Exploring Weather Trends

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Udacity - Data Analyst Nanodegree

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Project1 – Explore Weather Trends

Riyadh, Saudi Arabia

Overview

In this project, I have analyzed local temperature of Riyadh, Saudi Arabia in accordance with the global temperature data and compared. I had been provided with a database on Udacity portal from where I have extract, manipulate and visualize the data as in the following goals.

Goals:

1.Extraction of data from the database and export to CSV file.

2.Making a chart visualization based in extracted data.

3.Observation based on chart.

Tools Used:

1.SQL: To extract the data from the database.

2.Python: For calculating moving average and plotting line chart.

3.ANACONDA – Jupyter Notebook: For writing python code and making observations.

Getting the data

The SQL query to extra data

```
select cd.city,cd.country,cd.year, cd.avg_temp cat, gd.avg_temp gat

from global_data gd

join city_data cd

on gd.year = cd.year

where city like 'Riyadh%'
```

In [27]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

Data cleaning

In [6]:
```
data =pd.read_csv("project1.csv")
data.head()
```

Out[6]:

	city	country	year	cat	gat
0	Riyadh	Saudi Arabia	1843	24.74	8.17
1	Riyadh	Saudi Arabia	1844	15.45	7.65
2	Riyadh	Saudi Arabia	1845	20.82	7.85
3	Riyadh	Saudi Arabia	1846	NaN	8.55
4	Riyadh	Saudi Arabia	1847	NaN	8.09

In [7]:
```
data.tail()
```

Out[7]:

	city	country	year	cat	gat
166	Riyadh	Saudi Arabia	2009	26.71	9.51
167	Riyadh	Saudi Arabia	2010	27.37	9.70
168	Riyadh	Saudi Arabia	2011	26.40	9.52
169	Riyadh	Saudi Arabia	2012	26.83	9.51
170	Riyadh	Saudi Arabia	2013	27.78	9.61

In [10]:
```
# set coulmn 'year' as an index
data.index = data['year']
data
```

Out[10]:

year	city	country	year	cat	gat
1843	Riyadh	Saudi Arabia	1843	24.74	8.17
1844	Riyadh	Saudi Arabia	1844	15.45	7.65
1845	Riyadh	Saudi Arabia	1845	20.82	7.85
1846	Riyadh	Saudi Arabia	1846	NaN	8.55
1847	Riyadh	Saudi Arabia	1847	NaN	8.09
...	...	...	...	...	...
2009	Riyadh	Saudi Arabia	2009	26.71	9.51
2010	Riyadh	Saudi Arabia	2010	27.37	9.70
2011	Riyadh	Saudi Arabia	2011	26.40	9.52
2012	Riyadh	Saudi Arabia	2012	26.83	9.51
2013	Riyadh	Saudi Arabia	2013	27.78	9.61

171 rows × 5 columns

In [11]:
```
data.drop(['year','city','country'],axis=1, inplace=True)
data
```

Out[11]:

year	cat	gat
1843	24.74	8.17
1844	15.45	7.65
1845	20.82	7.85
1846	NaN	8.55
1847	NaN	8.09
...	...	...
2009	26.71	9.51
2010	27.37	9.70
2011	26.40	9.52
2012	26.83	9.51
2013	27.78	9.61

171 rows × 2 columns

In [13]:
```
data.dropna(inplace=True)
data
```

Out[13]:

year	cat	gat
1843	24.74	8.17
1844	15.45	7.65
1845	20.82	7.85
1848	24.56	7.98
1849	24.80	7.98
...	...	...
2009	26.71	9.51
2010	27.37	9.70
2011	26.40	9.52
2012	26.83	9.51
2013	27.78	9.61

169 rows × 2 columns

Exploratory Data Analysis

In [25]:
```
data['moving_cat']=data['cat'].rolling(window=3).mean()
data['moving_gat']=data['gat'].rolling(window=3).mean()
data
```

Out[25]:

year	cat	gat	moving_cat	moving_gat
1843	24.74	8.17	NaN	NaN
1844	15.45	7.65	NaN	NaN
1845	20.82	7.85	20.336667	7.890000
1848	24.56	7.98	20.276667	7.826667
1849	24.80	7.98	23.393333	7.936667
...	...	...	...	...
2009	26.71	9.51	26.470000	9.556667
2010	27.37	9.70	26.763333	9.546667
2011	26.40	9.52	26.826667	9.576667
2012	26.83	9.51	26.866667	9.576667
2013	27.78	9.61	27.003333	9.546667

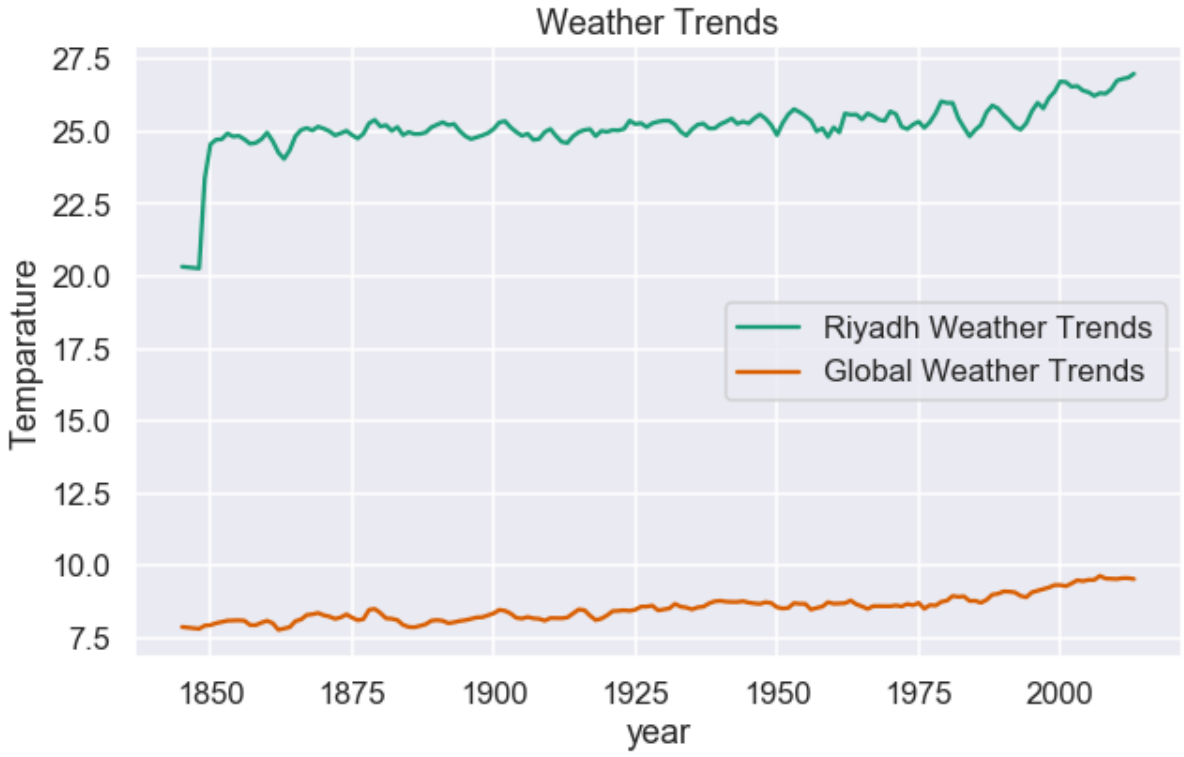
169 rows × 4 columns

Data Visualization

In [26]:
```
sns.set(style='darkgrid',context='talk',palette='Dark2')
fig,ax = plt.subplots(figsize=(10,6))
ax.plot(data['moving_cat'], label='Riyadh Weather Trends')
ax.plot(data['moving_gat'], label='Global Weather Trends')

ax.legend(loc='best')
ax.set_xlabel('year')
ax.set_ylabel('Temparature')
ax.set_title('Weather Trends')
```

Out[26]: Text(0.5, 1.0, 'Weather Trends')



Observation:

1.Riyadh is hotter, as you can see is higher than global.

2.There is a consistency over time between Riyadh temperature and global temperature.

3.The overall trend for Riyadh and global is that the temperature is increasing.

4.Few years before 1850, Riyadh temp has increased sharply while global temp has stable increase over this period.

5.In recent few years, the temperature increased higher for both Riyadh and global. Both lines are increasing quicker where Riyadh temperature has higher fluctuation.