

CO4

Question: 19 feed forward network using iris data set

Q: Programs on feedforward network to classify any standard dataset available in the public domain.

Procedure

```
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler, LabelEncoder
from sklearn.datasets import load_iris
from tensorflow.keras import models, layers

# Load the Iris dataset
iris = load_iris()
X = iris.data
y = iris.target

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Standardize the features
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# One-hot encode the target variable
label_encoder = LabelEncoder()
y_train = label_encoder.fit_transform(y_train)
y_test = label_encoder.transform(y_test)

# Create a simple feedforward neural network model
model = models.Sequential()
model.add(layers.Dense(64, activation='relu', input_shape=(4,)))
model.add(layers.Dense(32, activation='relu'))
```

```

model.add(layers.Dense(3, activation='softmax')) # Output layer with 3 classes

# Compile the model
model.compile(optimizer='adam',
              loss='sparse_categorical_crossentropy', # Use 'categorical_crossentropy' if y is
one-hot encoded
              metrics=['accuracy'])

# Train the model
model.fit(X_train, y_train, epochs=50, batch_size=8, validation_split=0.1)

# Evaluate the model on the test set
test_loss, test_acc = model.evaluate(X_test, y_test)
print(f'Test accuracy: {test_acc}')

```

Output

```

C:\Users\ajcemca\PycharmProjects\NithinR\venv\Scripts\python.exe C:\Users\ajcemca\PycharmProjects\NithinR\Q19.py
2023-11-23 15:23:10.542314: I tensorflow/core/util/port.cc:113] oneDNN custom operations are on. You may see slightly different num
WARNING:tensorflow:From C:\Users\ajcemca\PycharmProjects\NithinR\venv\lib\site-packages\keras\src\losses.py:2976: The name tf.losses
WARNING:tensorflow:From C:\Users\ajcemca\PycharmProjects\NithinR\venv\lib\site-packages\keras\src\backend.py:873: The name tf.get_d
2023-11-23 15:23:21.605678: I tensorflow/core/platform/cpu_feature_guard.cc:182] This TensorFlow binary is optimized to use availab
To enable the following instructions: SSE SSE2 SSE3 SSE4.1 SSE4.2 AVX2 FMA, in other operations, rebuild TensorFlow with the approp
WARNING:tensorflow:From C:\Users\ajcemca\PycharmProjects\NithinR\venv\lib\site-packages\keras\src\optimizers\__init__.py:309: The n

Epoch 1/50
WARNING:tensorflow:From C:\Users\ajcemca\PycharmProjects\NithinR\venv\lib\site-packages\keras\src\utils\tf_utils.py:492: The name t
WARNING:tensorflow:From C:\Users\ajcemca\PycharmProjects\NithinR\venv\lib\site-packages\keras\src\engine\base_layer_utils.py:384: T

14/14 [=====] - 2s 34ms/step - loss: 0.9907 - accuracy: 0.5278 - val_loss: 0.9055 - val_accuracy: 0.7500
Epoch 2/50
14/14 [=====] - 0s 6ms/step - loss: 0.7519 - accuracy: 0.7407 - val_loss: 0.7763 - val_accuracy: 0.7500
Epoch 3/50
14/14 [=====] - 0s 6ms/step - loss: 0.6013 - accuracy: 0.7963 - val_loss: 0.6837 - val_accuracy: 0.7500

```