# REPORT
# A Problem with Presidents

## Siddhi Wadgaonkar

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## Contents

# 1  Introduction

Since The United States of America gained independence in 1776, it has had a great leadership of 46 presidents so far. This report summarizes a few interesting statistics analyzed from the birth and death dates (if applicable) for these presidents and visualizes certain observations from the mined data.

# 2  Summary

A few key observations from the analysis are as below:

- The observed mean age (in days) of all Presidents is 26410.7
- The weighted mean age (in days) of all Presidents is 26463.0
- The median age (in days) of all Presidents is 26227.0
- The most frequent ages (mode) are 67 and 76 with 3 Presidents each.
- The oldest (living) President is Jimmy Carter who is 97 years old as of September 10, 2022.
- The oldest (deceased) President was George Bush who lived 94 years.
- The youngest (deceased) President was John F. Kennedy who was assassinated at the age of 46.
- The youngest (living) President is Barack Obama who is 61 years old.

# 3 Implementation

The source code contains the following Python files:

1. main.py [Entry point to the code, calls functions implemented in the other two files]

2. process_data.py [Cleans and processes the input data and outputs the required tables]

3. draw_graph.py [Plots the required graphs]

Other files:

1. requirements.txt [Contains informaiton regarding the required libraries/packages to run this project ]

2. input.csv [The input data]

As per the problem statement, new variables year_of_birth, lived_years, lived_months, lived_days are introduced and computed. Additionally, I added a few more variables needed for the logic implementation. Most of the data processing is abstracted into process_data.py. `pandas` and `numpy` is majorly used for these purposes. draw_graph.py handles the visualization segment of the problem, using `matplotlib`.

# 4   Observations

This section explains the key observations from the analysis of top 10 Presidents from longest lived to shortest lived, top 10 Presidents from shortest lived, a generic plot of the calculated statistics and a frequency distribution of the Presidential ages,

## 4.1   Top 10 Oldest Presidents

Jimmy Carter, who is 97 years old is the longest living President. George H.W. Bush passed away in 2018 at the age of 94 and is the oldest deceased President.

Below table is created by taking top 10 rows of the table after sorting the living days in descending order:

Top 10 Presidents of the United States from longest lived to shortest lived

| PRESIDENT | BIRTH DATE | BIRTH PLACE | DEATH DATE | LOCATION OF DEATH | AGE |
|---|---|---|---|---|---|
| Jimmy Carter | Oct 1, 1924 | Plains, Georgia | ALIVE | ALIVE | 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 |

*Table 1: Top 10 Oldest Presidents of United States*

## 4.2   Top 10 Youngest Presidents

Barack Obama is the youngest living President aged 61 years old. John F. Kennedy, who died at an age of 46 years was the youngest deceased President.

Below table is created by taking top 10 rows of the table after sorting the living days in ascending order:

Top 10 Presidents of the United States from shortest lived to longest lived

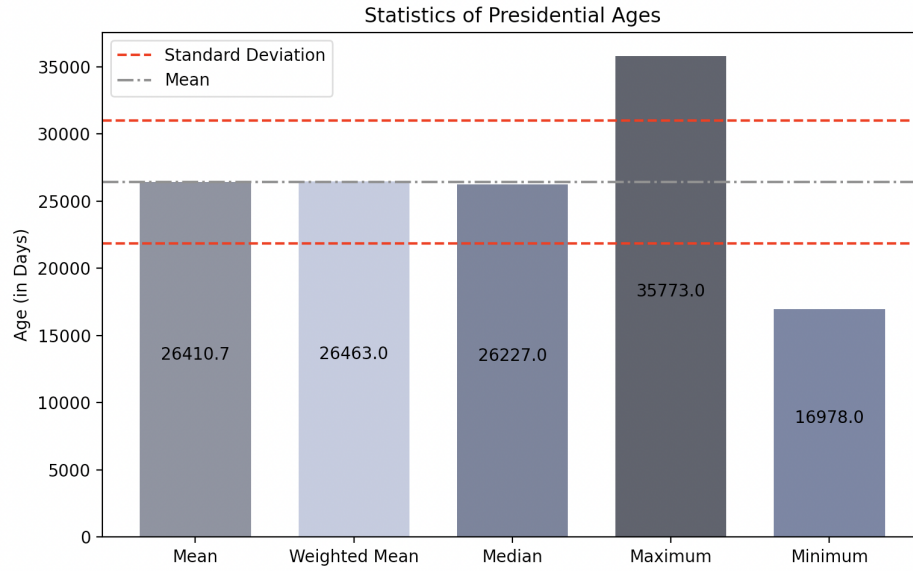| PRESIDENT | BIRTH DATE | BIRTH PLACE | DEATH DATE | LOCATION OF DEATH | AGE |
|---|---|---|---|---|---|
| John F. Kennedy | May 29, 1917 | Brookline, Mass. | Nov 22, 1963 | Dallas, Texas | 46 |
| James A. Garfield | Nov 19, 1831 | Cuyahoga Co., Ohio | Sep 19, 1881 | Elberon, New Jersey | 49 |
| James 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 |
| Calvin Coolidge | July 4, 1872 | Plymouth, Vermont | Jan 5, 1933 | Northampton, Mass. | 60 |
| Barack Obama | Aug 4, 1961 | Honolulu, Hawaii | ALIVE | ALIVE | 61 |

*Table 2: Top 10 Youngest Presidents of United States*

## 4.3   Statistical Analysis

The observed mean age (in days) of all presidents is 26410.7. The weighted mean age (in days) of all presidents is 26463.0. The median age (in days) of all presidents is 26227.0. The most frequent ages (mode) are 67 and 76 with 3 presidents each. The oldest (living) president is Jimmy Carter who is 97 years old as of September 10, 2022. The oldest (deceased) president was George Bush who lived 94 years. The youngest (deceased) president was John F. Kennedy who assassinated at the age of 46.

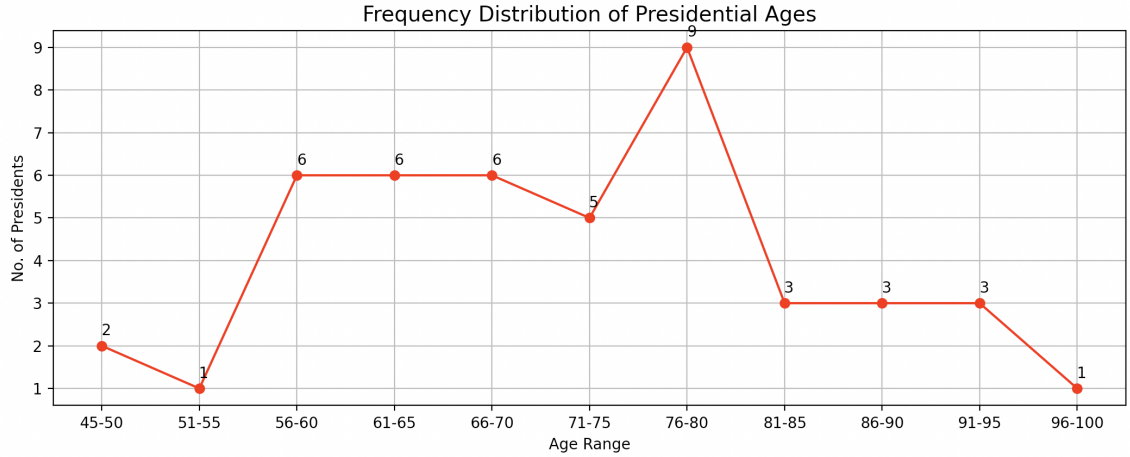| | Statistic | Age (Days) | Age (Years) |
|---|---|---|---|
| **0** | Mean Age | 26410.711111 | 71.888889 |
| **1** | Weighted Mean Age | 26463.026667 | 43.133333 |
| **2** | Median Age | 26227.0 | 71.0 |
| **3** | Mode Age | [24455, 27740] | [67, 76] |
| **4** | Maximum Age | 35773.0 | 97 |
| **5** | Minimum Age | 16978.0 | 46 |
| **6** | Standard Deviation | 4583.545827 | 12.546681 |

*Table 3: Statistics on Presidential Ages*



*Plot 1: Statistics of Age (in days)*

The statistics are plotted in terms of living days instead of living years to get a more clear picture of values.

The below graph shows the frequency distribution of the Presidential ages. This is done by binning the ages into bins of size 5 i.e. range of ages for example 45-50, 50-55...95-100. This basic line graph shows that a max of 9 Presidents were/are in the age range 76-80. Only 1 President in the age range category of 51-55 and 97-100.



*Plot 2: Frequency Distribution of Presidential Ages*

# 5   Conclusion

We examine the trends in the life expectancy of Presidents using the analysis of the provided data that was done above. The age range is wide, between 46 to 97 to be exact. The average life expectancy of a President is 72 years. The majority of Presidents have lived above the age of 60, and the median age closely reflects this tendency.

# 6   Future Scope

This examination was done purely based on the numerical data without considering any other factors that may have influenced this data. A more comprehensive analysis approach can be established to get in depth observational statistics and help in taking decisions in future. For example, the assassination of four of the top eight youngest Presidents, which is an unnatural death, has a substantial impact on the metrics computed. Also, some additional data like at what age did these Presidents come into power could be valuable input which could help us understand the trends in the decision making of US Presidents based on their age.