Practical – 8

Aim: Data/Object classification using CNN

- Code:

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import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv1D, MaxPooling1D, Flatten, Dense, Dropout
from tensorflow.keras.utils import to_categorical

data_set = pd.read_csv('/content/drive/MyDrive/temp/practical_4_2.csv')
X = data_set[['Match_Duration', 'Loot_Collected', 'Enemies_Defeated']].values
y = data_set['Player_Score'].values
y_class = pd.qcut(y, q=3, labels=[0, 1, 2])
y_class = y_class.astype(int)
X_train, X_test, y_train, y_test = train_test_split(X, y_class, test_size=0.2, random_state=42)

scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

X_train = X_train.reshape((X_train.shape[0], X_train.shape[1], 1))
X_test = X_test.reshape((X_test.shape[0], X_test.shape[1], 1))

y_train_cat = to_categorical(y_train, num_classes=3)
y_test_cat = to_categorical(y_test, num_classes=3)
model = Sequential()
model.add(Conv1D(32, kernel_size=2, activation='relu', input_shape=(3, 1)))
model.add(MaxPooling1D(pool_size=1))
model.add(Flatten())
model.add(Dense(64, activation='relu'))
model.add(Dropout(0.2))
model.add(Dense(3, activation='softmax'))

model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=['accuracy'])

model.fit(X_train, y_train_cat, epochs=50, batch_size=8, validation_data=(X_test, y_test_cat))

loss, accuracy = model.evaluate(X_test, y_test_cat)

print(f"Test Accuracy: {accuracy*100:.2f}%")
```

- Output

```
Epoch 29/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.6034 - loss: 0.9141 - val_accuracy: 0.2222 - val_loss: 1.2246
Epoch 30/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.4874 - loss: 0.9923 - val_accuracy: 0.2222 - val_loss: 1.2235
Epoch 31/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 14ms/step - accuracy: 0.5461 - loss: 0.8841 - val_accuracy: 0.2778 - val_loss: 1.2296
Epoch 32/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.5815 - loss: 0.8933 - val_accuracy: 0.2778 - val_loss: 1.2553
Epoch 33/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.6092 - loss: 0.8968 - val_accuracy: 0.2222 - val_loss: 1.2485
Epoch 34/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 9ms/step - accuracy: 0.5941 - loss: 0.9374 - val_accuracy: 0.2222 - val_loss: 1.2403
Epoch 35/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.5601 - loss: 0.9276 - val_accuracy: 0.2222 - val_loss: 1.2482
Epoch 36/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.5829 - loss: 0.9168 - val_accuracy: 0.2778 - val_loss: 1.2636
Epoch 37/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.5630 - loss: 0.9368 - val_accuracy: 0.2778 - val_loss: 1.2717
Epoch 38/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.4688 - loss: 0.9701 - val_accuracy: 0.2222 - val_loss: 1.2766
Epoch 39/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.5943 - loss: 0.8777 - val_accuracy: 0.2778 - val_loss: 1.2873
Epoch 40/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 11ms/step - accuracy: 0.5416 - loss: 0.8990 - val_accuracy: 0.2778 - val_loss: 1.2944
Epoch 41/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.6465 - loss: 0.8470 - val_accuracy: 0.2222 - val_loss: 1.2931
Epoch 42/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 10ms/step - accuracy: 0.4655 - loss: 0.9851 - val_accuracy: 0.2222 - val_loss: 1.2893
Epoch 43/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 18ms/step - accuracy: 0.4801 - loss: 0.9609 - val_accuracy: 0.2222 - val_loss: 1.2766
Epoch 44/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 14ms/step - accuracy: 0.5292 - loss: 0.9191 - val_accuracy: 0.2222 - val_loss: 1.2691
Epoch 45/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 17ms/step - accuracy: 0.5104 - loss: 0.9292 - val_accuracy: 0.2222 - val_loss: 1.2683
Epoch 46/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 17ms/step - accuracy: 0.5799 - loss: 0.8541 - val_accuracy: 0.2222 - val_loss: 1.2825
Epoch 47/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 13ms/step - accuracy: 0.4799 - loss: 0.9882 - val_accuracy: 0.2222 - val_loss: 1.3030
Epoch 48/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 19ms/step - accuracy: 0.6391 - loss: 0.8558 - val_accuracy: 0.2222 - val_loss: 1.3088
Epoch 49/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 16ms/step - accuracy: 0.5804 - loss: 0.9428 - val_accuracy: 0.2222 - val_loss: 1.2944
Epoch 50/50
9/9 ━━━━━━━━━━━━━━━━━━━━ 0s 17ms/step - accuracy: 0.6200 - loss: 0.8375 - val_accuracy: 0.2222 - val_loss: 1.2910
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 65ms/step - accuracy: 0.2222 - loss: 1.2910
Test Accuracy: 22.22%
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Faculty Signature: _____ Date: _____