Assignment No: 2B

Roll No.: - 19121028

Title of the Assignment:

Multiclass classification using Deep Neural Networks: Example: Use the OCR letter recognition dataset https://archive.ics.uci.edu/ml/datasets/letter+recognition

```
import pandas as pd
# Load the dataset
data = pd.read_csv("https://archive.ics.uci.edu/ml/machine-learning-databases/letter-recognition/letter-recognition.data", header=None)
from sklearn.preprocessing import LabelEncoder
from sklearn.model_selection import train_test_split
# Preprocess the dataset
X = data.iloc[:, 1:]
y = data.iloc[:, 0]
encoder = LabelEncoder()
y = encoder.fit_transform(y)
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
from keras.models import Sequential
from keras.layers import Dense, Dropout
# Build the DNN model
model = Sequential()
model.add(Dense(units=64, activation='relu', input_dim=X_train.shape[1]))
model.add(Dropout(0.2))
model.add(Dense(units=32, activation='relu'))
model.add(Dropout(0.2))
model.add(Dense(units=26, activation='softmax'))
# Train the model
model.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
model.fit(X_train, y_train, epochs=10, batch_size=32)
   Epoch 1/10
   Fnoch 2/10
   Epoch 3/10
   Epoch 4/10
   500/500 [================== - 1s 2ms/step - loss: 1.3511 - accuracy: 0.5789
   Epoch 5/10
   Epoch 6/10
   500/500 [=================== - 1s 2ms/step - loss: 1.1832 - accuracy: 0.6273
   Epoch 7/10
   Epoch 8/10
   Epoch 9/10
   500/500 [===
             500/500 [================= ] - 3s 6ms/step - loss: 1.0166 - accuracy: 0.6773
   <keras.callbacks.History at 0x7f2f85b18bb0>
# Test the model
loss, accuracy = model.evaluate(X_test, y_test)
print("Test Loss:", loss)
print("Test Accuracy:", accuracy)
   Test Loss: 0.7014068365097046
   Test Accuracy: 0.8012499809265137
```

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