dmv2

November 3, 2024

1 Interacting with Web APIs Problem Statement: Analyzing Weather Data from OpenWeatherMap API. The goal is to interact with the OpenWeatherMap API to retrieve weather data for a specific location and perform data modeling and visualization to analyze weather patterns over time.

[4]:
```
import requests
import pandas as pd
import json
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')

API_key = '2cac9177ae64d8f6733f9e5a51d63919'

countries = ['Jamaica', 'Indonesia', 'United States',  "Turkey", 'Saudi Arabia',␣
 ↪, "Egypt", 'China']

country_name_list = []
maxtemp = []
mintemp = []
humidity = []
windspeed = []

for country_names in countries:

    url = f'http://api.openweathermap.org/data/2.5/weather?
 ↪q={country_names}&APPID={API_key}&units=metric'
    r = requests.get(url)
    data = r.json()
    formatted_json = json.dumps(data, sort_keys = True, indent = 4)

    print(data)
    country_name_list.append(data['name'])
    maxtemp.append(data['main']['temp_max'])
```

```
    mintemp.append(data['main']['temp_min'])
    humidity.append(data['main']['humidity'])
    windspeed.append(data['wind']['speed'])


df = pd.DataFrame()
df['Names'] = country_name_list
df['Max_Temp'] = maxtemp
df['Min_Temp'] = mintemp
df['Humidity'] = humidity
df['WindSpeed'] = windspeed

df.head()
```

```
{'coord': {'lon': -82.1703, 'lat': 22.9792}, 'weather': [{'id': 800, 'main':
'Clear', 'description': 'clear sky', 'icon': '01n'}], 'base': 'stations',
'main': {'temp': 23.5, 'feels_like': 24.1, 'temp_min': 23.5, 'temp_max': 23.56,
'pressure': 1015, 'humidity': 84, 'sea_level': 1015, 'grnd_level': 1000},
'visibility': 10000, 'wind': {'speed': 5.64, 'deg': 64, 'gust': 11.64},
'clouds': {'all': 0}, 'dt': 1730525698, 'sys': {'type': 2, 'id': 47732,
'country': 'CU', 'sunrise': 1730547267, 'sunset': 1730587796}, 'timezone':
-14400, 'id': 3556406, 'name': 'Jamaica', 'cod': 200}
{'coord': {'lon': 120, 'lat': -5}, 'weather': [{'id': 501, 'main': 'Rain',
'description': 'moderate rain', 'icon': '10d'}], 'base': 'stations', 'main':
{'temp': 28.41, 'feels_like': 33.33, 'temp_min': 28.41, 'temp_max': 28.41,
'pressure': 1010, 'humidity': 81, 'sea_level': 1010, 'grnd_level': 964},
'visibility': 10000, 'wind': {'speed': 1.33, 'deg': 105, 'gust': 1.8}, 'rain':
{'1h': 2.63}, 'clouds': {'all': 67}, 'dt': 1730525698, 'sys': {'type': 1, 'id':
9325, 'country': 'ID', 'sunrise': 1730496886, 'sunset': 1730541135}, 'timezone':
28800, 'id': 1643084, 'name': 'Indonesia', 'cod': 200}
{'coord': {'lon': -98.5, 'lat': 39.76}, 'weather': [{'id': 803, 'main':
'Clouds', 'description': 'broken clouds', 'icon': '04n'}], 'base': 'stations',
'main': {'temp': 10.13, 'feels_like': 9, 'temp_min': 10.13, 'temp_max': 10.13,
'pressure': 1020, 'humidity': 69, 'sea_level': 1020, 'grnd_level': 956},
'visibility': 10000, 'wind': {'speed': 3.56, 'deg': 107, 'gust': 5.81},
'clouds': {'all': 83}, 'dt': 1730525698, 'sys': {'country': 'US', 'sunrise':
1730552661, 'sunset': 1730590241}, 'timezone': -18000, 'id': 6252001, 'name':
'United States of America', 'cod': 200}
{'coord': {'lon': 34.9115, 'lat': 39.059}, 'weather': [{'id': 800, 'main':
'Clear', 'description': 'clear sky', 'icon': '01d'}], 'base': 'stations',
'main': {'temp': 1.4, 'feels_like': 1.4, 'temp_min': 1.4, 'temp_max': 1.4,
'pressure': 1021, 'humidity': 49, 'sea_level': 1021, 'grnd_level': 887},
'visibility': 10000, 'wind': {'speed': 0.71, 'deg': 111, 'gust': 0.84},
'clouds': {'all': 0}, 'dt': 1730525698, 'sys': {'type': 1, 'id': 6964,
'country': 'TR', 'sunrise': 1730520543, 'sunset': 1730558321}, 'timezone':
10800, 'id': 298795, 'name': 'Turkey', 'cod': 200}
{'coord': {'lon': 45, 'lat': 25}, 'weather': [{'id': 800, 'main': 'Clear',
```

```
'description': 'clear sky', 'icon': '01d'}], 'base': 'stations', 'main':
{'temp': 24.58, 'feels_like': 24.24, 'temp_min': 24.58, 'temp_max': 24.58,
'pressure': 1018, 'humidity': 44, 'sea_level': 1018, 'grnd_level': 931},
'visibility': 10000, 'wind': {'speed': 8.66, 'deg': 156, 'gust': 11.5},
'clouds': {'all': 7}, 'dt': 1730525698, 'sys': {'country': 'SA', 'sunrise':
1730516885, 'sunset': 1730557136}, 'timezone': 10800, 'id': 102358, 'name':
'Saudi Arabia', 'cod': 200}
{'coord': {'lon': -75.5299, 'lat': 40.6801}, 'weather': [{'id': 804, 'main':
'Clouds', 'description': 'overcast clouds', 'icon': '04n'}], 'base': 'stations',
'main': {'temp': 10.55, 'feels_like': 9.25, 'temp_min': 8.66, 'temp_max': 10.96,
'pressure': 1024, 'humidity': 61, 'sea_level': 1024, 'grnd_level': 1009},
'visibility': 10000, 'wind': {'speed': 2.57, 'deg': 260}, 'clouds': {'all':
100}, 'dt': 1730525543, 'sys': {'type': 1, 'id': 3204, 'country': 'US',
'sunrise': 1730547243, 'sunset': 1730584633}, 'timezone': -14400, 'id': 5188351,
'name': 'Egypt', 'cod': 200}
{'coord': {'lon': -99.2333, 'lat': 25.7}, 'weather': [{'id': 802, 'main':
'Clouds', 'description': 'scattered clouds', 'icon': '03n'}], 'base':
'stations', 'main': {'temp': 25.19, 'feels_like': 25.88, 'temp_min': 25.19,
'temp_max': 25.19, 'pressure': 1014, 'humidity': 81, 'sea_level': 1014,
'grnd_level': 998}, 'visibility': 10000, 'wind': {'speed': 7.9, 'deg': 130,
'gust': 12.35}, 'clouds': {'all': 38}, 'dt': 1730525400, 'sys': {'country':
'MX', 'sunrise': 1730465131, 'sunset': 1730505322}, 'timezone': -21600, 'id':
3530839, 'name': 'China', 'cod': 200}
```

[4]:

	Names	Max_Temp	Min_Temp	Humidity	WindSpeed
0	Jamaica	23.56	23.50	84	5.64
1	Indonesia	28.41	28.41	81	1.33
2	United States of America	10.13	10.13	69	3.56
3	Turkey	1.40	1.40	49	0.71
4	Saudi Arabia	24.58	24.58	44	8.66

[5]:
```
df.isna().sum()
```

[5]:
```
Names        0
Max_Temp     0
Min_Temp     0
Humidity     0
WindSpeed    0
dtype: int64
```

[6]:
```
df.duplicated().sum()
```

[6]:
```
0
```

[7]:
```
df.describe()
```

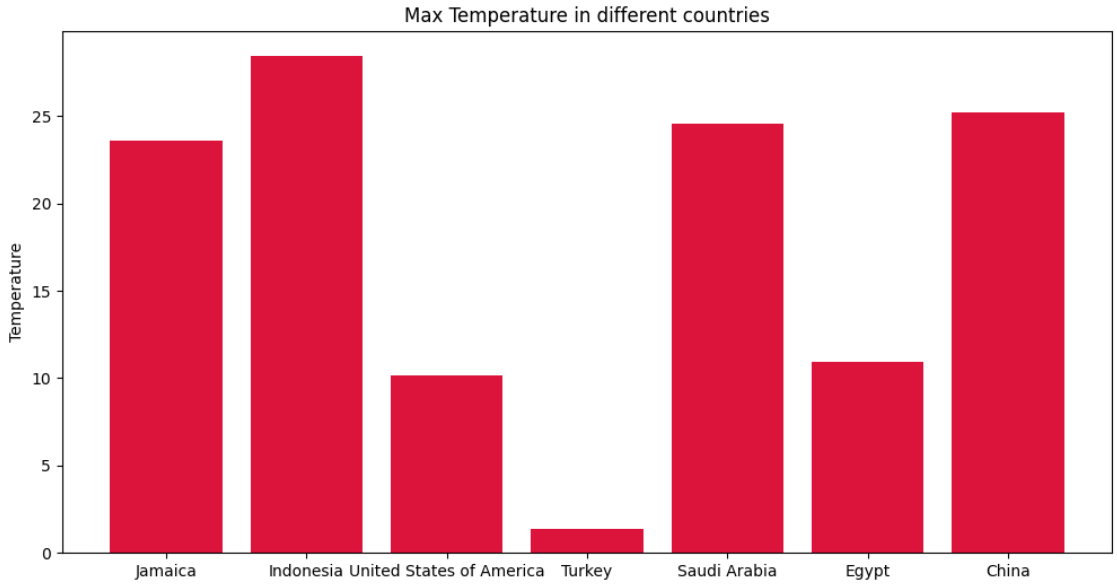
[7]:

	Max_Temp	Min_Temp	Humidity	WindSpeed
count	7.000000	7.000000	7.000000	7.000000
mean	17.747143	17.410000	67.000000	4.338571
std	10.172554	10.455512	16.196707	3.135929
min	1.400000	1.400000	44.000000	0.710000
25%	10.545000	9.395000	55.000000	1.950000
50%	23.560000	23.500000	69.000000	3.560000
75%	24.885000	24.885000	81.000000	6.770000
max	28.410000	28.410000	84.000000	8.660000

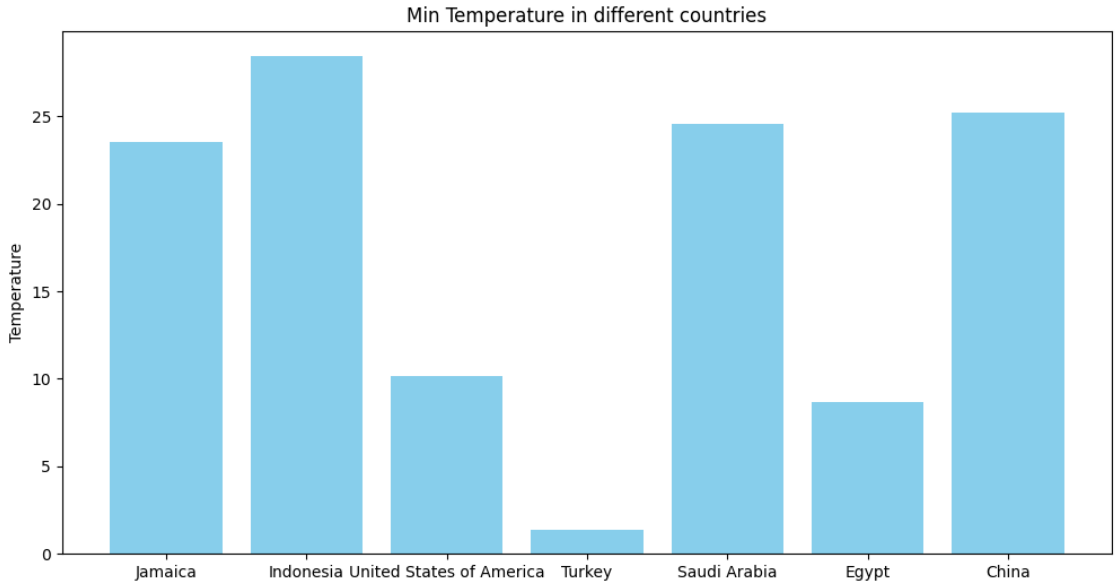
[8]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7 entries, 0 to 6
Data columns (total 5 columns):
 #   Column      Non-Null Count  Dtype  
---  ------      --------------  -----  
 0   Names       7 non-null      object 
 1   Max_Temp    7 non-null      float64
 2   Min_Temp    7 non-null      float64
 3   Humidity    7 non-null      int64  
 4   WindSpeed   7 non-null      float64
dtypes: float64(3), int64(1), object(1)
memory usage: 412.0+ bytes
```

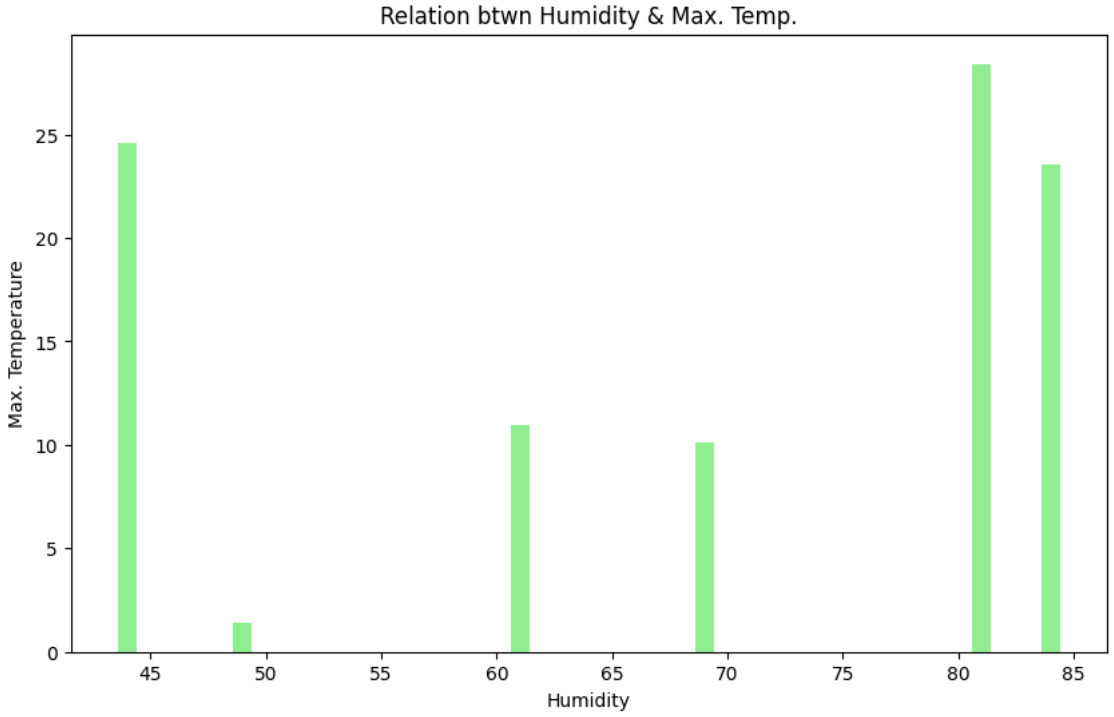
[9]:
```
plt.figure(figsize=(12,6))
plt.bar(df['Names'], df['Max_Temp'], color='crimson')
plt.title("Max Temperature in different countries")
plt.ylabel("Temperature")
plt.show()
```



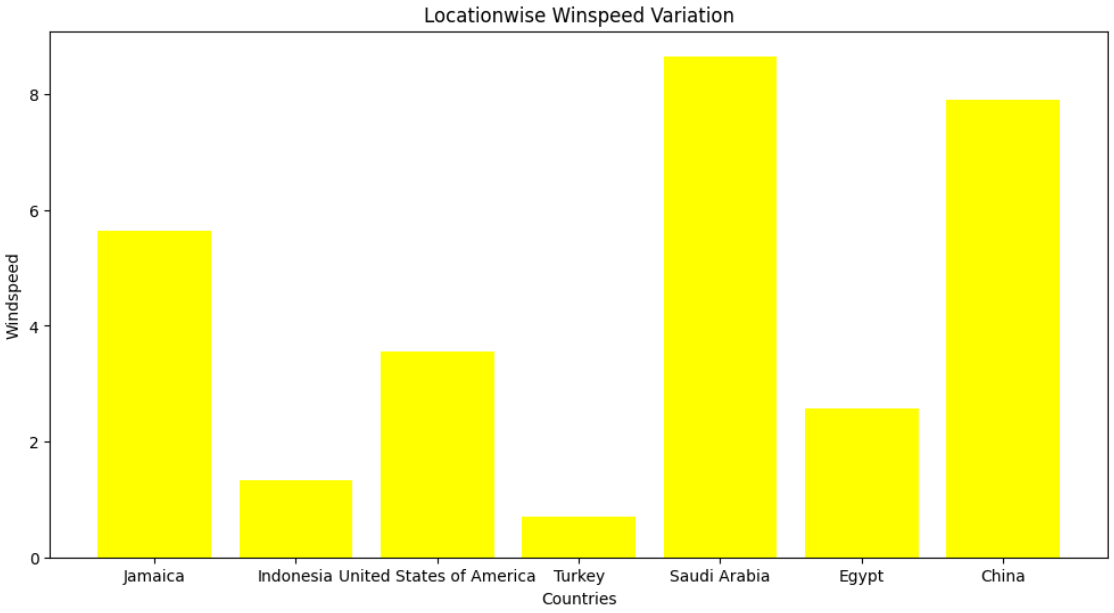
[10]:
```
plt.figure(figsize=(12,6))
plt.bar(df['Names'], df['Min_Temp'], color='skyblue')
plt.title("Min Temperature in different countries")
plt.ylabel("Temperature")
plt.show()
```



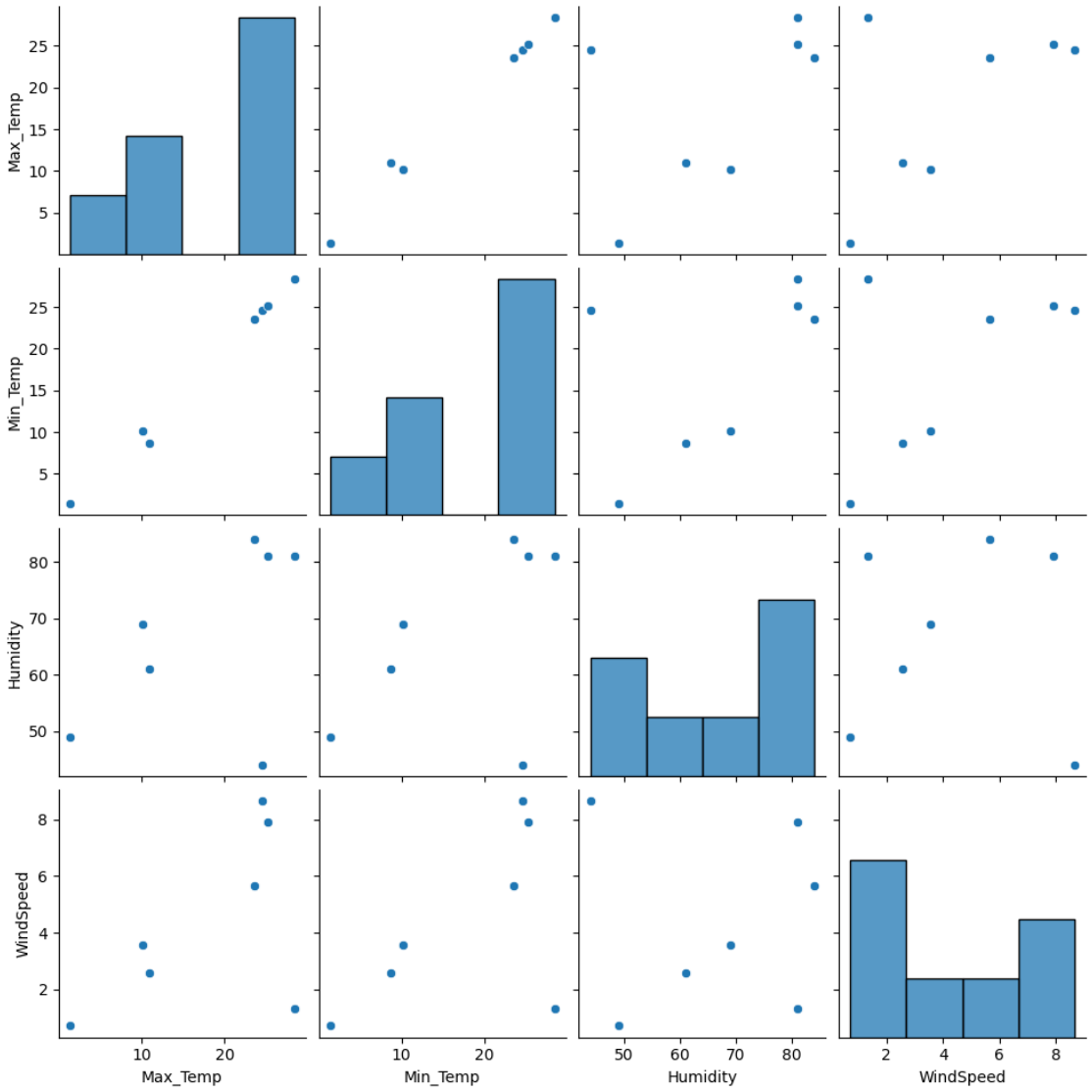
[11]:
```
plt.figure(figsize=(10,6))
plt.bar(df['Humidity'],df['Max_Temp'],color='lightgreen')
plt.title('Relation btwn Humidity & Max. Temp.')
plt.xlabel('Humidity')
plt.ylabel('Max. Temperature')
plt.show()
```



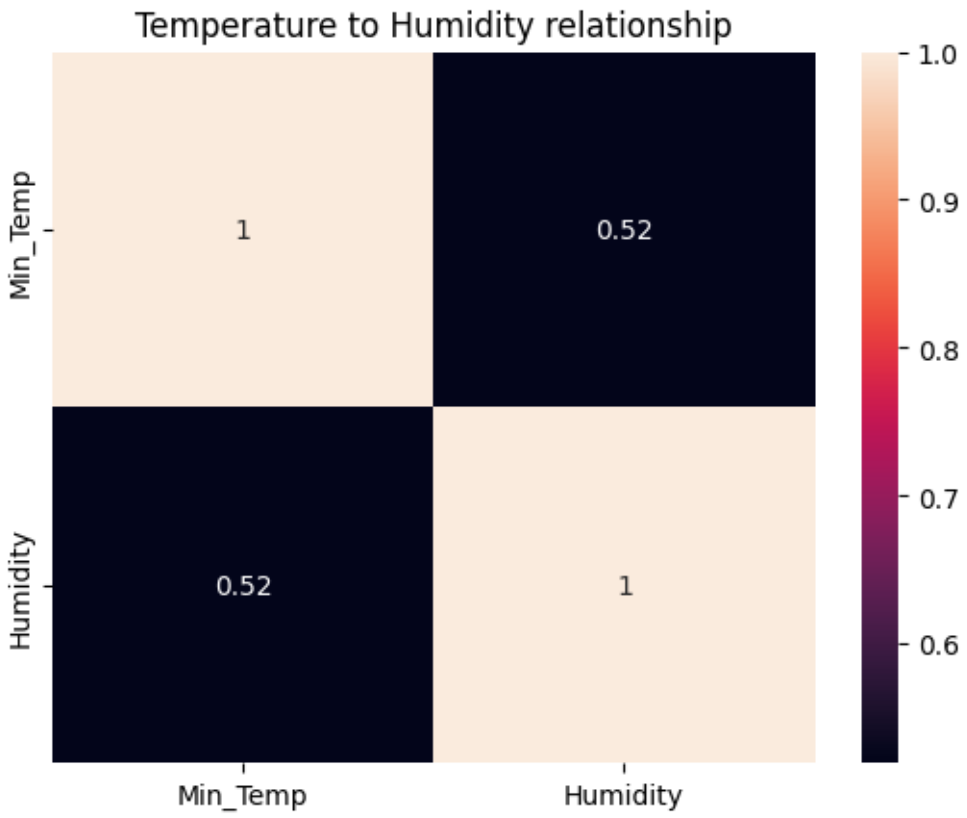
[12]:
```
plt.figure(figsize=(12,6))
plt.bar(df['Names'],df['WindSpeed'],color='yellow')
plt.title('Locationwise Winspeed Variation')
plt.xlabel('Countries')
plt.ylabel('Windspeed')
plt.show()
```



[13]:
```
sns.pairplot(df)
plt.show()
```



[14]:
```
corr_matrix = df[['Min_Temp','Humidity']].corr()
sns.heatmap(corr_matrix, annot=True)
plt.title("Temperature to Humidity relationship")
plt.show()
```


Temperature to Humidity relationship
Min_Temp
Humidity
1
0.52
0.52
1
Min_Temp
Humidity
1.0
0.9
0.8
0.7
0.6

[ ]: