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import numpy as np
import pandas as pd
import pandas_datareader as web
import matplotlib.pyplot as plt
import datetime as dt
from sklearn.preprocessing import MinMaxScaler
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, LSTM, Dropout

# Load Data
company = 'AAPL' # Example: Apple Inc.
start = dt.datetime(2012, 1, 1)
end = dt.datetime(2024, 1, 1)

try:
    # Attempt to fetch data from Alpha Vantage (adjust API key as necessary)
    data = web.DataReader(company, 'av-daily', start=start, end=end, api_key='YOUR_API_KEY_HERE')
except Exception as e:
    print(f"Error fetching data: {e}")
    raise

# Prepare data
scaler = MinMaxScaler(feature_range=(0, 1))
scaled_data = scaler.fit_transform(data['close'].values.reshape(-1, 1))

prediction_days = 60
x_train = []
y_train = []

for x in range(prediction_days, len(scaled_data)):
    x_train.append(scaled_data[x - prediction_days:x, 0])
    y_train.append(scaled_data[x, 0])

x_train, y_train = np.array(x_train), np.array(y_train)
x_train = np.reshape(x_train, (x_train.shape[0], x_train.shape[1], 1))

# Build the model
model = Sequential()
model.add(LSTM(units=50, return_sequences=True, input_shape=(x_train.shape[1], 1)))
model.add(Dropout(0.2))
model.add(LSTM(units=50, return_sequences=True))
model.add(Dropout(0.2))
model.add(LSTM(units=50))
model.add(Dropout(0.2))
model.add(Dense(units=1)) # prediction of the next closing value

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

# Train model
model.fit(x_train, y_train, batch_size=32, epochs=25)

# Test the model accuracy on existing data
test_start = dt.datetime(2024, 1, 1)
test_end = dt.datetime.now()

try:
    # Attempt to fetch test data from Alpha Vantage
    test_data = web.DataReader(company, 'av-daily', start=test_start, end=test_end, api_key='YOUR_API_KEY_HERE')
except Exception as e:
    print(f"Error fetching test data: {e}")
    raise

actual_prices = test_data['close'].values
total_dataset = pd.concat((data['close'], test_data['close']), axis=0)
model_inputs = total_dataset[len(total_dataset) - len(test_data) - prediction_days:].values
model_inputs = model_inputs.reshape(-1, 1)
model_inputs = scaler.transform(model_inputs)

# Make Predictions on Test Data
x_test = []
for x in range(prediction_days, len(model_inputs)):
    x_test.append(model_inputs[x - prediction_days:x, 0])

x_test = np.array(x_test)

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x_test = np.reshape(x_test, (x_test.shape[0], x_test.shape[1], 1))
predicted_prices = model.predict(x_test)
predicted_prices = scaler.inverse_transform(predicted_prices)

# Plot The Test Predictions
plt.plot(actual_prices, color="black", label=f"Actual {company} Price")
plt.plot(predicted_prices, color='green', label=f"Predicted {company} Price")
plt.title(f"{company} Share Price")
plt.xlabel('Time')
plt.ylabel(f'{company} Share Price')
plt.legend()
plt.show()
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