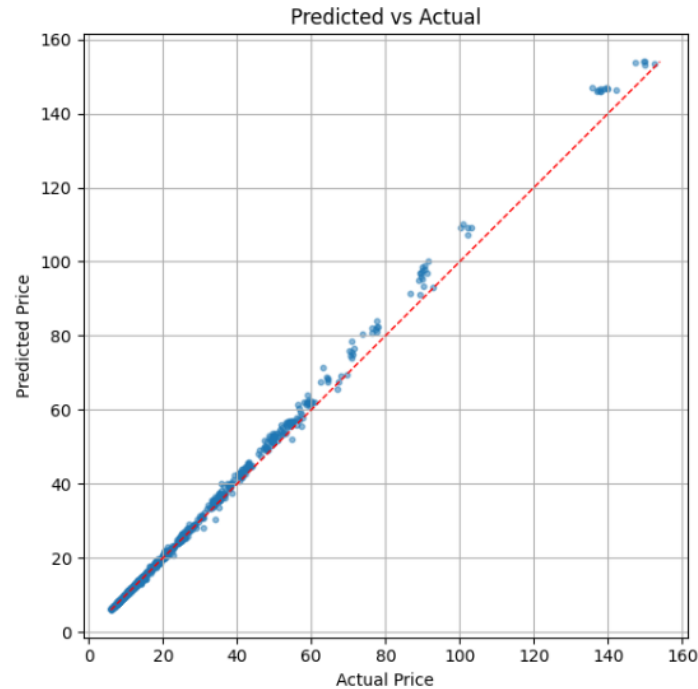


First, Predict stock price using LSTM, using open and close price, calculate $\log_{\text{open}} = \log(\text{open})$, $\log_{\text{close}} = \log(\text{close})$ $y_{\text{next_log_close}} = \log(\text{close})$ shifted by -1 day (target).

MAE = 2.3985



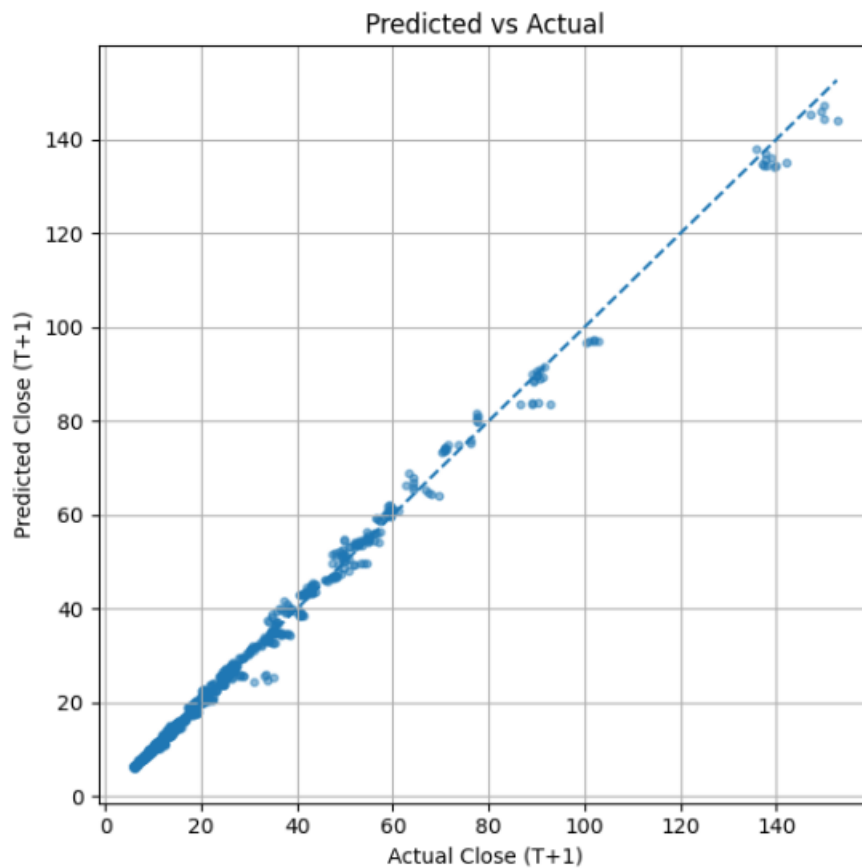
	Symbol	MAE	RMSE	MAPE (%)	Dir_Acc (%)
0	4337	0.023598	0.026019	0.351749	55.555556
1	4280	0.034920	0.045414	0.544615	55.555556
2	4344	0.039219	0.044362	0.481614	75.000000
3	4310	0.039246	0.055845	0.496603	77.777778
4	4334	0.040217	0.049881	0.572491	66.666667
...	...	...	...	...	...
191	2010	3.776693	4.480155	5.146355	77.777778
192	8210	3.806138	4.679245	3.775316	44.444444
193	6004	4.103038	4.182906	5.699162	55.555556
194	4001	6.808890	6.957668	7.479620	44.444444
195	2270	8.168069	8.460672	5.456222	55.555556

The LSTM model achieves ~1% MAPE for most companies, and high predictive accuracy. Some stocks show higher error rates, improvement through additional features.

```

Epoch 10/100  train: 0.167411  val: 0.239100
Epoch 20/100  train: 0.123999  val: 0.211370
Epoch 30/100  train: 0.108095  val: 0.220065
Epoch 40/100  train: 0.091610  val: 0.248397
Epoch 50/100  train: 0.079754  val: 0.289229
Epoch 60/100  train: 0.072150  val: 0.297958
Epoch 70/100  train: 0.070746  val: 0.290875
Early stopping at epoch 73 (best val=0.209986)
VAL - loss: 0.209986 | MAE_ret: 0.029946 | Pearson r: 0.1163 | DirAcc: 46.03% | MASE: 2.065
TEST - MAE_ret: 0.036212 | Pearson r: 0.0884 | DirAcc: 50.62% | MASE: 2.201

```



Using OHLCV by increasing features to `[["open","high","low","close","volume_traded"]]`

```

Epoch 001 | Train Loss: 0.3949 | Val Loss: 0.3316
Epoch 010 | Train Loss: 0.3932 | Val Loss: 0.3305
Epoch 020 | Train Loss: 0.3914 | Val Loss: 0.3295
Epoch 030 | Train Loss: 0.3897 | Val Loss: 0.3285
Epoch 040 | Train Loss: 0.3880 | Val Loss: 0.3277
Epoch 050 | Train Loss: 0.3863 | Val Loss: 0.3270
Epoch 060 | Train Loss: 0.3847 | Val Loss: 0.3264
Epoch 070 | Train Loss: 0.3831 | Val Loss: 0.3258
Epoch 080 | Train Loss: 0.3815 | Val Loss: 0.3253
Epoch 090 | Train Loss: 0.3799 | Val Loss: 0.3249
Epoch 100 | Train Loss: 0.3783 | Val Loss: 0.3246
Epoch 110 | Train Loss: 0.3767 | Val Loss: 0.3244
Epoch 120 | Train Loss: 0.3751 | Val Loss: 0.3242

```

FINAL METRICS

```

VAL - MAE: 0.028394 | DirAcc: 82.10%
TEST - MAE: 0.026393 | DirAcc: 84.94%

```

Comparison between actual values and predicted values from Literature Review



Table 6 Configuration of LSTM

Parameters	Configurations
Batch size	128
Optimizer	Adam
Learning rate	1×10^{-3} with decay factor 0.95
Stopping algorithms	500 epochs

Performance of SET50

Industry	MAE
Overall SET50	9.6849
AGRO	8.4667
FINCIAL	11.4178