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#Matematyka Konkretna
#Laboratorium 9
#Biegun Daniel https://github.com/S1Daniel/MK
#Wariant 2

import tensorflow as tf
import numpy as np

def generate_data(num_samples=1000, num_bits=32):
    X = np.random.randint(0, 2, size=(num_samples, 32, 2))
    Y = np.sum(X, axis=1)
    return X, Y

model = tf.keras.Sequential([
    tf.keras.layers.SimpleRNN(16, input_shape=(32, 2),
    activation='relu', return_sequences=True),
    tf.keras.layers.SimpleRNN(16, activation='relu'),
    tf.keras.layers.Dense(1, activation='linear')
])

model.compile(optimizer='adam', loss='mean_squared_error',
metrics=['mae'])

X_train, Y_train = generate_data()

model.fit(X_train, Y_train, epochs=10, batch_size=32)

X_test, Y_test = generate_data(10)
predictions = model.predict(X_test)

for i in range(10):
    input_data = X_test[i]
    true_output = Y_test[i]
    predicted_output = predictions[i].round()

    print(f"Wejscie: {input_data}")
    print(f"Prawdziwa suma: {true_output}")
    print(f"Przewidziana suma: {predicted_output}")
    print()

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Epoch 1/10
32/32 [=====] - 2s 6ms/step - loss: 166.6795
- mae: 11.8205
Epoch 2/10
32/32 [=====] - 0s 6ms/step - loss: 14.1498 -
mae: 3.0346
Epoch 3/10
32/32 [=====] - 0s 6ms/step - loss: 7.5256 -
mae: 2.1773

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Epoch 4/10
32/32 [=====] - 0s 6ms/step - loss: 6.4141 -
mae: 2.0314
Epoch 5/10
32/32 [=====] - 0s 6ms/step - loss: 6.0068 -
mae: 1.9590
Epoch 6/10
32/32 [=====] - 0s 6ms/step - loss: 5.5936 -
mae: 1.8925
Epoch 7/10
32/32 [=====] - 0s 6ms/step - loss: 5.1505 -
mae: 1.8212
Epoch 8/10
32/32 [=====] - 0s 6ms/step - loss: 4.8509 -
mae: 1.7670
Epoch 9/10
32/32 [=====] - 0s 6ms/step - loss: 4.7563 -
mae: 1.7493
Epoch 10/10
32/32 [=====] - 0s 6ms/step - loss: 4.6569 -
mae: 1.7312
1/1 [=====] - 0s 211ms/step
Wejscie: [[0 1]
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Prawdziwa suma: [16 11]
Przewidziana suma: [14.]
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Prawdziwa suma: [18 18]
Przewidziana suma: [18.]
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Wejscie: [[0 1]
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Prawdziwa suma: [13 19]

Przewidziana suma: [16.]

Wejscie: [[0 1]

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Prawdziwa suma: [10 13]
Przewidziana suma: [12.]
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Wejscie: [[0 0]
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Prawdziwa suma: [22 14]
Przewidziana suma: [18.]
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Wejscie: [[0 0]

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Prawdziwa suma: [18 15]

Przewidziana suma: [17.]

Wejscie: [[1 1]

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Prawdziwa suma: [14 21]  
Przewidziana suma: [17.]

Wejscie: [[0 0]

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Prawdziwa suma: [16 12]
Przewidziana suma: [14.]
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Prawdziwa suma: [14 15]
Przewidziana suma: [14.]
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Prawdziwa suma: [19 8]  
Przewidziana suma: [13.]