Age Analysis of Members of the 113th Congress of the United States

Introduction

This project uses the Python Polars package to analyze data of U.S. Congressional Members. Functions are created to read in this data as a Polars DataFrame, calculate the mean, median, and standard deviation of age, and to plot the distribution of age by Congress.

Data was accessed from the following GitHub repository:
https://github.com/fivethirtyeight/data/blob/master/congress-age/congress-terms.csv

Descriptive Statistics

In [9]:
```
# import packages
import polars as pl
import matplotlib.pyplot as plt
import os
```

In [10]:
```
# Define Function to Read in Data from Github URL


def read_congressdata(url):
    return pl.read_csv(url, has_header=True, truncate_ragged_lines=True)


# Load Data
url = "https://github.com/fivethirtyeight/data/blob/master/congress-age/cong
df = read_congressdata(url)
df.head()
```

Out[10]: shape: (5, 13)

congress	chamber	bioguide	firstname	middlename	lastname	suffix	birthday
i64	str	str	str	str	str	str	str
80	"house"	"M000112"	"Joseph"	"Jefferson"	"Mansfield"	null	"1861-02-09"
80	"house"	"D000448"	"Robert"	"Lee"	"Doughton"	null	"1863-11-07"
80	"house"	"S000001"	"Adolph"	"Joachim"	"Sabath"	null	"1866-04-04"
80	"house"	"E000023"	"Charles"	"Aubrey"	"Eaton"	null	"1868-03-29"
80	"house"	"L000296"	"William"	null	"Lewis"	null	"1868-09-22"

In [7]:
```python
# Define Functions to Calculate Mean, Median, and Standard Deviation of Age
def mean_age(df):
    # calculate mean of column with "age" in it
    age_column = [col for col in df.columns if "age" in col]
    if age_column:
        # Assuming there's onlmeany one age column in NC voter file data
        column_name = age_column[0]
        # Calculate the mean of the identified column
        result = df[column_name].mean()
        return result
    else:
        result = print("No column containing 'age' found.")
    return result


def median_age(df):
    # calculate median of column with "age" in it
    age_column = [col for col in df.columns if "age" in col]
    if age_column:
        # Assuming there's only one age column in NC voter file data
        column_name = age_column[0]
        # Calculate the mean of the identified column
        result = df[column_name].median()
        return result
    else:
        result = print("No column containing 'age' found.")
    return result


def std_age(df):
    # calculate standard deviation of column with "age" in it
    age_column = [col for col in df.columns if "age" in col]
    if age_column:
        # Assuming there's only one age column in NC voter file data
        column_name = age_column[0]
```

```
        # Calculate the mean of the identified column
        result = df[column_name].std()
        return result
    else:
        result = print("No column containing 'age' found.")
    return result


# Calculate Mean, Median, and Standard Deviation
summary = {
    "Statistic": [
        "Mean Age",
        "Median Age",
        "Standard Deviation of Age",
        "Count of Congressional Members",
    ],
    "Value (Rounded)": [
        round(mean_age(df), 2),
        round(median_age(df), 2),
        round(std_age(df), 2),
        round(len(df), 2),
    ],
}
# Create DataFrame
summarydf = pl.DataFrame(summary)
print(summarydf)
```

shape: (4, 2)

Statistic	Value (Rounded)
str	f64
Mean Age	53.31
Median Age	53.0
Standard Deviation of Age	10.68
Count of Congressional Members	18635.0

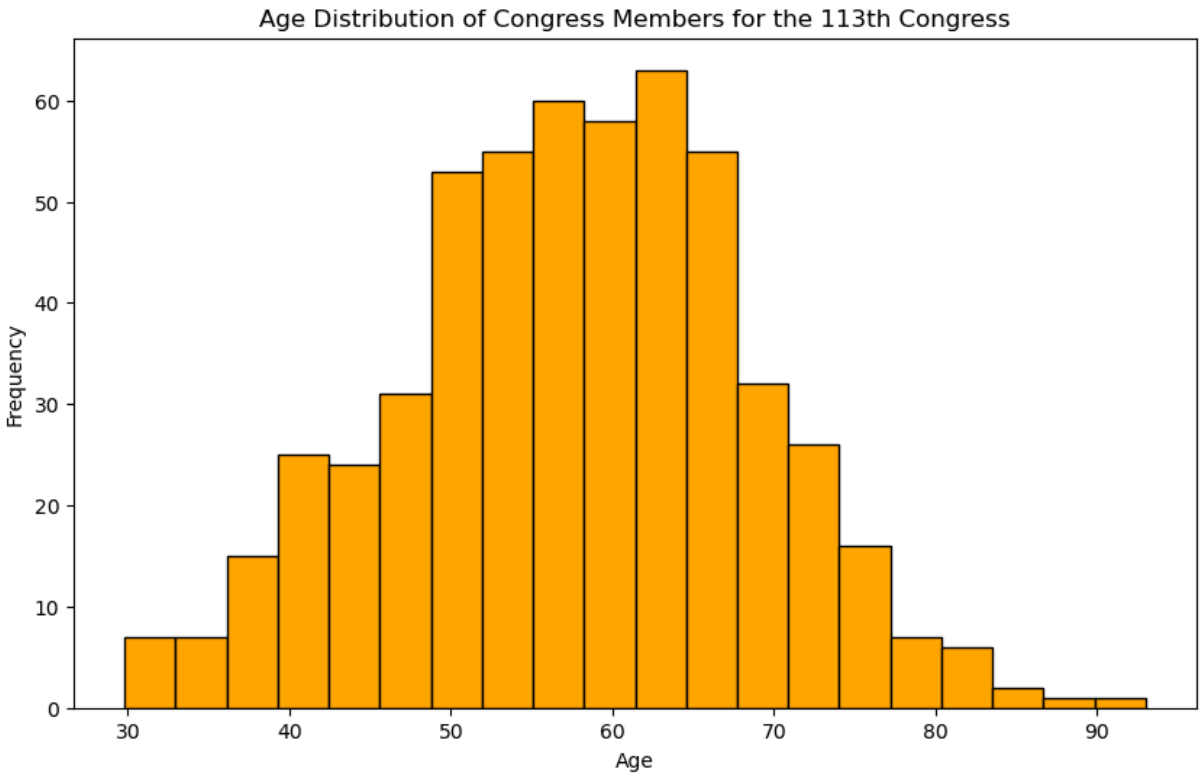
Data Visualization

To visualize the distribution of age among U.S. Congressional members for a specific Congress, we use a histogram created with the matplotlib Python package.

In [8]:
```
def generate_hist_member_age_bycongress(df, congress, plot_name):
    # create a histogram of ages for Congressional Members
    # as filtered for a specific Congress
    congress_df = df.filter(pl.col("congress") == congress)
    plt.figure(figsize=(10, 6))
    plt.hist(congress_df["age"], bins=20, color="orange", edgecolor="black")
    plt.title(f"Age Distribution of Congress Members for the {congress:.0f}t
    plt.xlabel("Age")
    plt.ylabel("Frequency")
    subfolder = "Output Images"
    file_path = os.path.join(subfolder, plot_name)
```

```
    plt.savefig(file_path)
    plt.show()


generate_hist_member_age_bycongress(df, 113, "113th_congress")
```



Conclusion

In this project, we used the Python Polars package to calculate summary statistics and create a simple histogram. Further analysis of U.S Congressional members by demographic characteristics and socioeconomic background may help us better understand the barriers to elected office that some communities may face.