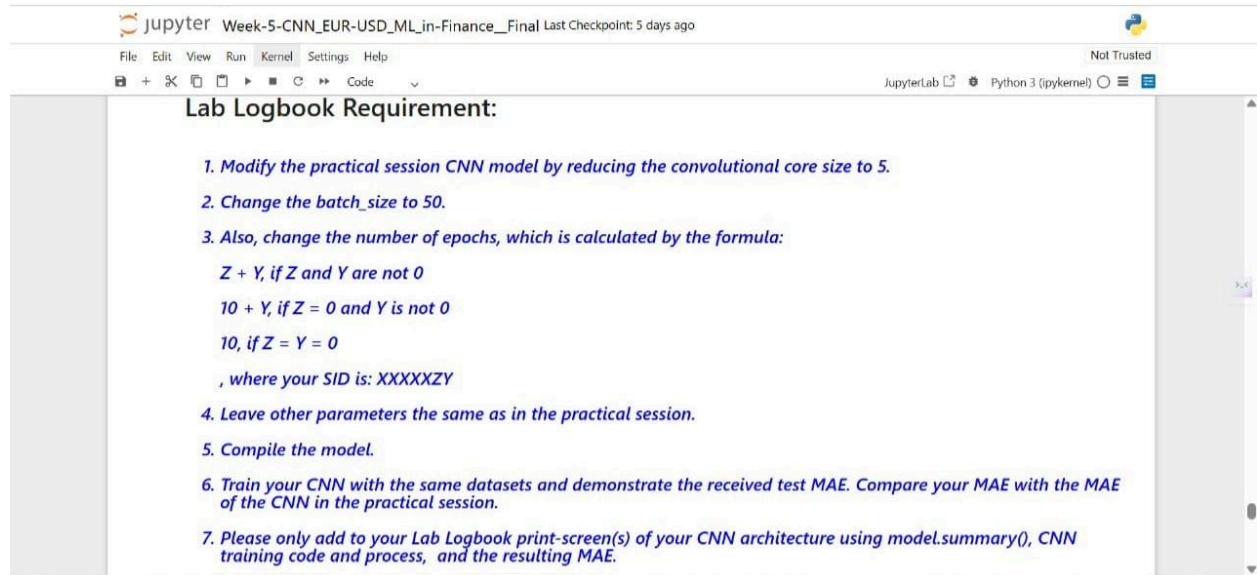


NAME :- JUPUDI VISHNU PAVAN KUMAR

SID NUMBER :- 2449129

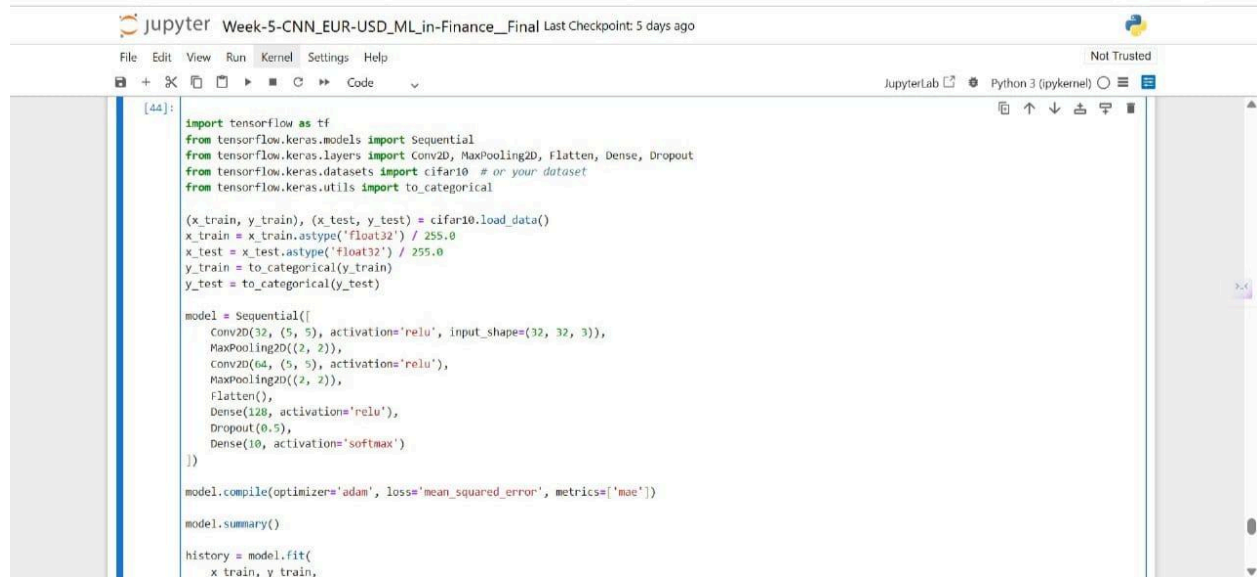
ASSIGNMENT :- WEEK 5

CODE :-



**Lab Logbook Requirement:**

1. Modify the practical session CNN model by reducing the convolutional core size to 50.
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.



```
[44]: import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense, Dropout
from tensorflow.keras.datasets import cifar10 # or your dataset
from tensorflow.keras.utils import to_categorical

(x_train, y_train), (x_test, y_test) = cifar10.load_data()
x_train = x_train.astype('float32') / 255.0
x_test = x_test.astype('float32') / 255.0
y_train = to_categorical(y_train)
y_test = to_categorical(y_test)

model = Sequential([
    Conv2D(32, (5, 5), activation='relu', input_shape=(32, 32, 3)),
    MaxPooling2D((2, 2)),
    Conv2D(64, (5, 5), activation='relu'),
    MaxPooling2D((2, 2)),
    Flatten(),
    Dense(128, activation='relu'),
    Dropout(0.5),
    Dense(10, activation='softmax')
])

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

model.summary()

history = model.fit(
    x_train, y_train,
```

Jupyter Week-5-CNN\_EUR-USD\_ML\_in-Finance\_Final Last Checkpoint: 5 days ago

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JupyterLab Python 3 (ipykernel)

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

model.summary()

history = model.fit(
    x_train, y_train,
    batch_size=50,
    epochs=11,
    validation_data=(x_test, y_test),
    verbose=1
)

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

Model: "sequential\_3"

Layer (type)	Output Shape	Param #
conv2d_4 (Conv2D)	(None, 28, 28, 32)	2,432
max_pooling2d_4 (MaxPooling2D)	(None, 14, 14, 32)	0
conv2d_5 (Conv2D)	(None, 10, 10, 64)	51,264
max_pooling2d_5 (MaxPooling2D)	(None, 5, 5, 64)	0

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Layer (type)	Output Shape	Param #
conv2d_4 (Conv2D)	(None, 28, 28, 32)	2,432
max_pooling2d_4 (MaxPooling2D)	(None, 14, 14, 32)	0
conv2d_5 (Conv2D)	(None, 10, 10, 64)	51,264
max_pooling2d_5 (MaxPooling2D)	(None, 5, 5, 64)	0
flatten_2 (Flatten)	(None, 1600)	0
dense_6 (Dense)	(None, 128)	204,928
dropout_1 (Dropout)	(None, 128)	0
dense_7 (Dense)	(None, 10)	1,290

Total params: 259,914 (1015.29 KB)

Trainable params: 259,914 (1015.29 KB)

Non-trainable params: 0 (0.00 B)

OUTPUT

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JupyterLab Python 3 (ipykernel)

```
Epoch 1/11
1000/1000 — 25s 21ms/step - loss: 0.0741 - mae: 0.1481 - val_loss: 0.0636 - val_mae: 0.1257
Epoch 2/11
1000/1000 — 21s 21ms/step - loss: 0.0629 - mae: 0.1248 - val_loss: 0.0575 - val_mae: 0.1174
Epoch 3/11
1000/1000 — 22s 22ms/step - loss: 0.0579 - mae: 0.1143 - val_loss: 0.0539 - val_mae: 0.1095
Epoch 4/11
1000/1000 — 22s 22ms/step - loss: 0.0544 - mae: 0.1069 - val_loss: 0.0522 - val_mae: 0.1026
Epoch 5/11
1000/1000 — 21s 21ms/step - loss: 0.0519 - mae: 0.1016 - val_loss: 0.0490 - val_mae: 0.0963
Epoch 6/11
1000/1000 — 21s 21ms/step - loss: 0.0494 - mae: 0.0963 - val_loss: 0.0505 - val_mae: 0.0966
Epoch 7/11
1000/1000 — 40s 20ms/step - loss: 0.0477 - mae: 0.0927 - val_loss: 0.0472 - val_mae: 0.0898
Epoch 8/11
1000/1000 — 21s 21ms/step - loss: 0.0464 - mae: 0.0898 - val_loss: 0.0459 - val_mae: 0.0869
Epoch 9/11
1000/1000 — 21s 21ms/step - loss: 0.0451 - mae: 0.0871 - val_loss: 0.0470 - val_mae: 0.0887
Epoch 10/11
1000/1000 — 22s 22ms/step - loss: 0.0439 - mae: 0.0845 - val_loss: 0.0435 - val_mae: 0.0828
Epoch 11/11
1000/1000 — 21s 21ms/step - loss: 0.0429 - mae: 0.0825 - val_loss: 0.0445 - val_mae: 0.0828

Test MAE (Modified CNN): 0.0828
```