Data Collection and Preprocessing Phase

Date	24 April 2024
Team ID	739744
Project Title	Freedom of the World Classification
Maximum Marks	6 Marks

Data Exploration and Preprocessing Template

Identifies data sources, assesses quality issues like missing values and duplicates, and implements resolution plans to ensure accurate and reliable analysis.

Section: Data Overview

Description:

	Edition	PR rating	CL rating	A1	A2	A3	A	B1	B2	B3	...	F3
count	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	...	2095.000000
mean	2017.503103	3.575656	3.458234	2.412888	2.523628	2.391885	7.328401	2.599523	2.466826	2.253461	...	2.000477
std	2.873464	2.211561	1.932492	1.615921	1.527616	1.419146	4.425660	1.401493	1.572119	1.435066	...	1.390547
min	2013.000000	1.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000
25%	2015.000000	1.000000	2.000000	1.000000	1.000000	1.000000	3.000000	1.000000	1.000000	1.000000	...	1.000000
50%	2018.000000	3.000000	3.000000	3.000000	3.000000	3.000000	9.000000	3.000000	3.000000	2.000000	...	2.000000
75%	2020.000000	6.000000	5.000000	4.000000	4.000000	4.000000	12.000000	4.000000	4.000000	4.000000	...	3.000000
max	2022.000000	7.000000	7.000000	4.000000	4.000000	4.000000	12.000000	4.000000	4.000000	4.000000	...	4.000000

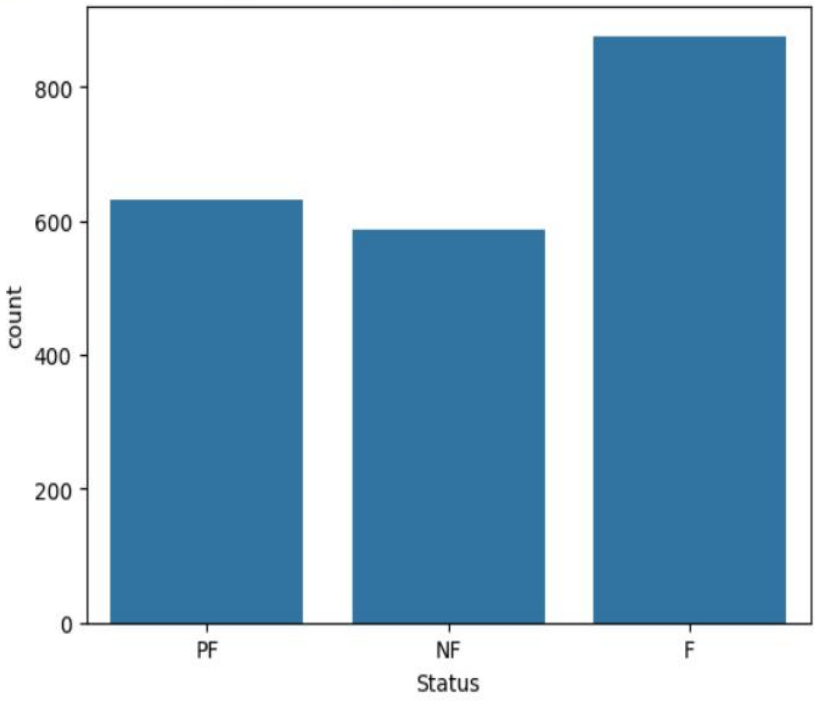
8 rows × 38 columns

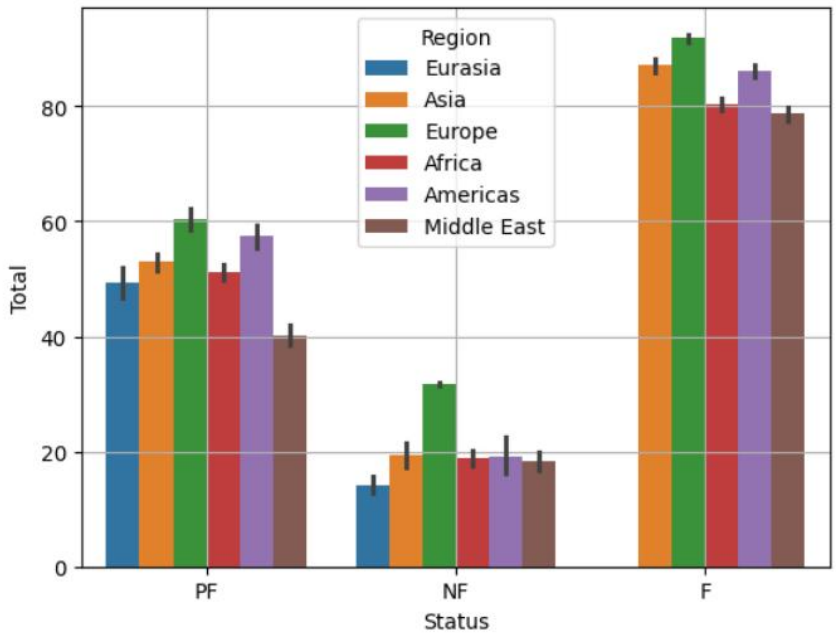
	F3	F4	F	G1	G2	G3	G4	G	CL	Total
	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000	2095.000000
	2.000477	1.850597	7.850119	2.633890	2.364200	2.291169	2.002387	9.291647	34.949403	57.798091
	1.390547	1.101843	4.941150	1.254256	1.102466	1.046755	1.057332	4.153617	17.126707	30.288533
	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	-1.000000
	1.000000	1.000000	4.000000	2.000000	2.000000	2.000000	1.000000	6.000000	20.500000	30.000000
	2.000000	2.000000	7.000000	3.000000	2.000000	2.000000	2.000000	9.000000	36.000000	62.000000
	3.000000	3.000000	12.000000	4.000000	3.000000	3.000000	3.000000	13.000000	51.000000	87.000000
	4.000000	4.000000	16.000000	4.000000	4.000000	4.000000	4.000000	16.000000	60.000000	100.000000

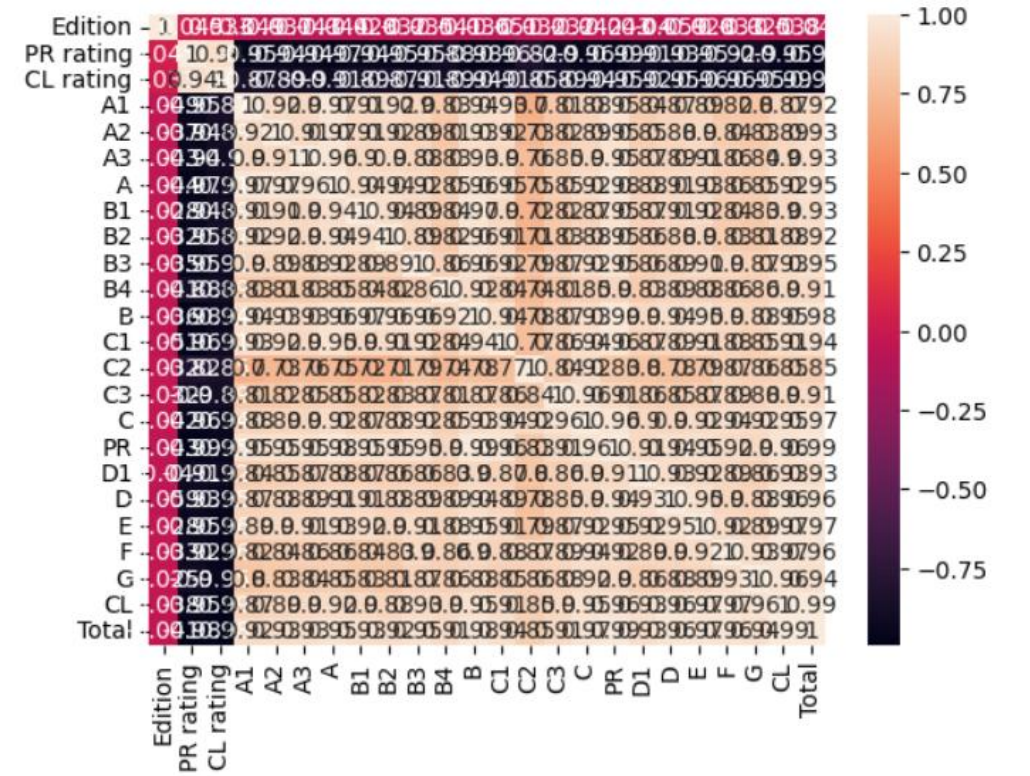
Univariate Analysis

```
sns.countplot(data=data,x='Status')
```

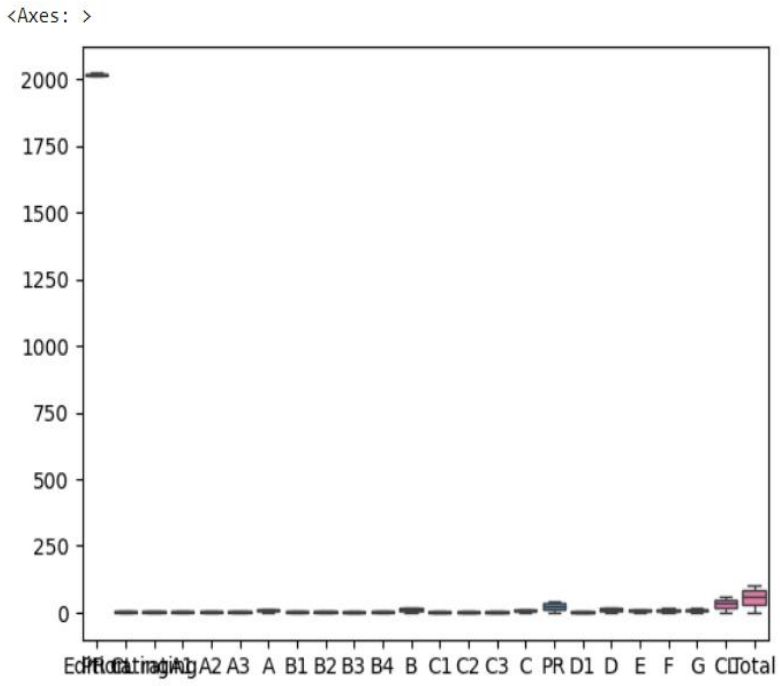
```
<Axes: xlabel='Status', ylabel='count'>
```



Bivariate Analysis	``` import seaborn as sns import matplotlib.pyplot as plt sns.barplot(data=data, x='Status',y='Total', hue='Region') plt.grid(True) plt.show() ``` 
Multivariate Analysis	``` import seaborn as sns import matplotlib.pyplot as plt import pandas as pd # Import pandas for data manipulation # Assuming 'Country/Territory' is the column with non-numerical values numerical_data = data.select_dtypes(include=['number']) # Select only numerical columns sns.heatmap(numerical_data.corr(), annot=True) plt.show() ```


Edition
PR rating
CL rating
A1
A2
A3
A
B1
B2
B3
B4
B
C1
C2
C3
C
PR
D1
D
E
F
G
CL
Total
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75

Outliers


<Axes: >
2000
1750
1500
1250
1000
750
500
250
0
A1 A2 A3 A B1 B2 B3 B4 B C1 C2 C3 C PR D1 D E F G CL Total

Data Preprocessing Code Screenshots

Loading Data

```
data=pd.read_csv('/content/Freedom in the World 2013-2022 Dataset (Ver 2.18.23).csv')
```

```
data.head()
```

	Country/Territory	Region	C/T	Edition	Status	PR rating	CL rating	A1	A2	A3	...	F3	F4	F	G1	G2	G3	G4	G	CL	Total
0	Abkhazia	Eurasia	t	2022	PF	5	5	2	2	1	...	1	1	4	1	1	2	1	5	23	40
1	Afghanistan	Asia	c	2022	NF	7	6	0	0	0	...	0	0	0	0	1	0	1	2	9	10
2	Albania	Europe	c	2022	PF	3	3	3	3	3	...	2	3	9	3	2	2	2	9	39	67
3	Algeria	Africa	c	2022	NF	6	5	1	1	1	...	2	2	6	2	2	2	1	7	22	32
4	Andorra	Europe	c	2022	F	1	1	4	4	4	...	4	3	15	4	4	3	4	15	55	93

5 rows × 42 columns

```
data.tail()
```

	Country/Territory	Region	C/T	Edition	Status	PR rating	CL rating	A1	A2	A3	...	F3	F4	F	G1	G2	G3	G4	G	CL	Total
2090	West Bank	Middle East	t	2013	NF	6	5	0	0	2	...	0	1	5	1	1	2	1	5	24	30
2091	Western Sahara	Africa	t	2013	NF	7	7	0	0	0	...	0	0	0	1	1	2	0	4	7	5
2092	Yemen	Middle East	c	2013	NF	6	6	1	0	2	...	0	1	2	2	1	1	1	5	16	25
2093	Zambia	Africa	c	2013	PF	3	4	3	3	3	...	2	2	8	3	2	1	2	8	34	62
2094	Zimbabwe	Africa	c	2013	NF	6	6	1	1	1	...	0	0	1	1	1	1	1	4	14	25

5 rows × 42 columns

Handling Missing values

```
[ ] test_data.isna().sum()
```

```
no_of_adults                          0
no_of_children                        0
no_of_weekend_nights                  0
no_of_week_nights                     0
type_of_meal_plan                     0
required_car_parking_space            0
room_type_reserved                    0
lead_time                             0
arrival_year                          0
arrival_month                         0
arrival_date                          0
market_segment_type                   0
repeated_guest                        0
no_of_previous_cancellations          0
no_of_previous_bookings_not_canceled  0
avg_price_per_room                    0
no_of_special_requests                0
dtype: int64
```

```
[ ] train_data.isna().sum()
```

```
no_of_adults                          0
no_of_children                        0
no_of_weekend_nights                  0
no_of_week_nights                     0
type_of_meal_plan                     0
required_car_parking_space            0
room_type_reserved                    0
lead_time                             0
arrival_year                          0
arrival_month                         0
arrival_date                          0
market_segment_type                   0
repeated_guest                        0
no_of_previous_cancellations          0
no_of_previous_bookings_not_canceled  0
avg_price_per_room                    0
no_of_special_requests                0
booking_status                        0
dtype: int64
```

Save Processed Data	``` import joblib joblib.dump(knn,'model.pkl') ``` ['model.pkl']