

## Parameter Configuration.

```
epochs=5
batch_size=32
SEED = 42
Dropout(0.2)
optimizer='adam'
loss='mse'
patience=3
WINDOW=100
RMSE (Root Mean Squared Error)
MAE (Mean Absolute Error)
```

## LSTM1 (32) LSTM2 (32)

Layer (type)	Output Shape	Param #
lstm (LSTM)	(None, 100, 32)	4,352
dropout (Dropout)	(None, 100, 32)	0
lstm_1 (LSTM)	(None, 32)	8,320
dropout_1 (Dropout)	(None, 32)	0
dense (Dense)	(None, 1)	33

Total params: 12,705 (49.63 KB)  
Trainable params: 12,705 (49.63 KB)  
Non-trainable params: 0 (0.00 B)

Epoch 1/5  
1397/1397 ————— 80s 56ms/step - loss: 0.0180 - val\_loss: 1.9940e-04

Epoch 2/5  
1397/1397 ————— 76s 54ms/step - loss: 0.0021 - val\_loss: 2.8744e-04

Epoch 3/5  
1397/1397 ————— 74s 53ms/step - loss: 0.0011 - val\_loss: 1.4861e-04

Epoch 4/5  
1397/1397 ————— 74s 53ms/step - loss: 6.6396e-04 - val\_loss: 1.7336e-04

Epoch 5/5  
1397/1397 ————— 74s 53ms/step - loss: 5.8304e-04 - val\_loss: 1.2550e-04

1397/1397 ————— 20s 14ms/step - loss: 3.5867e-05

MSE Train: 5.032995613873936e-05

464/464 ————— 6s 14ms/step - loss: 1.0148e-04

MSE Test: 0.0001255049864994362

464/464 ————— 6s 14ms/step - loss: 9.5735e-05

MSE Val: 0.00011398047354305163

Test Set RMSE (Original Scale): 0.000935 EURUSD  
Test Set MAE (Original Scale): 0.000641 EURUSD  
Validation Set RMSE (Original Scale): 0.000891 EURUSD  
Validation Set MAE (Original Scale): 0.000559 EURUSD  
Training Set RMSE (Original Scale): 0.000592 EURUSD  
Training Set MAE (Original Scale): 0.000411 EURUSD

## LSTM1 (50) LSTM2 (50)

Layer (type)	Output Shape	Param #
lstm_18 (LSTM)	(None, 100, 50)	10,400
dropout_18 (Dropout)	(None, 100, 50)	0
lstm_19 (LSTM)	(None, 50)	20,200
dropout_19 (Dropout)	(None, 50)	0
dense_9 (Dense)	(None, 1)	51
Total params: 30,651 (119.73 KB)		
Trainable params: 30,651 (119.73 KB)		
Non-trainable params: 0 (0.00 B)		

```

Epoch 1/5
1397/1397 ————— 89s 62ms/step - loss:
0.0106 - val_loss: 3.8778e-04
Epoch 2/5
1397/1397 ————— 86s 62ms/step - loss:
0.0015 - val_loss: 3.4055e-04
Epoch 3/5
1397/1397 ————— 88s 63ms/step - loss:
8.3531e-04 - val_loss: 1.8361e-04
Epoch 4/5
1397/1397 ————— 85s 61ms/step - loss:
5.0167e-04 - val_loss: 1.3044e-04
Epoch 5/5
1397/1397 ————— 89s 64ms/step - loss:
4.0266e-04 - val_loss: 1.2788e-04

1397/1397 ————— 24s 17ms/step - loss:
3.1963e-05
MSE Train: 4.3991123675368726e-05
464/464 ————— 8s 17ms/step - loss:
1.2305e-04
MSE Test: 0.00012788374442607164
464/464 ————— 8s 17ms/step - loss:
1.0914e-04
MSE Val: 0.00011816350888693705

```

```

Test Set RMSE (Original Scale): 0.000944 EURUSD
Test Set MAE (Original Scale): 0.000692 EURUSD
Validation Set RMSE (Original Scale): 0.000907 EURUSD
Validation Set MAE (Original Scale): 0.000619 EURUSD
Training Set RMSE (Original Scale): 0.000554 EURUSD
Training Set MAE (Original Scale): 0.000394 EURUSD

```

## LSTM1 (64) LSTM2 (64)

Layer (type)	Output Shape	Param #
lstm_2 (LSTM)	(None, 100, 64)	16,896
dropout_2 (Dropout)	(None, 100, 64)	0
lstm_3 (LSTM)	(None, 64)	33,024
dropout_3 (Dropout)	(None, 64)	0
dense_1 (Dense)	(None, 1)	65
Total params: 49,985 (195.25 KB)		
Trainable params: 49,985 (195.25 KB)		
Non-trainable params: 0 (0.00 B)		

Epoch 1/5  
 1397/1397 ————— 97s 67ms/step - loss: 0.0092 - val\_loss: 2.4299e-04

Epoch 2/5  
 1397/1397 ————— 98s 70ms/step - loss: 0.0013 - val\_loss: 1.4648e-04

Epoch 3/5  
 1397/1397 ————— 95s 68ms/step - loss: 7.5751e-04 - val\_loss: 1.6219e-04

Epoch 4/5  
 1397/1397 ————— 98s 70ms/step - loss: 4.7725e-04 - val\_loss: 1.0705e-04

Epoch 5/5  
 1397/1397 ————— 97s 69ms/step - loss: 3.5611e-04 - val\_loss: 3.6942e-04

1397/1397 ————— 27s 20ms/step - loss: 5.8200e-05  
 MSE Train: 0.0001439999759895727

464/464 ————— 9s 19ms/step - loss: 5.5562e-04  
 MSE Test: 0.0003694238548632711

464/464 ————— 9s 20ms/step - loss: 3.4127e-04  
 MSE Val: 0.0003132599522359669

Test Set RMSE (Original Scale): 0.001604 EURUSD  
 Test Set MAE (Original Scale): 0.001302 EURUSD  
 Validation Set RMSE (Original Scale): 0.001477 EURUSD  
 Validation Set MAE (Original Scale): 0.001227 EURUSD  
 Training Set RMSE (Original Scale): 0.001002 EURUSD  
 Training Set MAE (Original Scale): 0.000747 EURUSD

## LSTM1 (100) LSTM2 (100)

Layer (type)	Output Shape	Param #
lstm_4 (LSTM)	(None, 100, 100)	40,800
dropout_4 (Dropout)	(None, 100, 100)	0
lstm_5 (LSTM)	(None, 100)	80,400
dropout_5 (Dropout)	(None, 100)	0
dense_2 (Dense)	(None, 1)	101

Total params: 121,301 (473.83 KB)  
Trainable params: 121,301 (473.83 KB)  
Non-trainable params: 0 (0.00 B)

Epoch 1/5  
1397/1397 ————— 155s 109ms/step - loss: 0.0056 - val\_loss: 3.9407e-04

Epoch 2/5  
1397/1397 ————— 152s 108ms/step - loss: 9.4087e-04 - val\_loss: 1.4430e-04

Epoch 3/5  
1397/1397 ————— 153s 109ms/step - loss: 6.3657e-04 - val\_loss: 1.2405e-04

Epoch 4/5  
1397/1397 ————— 152s 109ms/step - loss: 3.9885e-04 - val\_loss: 1.0279e-04

Epoch 5/5  
1397/1397 ————— 152s 108ms/step - loss: 3.0806e-04 - val\_loss: 1.3500e-04

1397/1397 ————— 43s 31ms/step - loss: 6.4645e-05

MSE Train: 7.332218228839338e-05

464/464 ————— 14s 31ms/step - loss: 1.3029e-04

MSE Test: 0.00013499798660632223

464/464 ————— 14s 31ms/step - loss: 1.2520e-04

MSE Val: 0.0001353582483716309

Test Set RMSE (Original Scale): 0.000970 EURUSD  
Test Set MAE (Original Scale): 0.000771 EURUSD  
Validation Set RMSE (Original Scale): 0.000971 EURUSD  
Validation Set MAE (Original Scale): 0.000763 EURUSD  
Training Set RMSE (Original Scale): 0.000715 EURUSD  
Training Set MAE (Original Scale): 0.000627 EURUSD

## LSTM1 (128) LSTM2 (128)

Layer (type)	Output Shape	Param #
lstm_6 (LSTM)	(None, 100, 128)	66,560
dropout_6 (Dropout)	(None, 100, 128)	0
lstm_7 (LSTM)	(None, 128)	131,584
dropout_7 (Dropout)	(None, 128)	0
dense_3 (Dense)	(None, 1)	129

Total params: 198,273 (774.50 KB)  
Trainable params: 198,273 (774.50 KB)  
Non-trainable params: 0 (0.00 B)

Epoch 1/5  
1397/1397 ————— 244s 173ms/step - loss: 0.0071 - val\_loss: 3.5466e-04

Epoch 2/5  
1397/1397 ————— 241s 173ms/step - loss: 8.5450e-04 - val\_loss: 2.1410e-04

Epoch 3/5  
1397/1397 ————— 240s 172ms/step - loss: 6.0006e-04 - val\_loss: 1.0172e-04

Epoch 4/5  
1397/1397 ————— 239s 171ms/step - loss: 4.1334e-04 - val\_loss: 1.3750e-04

Epoch 5/5  
1397/1397 ————— 239s 171ms/step - loss: 3.0346e-04 - val\_loss: 2.3335e-04

1397/1397 ————— 77s 55ms/step - loss: 1.3436e-04

MSE Train: 0.00014718643797095865

464/464 ————— 26s 56ms/step - loss: 2.7769e-04

MSE Test: 0.0002333487936994061

464/464 ————— 26s 55ms/step - loss: 2.8434e-04

MSE Val: 0.00028384377947077155

Test Set RMSE (Original Scale): 0.001275 EURUSD  
Test Set MAE (Original Scale): 0.001097 EURUSD  
Validation Set RMSE (Original Scale): 0.001406 EURUSD  
Validation Set MAE (Original Scale): 0.001268 EURUSD  
Training Set RMSE (Original Scale): 0.001013 EURUSD  
Training Set MAE (Original Scale): 0.000911 EURUSD

## LSTM1 (100) LSTM2 (50)

Layer (type)	Output Shape	Param #
lstm_8 (LSTM)	(None, 100, 100)	40,800
dropout_8 (Dropout)	(None, 100, 100)	0
lstm_9 (LSTM)	(None, 50)	30,200
dropout_9 (Dropout)	(None, 50)	0
dense_4 (Dense)	(None, 1)	51

Total params: 71,051 (277.54 KB)  
Trainable params: 71,051 (277.54 KB)  
Non-trainable params: 0 (0.00 B)

Epoch 1/5  
1397/1397 — 125s 88ms/step - loss: 0.0091 - val\_loss: 2.8174e-04

Epoch 2/5  
1397/1397 — 121s 87ms/step - loss: 0.0014 - val\_loss: 1.4876e-04

Epoch 3/5  
1397/1397 — 120s 86ms/step - loss: 8.1151e-04 - val\_loss: 1.4473e-04

Epoch 4/5  
1397/1397 — 122s 87ms/step - loss: 4.6519e-04 - val\_loss: 1.7867e-04

Epoch 5/5  
1397/1397 — 119s 85ms/step - loss: 3.9502e-04 - val\_loss: 1.7353e-04

1397/1397 — 35s 25ms/step - loss: 9.6845e-05

MSE Train: 0.00010955632023978978

464/464 — 11s 25ms/step - loss: 1.5642e-04

MSE Test: 0.00017352985742036253

464/464 — 11s 25ms/step - loss: 1.3470e-04

MSE Val: 0.000141099575557746

Test Set RMSE (Original Scale): 0.001100 EURUSD  
Test Set MAE (Original Scale): 0.000900 EURUSD  
Validation Set RMSE (Original Scale): 0.000992 EURUSD  
Validation Set MAE (Original Scale): 0.000769 EURUSD  
Training Set RMSE (Original Scale): 0.000874 EURUSD  
Training Set MAE (Original Scale): 0.000784 EURUSD

## LSTM1 (50) LSTM2 (100)

Layer (type)	Output Shape	Param #
lstm_10 (LSTM)	(None, 100, 50)	10,400
dropout_10 (Dropout)	(None, 100, 50)	0
lstm_11 (LSTM)	(None, 100)	60,400
dropout_11 (Dropout)	(None, 100)	0
dense_5 (Dense)	(None, 1)	101

**Total params:** 70,901 (276.96 KB)  
**Trainable params:** 70,901 (276.96 KB)  
**Non-trainable params:** 0 (0.00 B)

Epoch 1/5  
**1397/1397** ————— **119s** 83ms/step - loss: 0.0093 - val\_loss: 2.6485e-04

Epoch 2/5  
**1397/1397** ————— **120s** 86ms/step - loss: 0.0010 - val\_loss: 5.6755e-04

Epoch 3/5  
**1397/1397** ————— **119s** 85ms/step - loss: 6.9029e-04 - val\_loss: 1.9021e-04

Epoch 4/5  
**1397/1397** ————— **119s** 85ms/step - loss: 4.5451e-04 - val\_loss: 1.2900e-04

Epoch 5/5  
**1397/1397** ————— **116s** 83ms/step - loss: 3.3161e-04 - val\_loss: 2.7950e-04

**1397/1397** ————— **32s** 23ms/step - loss: 4.4910e-05

MSE Train: 0.00010057617328129709

**464/464** ————— **11s** 23ms/step - loss: 3.8134e-04

MSE Test: 0.0002795002073980868

**464/464** ————— **11s** 23ms/step - loss: 2.4349e-04

MSE Val: 0.00023330608382821083

Test Set RMSE (Original Scale): 0.001395 EURUSD

Test Set MAE (Original Scale): 0.001136 EURUSD

Validation Set RMSE (Original Scale): 0.001275 EURUSD

Validation Set MAE (Original Scale): 0.001022 EURUSD

Training Set RMSE (Original Scale): 0.000837 EURUSD

Training Set MAE (Original Scale): 0.000625 EURUSD



## LSTM1 (128) LSTM2 (32)

Layer (type)	Output Shape	Param #
lstm_12 (LSTM)	(None, 100, 128)	66,560
dropout_12 (Dropout)	(None, 100, 128)	0
lstm_13 (LSTM)	(None, 32)	20,608
dropout_13 (Dropout)	(None, 32)	0
dense_6 (Dense)	(None, 1)	33

Total params: 87,201 (340.63 KB)  
 Trainable params: 87,201 (340.63 KB)  
 Non-trainable params: 0 (0.00 B)

Epoch 1/5  
 1397/1397 ————— 151s 106ms/step - loss: 0.0090 - val\_loss: 3.4523e-04

Epoch 2/5  
 1397/1397 ————— 146s 105ms/step - loss: 0.0017 - val\_loss: 1.4133e-04

Epoch 3/5  
 1397/1397 ————— 144s 103ms/step - loss: 8.3242e-04 - val\_loss: 1.7078e-04

Epoch 4/5  
 1397/1397 ————— 145s 104ms/step - loss: 5.6318e-04 - val\_loss: 3.9670e-04

Epoch 5/5  
 1397/1397 ————— 145s 104ms/step - loss: 5.2231e-04 - val\_loss: 1.7644e-04

1397/1397 ————— 47s 33ms/step - loss: 2.5981e-05

MSE Train: 5.7540019042789936e-05

464/464 ————— 16s 34ms/step - loss: 2.3651e-04

MSE Test: 0.00017643843602854759

464/464 ————— 16s 34ms/step - loss: 1.5077e-04

MSE Val: 0.00014701213513035327

Test Set RMSE (Original Scale): 0.001109 EURUSD  
 Test Set MAE (Original Scale): 0.000874 EURUSD  
 Validation Set RMSE (Original Scale): 0.001012 EURUSD  
 Validation Set MAE (Original Scale): 0.000765 EURUSD  
 Training Set RMSE (Original Scale): 0.000633 EURUSD  
 Training Set MAE (Original Scale): 0.000445 EURUSD

## LSTM1 (30) LSTM2 (30) window (30)

Layer (type)	Output Shape	Param #
lstm_14 (LSTM)	(None, 30, 30)	3,840
dropout_14 (Dropout)	(None, 30, 30)	0
lstm_15 (LSTM)	(None, 30)	7,320
dropout_15 (Dropout)	(None, 30)	0
dense_7 (Dense)	(None, 1)	31

Total params: 11,191 (43.71 KB)  
Trainable params: 11,191 (43.71 KB)  
Non-trainable params: 0 (0.00 B)

Epoch 1/5  
1399/1399 ————— 28s 18ms/step - loss: 0.0135 - val\_loss: 2.5161e-04

Epoch 2/5  
1399/1399 ————— 25s 18ms/step - loss: 0.0019 - val\_loss: 1.8576e-04

Epoch 3/5  
1399/1399 ————— 25s 18ms/step - loss: 9.2167e-04 - val\_loss: 2.2659e-04

Epoch 4/5  
1399/1399 ————— 25s 18ms/step - loss: 6.1952e-04 - val\_loss: 2.0153e-04

Epoch 5/5  
1399/1399 ————— 24s 17ms/step - loss: 5.8358e-04 - val\_loss: 2.0982e-04

1399/1399 ————— 7s 5ms/step - loss: 7.8847e-05

MSE Train: 9.930000669555739e-05

466/466 ————— 2s 5ms/step - loss: 2.2912e-04

MSE Test: 0.00020981657144147903

466/466 ————— 2s 5ms/step - loss: 2.4250e-04

MSE Val: 0.00025096218450926244

Test Set RMSE (Original Scale): 0.001209 EURUSD  
Test Set MAE (Original Scale): 0.000948 EURUSD  
Validation Set RMSE (Original Scale): 0.001322 EURUSD  
Validation Set MAE (Original Scale): 0.001087 EURUSD  
Training Set RMSE (Original Scale): 0.000832 EURUSD  
Training Set MAE (Original Scale): 0.000676 EURUSD