In [1]:

**import** pandas **as** pd

**import** matplotlib.pyplot **as** plt

**import** seaborn **as** sns

*# Load the dataset*

*# Replace 'dataset.csv' with the actual path to your dataset*

file\_path **=** 'E:/cl\_ch\_ind.csv'

df **=** pd**.**read\_csv(file\_path)

*# Display the first few rows of the dataframe*

print(df**.**head())

*# Display basic information about the dataframe*

print(df**.**info())

*# Summary statistics of numerical columns*

print(df**.**describe())

*# Check for missing values*

print(df**.**isnull()**.**sum())

*# Data visualization # Example: Histogram*

plt**.**figure(figsize**=**(12, 6))

sns**.**histplot(df['F1962'], bins**=**20, kde**=True**) plt**.**title('Histogram of Numerical Column')

plt**.**xlabel('Values')

plt**.**ylabel('Frequency') plt**.**show()

*# Example: Boxplot*

plt**.**figure(figsize**=**(12, 6))

sns**.**boxplot(x**=**'F1962', y**=**'F1963', data**=**df)

plt**.**title('Boxplot of Numerical Column by Categorical Column') plt**.**xlabel('Categorical Column')

plt**.**ylabel('Numerical Column')

plt**.**show()

*# Example: Scatter plot*

plt**.**figure(figsize**=**(12, 6))

sns**.**scatterplot(x**=**'F1962', y**=**'F1963', data**=**df)

plt**.**title('Scatter Plot of Numerical Column 1 vs Numerical Column 2') plt**.**xlabel('Numerical Column 1')

plt**.**ylabel('Numerical Column 2')

plt**.**show()

ObjectId Country ISO2 ISO3 \

1. 1 Afghanistan, Islamic Rep. of AF AFG
2. 2 Albania AL ALB
3. 3 Algeria DZ DZA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3 | 4 | American Samoa | AS | ASM |
| 4 | 5 | Andorra, Principality of | AD | AND |

Indicator Unit \

1. Temperature change with respect to a baseline ... Degree Celsius
2. Temperature change with respect to a baseline ... Degree Celsius
3. Temperature change with respect to a baseline ... Degree Celsius
4. Temperature change with respect to a baseline ... Degree Celsius
5. Temperature change with respect to a baseline ... Degree Celsius

Source CTS\_Code \

1. Food and Agriculture Organization of the Unite... ECCS
2. Food and Agriculture Organization of the Unite... ECCS
3. Food and Agriculture Organization of the Unite... ECCS
4. Food and Agriculture Organization of the Unite... ECCS
5. Food and Agriculture Organization of the Unite... ECCS

CTS\_Name \

|  |  |  |
| --- | --- | --- |
| 1. Surface Temperature
2. Surface Temperature
3. Surface Temperature
4. Surface Temperature
 | ChangeChange Change Change |  |
| 4 Surface Temperature | Change |
| 0 Environment, Climate | Change, | CTS\_Full\_Descriptor ... F2013 Climate Indicator. 1.281 | F2014 0.456 | \ |
| 1 Environment, Climate | Change, | Climate Indicator. 1.333 | 1.198 |  |
| 2 Environment, Climate | Change, | Climate Indicator. 1.192 | 1.690 |  |
| 3 Environment, Climate | Change, | Climate Indicator. 1.257 | 1.170 |  |
| 4 Environment, Climate | Change, | Climate Indicator. 0.831 | 1.946 |  |
|  | F2015 | F2016 | F2017 | F2018 | F2019 | F2020 | F2021 | F2022 |
| 0 | 1.093 | 1.555 | 1.540 | 1.544 | 0.910 | 0.498 | 1.327 | 2.012 |
| 1 | 1.569 | 1.464 | 1.121 | 2.028 | 1.675 | 1.498 | 1.536 | 1.518 |
| 2 | 1.121 | 1.757 | 1.512 | 1.210 | 1.115 | 1.926 | 2.330 | 1.688 |
| 3 | 1.009 | 1.539 | 1.435 | 1.189 | 1.539 | 1.430 | 1.268 | 1.256 |
| 4 | 1.690 | 1.990 | 1.925 | 1.919 | 1.964 | 2.562 | 1.533 | 3.243 |

[5 rows x 72 columns]

<class 'pandas.core.frame.DataFrame'> RangeIndex: 225 entries, 0 to 224

Data columns (total 72 columns):

# Column Non-Null Count Dtype

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 |  | ObjectId | 225 | non-null |  | int64 |
| 1 |  | Country | 225 | non-null |  | object |
| 2 |  | ISO2 | 223 | non-null |  | object |
| 3 |  | ISO3 | 225 | non-null |  | object |
| 4 |  | Indicator | 225 | non-null |  | object |
| 5 |  | Unit | 225 | non-null |  | object |
| 6 |  | Source | 225 | non-null |  | object |
| 7 |  | CTS\_Code | 225 | non-null |  | object |
| 8 |  | CTS\_Name | 225 | non-null |  | object |
| 9 |  | CTS\_Full\_Descriptor | 225 | non-null |  | object |
| 10 |  | F1961 | 188 | non-null |  | float64 |
| 11 |  | F1962 | 189 | non-null |  | float64 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 12 | F1963 | 188 | non-null | float64 |
| 13 | F1964 | 188 | non-null | float64 |
| 14 | F1965 | 188 | non-null | float64 |
| 15 | F1966 | 192 | non-null | float64 |
| 16 | F1967 | 191 | non-null | float64 |
| 17 | F1968 | 191 | non-null | float64 |
| 18 | F1969 | 190 | non-null | float64 |
| 19 | F1970 | 189 | non-null | float64 |
| 20 | F1971 | 191 | non-null | float64 |
| 21 | F1972 | 192 | non-null | float64 |
| 22 | F1973 | 193 | non-null | float64 |
| 23 | F1974 | 192 | non-null | float64 |
| 24 | F1975 | 188 | non-null | float64 |
| 25 | F1976 | 189 | non-null | float64 |
| 26 | F1977 | 185 | non-null | float64 |
| 27 | F1978 | 189 | non-null | float64 |
| 28 | F1979 | 189 | non-null | float64 |
| 29 | F1980 | 191 | non-null | float64 |
| 30 | F1981 | 191 | non-null | float64 |
| 31 | F1982 | 192 | non-null | float64 |
| 32 | F1983 | 190 | non-null | float64 |
| 33 | F1984 | 188 | non-null | float64 |
| 34 | F1985 | 188 | non-null | float64 |
| 35 | F1986 | 190 | non-null | float64 |
| 36 | F1987 | 190 | non-null | float64 |
| 37 | F1988 | 190 | non-null | float64 |
| 38 | F1989 | 190 | non-null | float64 |
| 39 | F1990 | 189 | non-null | float64 |
| 40 | F1991 | 188 | non-null | float64 |
| 41 | F1992 | 208 | non-null | float64 |
| 42 | F1993 | 209 | non-null | float64 |
| 43 | F1994 | 208 | non-null | float64 |
| 44 | F1995 | 210 | non-null | float64 |
| 45 | F1996 | 210 | non-null | float64 |
| 46 | F1997 | 207 | non-null | float64 |
| 47 | F1998 | 210 | non-null | float64 |
| 48 | F1999 | 209 | non-null | float64 |
| 49 | F2000 | 209 | non-null | float64 |
| 50 | F2001 | 208 | non-null | float64 |
| 51 | F2002 | 212 | non-null | float64 |
| 52 | F2003 | 214 | non-null | float64 |
| 53 | F2004 | 213 | non-null | float64 |
| 54 | F2005 | 212 | non-null | float64 |
| 55 | F2006 | 215 | non-null | float64 |
| 56 | F2007 | 217 | non-null | float64 |
| 57 | F2008 | 212 | non-null | float64 |
| 58 | F2009 | 212 | non-null | float64 |
| 59 | F2010 | 215 | non-null | float64 |
| 60 | F2011 | 217 | non-null | float64 |
| 61 | F2012 | 215 | non-null | float64 |
| 62 | F2013 | 216 | non-null | float64 |
| 63 | F2014 | 216 | non-null | float64 |
| 64 | F2015 | 216 | non-null | float64 |
| 65 | F2016 | 213 | non-null | float64 |
| 66 | F2017 | 214 | non-null | float64 |
| 67 | F2018 | 213 | non-null | float64 |
| 68 | F2019 | 213 | non-null | float64 |
| 69 | F2020 | 212 | non-null | float64 |
| 70 | F2021 | 213 | non-null | float64 |
| 71 | F2022 | 213 | non-null | float64 |

dtypes: float64(62), int64(1), object(9) memory usage: 126.7+ KB

None

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | ObjectId | F1961 | F1962 | F1963 | F1964 | F1965 | \ |
| count | 225.000000 | 188.000000 | 189.000000 | 188.000000 | 188.000000 | 188.000000 |  |
| mean | 113.000000 | 0.163053 | -0.013476 | -0.006043 | -0.070059 | -0.247027 |  |
| std | 65.096083 | 0.405080 | 0.341812 | 0.387348 | 0.309305 | 0.270734 |  |
| min | 1.000000 | -0.694000 | -0.908000 | -1.270000 | -0.877000 | -1.064000 |  |
| 25% | 57.000000 | -0.097000 | -0.164000 | -0.205500 | -0.236500 | -0.392500 |  |
| 50% | 113.000000 | 0.064500 | -0.056000 | -0.003000 | -0.056000 | -0.230500 |  |
| 75% | 169.000000 | 0.318500 | 0.114000 | 0.230500 | 0.132500 | -0.091500 |  |
| max | 225.000000 | 1.892000 | 0.998000 | 1.202000 | 1.097000 | 0.857000 |  |
|  | F1966 | F1967 | F1968 | F1969 | ... F2013 \ |
| count | 192.000000 | 191.000000 | 191.000000 | 190.000000 | ... 216.000000 |
| mean | 0.105505 | -0.110832 | -0.199110 | 0.157942 | ... 0.931199 |
| std | 0.378423 | 0.339484 | 0.270131 | 0.308540 | ... 0.321595 |
| min | -1.801000 | -1.048000 | -1.634000 | -0.900000 | ... 0.118000 |
| 25% | -0.035750 | -0.259500 | -0.340000 | -0.009000 | ... 0.743500 |
| 50% | 0.098000 | -0.146000 | -0.187000 | 0.204000 | ... 0.897000 |
| 75% | 0.277000 | 0.015000 | -0.067000 | 0.349000 | ... 1.187500 |
| max | 1.151000 | 1.134000 | 0.476000 | 0.939000 | ... 1.643000 |
|  | F2014 | F2015 | F2016 | F2017 | F2018 | F2019 | \ |
| count | 216.000000 | 216.000000 | 213.000000 | 214.000000 | 213.000000 | 213.000000 |  |
| mean | 1.114815 | 1.269773 | 1.439521 | 1.280785 | 1.302113 | 1.443061 |  |
| std | 0.564903 | 0.462162 | 0.401091 | 0.393999 | 0.596786 | 0.467510 |  |
| min | -0.092000 | -0.430000 | 0.250000 | 0.017000 | 0.238000 | 0.050000 |  |
| 25% | 0.744000 | 1.017750 | 1.147000 | 1.027500 | 0.865000 | 1.169000 |  |
| 50% | 0.986500 | 1.215000 | 1.446000 | 1.282000 | 1.125000 | 1.412000 |  |
| 75% | 1.335500 | 1.520500 | 1.714000 | 1.535000 | 1.834000 | 1.698000 |  |
| max | 2.704000 | 2.613000 | 2.459000 | 2.493000 | 2.772000 | 2.689000 |  |
|  | F2020 | F2021 | F2022 |  |  |  |  |
| count | 212.000000 | 213.000000 | 213.000000 |  |  |  |  |
| mean | 1.552038 | 1.343531 | 1.382113 |  |  |  |  |
| std | 0.621930 | 0.484692 | 0.669279 |  |  |  |  |
| min | 0.229000 | -0.425000 | -1.305000 |  |  |  |  |
| 25% | 1.161750 | 1.019000 | 0.878000 |  |  |  |  |
| 50% | 1.477000 | 1.327000 | 1.315000 |  |  |  |  |
| 75% | 1.826250 | 1.629000 | 1.918000 |  |  |  |  |
| max | 3.691000 | 2.676000 | 3.243000 |  |  |  |  |

[8 rows x 63 columns]

ObjectId 0

Country 0

ISO2 2

ISO3 0

Indicator 0

..

F2018 12

F2019 12

F2020 13

F2021 12

F2022 12

Length: 72, dtype: int64





