

```
1s [?] # Mount Google Drive
from google.colab import drive
drive.mount('/content/drive')

[?] Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
1m [▶] import pandas as pd
from keras.preprocessing.text import Tokenizer
from keras.preprocessing.sequence import pad_sequences
from keras.models import Sequential
from keras.layers import Dense, Embedding, LSTM, SpatialDropout1D
from matplotlib import pyplot
from sklearn.model_selection import train_test_split
from tensorflow.keras.utils import to_categorical

import re

from sklearn.preprocessing import LabelEncoder
url = 'https://drive.google.com/uc?id=1KCK_RXlAgohZr8sjsUu8vvfvsrEK6lF2'
data = pd.read_csv(url)
# Keeping only the necessary columns
data = data[['text', 'sentiment']]

data['text'] = data['text'].apply(lambda x: x.lower())
data['text'] = data['text'].apply(lambda x: re.sub('[^a-zA-z0-9\s]', '', x))

for idx, row in data.iterrows():
    row[0] = row[0].replace('rt', ' ')

max_fatures = 2000
tokenizer = Tokenizer(num_words=max_fatures, split=' ')
tokenizer.fit_on_texts(data['text'].values)
X = tokenizer.texts_to_sequences(data['text'].values)

X = pad_sequences(X)

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)

# Save the trained model to a file
model.save('sentiment_model.h5')
```

```
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291/291 - loss: 0.8278 - accuracy: 0.6426 - 56s/epoch - 193ms/step
144/144 - 2s - loss: 0.7539 - accuracy: 0.6728 - 2s/epoch - 11ms/step
0.7538867592811584
0.6727828979492188
['loss', 'accuracy']
/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 legacy. We recommend using instead the native Keras format, e.g. `model.save('my_model.keras')`.
  saving_api.save_model(

from keras.models import load_model

# Load the saved model
loaded_model = load_model('sentiment_model.h5')

# New text data
new_text = ["A lot of good things are happening. We are respected again throughout the world, and that's a great thing. @realDonaldTrump"]

# Preprocess the new text data
new_text = [text.lower() for text in new_text]
new_text = [re.sub('[^a-zA-Z0-9\s]', '', text) for text in new_text]
new_text_sequences = tokenizer.texts_to_sequences(new_text)
new_text_padded = pad_sequences(new_text_sequences, maxlen=X.shape[1])

# Make predictions on the new text data
predictions = loaded_model.predict(new_text_padded)

# Convert predictions to sentiment labels
predicted_sentiments = labelencoder.inverse_transform(predictions.argmax(axis=1))

# Print the predicted sentiments
print(predicted_sentiments)

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1/1 [=====] - 0s 390ms/step
['Negative']

[10] pip install scikeras
Collecting scikeras
  Downloading scikeras-0.12.0-py3-none-any.whl (27 kB)
Requirement already satisfied: packaging>=20.21 in /usr/local/lib/python3.10/dist-packages (from scikeras) (23.2)
Requirement already satisfied: scikit-learn=1.0.0 in /usr/local/lib/python3.10/dist-packages (from scikeras) (1.2.2)
Requirement already satisfied: numpy>=1.17.3 in /usr/local/lib/python3.10/dist-packages (from scikit-learn=1.0.0->scikeras) (1.23.5)
Requirement already satisfied: scipy>=1.3.2 in /usr/local/lib/python3.10/dist-packages (from scikit-learn=1.0.0->scikeras) (1.11.3)
Requirement already satisfied: joblib>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from scikit-learn=1.0.0->scikeras) (1.3.2)
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn=1.0.0->scikeras) (3.2.0)
Installing collected packages: scikeras
Successfully installed scikeras-0.12.0
```

```
from sklearn.model_selection import GridSearchCV
from scikeras.wrappers import KerasClassifier
model = KerasClassifier(build_fn=model, verbose=0)
batch_size = [10, 20, 40]
epochs = [1, 2, 3]
param_grid = dict(batch_size=batch_size, epochs=epochs)
from sklearn.model_selection import GridSearchCV
grid = GridSearchCV(estimator=model, param_grid=param_grid)
grid_result = grid.fit(X_train, Y_train)
# summarize results
print("Best: %f using %s" % (grid_result.best_score_, grid_result.best_params_))
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Best: 0.708167 using {'batch_size': 40, 'epochs': 1}

```

GitHub Repo Link: <https://github.com/Krypton0626/Bigdata/tree/main/ICP%209>

YouTube Video Link: <https://youtu.be/F12D-HQNp8Q>