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 size of the number of epochs, which is calculated by the formula:

$Z + Y$, *if* $Z = 0$

$10 + Y$, *if* $Z = 0$ *and Y is not 0*

10, 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 a print-screen of your CNN architecture using model.summary() and the resulting MAE to your Lab Logbook.

¶

```python
model = keras.Sequential([
    keras.layers.Conv1D(50,5, padding = 'same', input_shape= (50,5), activation=tf.nn.relu, kernel_initializer='normal'),
    keras.layers.MaxPooling1D(7),
    keras.layers.Conv1D(100,5,padding = 'same', activation = tf.nn.relu, kernel_initializer = "normal"),
    keras.layers.GlobalMaxPooling1D(),
    keras.layers.Dense(25, activation =tf.nn.relu, kernel_initializer = "normal"),
    keras.layers.Dense(2)
])
print(model.summary())
```

Model: "sequential_2"

Layer (type)	Output Shape	Param #
conv1d_4 (Conv1D)	(None, 50, 50)	1,300
max_pooling1d_2 (MaxPooling1D)	(None, 7, 50)	0
conv1d_5 (Conv1D)	(None, 7, 100)	25,100
global_max_pooling1d_2 (GlobalMaxPooling1D)	(None, 100)	0
dense_4 (Dense)	(None, 25)	2,525
dense_5 (Dense)	(None, 2)	52

Total params: 28,977 (113.19 KB)
Trainable params: 28,977 (113.19 KB)
Non-trainable params: 0 (0.00 B)
None

```
model.compile(optimizer = "adam", loss = "mse", metrics = ["mae"])
```

```
history = model.fit(X_train, y_train, batch_size =50, epochs=11, validation_split=0.2, verbose=1)

#sid = 2368529 where Z = 2 and Y = 9
```

```
Epoch 1/11
3520/3520 ──────────────── 24s 6ms/step - loss: 0.0084 - mae: 0.0454 - val_loss: 9.3309e-04 - val_mae: 0.0202
Epoch 2/11
3520/3520 ──────────────── 20s 6ms/step - loss: 7.5019e-04 - mae: 0.0186 - val_loss: 8.8981e-04 - val_mae: 0.0195
Epoch 3/11
3520/3520 ──────────────── 20s 6ms/step - loss: 7.1502e-04 - mae: 0.0181 - val_loss: 8.3847e-04 - val_mae: 0.0186
Epoch 4/11
3520/3520 ──────────────── 21s 6ms/step - loss: 6.9510e-04 - mae: 0.0177 - val_loss: 8.6578e-04 - val_mae: 0.0193
Epoch 5/11
3520/3520 ──────────────── 21s 6ms/step - loss: 7.0214e-04 - mae: 0.0177 - val_loss: 8.2659e-04 - val_mae: 0.0186
Epoch 6/11
3520/3520 ──────────────── 21s 6ms/step - loss: 6.7842e-04 - mae: 0.0175 - val_loss: 8.4197e-04 - val_mae: 0.0189
Epoch 7/11
3520/3520 ──────────────── 21s 6ms/step - loss: 6.9582e-04 - mae: 0.0176 - val_loss: 8.3462e-04 - val_mae: 0.0187
Epoch 8/11
3520/3520 ──────────────── 21s 6ms/step - loss: 7.0237e-04 - mae: 0.0176 - val_loss: 8.2371e-04 - val_mae: 0.0185
Epoch 9/11
3520/3520 ──────────────── 43s 6ms/step - loss: 6.7808e-04 - mae: 0.0175 - val_loss: 8.7874e-04 - val_mae: 0.0196
Epoch 10/11
3520/3520 ──────────────── 39s 6ms/step - loss: 6.9168e-04 - mae: 0.0175 - val_loss: 8.3649e-04 - val_mae: 0.0189
Epoch 11/11
3520/3520 ──────────────── 21s 6ms/step - loss: 6.7548e-04 - mae: 0.0174 - val_loss: 8.6348e-04 - val_mae: 0.0194
```

```
mse,mae = model.evaluate(X_test, y_test, verbose =1)
print("Mean absolute error: %.5f" %mae)
```

```
936/936 ──────────────── 3s 3ms/step - loss: 0.0012 - mae: 0.0237
Mean absolute error: 0.02526
```