NEURAL NETWORK & DEEP LEARNING

ASSIGNMENT 9

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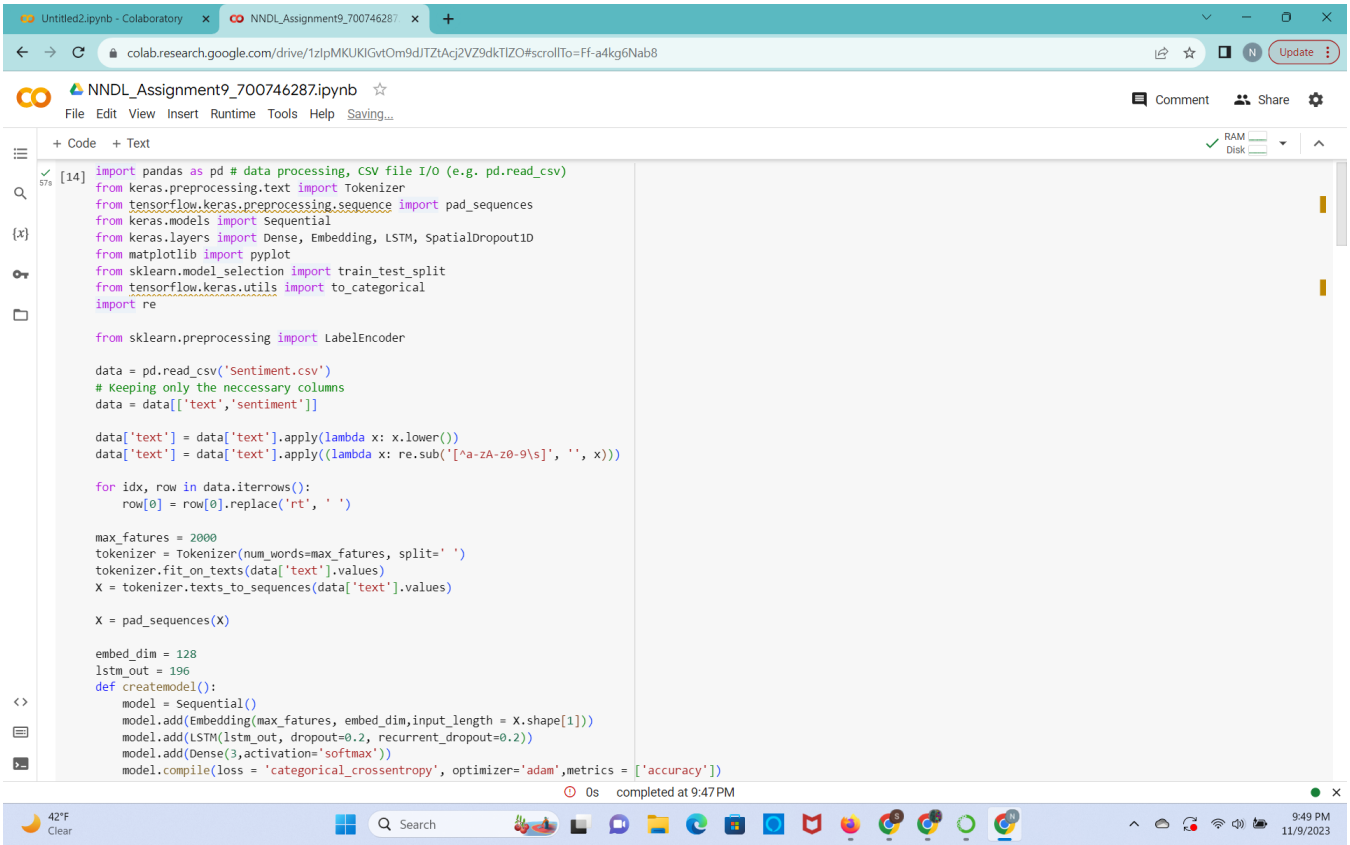
Student ID : 700746287

Git hub Link: https://github.com/NSnusha/NNDL_Assignment9

Video link: https://drive.google.com/file/d/1_4l5uuX3dhenTavemL9Zmnuwx5cVgEjh/view?usp=sharing



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[14]

```
embed_dim = 128
lstm_out = 196
def createmodel():
    model = Sequential()
    model.add(Embedding(max_fatures, embed_dim,input_length = X.shape[1]))
    model.add(LSTM(lstm_out, dropout=0.2, recurrent_dropout=0.2))
    model.add(Dense(3,activation='softmax'))
    model.compile(loss = 'categorical_crossentropy', optimizer='adam',metrics = ['accuracy'])
    return model
# print(model.summary())

labelencoder = LabelEncoder()
integer_encoded = labelencoder.fit_transform(data['sentiment'])
y = to_categorical(integer_encoded)
X_train, X_test, Y_train, Y_test = train_test_split(X,y, test_size = 0.33, random_state = 42)

batch_size = 32
model = createmodel()
model.fit(X_train, Y_train, epochs = 1, batch_size=batch_size, verbose = 2)
score,acc = model.evaluate(X_test,Y_test,verbose=2,batch_size=batch_size)
print(score)
print(acc)
print(model.metrics_names)
```

```
291/291 - 51s - loss: 0.8309 - accuracy: 0.6439 - 51s/epoch - 176ms/step
144/144 - 3s - loss: 0.7467 - accuracy: 0.6739 - 3s/epoch - 22ms/step
0.7466925382614136
0.6738750338554382
['loss', 'accuracy']
```

[15]

```
model.save('sentiment_model.h5')
```

```
/usr/local/lib/python3.10/dist-packages/keras/src/engine/training.py:3079: UserWarning: You are saving your model as an HDF5 file via `model.save()`. This file format is considered leg
  saving_api.save_model(
```

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```
from scikeras.wrappers import KerasClassifier
#from keras.wrappers.scikit_learn import KerasClassifier
from sklearn.model_selection import GridSearchCV
from keras.optimizers import Adam

def create_model(units=196, dropout=0.2, learning_rate=0.001):
    model = Sequential()
    model.add(Embedding(max_fatures, embed_dim,input_length = X.shape[1]))
    model.add(LSTM(units, dropout=dropout, recurrent_dropout=dropout))
    model.add(Dense(3, activation='softmax'))
    optimizer = Adam(lr=learning_rate)
    model.compile(loss='categorical_crossentropy', optimizer=optimizer, metrics=['accuracy'])
    return model

model = KerasClassifier(build_fn=createmodel,verbose=2) #initiating model to test performance by applying multiple hyper parameters
batch_size= [10, 20, 40] #hyper parameter batch_size
epochs = [1, 2] #hyper parameter no. of epochs
param_grid= {'batch_size':batch_size, 'epochs':epochs} #creating dictionary for batch size, no. of epochs
grid  = GridSearchCV(estimator=model, param_grid=param_grid) #Applying dictionary with hyper parameters
grid_result= grid.fit(X_train,Y_train) #Fitting the model
# summarize results
print("Best: %f using %s" % (grid_result.best_score_, grid_result.best_params_)) #best score, best hyper parameters
```

```
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
  X, y = self._initialize(X, y)
744/744 - 55s - loss: 0.8164 - accuracy: 0.6512 - 55s/epoch - 73ms/step
186/186 - 1s - 1s/epoch - 8ms/step
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
  X, y = self._initialize(X, y)
744/744 - 55s - loss: 0.8204 - accuracy: 0.6480 - 55s/epoch - 74ms/step
186/186 - 1s - 1s/epoch - 8ms/step
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
  X, y = self._initialize(X, y)
744/744 - 55s - loss: 0.8263 - accuracy: 0.6442 - 55s/epoch - 74ms/step
186/186 - 1s - 1s/epoch - 8ms/step
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
  X, y = self._initialize(X, y)
```

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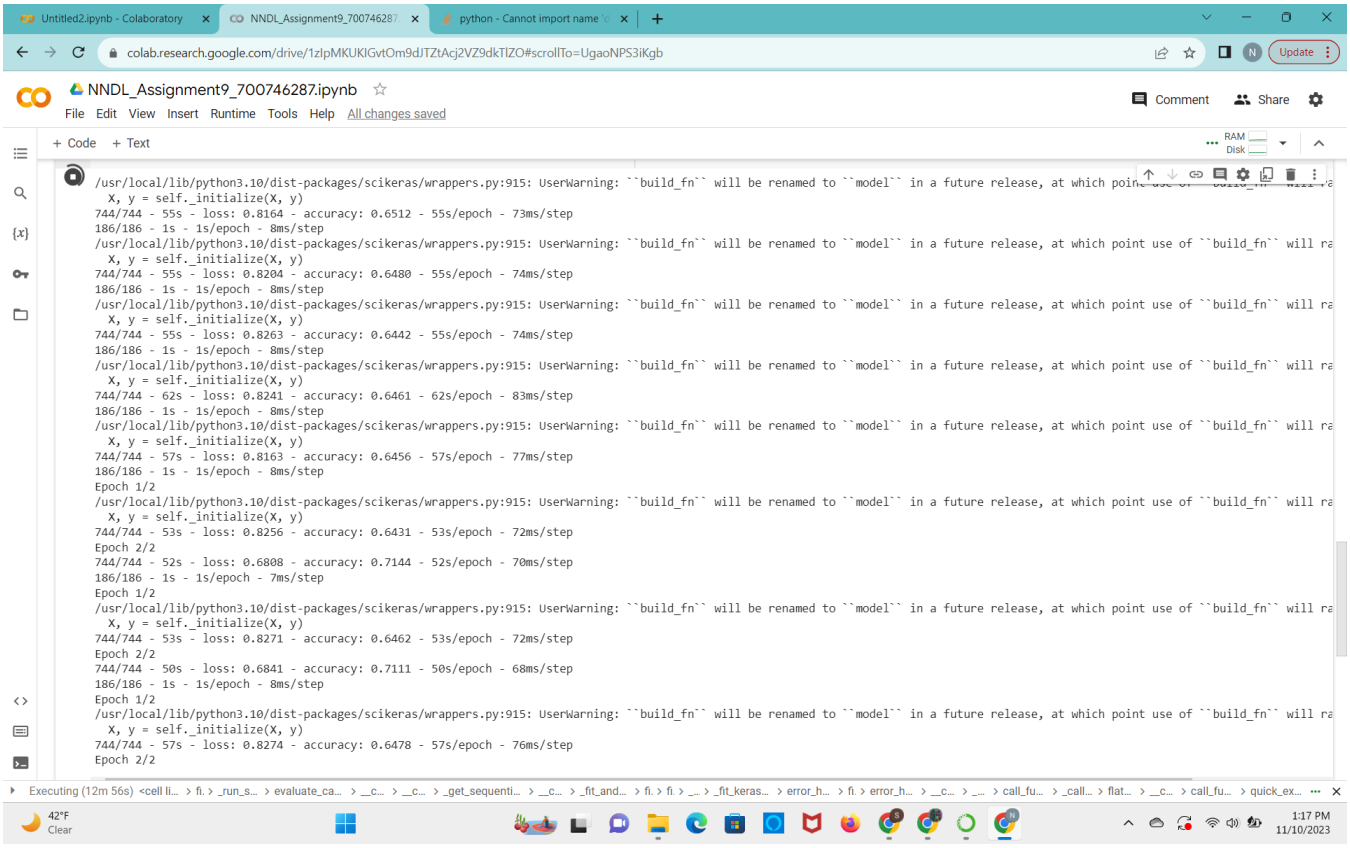
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186/186 - 1s - 1s/epoch - 8ms/step
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X, y = self._initialize(X, y)
744/744 - 62s - loss: 0.8241 - accuracy: 0.6461 - 62s/epoch - 83ms/step
186/186 - 1s - 1s/epoch - 8ms/step
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
X, y = self._initialize(X, y)
744/744 - 57s - loss: 0.8163 - accuracy: 0.6456 - 57s/epoch - 77ms/step
186/186 - 1s - 1s/epoch - 8ms/step
Epoch 1/2
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
X, y = self._initialize(X, y)
744/744 - 53s - loss: 0.8256 - accuracy: 0.6431 - 53s/epoch - 72ms/step
Epoch 2/2
744/744 - 52s - loss: 0.6808 - accuracy: 0.7144 - 52s/epoch - 70ms/step
186/186 - 1s - 1s/epoch - 7ms/step
Epoch 1/2
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
X, y = self._initialize(X, y)
744/744 - 53s - loss: 0.8271 - accuracy: 0.6462 - 53s/epoch - 72ms/step
Epoch 2/2
744/744 - 50s - loss: 0.6841 - accuracy: 0.7111 - 50s/epoch - 68ms/step
186/186 - 1s - 1s/epoch - 8ms/step
Epoch 1/2
/usr/local/lib/python3.10/dist-packages/scikeras/wrappers.py:915: UserWarning: ``build_fn`` will be renamed to ``model`` in a future release, at which point use of ``build_fn`` will ra
X, y = self._initialize(X, y)
744/744 - 57s - loss: 0.8274 - accuracy: 0.6478 - 57s/epoch - 76ms/step
Epoch 2/2
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