

pdfh72zm4

March 9, 2025

```
[45]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
[8]: url = 'https://raw.githubusercontent.com/jbrownlee/Datasets/master/
↳daily-min-temperatures.csv'
```

```
[10]: df = pd.read_csv(url, parse_dates = ['Date'], index_col = 'Date')
```

```
[11]: df
```

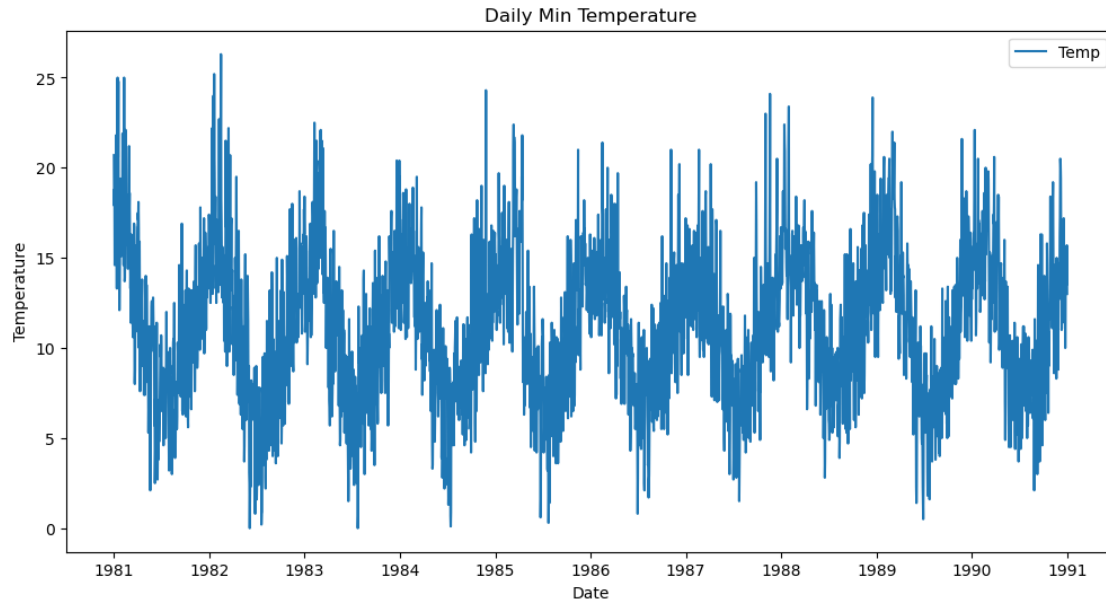
```
[11]:
```

Date	Temp
1981-01-01	20.7
1981-01-02	17.9
1981-01-03	18.8
1981-01-04	14.6
1981-01-05	15.8
...	...
1990-12-27	14.0
1990-12-28	13.6
1990-12-29	13.5
1990-12-30	15.7
1990-12-31	13.0

[3650 rows x 1 columns]

```
[17]: plt.figure(figsize = (12,6))
plt.title("Daily Min Temperature")
plt.xlabel('Date')
plt.ylabel('Temperature')
sns.lineplot(df)
```

```
[17]: <Axes: title={'center': 'Daily Min Temperature'}, xlabel='Date',
ylabel='Temperature'>
```

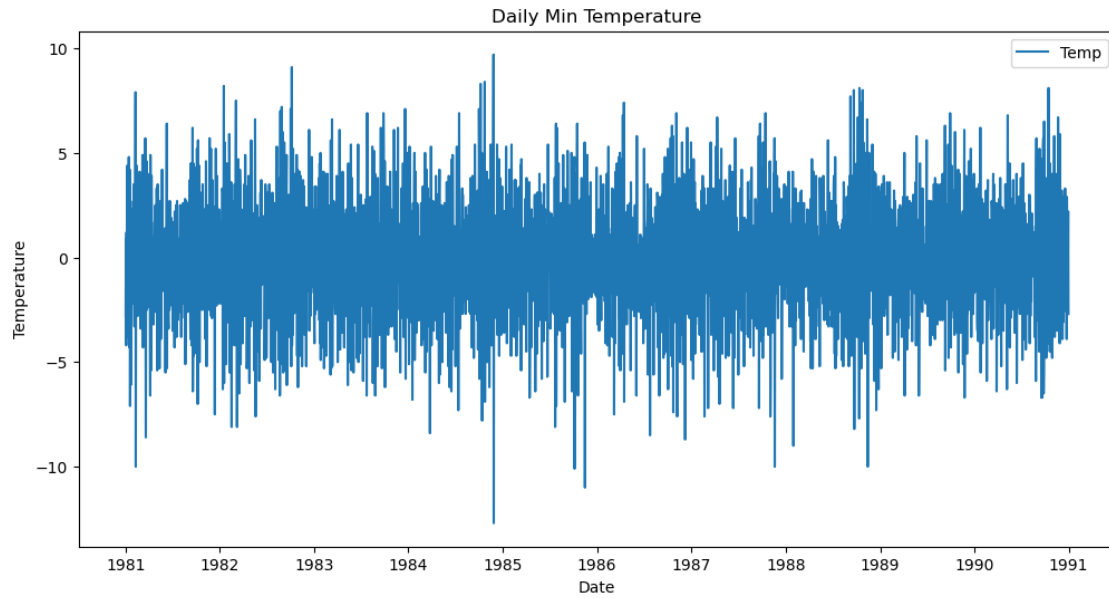


```
[25]: series = df

differenced_series = series.diff(periods = 1)
```

```
[26]: plt.figure(figsize = (12,6))
plt.title("Differenced Daily Min Temperature")
plt.xlabel('Date')
plt.ylabel('Temperature')
sns.lineplot(differenced_series)
```

```
[26]: <Axes: title={'center': 'Daily Min Temperature'}, xlabel='Date',
ylabel='Temperature'>
```

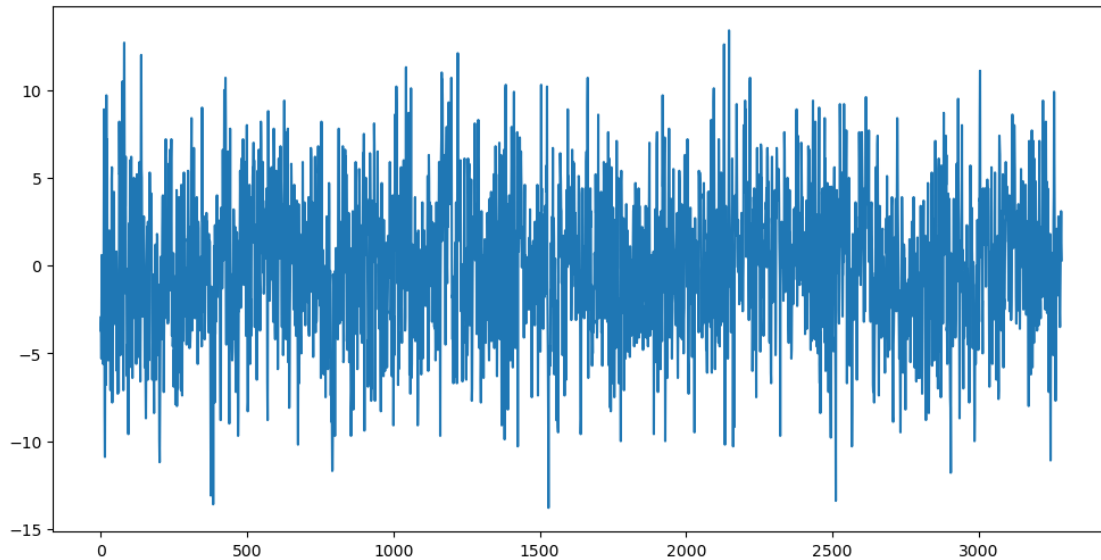


```
[56]: X = series.values
manual_differenced_series = list()
days_in_year = 365

for i in range(days_in_year, len(X)):
    value = X[i] - X[i - days_in_year]
    manual_differenced_series.append(value)
```

```
[57]: plt.figure(figsize = (12,6))
plt.plot(manual_differenced_series)
```

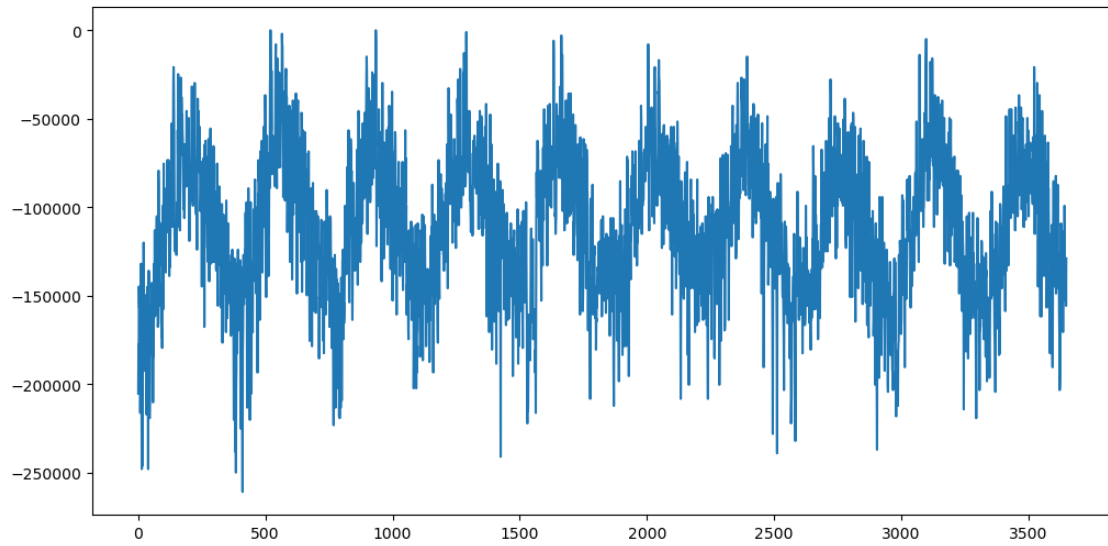
```
[57]: [<matplotlib.lines.Line2D at 0x2880f04d1d0>]
```



```
[58]: X = [i%365 for i in range(0, len(series))]
y = series.values
degree = 4
coef = np.polyfit(X, y, degree)
print('Coefficients: %s' % coef)
curve = list()
for i in range(len(X)):
    value = coef[-1]
    for d in range(degree):
        value += X[i]**(degree-d)*coef[d]
    curve.append(value)
    values = series.values
diff = list()
```

```
Coefficients: [[-1.17308000e-08]
 [ 9.30253946e-06]
 [-2.15977594e-03]
 [ 1.19147966e-01]
 [ 1.38980178e+01]]
```

```
[59]: for i in range(len(values)):
    value = values[i]*curve[i]
    diff.append(value)
plt.figure(figsize = (12,6))
plt.plot(diff)
plt.show()
```



[ ]: