
------------------------------------------------------------
Traceback (most recent call last):
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/connection.py", line 171, in _new_conn
    (self._dns_host, self.port), self.timeout, **extra_kw)
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/util/connection.py", line 79, in create_connect
    raise err
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/util/connection.py", line 69, in create_connect
    sock.connect(sa)
ConnectionRefusedError: [Errno 111] Connection refused

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/connectionpool.py", line 600, in urlopen
    chunked=chunked)
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/connectionpool.py", line 354, in _make_request
    conn.request(method, url, **httplib_request_kw)
  File "/home/ubuntu/anaconda3/lib/python3.6/http/client.py", line 1239, in request
    self._send_request(method, url, body, headers, encode_chunked)
  File "/home/ubuntu/anaconda3/lib/python3.6/http/client.py", line 1285, in _send_request
    self.endheaders(body, encode_chunked=encode_chunked)
  File "/home/ubuntu/anaconda3/lib/python3.6/http/client.py", line 1234, in endheaders
    self._send_output(message_body, encode_chunked=encode_chunked)
  File "/home/ubuntu/anaconda3/lib/python3.6/http/client.py", line 1026, in _send_output
    self.send(msg)
  File "/home/ubuntu/anaconda3/lib/python3.6/http/client.py", line 964, in send
    self.connect()
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/connection.py", line 196, in connect
    conn = self._new_conn()
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/connection.py", line 180, in _new_conn
    self, "Failed to establish a new connection: %s" % e)
urllib3.exceptions.NewConnectionError: <urllib3.connection.HTTPConnection object at 0x7f3387004390>: Failed to est

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/requests/adapters.py", line 449, in send
    timeout=timeout
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/connectionpool.py", line 638, in urlopen
    _stacktrace=sys.exc_info()[2])
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/urllib3/util/retry.py", line 398, in increment
    raise MaxRetryError(_pool, url, error or ResponseError(cause))
urllib3.exceptions.MaxRetryError: HTTPConnectionPool(host='localhost', port=8097): Max retries exceeded with url:
ction refused',))

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/visdom/__init__.py", line 711, in _send
    data=json.dumps(msg),
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/visdom/__init__.py", line 677, in _handle_post
    r = self.session.post(url, data=data)
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/requests/sessions.py", line 572, in post
    return self.request('POST', url, data=data, json=json, **kwargs)
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/requests/sessions.py", line 524, in request
    resp = self.send(prep, **send_kwargs)
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/requests/sessions.py", line 637, in send
    r = adapter.send(request, **kwargs)
  File "/home/ubuntu/anaconda3/lib/python3.6/site-packages/requests/adapters.py", line 516, in send
    raise ConnectionError(e, request=request)
requests.exceptions.ConnectionError: HTTPConnectionPool(host='localhost', port=8097): Max retries exceeded with ur
nnection refused',))
[Errno 111] Connection refused
1
```

f. The fake images produced by EnlightenGAN will be stored in the **EnlightenGAN/ablation/enlightening/test_200/images/** folder. ***Note:*** *For the sample image that we used (**2015_00661.jpg**) the format of the generated image will be **2015_00661_fake_B.png**.*

g. Since we will be using the enlightened output images of EnlightenGAN to fine-tune our Faster R-CNN model, we will have to rename these output images into their original names.

   i. *E.g.: **"2015__00661_fake_B.png**" needs to be renamed to "**2015__00661.png**"*

For this purpose we have written a small python script called rename.py. ***Note:*** *The reason why we had to rename the generated images into their original names was because that's how images are defined in the COCO annotations. If we didn't rename them, then we would have to make a new annotations file.*

h. Transfer all your enlightened output images into a folder on your local system and place the rename.py python script in the same folder.
    i. *Using your favorite Python IDE, run this python script and it will generate a folder called "**fakeImg**" where all your renamed fake images will be placed.*