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ASSIGNMENT-WEEK-05

The screenshot displays a JupyterLab environment with two open notebooks. The top notebook, titled 'Week-5-CNN_EUR-USD_ML_in-Finance_Final', contains a 'Lab Logbook Requirement' section with seven tasks. The bottom notebook, also titled 'Week-5-CNN_EUR-USD_ML_in-Finance_Final', shows a Python code snippet for a CNN model.

Lab Logbook Requirement:

1. Modify the practical session CNN model by reducing the convolutional core size to 5.
2. Change the batch_size to 50.
3. Also, change the number of epochs, which is calculated by the formula:
$$Z + Y, \text{ if } Z \text{ and } Y \text{ are not } 0$$
$$10 + Y, \text{ if } Z = 0 \text{ and } Y \text{ is not } 0$$
$$10, \text{ if } Z = Y = 0$$

, where your SID is: XXXXXZY
4. Leave other parameters the same as in the practical session.
5. Compile the model.
6. Train your CNN with the same datasets and demonstrate the received test MAE. Compare your MAE with the MAE of the CNN in the practical session.
7. Please only add to your Lab Logbook print-screen(s) of your CNN architecture using `model.summary()`, CNN training code and process, and the resulting MAE.

Python Code Snippet:

```
[42]: import tensorflow as tf
from tensorflow.keras import datasets, layers, models
from tensorflow.keras.optimizers import Adam
from tensorflow.keras.metrics import MeanAbsoluteError
(x_train, y_train), (x_test, y_test) = datasets.cifar10.load_data()
x_train, x_test = x_train / 255.0, x_test / 255.0
model = models.Sequential([
    layers.Conv2D(32, (5, 5), activation='relu', input_shape=(32, 32, 3)),
    layers.MaxPooling2D((2, 2)),
    layers.Conv2D(64, (5, 5), activation='relu'),
    layers.MaxPooling2D((2, 2)),
    layers.Flatten(),
    layers.Dense(64, activation='relu'),
    layers.Dense(10, activation='softmax')
])
model.summary()
model.compile(optimizer=Adam(),
              loss='sparse_categorical_crossentropy',
              metrics=[MeanAbsoluteError(), 'accuracy'])
history = model.fit(x_train, y_train,
                    epochs=10,
                    batch_size=50,
                    validation_data=(x_test, y_test),
                    verbose=1)

test_loss, test_mae, test_acc = model.evaluate(x_test, y_test, verbose=0)
print(f"\nTest MAE: {test_mae:.4f}")
print(f"\nTest Accuracy: {test_acc:.4f}")
```

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localhost8889/notebooks/Week-5-CNN_EUR-USD_ML_in-Finance_Final.ipynb

Jupyter Week-5-CNN_EUR-USD_ML_in-Finance_Final Last Checkpoint: 5 days ago

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Not Trusted

JupyterLab Python 3 (ipykernel)

Downloading data from <https://www.cs.toronto.edu/~kriz/cifar-10-python.tar.gz>
170498871/170498871 49s 0us/step

Model: "sequential_1"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 28, 28, 32)	2,432
max_pooling2d (MaxPooling2D)	(None, 14, 14, 32)	0
conv2d_1 (Conv2D)	(None, 10, 10, 64)	51,264
max_pooling2d_1 (MaxPooling2D)	(None, 5, 5, 64)	0
flatten (Flatten)	(None, 1600)	0
dense_2 (Dense)	(None, 64)	102,464
dense_3 (Dense)	(None, 10)	650

Total params: 156,810 (612.54 KB)

Trainable params: 156,810 (612.54 KB)

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Not Trusted

JupyterLab Python 3 (ipykernel)

Non-trainable params: 0 (0.00 B)

```
Epoch 1/10
1000/1000 — 58s 44ms/step - accuracy: 0.4445 - loss: 1.5308 - mean_absolute_error: 4.4200 - val_accuracy: 0.5262 - val_loss: 1.3174 - val_mean_absolute_error: 4.4200
Epoch 2/10
1000/1000 — 76s 38ms/step - accuracy: 0.5783 - loss: 1.1993 - mean_absolute_error: 4.4200 - val_accuracy: 0.5860 - val_loss: 1.1560 - val_mean_absolute_error: 4.4200
Epoch 3/10
1000/1000 — 42s 39ms/step - accuracy: 0.6249 - loss: 1.0716 - mean_absolute_error: 4.4200 - val_accuracy: 0.6412 - val_loss: 1.0320 - val_mean_absolute_error: 4.4200
Epoch 4/10
1000/1000 — 38s 38ms/step - accuracy: 0.6543 - loss: 0.9853 - mean_absolute_error: 4.4200 - val_accuracy: 0.6385 - val_loss: 1.0240 - val_mean_absolute_error: 4.4200
Epoch 5/10
1000/1000 — 39s 39ms/step - accuracy: 0.6797 - loss: 0.9151 - mean_absolute_error: 4.4200 - val_accuracy: 0.6589 - val_loss: 0.9798 - val_mean_absolute_error: 4.4200
Epoch 6/10
1000/1000 — 41s 40ms/step - accuracy: 0.6993 - loss: 0.8577 - mean_absolute_error: 4.4200 - val_accuracy: 0.6672 - val_loss: 0.9649 - val_mean_absolute_error: 4.4200
Epoch 7/10
1000/1000 — 40s 40ms/step - accuracy: 0.7163 - loss: 0.8097 - mean_absolute_error: 4.4200 - val_accuracy: 0.6892 - val_loss: 0.9139 - val_mean_absolute_error: 4.4200
Epoch 8/10
1000/1000 — 40s 40ms/step - accuracy: 0.7290 - loss: 0.7730 - mean_absolute_error: 4.4200 - val_accuracy: 0.6892 - val_loss: 0.9232 - val_mean_absolute_error: 4.4200
Epoch 9/10
1000/1000 — 40s 40ms/step - accuracy: 0.7446 - loss: 0.7324 - mean_absolute_error: 4.4200 - val_accuracy: 0.6884 - val_loss: 0.9050 - val_mean_absolute_error: 4.4200
Epoch 10/10
1000/1000 — 42s 42ms/step - accuracy: 0.7553 - loss: 0.6988 - mean_absolute_error: 4.4200 - val_accuracy: 0.6847 - val_loss: 0.9325 - val_mean_absolute_error: 4.4200
```

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Python 3 (ipykernel)

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Test MAE: 4.4200
Test Accuracy: 0.6847
```

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