Midterm Question 6

April 5, 2022

1 Midterm Question 6

1.1 Loading Libraries

[1]:
```
# Importing Libraries


## Importing Packages␣
 ↪##############################################################################
import tensorflow as tf
from tensorflow import keras
import numpy as np
import os

## Importing Model␣
 ↪##############################################################################
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Conv2D, MaxPool2D , Flatten
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.optimizers import Adam



# Personal Preference␣
 ↪##############################################################################
import warnings
warnings.filterwarnings('ignore')
```

1.2 Making the VGGnet 16 Layer

[2]:
```
# Creating the CNN

model = Sequential()
model.
 ↪add(Conv2D(input_shape=(224,224,3),filters=64,kernel_size=(3,3),padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=64,kernel_size=(3,3),padding="same", activation="relu"))
```

```
model.add(MaxPool2D(pool_size=(2,2),strides=(2,2)))

model.add(Conv2D(filters=128, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=128, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(MaxPool2D(pool_size=(2,2),strides=(2,2)))

model.add(Conv2D(filters=256, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=256, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=256, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(MaxPool2D(pool_size=(2,2),strides=(2,2)))

model.add(Conv2D(filters=512, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=512, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=512, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(MaxPool2D(pool_size=(2,2),strides=(2,2)))

model.add(Conv2D(filters=512, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=512, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(Conv2D(filters=512, kernel_size=(3,3), padding="same",␣
 ↪activation="relu"))
model.add(MaxPool2D(pool_size=(2,2),strides=(2,2)))
```

[3]:
```
# Final Dense Layers

model.add(Flatten())
model.add(Dense(units=4096,activation="relu"))
model.add(Dense(units=4096,activation="relu"))
model.add(Dense(units=2, activation="softmax"))
```

[4]:
```
# Compiling the model

opt = Adam(lr=0.001)
model.compile(optimizer=opt, loss= keras.losses.categorical_crossentropy,␣
 ↪metrics=['accuracy'])
```

```
--------------------------------------------------------------------------
```

```
ModuleNotFoundError                       Traceback (most recent call last)
<ipython-input-4-b2a73ac123a0> in <module>
      2
      3 opt = Adam(lr=0.001)
----> 4 model.compile(optimizer=opt, loss= keras.losses.categorical_crossentropy,␣
 ↪metrics=['accuracy'])

~\AppData\Roaming\Python\Python38\site-packages\tensorflow\python\util\lazy_loade
 ↪py in __getattr__(self, item)
     60
     61   def __getattr__(self, item):
---> 62     module = self._load()
     63     return getattr(module, item)
     64

~\AppData\Roaming\Python\Python38\site-packages\tensorflow\python\util\lazy_loade
 ↪py in _load(self)
     43     """Load the module and insert it into the parent's globals."""
     44     # Import the target module and insert it into the parent's namespace
---> 45     module = importlib.import_module(self.__name__)
     46     self._parent_module_globals[self._local_name] = module
     47

~\Anaconda3\lib\importlib\__init__.py in import_module(name, package)
    125                 break
    126             level += 1
--> 127     return _bootstrap._gcd_import(name[level:], package, level)
    128
    129

~\Anaconda3\lib\importlib\_bootstrap.py in _gcd_import(name, package, level)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load_unlocked(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _call_with_frames_removed(f, *args,␣
 ↪**kwds)

~\Anaconda3\lib\importlib\_bootstrap.py in _gcd_import(name, package, level)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load_unlocked(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _call_with_frames_removed(f, *args,␣
 ↪**kwds)
```

```
~\Anaconda3\lib\importlib\_bootstrap.py in _gcd_import(name, package, level)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load_unlocked(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _call_with_frames_removed(f, *args,␣
↪**kwds)

~\Anaconda3\lib\importlib\_bootstrap.py in _gcd_import(name, package, level)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load(name, import_)

~\Anaconda3\lib\importlib\_bootstrap.py in _find_and_load_unlocked(name, import_)

ModuleNotFoundError: No module named 'keras'
```

[5]:
```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 224, 224, 64)      1792
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 224, 224, 64)      36928
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 112, 112, 64)      0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 112, 112, 128)     73856
_________________________________________________________________
conv2d_3 (Conv2D)            (None, 112, 112, 128)     147584
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 56, 56, 128)       0
_________________________________________________________________
conv2d_4 (Conv2D)            (None, 56, 56, 256)       295168
_________________________________________________________________
conv2d_5 (Conv2D)            (None, 56, 56, 256)       590080
_________________________________________________________________
conv2d_6 (Conv2D)            (None, 56, 56, 256)       590080
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 28, 28, 256)       0
_________________________________________________________________
conv2d_7 (Conv2D)            (None, 28, 28, 512)       1180160
_________________________________________________________________
conv2d_8 (Conv2D)            (None, 28, 28, 512)       2359808
_________________________________________________________________
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```
conv2d_9 (Conv2D)            (None, 28, 28, 512)       2359808
_________________________________________________________________
max_pooling2d_3 (MaxPooling2 (None, 14, 14, 512)       0
_________________________________________________________________
conv2d_10 (Conv2D)           (None, 14, 14, 512)       2359808
_________________________________________________________________
conv2d_11 (Conv2D)           (None, 14, 14, 512)       2359808
_________________________________________________________________
conv2d_12 (Conv2D)           (None, 14, 14, 512)       2359808
_________________________________________________________________
max_pooling2d_4 (MaxPooling2 (None, 7, 7, 512)         0
_________________________________________________________________
flatten (Flatten)            (None, 25088)             0
_________________________________________________________________
dense (Dense)                (None, 4096)              102764544
_________________________________________________________________
dense_1 (Dense)              (None, 4096)              16781312
_________________________________________________________________
dense_2 (Dense)              (None, 2)                 8194
=================================================================
Total params: 134,268,738
Trainable params: 134,268,738
Non-trainable params: 0
_________________________________________________________________
```

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