stock-price-prediction

March 17, 2024

```python
[4]: import numpy as np
     import pandas as pd
     import tensorflow as tf
     import matplotlib.pyplot as plt
     from sklearn.preprocessing import MinMaxScaler
     from tensorflow.keras.models import Model
     from tensorflow.keras.layers import Input, LSTM, Dense

     stock_data = pd.read_csv('C:/Users/TAWFEEQ/Desktop/dataset.csv')

     scaler = MinMaxScaler(feature_range=(0, 1))
     scaled_data = scaler.fit_transform(stock_data['Close'].values.reshape(-1, 1))

     window_size = 10

     def create_sequences(data, window_size):
         X = []
         y = []
         for i in range(len(data) - window_size):
             X.append(data[i:i+window_size])
             y.append(data[i+window_size])
         return np.array(X), np.array(y)

     X, y = create_sequences(scaled_data, window_size)

     split = int(0.8 * len(X))
     X_train, X_test = X[:split], X[split:]
     y_train, y_test = y[:split], y[split:]

     input_shape = (window_size, 1)

     inputs = Input(shape=input_shape)

     x = LSTM(units=50, return_sequences=True)(inputs)
     x = LSTM(units=50, return_sequences=False)(x)
     x = Dense(units=25)(x)
     outputs = Dense(units=1)(x)
```

```python
model = Model(inputs=inputs, outputs=outputs)

model.compile(optimizer='adam', loss='mean_squared_error')

model.fit(X_train, y_train, epochs=100, batch_size=32)

mse = model.evaluate(X_test, y_test)
print("Mean Squared Error:", mse)

future_dates = pd.date_range(start=stock_data['Date'].iloc[-1], periods=5)
future_features = scaled_data[-window_size:].reshape(1, window_size, 1)
future_predictions = []

for _ in range(5):
    future_price = model.predict(future_features)
    future_predictions.append(future_price[0][0])
    future_features = np.roll(future_features, -1, axis=1)
    future_features[0, -1] = future_price

predicted_prices = scaler.inverse_transform(np.array(future_predictions).
 ↪reshape(-1, 1))

future_dates = pd.date_range(start=stock_data['Date'].iloc[-1], periods=5)
future_predictions_df = pd.DataFrame({'Date': future_dates, 'Predicted_Price':␣
 ↪predicted_prices.flatten()})
print(future_predictions_df)

plt.figure(figsize=(10, 6))

plt.plot(stock_data['Date'], scaler.inverse_transform(scaled_data),␣
 ↪label='Training Data', color='blue')

plt.plot(future_dates.strftime('%Y-%m-%d'), predicted_prices, label='Predicted␣
 ↪Data', color='red')

plt.title('Historical and Predicted Prices Over Time')
plt.xlabel('Date')
plt.ylabel('Price')
plt.legend()
plt.grid(True)
plt.show()

df = pd.DataFrame(future_predictions_df)

plt.figure(figsize=(8, 6))
df.plot(x='Date', y='Predicted_Price', kind='line', marker='o')
```

```python
plt.title('Predicted Price')
plt.xlabel('Date')
plt.ylabel('Price')
plt.grid(True)
plt.show()
```

Epoch 1/100
25/25   9s 15ms/step -
loss: 0.0713
Epoch 2/100
25/25   0s 14ms/step -
loss: 0.0052
Epoch 3/100
25/25   0s 14ms/step -
loss: 0.0020
Epoch 4/100
25/25   0s 14ms/step -
loss: 0.0019
Epoch 5/100
25/25   0s 15ms/step -
loss: 0.0019
Epoch 6/100
25/25   0s 15ms/step -
loss: 0.0016
Epoch 7/100
25/25   0s 15ms/step -
loss: 0.0018
Epoch 8/100
25/25   0s 16ms/step -
loss: 0.0018
Epoch 9/100
25/25   0s 15ms/step -
loss: 0.0020
Epoch 10/100
25/25   0s 14ms/step -
loss: 0.0019
Epoch 11/100
25/25   0s 14ms/step -
loss: 0.0017
Epoch 12/100
25/25   0s 14ms/step -
loss: 0.0018
Epoch 13/100
25/25   0s 15ms/step -
loss: 0.0016
Epoch 14/100
25/25   0s 15ms/step -

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loss: 0.0015
Epoch 15/100
25/25              0s 14ms/step -
loss: 0.0020
Epoch 16/100
25/25              0s 14ms/step -
loss: 0.0016
Epoch 17/100
25/25              0s 14ms/step -
loss: 0.0015
Epoch 18/100
25/25              0s 15ms/step -
loss: 0.0016
Epoch 19/100
25/25              0s 15ms/step -
loss: 0.0016
Epoch 20/100
25/25              0s 15ms/step -
loss: 0.0015
Epoch 21/100
25/25              0s 15ms/step -
loss: 0.0014
Epoch 22/100
25/25              0s 15ms/step -
loss: 0.0015
Epoch 23/100
25/25              0s 14ms/step -
loss: 0.0012
Epoch 24/100
25/25              0s 15ms/step -
loss: 0.0015
Epoch 25/100
25/25              0s 15ms/step -
loss: 0.0014
Epoch 26/100
25/25              0s 15ms/step -
loss: 0.0014
Epoch 27/100
25/25              0s 15ms/step -
loss: 0.0013
Epoch 28/100
25/25              0s 15ms/step -
loss: 0.0011
Epoch 29/100
25/25              0s 15ms/step -
loss: 0.0010
Epoch 30/100
25/25              0s 17ms/step -
```

```
loss: 0.0013
Epoch 31/100
25/25                0s 15ms/step -
loss: 0.0010
Epoch 32/100
25/25                0s 14ms/step -
loss: 0.0011
Epoch 33/100
25/25                0s 15ms/step -
loss: 9.2211e-04
Epoch 34/100
25/25                0s 15ms/step -
loss: 0.0011
Epoch 35/100
25/25                0s 15ms/step -
loss: 0.0011
Epoch 36/100
25/25                0s 15ms/step -
loss: 0.0010
Epoch 37/100
25/25                0s 15ms/step -
loss: 0.0010
Epoch 38/100
25/25                0s 15ms/step -
loss: 9.9960e-04
Epoch 39/100
25/25                0s 15ms/step -
loss: 9.7448e-04
Epoch 40/100
25/25                0s 14ms/step -
loss: 9.9859e-04
Epoch 41/100
25/25                0s 15ms/step -
loss: 8.6109e-04
Epoch 42/100
25/25                0s 14ms/step -
loss: 8.9841e-04
Epoch 43/100
25/25                0s 15ms/step -
loss: 9.1857e-04
Epoch 44/100
25/25                0s 15ms/step -
loss: 0.0012
Epoch 45/100
25/25                0s 15ms/step -
loss: 0.0010
Epoch 46/100
25/25                0s 15ms/step -
```

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loss: 8.9055e-04
Epoch 47/100
25/25                0s 15ms/step -
loss: 9.1783e-04
Epoch 48/100
25/25                0s 14ms/step -
loss: 7.3022e-04
Epoch 49/100
25/25                0s 14ms/step -
loss: 8.3508e-04
Epoch 50/100
25/25                0s 14ms/step -
loss: 7.7731e-04
Epoch 51/100
25/25                0s 15ms/step -
loss: 8.2940e-04
Epoch 52/100
25/25                0s 14ms/step -
loss: 7.6216e-04
Epoch 53/100
25/25                0s 14ms/step -
loss: 7.3072e-04
Epoch 54/100
25/25                0s 14ms/step -
loss: 8.3566e-04
Epoch 55/100
25/25                0s 14ms/step -
loss: 7.6586e-04
Epoch 56/100
25/25                0s 14ms/step -
loss: 6.8876e-04
Epoch 57/100
25/25                0s 16ms/step -
loss: 7.2639e-04
Epoch 58/100
25/25                0s 14ms/step -
loss: 7.0320e-04
Epoch 59/100
25/25                0s 15ms/step -
loss: 7.9268e-04
Epoch 60/100
25/25                0s 14ms/step -
loss: 5.9368e-04
Epoch 61/100
25/25                0s 16ms/step -
loss: 6.1860e-04
Epoch 62/100
25/25                0s 14ms/step -
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loss: 6.6976e-04
Epoch 63/100
25/25                 0s 14ms/step -
loss: 7.2400e-04
Epoch 64/100
25/25                 0s 14ms/step -
loss: 6.1713e-04
Epoch 65/100
25/25                 0s 14ms/step -
loss: 6.0383e-04
Epoch 66/100
25/25                 0s 15ms/step -
loss: 5.5095e-04
Epoch 67/100
25/25                 0s 14ms/step -
loss: 5.3239e-04
Epoch 68/100
25/25                 0s 15ms/step -
loss: 6.0590e-04
Epoch 69/100
25/25                 0s 14ms/step -
loss: 6.1747e-04
Epoch 70/100
25/25                 0s 16ms/step -
loss: 6.3690e-04
Epoch 71/100
25/25                 0s 14ms/step -
loss: 5.7414e-04
Epoch 72/100
25/25                 0s 16ms/step -
loss: 6.4617e-04
Epoch 73/100
25/25                 0s 14ms/step -
loss: 7.3333e-04
Epoch 74/100
25/25                 0s 16ms/step -
loss: 5.6103e-04
Epoch 75/100
25/25                 0s 15ms/step -
loss: 4.8936e-04
Epoch 76/100
25/25                 0s 15ms/step -
loss: 5.8028e-04
Epoch 77/100
25/25                 0s 14ms/step -
loss: 6.3717e-04
Epoch 78/100
25/25                 0s 15ms/step -
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loss: 6.0691e-04
Epoch 79/100
25/25                0s 15ms/step -
loss: 6.5235e-04
Epoch 80/100
25/25                0s 15ms/step -
loss: 6.4228e-04
Epoch 81/100
25/25                0s 13ms/step -
loss: 5.9141e-04
Epoch 82/100
25/25                0s 16ms/step -
loss: 6.2562e-04
Epoch 83/100
25/25                0s 15ms/step -
loss: 6.1304e-04
Epoch 84/100
25/25                0s 16ms/step -
loss: 5.5837e-04
Epoch 85/100
25/25                0s 15ms/step -
loss: 5.5738e-04
Epoch 86/100
25/25                0s 14ms/step -
loss: 6.0891e-04
Epoch 87/100
25/25                0s 15ms/step -
loss: 5.7587e-04
Epoch 88/100
25/25                0s 14ms/step -
loss: 5.1393e-04
Epoch 89/100
25/25                0s 15ms/step -
loss: 5.7358e-04
Epoch 90/100
25/25                0s 14ms/step -
loss: 5.8552e-04
Epoch 91/100
25/25                0s 14ms/step -
loss: 5.6062e-04
Epoch 92/100
25/25                0s 14ms/step -
loss: 7.2567e-04
Epoch 93/100
25/25                0s 14ms/step -
loss: 6.8427e-04
Epoch 94/100
25/25                0s 15ms/step -
```
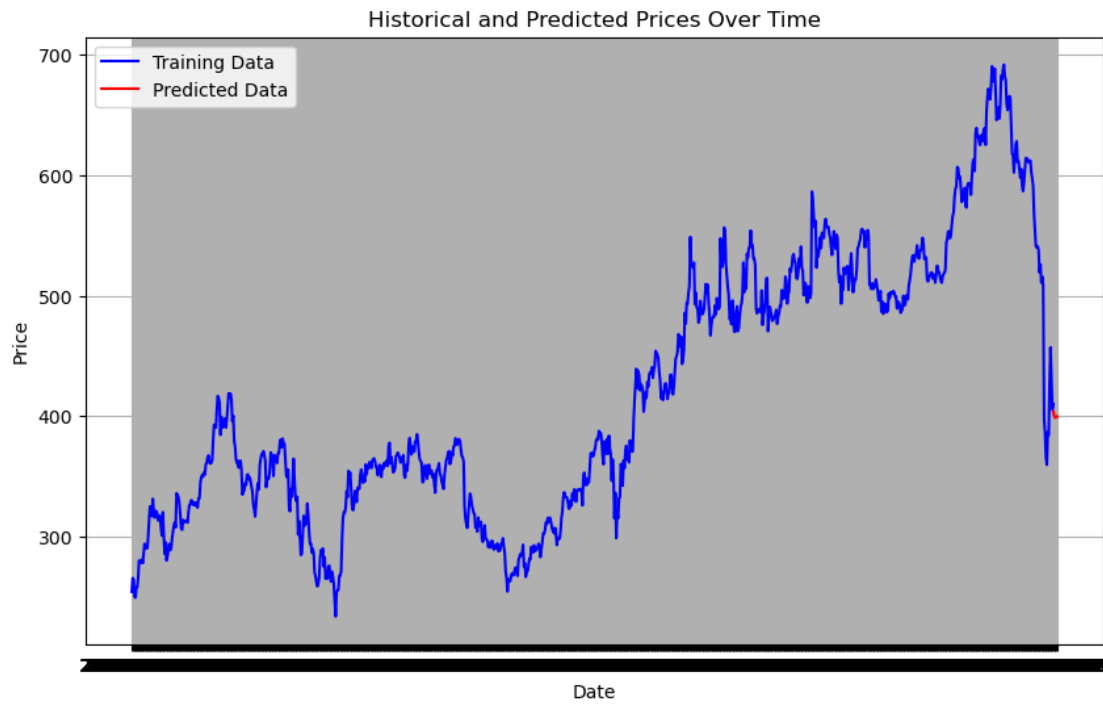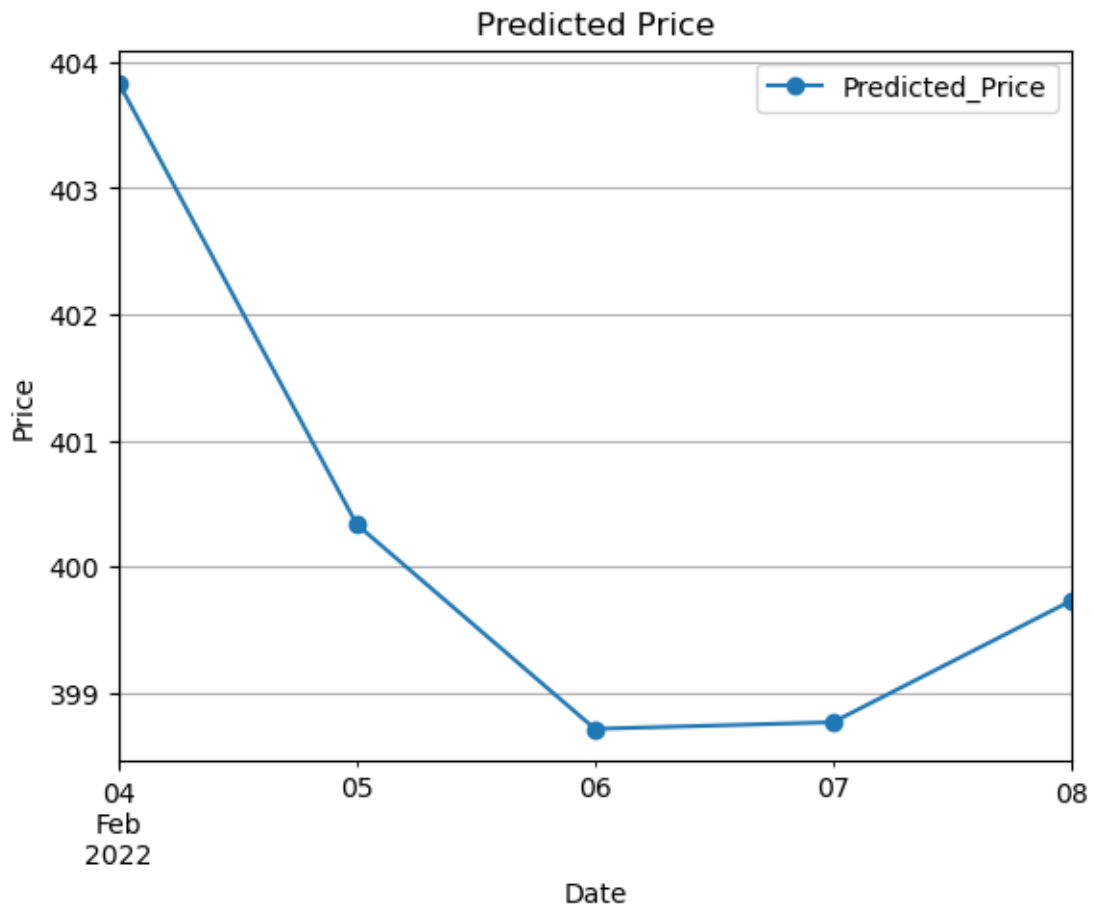
```
loss: 5.3963e-04
Epoch 95/100
25/25              0s 14ms/step -
loss: 6.2307e-04
Epoch 96/100
25/25              0s 16ms/step -
loss: 5.4418e-04
Epoch 97/100
25/25              0s 15ms/step -
loss: 6.3795e-04
Epoch 98/100
25/25              0s 14ms/step -
loss: 5.6411e-04
Epoch 99/100
25/25              0s 15ms/step -
loss: 5.7613e-04
Epoch 100/100
25/25              0s 15ms/step -
loss: 6.5103e-04
7/7            1s 7ms/step - loss:
5.6575e-04
Mean Squared Error: 0.001081580063328147
1/1            1s 801ms/step
1/1            0s 45ms/step
1/1            0s 36ms/step
1/1            0s 53ms/step
1/1            0s 32ms/step
        Date   Predicted_Price
0 2022-02-04      403.837463
1 2022-02-05      400.335144
2 2022-02-06      398.714355
3 2022-02-07      398.766846
4 2022-02-08      399.729767
```

Historical and Predicted Prices Over Time

<Figure size 800x600 with 0 Axes>

Predicted Price

[ ]: