FAO Case Study

Participant Details

Title = "Engr."

Name = "Nasir Abdul Aziz Jumani"

Email = "nasirazizjumani@gmail.com"

Whatsapp = "00923362080370"

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

In [ ]:
```
hararat = pd.read_csv('hararat.csv')
hararat.head(5)
```

Out[ ]:

	Domain Code	Domain	Area Code (FAO)	Area	Element Code	Element	Months Code	Months	Year Code	Year
0	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1961	1961
1	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1962	1962
2	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1963	1963
3	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1964	1964
4	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1965	1965

In [ ]:
```
# basic statistics or summary
hararat.describe()
```

Out[ ]:

	Area Code (FAO)	Element Code	Months Code	Year Code	Year	Value
count	4320.000000	4320.0	4320.000000	4320.000000	4320.000000	4320.000000
mean	92.666667	7271.0	7006.500000	1990.500000	1990.500000	0.399972
std	57.387437	0.0	3.452452	17.320107	17.320107	1.018098
min	2.000000	7271.0	7001.000000	1961.000000	1961.000000	-7.724000
25%	38.000000	7271.0	7003.750000	1975.750000	1975.750000	-0.155500

	Area Code (FAO)	Element Code	Months Code	Year Code	Year	Value
50%	101.000000	7271.0	7006.500000	1990.500000	1990.500000	0.377000
75%	149.000000	7271.0	7009.250000	2005.250000	2005.250000	0.964250
max	165.000000	7271.0	7012.000000	2020.000000	2020.000000	4.803000

In [ ]:
```
hararat.head(5)
```

Out[ ]:

	Domain Code	Domain	Area Code (FAO)	Area	Element Code	Element	Months Code	Months	Year Code	Year
0	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1961	1961
1	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1962	1962
2	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1963	1963
3	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1964	1964
4	ET	Temperature change	2	Afghanistan	7271	Temperature change	7001	January	1965	1965

In [ ]:
```
# dropping few columns and make a new data set

new_hararat = hararat.drop(['Domain Code', 'Element Code', 'Year Code', 'Months Code
new_hararat.head()
```

Out[ ]:

	Domain	Area Code (FAO)	Area	Element	Months	Year	Unit	Value
0	Temperature change	2	Afghanistan	Temperature change	January	1961	C	0.746
1	Temperature change	2	Afghanistan	Temperature change	January	1962	C	0.009
2	Temperature change	2	Afghanistan	Temperature change	January	1963	C	2.695
3	Temperature change	2	Afghanistan	Temperature change	January	1964	C	-5.277
4	Temperature change	2	Afghanistan	Temperature change	January	1965	C	1.827

In [ ]:
```
new_hararat.mean()
```

```
C:\Users\Nasir\AppData\Local\Temp/ipykernel_18508/3790122997.py:1: FutureWarning: Dr
opping of nuisance columns in DataFrame reductions (with 'numeric_only=None') is dep
recated; in a future version this will raise TypeError.  Select only valid columns b
efore calling the reduction.
  new_hararat.mean()
Area Code (FAO)      92.666667
```

Out[ ]:
```
Year               1990.500000
Value                 0.399972
dtype: float64
```

In [ ]:
```
new_hararat.value_counts('Value')
```

Out[ ]:
```
Value
 0.599    9
 0.050    8
 0.361    7
 0.023    7
 0.043    7
        ..
-0.064    1
-0.065    1
-0.066    1
-0.067    1
 4.803    1
Length: 2443, dtype: int64
```

In [ ]:
```
new_hararat.groupby(["Area"]).mean()
```

Out[ ]:

Area	Area Code (FAO)	Year	Value
Afghanistan	2.0	1990.5	0.477028
India	100.0	1990.5	0.275061
Iran (Islamic Republic of)	102.0	1990.5	0.636314
Nepal	149.0	1990.5	0.255029
Pakistan	165.0	1990.5	0.272197
Sri Lanka	38.0	1990.5	0.484204

In [ ]:
```
mahina_waar_darja_bandi = new_hararat.groupby(["Area", "Months"]).mean()
```

In [ ]:
```
new_hararat[new_hararat ['Months'] == 'January'].mean()
```

Out[ ]:
```
C:\Users\Nasir\AppData\Local\Temp/ipykernel_18508/4200609254.py:1: FutureWarning: Dr
opping of nuisance columns in DataFrame reductions (with 'numeric_only=None') is dep
recated; in a future version this will raise TypeError.  Select only valid columns b
efore calling the reduction.
  new_hararat[new_hararat ['Months'] == 'January'].mean()
Area Code (FAO)      92.666667
Year               1990.500000
Value                 0.366144
dtype: float64
```

In [ ]:
```
#January k maheenay me climate change ki sharah
new_hararat[new_hararat ['Months'] == 'January'].groupby(["Area", "Months"]).mean()
```

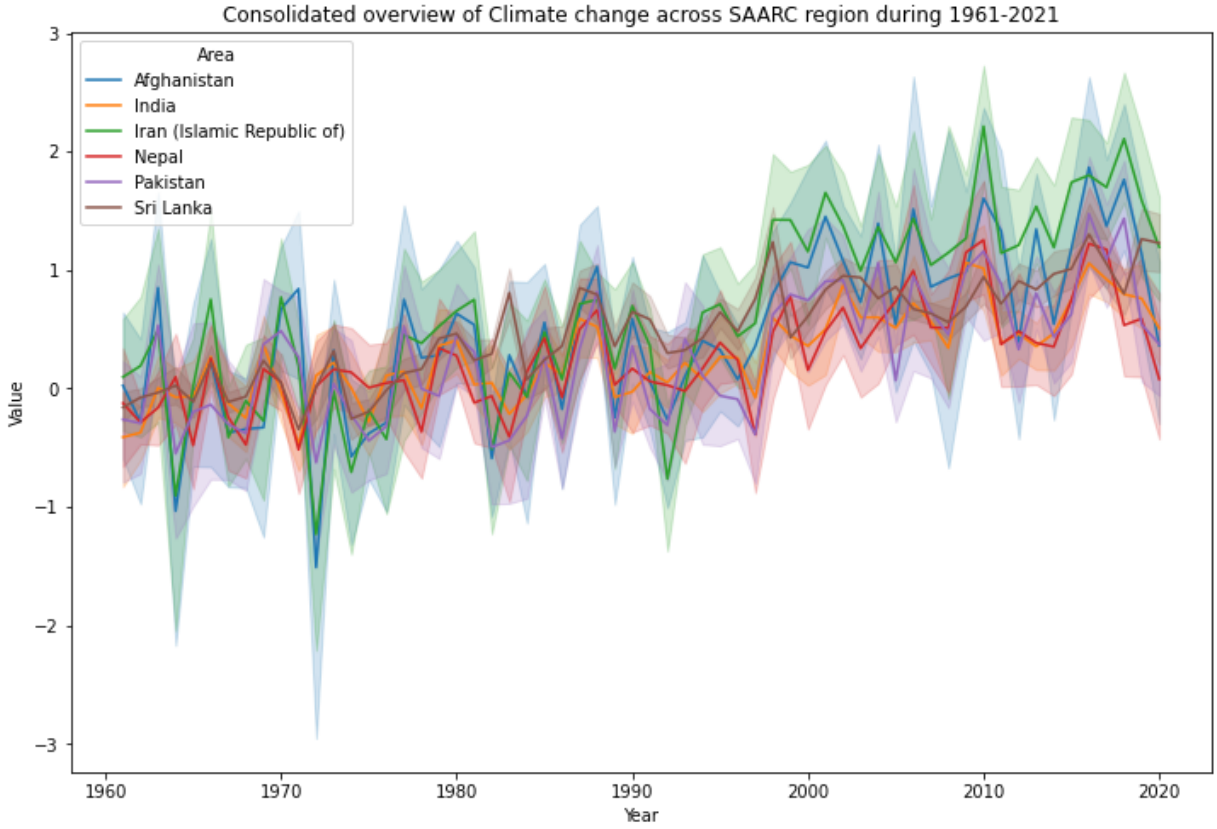
Out[ ]:

Area	Months	Area Code (FAO)	Year	Value
Afghanistan	**January**	2.0	1990.5	0.479600

Area	Months	Area Code (FAO)	Year	Value
India	**January**	100.0	1990.5	0.242783
Iran (Islamic Republic of)	**January**	102.0	1990.5	0.569883
Nepal	**January**	149.0	1990.5	0.153333
Pakistan	**January**	165.0	1990.5	0.306117
Sri Lanka	**January**	38.0	1990.5	0.445150

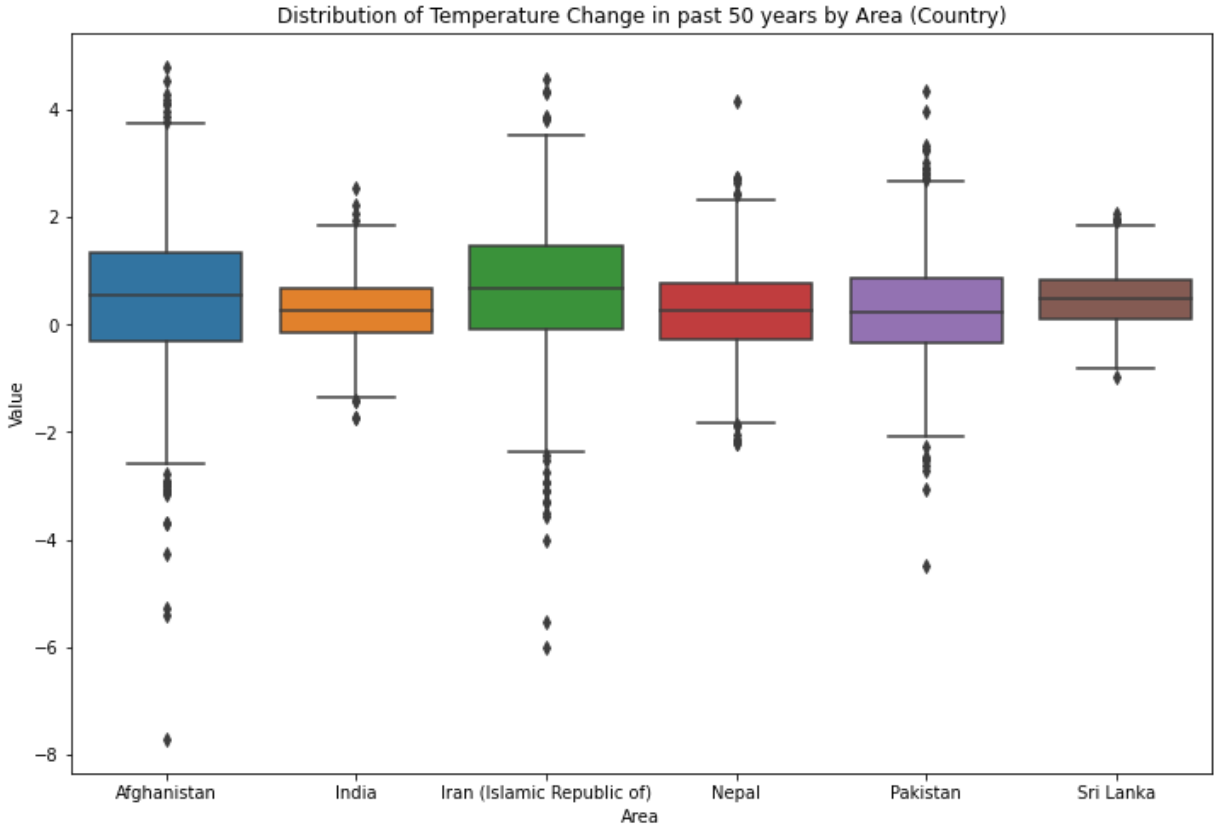
In [ ]:
```
plt.figure(figsize=(12,8))
sns.lineplot(x="Year", y="Value", hue="Area",data=new_hararat).set(title="Consolidat
```

Out[ ]:
```
[Text(0.5, 1.0, 'Consolidated overview of Climate change across SAARC region during
1961-2021')]
```



In [ ]:
```
plt.figure(figsize=(12,8))
sns.boxplot(data=new_hararat, x="Area", y="Value").set(title="Distribution of Temper
```

Out[ ]:
```
[Text(0.5, 1.0, 'Distribution of Temperature Change in past 50 years by Area (Countr
y)')]
```


Distribution of Temperature Change in past 50 years by Area (Country)
Value
4
2
0
−2
−4
−6
−8
Afghanistan
India
Iran (Islamic Republic of)
Nepal
Pakistan
Sri Lanka
Area