A Report on a Problem With Presidents

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1 Introduction

The United States, in its 245 vibrant years of independence, has seen 46 presidents - starting from *George Washington* assuming office in 1789, to *Joe Biden*, the incumbent since 2021. The provided problem revolves around the distribution of the total age of presidents.

According to the observations, the mean age is $26,366.71$ days or 72.23 years, while the weighted mean is $26,240.2$ days or 71.89 years. The median age is $26,227$ days or 71.85 years, and the most frequent age (mode) are 60, 67, 75, and 78, 3 each. The oldest living president is *Jimmy Carter*, who is currently 97.10 years old. The oldest deceased president was *George H.W. Bush*, who died in 2018 at an age of 94 years. The president with the lowest age was *John F. Kennedy*, who was unfortunately assassinated very young at 46.5 years of age. Finally, the standard deviation of presidential ages is $4,564.9$ days, or 12.5 years.

2 Source Code

Please find the Python code in the files *presidents.py* and *presidents.ipynb*. I recommend opening the *.ipynb* file using Jupyter Notebook as it offers you to visualize Pandas Dataframes as tables, which is unavailable natively using Python. The screenshots below are the outputs of the Jupyter Notebook code.

3 Observations

In order to calculate the age of a president, I introduced a variable called *most_recent_date_living*. This held the date of death if the president was deceased, or the current date otherwise. Based on this variable, the values of *living_days*, *living_months* and *living_years* were calculated.

All data manipulations and calculations have been performed using *pandas* and *numpy* on *Python*.

3.1 Top 10 Oldest Presidents

The oldest living president is *Jimmy Carter* at 97.10 years old, and the oldest deceased was *George H.W. Bush*, who died in 2018 at an age of 94 years.

The table below has been sorted based on *descending* order of the *living_days* field. Only user-readable columns have been included in this render of the table. Additionally, living presidents have been colored *green* to distinguish from their deceased counterparts.

Top 10 Presidents of the United States by age lived, oldest first

PRESIDENT	BIRTH DATE	BIRTH PLACE	DEATH DATE	LOCATION OF DEATH	AGE
Jimmy Carter	Oct 1, 1924	Plains, Georgia	Living	Living	97
George Bush	June 12, 1924	Milton, Mass.	Nov 30, 2018	Houston, Texas	94
Gerald Ford	July 14, 1913	Omaha, Nebraska	Dec 26, 2006	Rancho Mirage, Cal.	93
Ronald Reagan	Feb 6, 1911	Tampico, Illinois	June 5, 2004	Los Angeles, Cal.	93
John Adams	Oct 30, 1735	Quincy, Mass.	July 4, 1826	Quincy, Mass.	90
Herbert Hoover	Aug 10, 1874	West Branch, Iowa	Oct 20, 1964	New York, New York	90
Harry S. Truman	May 8, 1884	Lamar, Missouri	Dec 26, 1972	Kansas City, Missouri	88
James Madison	Mar 16, 1751	Port Conway, Va.	June 28, 1836	Orange Co., Va.	85
Thomas Jefferson	Apr 13, 1743	Albemarle Co., Va.	July 4, 1826	Albemarle Co., Va.	83
Richard Nixon	Jan 9, 1913	Yorba Linda, Cal.	Apr 22, 1994	New York, New York	81

3.2 Top 10 Youngest Presidents

The youngest living president is *Barack Obama* at 60 years old, and the youngest deceased was *John F. Kennedy*, who died in 1963 at an age of 46 years.

The table below has been sorted based on *ascending* order of the *living_days* field. Like the previous table, only user-readable columns have been included, and living presidents have been colored *green*.

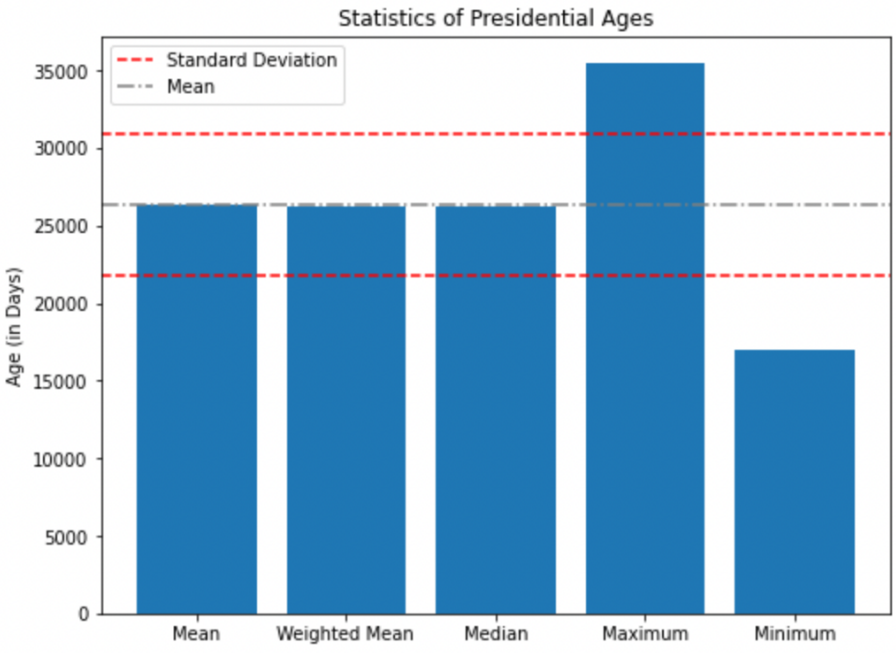
Top 10 Presidents of the United States by age lived, youngest first

PRESIDENT	BIRTH DATE	BIRTH PLACE	DEATH DATE	LOCATION OF DEATH	AGE
John F. Kennedy	May 29, 1917	Brookline, Mass.	Nov 22, 1963	Dallas, Texas	46
James A. Garfield	Nov 19, 1831	Cuyahoga Co., Ohio	Sep 19, 1881	Elberon, New Jersey	49
James K. Polk	Nov 2, 1795	Mecklenburg Co., N.C.	June 15, 1849	Nashville, Tennessee	53
Abraham Lincoln	Feb 12, 1809	LaRue Co., Kentucky	Apr 15, 1865	Washington, D.C.	56
Chester Arthur	Oct 5, 1829	Fairfield, Vermont	Nov 18, 1886	New York, New York	57
Warren G. Harding	Nov 2, 1865	Morrow County, Ohio	Aug 2, 1923	San Francisco, Cal.	57
William McKinley	Jan 29, 1843	Niles, Ohio	Sep 14, 1901	Buffalo, New York	58
Theodore Roosevelt	Oct 27, 1858	New York, New York	Jan 6, 1919	Oyster Bay, New York	60
Barack Obama	Aug 4, 1961	Honolulu, Hawaii	Living	Living	60
Calvin Coolidge	July 4, 1872	Plymouth, Vermont	Jan 5, 1933	Northampton, Mass.	60

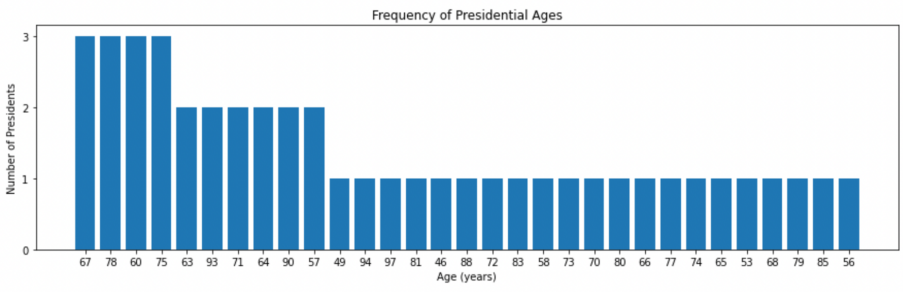
3.3 Statistical Analysis

Statistic	Age (Days)	Age (Years)
Mean Age	26366.711111	72.237565
Weighted Mean Age	26240.209877	71.890986
Median Age	26227.000000	71.854795
Mode Age	[21900, 24455, 27375, 28470]	[60.0, 67.0, 75.0, 78.0]
Maximum Age	35443.000000	97.104110
Minimum Age	16978.000000	46.515068
Standard Deviation	4564.903761	12.506586

The **mean age** is 72.23 years, which was calculated directly on the *living_days* variable. The **weighted mean** age is 71.89 years. To calculate the weighted mean, the frequency of each age (in years) was identified and applied as the weight over the *living_days* variable. The **median age** is 71.85 years, calculated directly on the *living_days* variable. The **maximum age** is 97.10 years, while the **minimum age** is 46.51 years. The standard deviation is 12.5 years.



The **mode age**, or the most frequent ages are 60, 67, 75 and 78 - each of these ages have **three presidents** under their count. The mode was calculated using the *living_years* variable, as *living_days* were not shared commonly by any presidents. The plot of frequency of each age in years is shown below.



4 Conclusion

Through the above analysis of the provided data, we look at the trends of Presidential life expectancy. The range is large - between 46 and 97 years old to be precise. The mean age of 72 years signifies that on an average, a President's life expectancy is slightly lesser, yet close to the current life expectancy of males in the United States, which was 75.1 years in 2020.[1] The median age also closely follows this trend, and the majority of the Presidents have lived beyond the age of 60.

Four of the top eight youngest Presidents were assassinated, which is an unnatural death and significantly affects the computed metrics. John F. Kennedy, for example, is a significant anomaly when compared to the overall data, as he was assassinated young during the times when healthcare was fairly modernized and life expectancy was significantly rising, especially for those who had access to it. Perhaps these Presidents might have lived longer had the unfortunate incident never occurred.

References

[1] Provisional Life Expectancy Estimates for January through June, 2020 - CDC, NVSS, NCSS.