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import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from pathlib import Path
import string
import re
import joblib
import json
from collections import Counter
import nltk
from nltk.corpus import stopwords
from nltk.stem import WordNetLemmatizer
import nltk
import random
import pickle
from time import time
from nltk.stem.lancaster import LancasterStemmer
from tensorflow.keras.utils import plot_model
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Embedding, Dense
from tensorflow.keras.callbacks import ModelCheckpoint, EarlyStopping, ReduceLROnPlateau
from tensorflow.python.keras.callbacks import ModelCheckpoint, EarlyStopping, ReduceLROnPlateau
tensorboard = TensorBoard(log_dir='./logs/(time)')

In [1]:
nltk.download('wordnet')

[nltk_data] Downloading package wordnet to C:\Users\Deepak
[nltk_data] \Avudiappan\AppData\Roaming\nltk_data...
[nltk_data] Package wordnet is already up-to-date

Out[2]:
True

In [3]:
def load_doc(jsonFile):
    with open(jsonFile, encoding='utf8') as file:
        json_data = json.loads(file.read())
        return json_data

In [4]:
# data = load_doc('intents.json')
data = load_doc('intents.json')

In [5]:
# Data Preprocessing
words, labels, docs_x, docs_y = [], [], [], []
stemmer = LancasterStemmer()
nltk.download('punkt')
for intent in data['intents']:
    for pattern in intent['patterns']:
        wrds = nltk.word_tokenize(pattern)
        training.append([bag for bag in enumerate(docs_x) if wrds in bag])
        docs_x.append(wrds)
        docs_y.append(intent['tag'])

    if intent['tag'] not in labels:
        labels.append(intent['tag'])

words = [stemmer.stem(w.lower()) for w in words if w != '?'] # converting all words to lowercase
removed_dups = list(set(words)) # removing all duplicate words
labels = sorted(labels) # removing all duplicate labels

# One-hot encoding
training_output = [], []
out_empty = [0 for _ in range(len(labels))]

# Creating bag of words
for X, doc in enumerate(docs_x):
    bag = []
    wrds = [stemmer.stem(w) for w in doc]

    for w in words:
        bag.append(1 if w in wrds else 0)

    bag.append(0)
    output_row = out_empty[:]
    output_row[labels.index(doc_y[x])] = 1
    training.append(bag)
    output.append(output_row)

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[nltk_data] Package punkt is already up-to-date

In [6]:
# converting to array
training = np.array(training)
output = np.array(output)

In [7]:
training[0].shape

Out[7]:
(128,)

In [8]:
output[0].shape

Out[8]:
(17,)

In [9]:
#Predicting results
with open("data.pickle", "wb") as f:
    pickle.dump([words, labels, training, output], f)

In [10]:
early_stopping = EarlyStopping(monitor='loss', patience=5)
checkpoint = ModelCheckpoint("model-v1.h5",
                             monitor="loss",
                             mode="min",
                             save_best_only=True,
                             verbose=0)

reduce_lr = ReduceLROnPlateau(monitor='loss', factor = 0.2, patience = 3, verbose = 1, min_delta = 0.0001)
callbacks = [early_stopping, checkpoint, reduce_lr]

In [11]:
model = Sequential()
model.add(Dense(units=len(training[0]), activation = 'relu' ))
model.add(Dense(32, activation = 'relu'))
model.compile(loss='categorical_crossentropy', optimizer = 'adam', metrics=['accuracy'])

In [12]:
history = model.fit(training, output, batch_size = 16, epochs=500, callbacks = [tensorboard, callbacks], verbose=0)

Epoch 1/500
1/11 =>.....- ETA: 0s - loss: 2.8544 - accuracy: 0.0000e+00WARNING:tensorflow:From C:\Users\Deepak\Avudiappan\AppData\Roaming\Python\Python37\site-packages\tensorflow\python\ops\summary_ops.py:1277: stop (from tensorflow.python.eager.profiler) is deprecated and will be removed after 2020-07-01.
Instructions for updating:
use tf.profiler.experimental.stop instead.
2/11 [====]----- ETA: 0s - loss: 2.8404 - accuracy: 0.0000e+00WARNING:tensorflow:Call hends method 'on_train_batch_end' is slow compared to the batch time (Batch time: 0.0070s vs 'on_train_batch_end' time: 0.0793s). Check your callbacks.
Epoch 2/500
1/11 [====]----- ETA: 0s - loss: 2.7879 - accuracy: 0.1250
Epoch 3/500
1/11 [====]----- ETA: 0s - loss: 2.7474 - accuracy: 0.1563
Epoch 4/500
1/11 [====]----- ETA: 0s - loss: 2.6684 - accuracy: 0.1875
Epoch 5/500
1/11 [====]----- ETA: 0s - loss: 2.6459 - accuracy: 0.2284
Epoch 6/500
1/11 [====]----- ETA: 0s - loss: 2.6249 - accuracy: 0.2500
Epoch 7/500
1/11 [====]----- ETA: 0s - loss: 2.5218 - accuracy: 0.1875
Epoch 8/500
1/11 [====]----- ETA: 0s - loss: 2.5844 - accuracy: 0.1875
Epoch 9/500
1/11 [====]----- ETA: 0s - loss: 2.5684 - accuracy: 0.2840
Epoch 10/500
1/11 [====]----- ETA: 0s - loss: 2.4732 - accuracy: 0.4375
Epoch 11/500
1/11 [====]----- ETA: 0s - loss: 2.4732 - accuracy: 0.2901
Epoch 12/500
1/11 [====]----- ETA: 0s - loss: 2.6204 - accuracy: 0.0625
Epoch 13/500
1/11 [====]----- ETA: 0s - loss: 2.3594 - accuracy: 0.1563
Epoch 14/500
1/11 [====]----- ETA: 0s - loss: 2.5559 - accuracy: 0.3333
Epoch 15/500
1/11 [====]----- ETA: 0s - loss: 2.5114 - accuracy: 0.1250
Epoch 16/500
1/11 [====]----- ETA: 0s - loss: 2.2478 - accuracy: 0.3580
Epoch 17/500
1/11 [====]----- ETA: 0s - loss: 2.0641 - accuracy: 0.5625
Epoch 18/500
1/11 [====]----- ETA: 0s - loss: 2.2478 - accuracy: 0.1193
Epoch 19/500
1/11 [====]----- ETA: 0s - loss: 2.1193 - accuracy: 0.4012
Epoch 20/500
1/11 [====]----- ETA: 0s - loss: 1.9857 - accuracy: 0.4383
Epoch 21/500
1/11 [====]----- ETA: 0s - loss: 1.7662 - accuracy: 0.6250
Epoch 22/500
1/11 [====]----- ETA: 0s - loss: 1.8404 - accuracy: 0.4677
Epoch 23/500
1/11 [====]----- ETA: 0s - loss: 1.7519 - accuracy: 0.5000
Epoch 24/500
1/11 [====]----- ETA: 0s - loss: 1.6997 - accuracy: 0.5617
Epoch 25/500
1/11 [====]----- ETA: 0s - loss: 1.7061 - accuracy: 0.5000
Epoch 26/500
1/11 [====]----- ETA: 0s - loss: 1.5500 - accuracy: 0.5926
Epoch 27/500
1/11 [====]----- ETA: 0s - loss: 1.1444 - accuracy: 0.7500
Epoch 28/500
1/11 [====]----- ETA: 0s - loss: 1.4051 - accuracy: 0.6296
Epoch 29/500
1/11 [====]----- ETA: 0s - loss: 1.1718 - accuracy: 0.5625
Epoch 30/500
1/11 [====]----- ETA: 0s - loss: 1.2632 - accuracy: 0.6605
Epoch 31/500
1/11 [====]----- ETA: 0s - loss: 1.1315 - accuracy: 0.6875
Epoch 32/500
1/11 [====]----- ETA: 0s - loss: 1.2006 - accuracy: 0.7407
Epoch 33/500
1/11 [====]----- ETA: 0s - loss: 0.7486 - accuracy: 1.0000
Epoch 34/500
1/11 [====]----- ETA: 0s - loss: 0.8514 - accuracy: 0.8272
Epoch 35/500
1/11 [====]----- ETA: 0s - loss: 0.7401 - accuracy: 1.0000
Epoch 36/500
1/11 [====]----- ETA: 0s - loss: 0.8512 - accuracy: 0.8580
Epoch 37/500
1/11 [====]----- ETA: 0s - loss: 0.6172 - accuracy: 0.8125
Epoch 38/500
1/11 [====]----- ETA: 0s - loss: 0.7417 - accuracy: 0.8642
Epoch 39/500
1/11 [====]----- ETA: 0s - loss: 0.6334 - accuracy: 1.0000
Epoch 40/500
1/11 [====]----- ETA: 0s - loss: 0.6322 - accuracy: 0.9074
Epoch 41/500
1/11 [====]----- ETA: 0s - loss: 0.4522 - accuracy: 1.0000
Epoch 42/500
1/11 [====]----- ETA: 0s - loss: 0.5474 - accuracy: 0.9259
Epoch 43/500
1/11 [====]----- ETA: 0s - loss: 0.5302 - accuracy: 0.9375
Epoch 44/500
1/11 [====]----- ETA: 0s - loss: 0.4686 - accuracy: 0.9444
Epoch 45/500
1/11 [====]----- ETA: 0s - loss: 0.4271 - accuracy: 0.9375
Epoch 46/500
1/11 [====]----- ETA: 0s - loss: 0.4047 - accuracy: 0.9506
Epoch 47/500
1/11 [====]----- ETA: 0s - loss: 0.6125 - accuracy: 0.8750
Epoch 48/500
1/11 [====]----- ETA: 0s - loss: 0.4047 - accuracy: 0.9506
Epoch 49/500
1/11 [====]----- ETA: 0s - loss: 0.2379 - accuracy: 1.0000
Epoch 50/500
1/11 [====]----- ETA: 0s - loss: 0.3020 - accuracy: 0.9630
Epoch 51/500
1/11 [====]----- ETA: 0s - loss: 0.2894 - accuracy: 0.9375
Epoch 52/500
1/11 [====]----- ETA: 0s - loss: 0.2697 - accuracy: 0.9375
Epoch 53/500
1/11 [====]----- ETA: 0s - loss: 0.2697 - accuracy: 0.9630
Epoch 54/500
1/11 [====]----- ETA: 0s - loss: 0.2023 - accuracy: 0.9375
Epoch 55/500
1/11 [====]----- ETA: 0s - loss: 0.2419 - accuracy: 0.9630
Epoch 56/500
1/11 [====]----- ETA: 0s - loss: 0.2170 - accuracy: 0.9375
Epoch 57/500
1/11 [====]----- ETA: 0s - loss: 0.2194 - accuracy: 0.9630
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1/11 [====]----- ETA: 0s - loss: 0.1499 - accuracy: 1.0000
Epoch 59/500
1/11 [====]----- ETA: 0s - loss: 0.2069 - accuracy: 0.9691
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Epoch 61/500
1/11 [====]----- ETA: 0s - loss: 0.2459 - accuracy: 0.9375
Epoch 62/500
1/11 [====]----- ETA: 0s - loss: 0.1912 - accuracy: 0.9691
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Epoch 257/500
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Epoch 258/500
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