"My Fellow Citizens..."

A Visual Exploration of the United States Presidential Inaugural Addresses
(1789-2021)

Douglas S. Locke
M.S. Data Visualization Candidate, Parsons School of Design

Thesis Advisor: Alec Barrett

May 2021

Acknowledgements

Thank you to my wife Jessica, and our children Hannah, Claire, Ewan, & Elizabeth for your support, love, and patience.

Thanks to my thesis advisor Alec Barrett, who gave insightful feedback and elevated my work. Thanks also to the professors who also gave me helpful advice and inspired me to do my best: Daniel Sauter, Aaron Hill, William Bevington, Richard The, and Christian Swinehart.

And thank you to the many students who have joined me in this journey and shared your insight and knowledge with me. Your critiques and feedback were a constant source of inspiration and encouragement.

Table of Contents

Synopsis

The United States Presidential inaugural speeches serve to form a qualitative and historical basis for applying data visualization techniques. This data visualization serves to illuminate historical context, further evaluate the texts, and aid in their appreciation. Visualization techniques employed are designed to aid in topical exploration & allow user agency to confirm existing and enable new discovery of insights.

Introduction

"My Fellow Citizens..." explores the combination of the traditional liberal arts with the comparatively modern field of data visualization. The project attempts to demonstrate that a historical corpus of text, analyzed using natural language processes, and visualized through modern data visualization methods can facilitate an understanding, reveal existing & generate new insights, and allow for a fuller appreciation of the texts.

American history is often understood through a lens of its highest leaders, especially the presidents. It is often said in American media today the President of the United States (referred to subsequently as POTUS) is the "leader of the free world" due to their enormous influence in setting and influencing public policy both domestically and in the modern era, internationally. Thus studying the words of American presidents is crucial to understanding societal concerns & related governance. Also, the tone, topics, and delivery all speak to American cultural norms & expectations.

This analysis will hopefully stimulate an interest in historical studies, not only in American history, but could be applied to any historical period where a corpus of texts can be gathered and examined. By starting with qualitative texts sourced from humans that conceived them (or at least by their speech writers), we begin with ideas and thoughts encoded directly into language. From there, this language can be analyzed and further processed, in order to understand various aspects, including tonal qualities and

speech construction. The various derivative analytical results could be brought together visually with the original texts, enhancing a reader's comprehension.

Noah Webster (1758-1843), a supporter of American independence, and a defender of Washington's presidency, defined "inaugurate" in his 1828 dictionary as:

> "To introduce or induct into an office with solemnity or suitable ceremonies; to invest with an office in a formal manner; a word borrowed from the ceremonies used by the Romans when they were received into the college of augurs. Kings and emperors are inaugurated by coronation; a prelate, by consecration; and the president of a college by such ceremonies and forms as give weight and authority to the transaction." [1]

The United States of America had its Constitutional founding on March 4th, 1789. No less than two months later, on April 30th, 1789, President George Washington made the country's first inaugural address.   Not mandated by the constitution, Washington's address was made at Federal Hall in New York City, addressing Congress, with approximately 10,000 spectators also in attendance. Washington was noted by historians to be distressed and nervous, perhaps given the historic gravitas of the moment. Afterwards, he processed to a church prayer service, while fireworks lit up the New York sky.[2]   Thus a moment of pomp and ceremony was born, something that has occurred 58 times since, right up to the present day.

---

[1] Webster, "Webster's Dictionary - Inaugurate".
[2] Boller, "Presidential inaugurations", pg.11-19.

The inauguration of the POTUS captures a historical moment, that is often an assessment of not only the current moment, but also bringing forth an aspirational future. The POTUS' annual message, called the State of the Union, is a speech that often reflects on achievements & challenges, but almost always is a policy speech. It would seem absurd to most Americans to follow a State of The Union speech with fireworks. The inauguration speech, however, is often an emotional appeal and an enduring testament to the continuation of the republic

Many of the POTUS inaugural speeches (78%) are less than 3,000 words, making many of them readable in about 10-15 minutes each. An ambitious and speedy reader may be able to read all the inaugural speeches in less than a single day. Each speech provides a glimpse into the political, social, and economic outlook of a nation from the vantage point of its highest leadership at a point of transition. Because the inaugural speech event is regularly repeated, it is possible to measure changes of both form and content of the speeches over time.

This project will not be an attempt on the part of its author to judge the political worth of each presidential speech. While that type of evaluation is typically left to historians and political commentators, the project should serve to enhance the user's ability to form their own opinions. Instead, the goal is to use visualization to understand how form & content of speech are similar and different to each other across the corpus of text, and to present visualization as an effective means of exploration that can benefit historians, speech writers, and the general public. I further do not suggest that

presidential political speech is speech that represents the entire nation as a whole. Instead it offers a national perspective from a vantage point of high political power. Surely, rural farmers, city shopkeepers, and slaves have voices that would reflect unique concerns & issues. Having consistent and meaningful data collection for these voices unfortunately is much more difficult or impossible to obtain in a consistent manner over time.

Inspiration for this work was also taken from the writings of visualization researcher and designer Richard Brath. Brath's academic and research interests explore information density and especially text visualization. Many design trends in modern data visualization prioritize minimalism and direct messaging of content. Brath challenges these concepts, often prioritizing a kind of maximum cognitive load to allow users to most fully use their own capabilities to explore & discover content. Ultimately I found this approach to be most respectful of an audience's full capabilities to absorb and process content.

Treatment

LITERATURE REVIEW : PART 1, HISTORY

Since 1789, there have been 46 presidential transitions of power in the United States. 59 times (as some presidents were elected more than once) the president has delivered an inaugural address.   The inaugurations themselves have been largely celebratory affairs, replete with much pomp and ceremony.   The speeches given reflect something both about where the country has been and how the new president plans to lead in the future.

The actions surrounding the inaugural have often contained much symbolism in unifying the country.   The most visible form of this unity was a tradition begun in 1837, when President Andrew Jackson rode together with president-elect Martin Van Buren.[3] This act of unity, with the sitting president and president-elect riding in together has been repeated several times since.   Perhaps one of the most significant examples of national unity occurred In 1913, President Woodrow Wilson was sworn in by Chef Justice Edward D. White, a man who fifty years earlier who took up arms against his government as a Confederate soldier.[4]

In many ways, while the presidential inaugurations are times when the country seeks to reunite itself symbolically, it is also a time for the president to chart a course for the future.   The president's plans and outlook are delivered in the inaugural address.

---

[3] Bendat, Jim. "Democracy's Big Day", 10.
[4] Ibid, *vxi*.

Originally intended by the first president, George Washington, to speak to Congress, over the years this evolved to include the general public, the media, and the entire world.[5]

The factors that most shape the inaugural address can be summarized as both "the times" and "the man." The times reflect the societal conditions in which the president lives, including war and peace, or prosperity or recession. "The Man" refers to the president's individual "abilities and personality of the president, including characteristics, such as moderation, flexibility, forcefulness, and poise." [6]

It was not until Franklin Roosevelt (first elected in 1933) that presidents began to more heavily rely directly on speechwriters, and in effect became presidential advisors with policymaking influence.[7] In a survey of presidential speechwriters, when asked "What makes a great speech?" less than a third of speechwriters interviewed said "substantive content". [8] As presidential speech making continued to evolve in the 20th century, presidents evolved from anonymous "ghostwriters" towards hiring known journalists, "so that style and substance are increasingly indistinguishable, with the imperatives of the former encroaching on the latter."[9]

---

[5] Whissell and Sigelman, "The Times and the Man as Predictors of Emotion and Style in the Inaugural Addresses of U.S. Presidents," 255-256.

[6] Ibid, 256.

[7] Lim, "The Anti-Intellectual Presidency: the Decline of Presidential Rhetoric from George Washington to George W. Bush", 78.

[8] Ibid, 82.

[9] Ibid, 90.

Jim Bendat, a historian who specializes in presidential inaugurations, plainly says that many of the inaugural speeches are "eminently forgettable", filled with platitudes and niceties as they attempt to bring people together after a usually contentious election cycle.[10]   Another historian, Paul Boller writes, "only a handful have achieved distinction and bear reading today (except by historians)....The very best inaugurals discussed important issues with high seriousness, were written with verve, imagination, and an engaging prose style, and were eminently quotable."[11]

We can use historian evaluation as a starting basis for qualitative assessment regarding speech quality as well as opportunity.   Bendat identifies also seven significant historical transition opportunities. The following table completes helps to summarize historical takes on Presidential speech quality and opportunities to make significant speeches, given "the times".

	Boller Best Speech Quality (assessing 1789-1997)[12]	Bendat Best Speech Quality (assessing 1789-2012)[13]	Bendat Significant Transition (assessing 1789-2012)[14]	Transition Theme
Washington's First (1789)	X		X	Close of Revolution
Jefferson's First (1801)	X	X	X	First Change in Political Power
Jackson's ??? (1829)			X	Power of the People
Lincoln's First (1861)	X	X	X	Eve of Civil War

---

[10] Bendat, 79.
[11] Boller, "Presidential Inaugurations," 142.
[12] Ibid, 141-142.
[13] Bendat, 81.   Note: Bendat was not specific when referring to which presidential inaugural when a president made more than 1. He identifies presidents who made inaugural speeches which "resonated with deep meaning and impassioned eloquence."
[14] Ibid, xvii.

Lincoln's Second (1865)	X	X	X	Civil War
Hayes (1877)			X	After Disputed Election
Wilson's First (1913)	X			None
Wilson's Second (1917)			X	Eve of U.S.Entry toWorld War I
F.D. Roosevelt's first (1933)	X		X	Great Depression
F.D. Roosevelt's third (1945)			X	World War II
Kennedy (1961)	X	X		None
G.W. Bush (2001)			X	After Disputed Election
Obama (2009)			X	First African American President

Figure 1.0

LITERATURE REVIEW : PART 2, LINGUISTIC ANALYSIS

Presidential political speech has been given attention and study in academia. There have been a wide variety of text analytics approaches, with various aims and objectives.

Whissel & Sigelman in 2001 specifically examined the Inaugural addresses and discovered that "language that is linguistically simple, emotionally evocative, highly imaged, and rich in references to American values is an important descriptor of inaugural addresses."[15]   Their approach relied more heavily on detecting tone & emotional words using specialized "word dictionaries" such as the "Dictionary of Affect", developed by the author, which as an example, rates nouns on their ability to produce "clear mental images" in the reader or listener. [16]

---

[15] Whissell and Sigelman, 255.
[16] Ibid, 257.

Another approach involves a greater focus on lexical shifts over time. In 2015, Rule, Cointet, and Bearman discovered in a study of State of the Union addresses that "entry into World War I in 1917 indexed the decisive transition to the modern period in American political consciousness, ushering in new objects of political discourse."[17] These authors took a more topic oriented approach, "broadly characterized as co-occurrence approaches, which induce categories by relying on terms joint appearance over a particular unit of text."[18]   Interestingly, their method is insensitive to variation in "speech length and elegance."[19]

Other approaches focus much tighter on grammar and construction. A study of Donald Trump's inaugural focused in part on the speech's pronoun usage, as a means of adding relational context to subtly maximize persuasion.[20]   Elvin Lim's book "The Anti-Intellectual Presidency" presents its arguments by demonstrating Flesch (reading ease) scores, which themselves are based in part by sentence length analysis. [21]

LITERATURE REVIEW : PART 3, CULTURAL ANALYTICS & DATA VISUALIZATION

Lev Manovich writes in his book "Cultural Analytics" that "along with big data, the humanities are also discovering how scientific thinking and methodologies can be applied to their subjects. And here the concepts and method of sampling, feature extraction, and

---

[17] Rule, Cointet, Bearman, 10837-10844.
[18] Rule, Cointet, Bearman, 10838.
[19] Ibid, 10839.
[20] Chen, "A Critical Discourse Analysis of Donald Trump's Inaugural Speech from the Perspective of Systemic Functional Grammar," 970.
[21] Lim, "The Anti Intellectual Presidency," 34-35.

exploratory data analysis are more important than data size."[22]   In other words, the precise challenge in working with "arts & letters" topics is to bring the qualitative towards the quantitative, and we need not begin with particularly large data sets.   Large data sets do not inherently provide more value.   As we have seen, the presidential inaugural address are a topic that have been studied previously. What new insights may be derived via data visualization?

With the advent of the printing press in the 1500s, text was often separated from image in books. With low resolution computer displays in the 1980s through 2010s, fine detail was often impossible to render.   In "Visualizing with Text", Brath writes

> By the 1950s, the International Style was sweeping across the world, promoting design that supported international trade and communication. At the core of the International Style was *modernism*, which emphasized simplicity, cleanness, and readability, as well as minimizing language specific text in favor of non language icons. Thus, despite improvements in screen resolutions in the past 10 years, old norms still prevail today; visual communication is often much less dense than is theoretically possible, especially given advances in screen resolution, such as Apple's Retina Display in 2012.[23]

Opportunities to explore rich content using high information density in high resolution computer displays are only beginning to be devised and thus their potential for improving human comprehension are now being realized.

---

[22] Manovich, "Cultural Analytics," 52.
[23] Brath, "Visualizing with Text," 6-9.

Qualitative data visualization takes many forms. In "Better Data Visualizations" author Jon Schwabish identifies the following forms of qualitative data visualization:

> Icons
> Word Clouds
> Word Trees
> Specific Words
> Quotes
> Coloring Phrases
> Matricies and Lists

Word clouds emphasize frequency, but as Schwabish notes, word clouds fail to effectively communicate comparative frequency.   Also, color and placement in Word clouds are often arbitrarily assigned, adding no additional analytical value. Word clouds can be somewhat improved using "semantic groups".[24]

Schwabish also writes that "if context is important, visualizing individual words is not the most useful way to show your qualitative data." [25] He recommends showing quotes in full.

Another method Brath suggests to deliver context is to use the full width of a bar chart, and superimpose text across the entire width of the bar.[26] The key to use this technique effectively is allow the bar length to be easily compared using color. At the same time the additional text provides valuable information - and can serve to give the user additional information without taking up additional space.   This leads to a higher cognitive load, but one that can be readily accommodated.

Some of the other devices listed by Schwabish, such as Specific Words or Coloring Phrases alone cannot fully immerse a user into exploring the depths of a complex qualitative text, such as a speech.   This is where a principle such as Ben Schneiderman's

---

[24] Hearst, Marti, et. al "An Evaluation of Semantically Grouped Word Cloud Designs," 1-2.
[25] Schwabish, 319.
[26] Brath, 191.

"Visual Information Seeking Mantra" is helpful. This is because this principle ensembles visualization types together to maximize understanding. Schneiderman writes:

> The Visual Information Seeking mantra extends these principles to database browsing: Overview first, zoom and filter, then details-on-demand. In several projects over the past 6 years we had to relearn this principle, so I wrote it down to solidify it in my mind. Users should be able to see the full database, the table of contents, or the course outline to orient themselves first. Then they can zoom in on what they want, filter out what they don't want, and navigate to get the specific details. [27]

Similarly, Manovich writes: "ideally the analysis of the larger cultural patterns should also lead us to particular individual cases - that is individual creations or cultural behaviors." In other words, our resting place should be to identify individual works, and appreciate them with the previously acquired contexts now in place.

METHODOLOGY

PART 1: BASE DATA

The starting point for the data collection was the retrieval of the 59 Inaugural Addresses. (see Bibliography)

PART 2: SUPPLEMENTAL DATA - VISUAL

Presidential Photographs were retrieved from Wikipedia. The photos serve to humanize the speech content.

 https://en.wikipedia.org/wiki/List_of_presidents_of_the_United_States

PART 3: SUPPLEMENTAL DATA - CONTEXT

---

[27] Schneiderman, Ben, "A Grander Goal: A Thousand-Fold Increase In Human Capabilites," 4-10.

Supplemental Presidential data, such as Party, Date of inaugural, weather, etc. was

available in the Appendix within "Democracy's Big Day" by Jim Bendat. Additional facts

on were retrieved from the University of California Santa Barbara here:

https://www.presidency.ucsb.edu/people/president

Another form of enhancement (wikipedia sourced) also highlighted more about the

transition moments in terms of war & peace and prosperity or economic recession.

    List of Recessions was retrieved from

    https://en.wikipedia.org/wiki/List_of_recessions_in_the_United_States

    List of Wars was retrieved from

    https://en.wikipedia.org/wiki/List_of_wars_involving_the_United_States

Another form of data enhancement chosen was the inclusion of the 2017 C-SPAN

"Presidential Historians Survey".   This data adds context to understand both the overall

presidential historical ranking, as well rankings on each president's strength of public

persuasion.

The 2017 C-SPAN "Presidential Historians Survey" was retrieved from

https://www.c-span.org/presidentsurvey2017/

A final form of data enhancement is historian commentary regarding speeches that are

considered excellent and truly noteworthy, as well as historian comments regarding truly

historic transitions. (See Figure 1.0 above).

Data regarding recent presidents such as Donald Trump and Joe Biden were taken from

Donald Trump:

https://en.wikipedia.org/wiki/Inauguration_of_Donald_Trump

Joe Biden:

https://en.wikipedia.org/wiki/Inauguration_of_Joe_Biden

TEXT PROCESSING: CONTENT

For one choice of text analyzing software, I wanted a tool that would expressly focus on content analysis, or what the speeches were conveying to an audience.   I selected DICTION developed by Dr. Roderick P. Hart, who holds the Allan Shivers Centennial Chair in Communication at the University of Texas at Austin. He is the author of "Political Tone: How Leaders Talk and Why" and has been published in Presidential Studies Quarterly, a journal of presidential theory and research.

DICTION embodies the linguistic philosophy of Dr. Hart and his co-authors.   In "Political Tone" *tone* is defined as "a tool people use (sometimes unwittingly) to create distinct social impressions via word choice."[28] DICTION is described as

> ...A multiplatform program written in JAVA that deploys some 10,000 search words in 33 word lists or dictionaries and that includes several calculated variables as well. None of the search terms is duplicated in these lists, which gives the user an unusually rich understanding of a text. The program produces five master variables by combining (and after standardization) the subaltern variables. The master variables were chosen intentionally, the assumption being that if only five

---

[28] Roderick Hart, Jay Childers, and Colene Lind, "Political Tone: How Leaders Talk & Why", 9.

questions could be asked of a given passage, these five would produce the most

robust understanding. Based on an analysis of some 30,000 verbal texts, no

statistically significant relationship exists among any of these master variables,

meaning that each sheds unique light on the passage being examined.[29]

These five "master variable"'s are defined by the authors as:

Certainty: "indicated resoluteness, inflexibility, and completeness, and a tendency

to speak ex cathedra."

Optimism: "language endorsing some person group concept or event or

highlighting their positive entailments."

Activity: "features movement, change, the implementation of ideas, and the

avoidance of inertia, and helps distinguish reflective from non reflective texts"

Realism: "language describing tangible immediate recognizable matters that affect

people's everyday lives"

Commonality: "language highlighting the agreed-upon values of a group and

rejecting idiosyncratic modes of engagement" [30]

To use DICTION, the 59 inaugural addresses are first prepared into individual text files,

and are then loaded into the DICTION software.   DICTION processes and produces a

resultant 59 row comma separated file, with the five "master" variables, plus many other

sub variables that are used to calculate the five master variables.

---

[29] Hart, Childers, and Lind, 13-14.
[30] Ibid, 14-15.
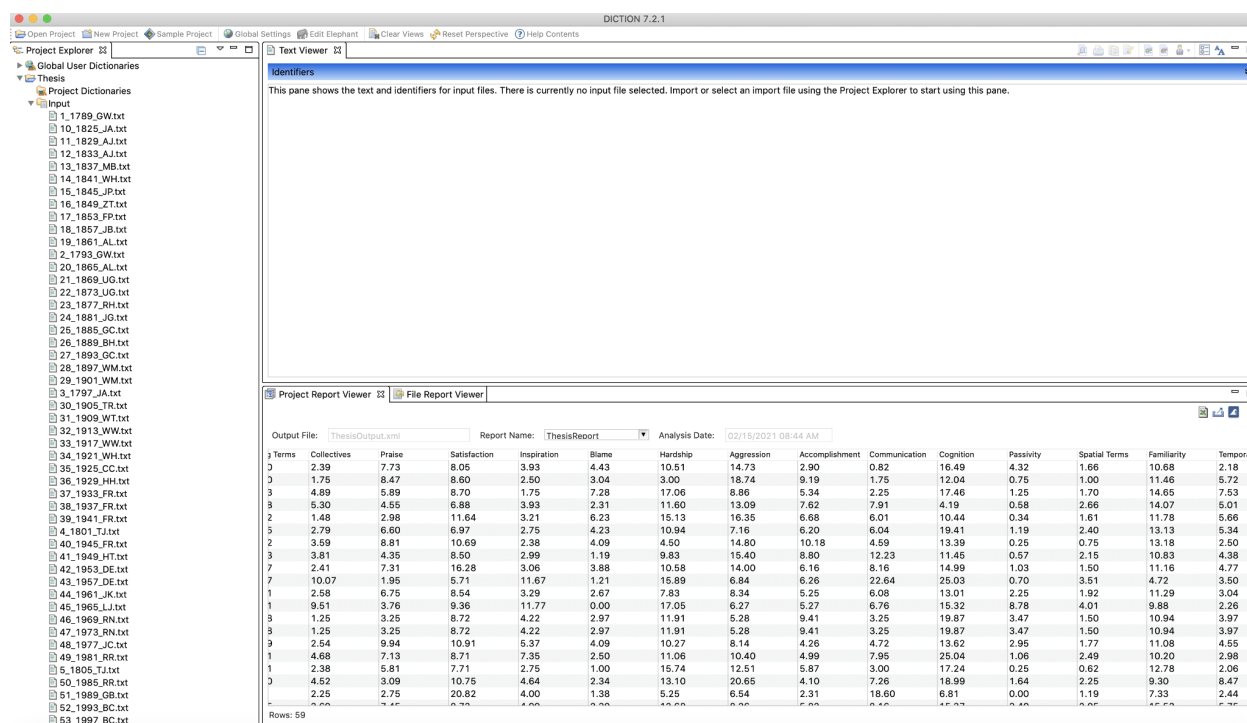
Figure 2.0, DICTION interface screen

TEXT PROCESSING: FORM

The next analysis evaluates the ease or difficulty in reading the texts using Readable.com.

Readable.com describes its service as being "geared towards helping your writing become

clearer and simpler to understand." It computes many "readability" measures including

Flesch Reading Ease, Gunning Fog, SMOG, and the Automated Readability Index.

Further Readable.com identifies long sentences, complex words, difficult words, cliches,

adverbs, passive voice, tone (formal or conversational), and sentiment (positive or

negative). Using Readable.com involved sending the speeches to the Readable.com site,

and it returns a CSV with analysis variables.

PART 4: DATA SCIENCE & ANALYTICS

These five data elements, identified at individual speech level, were analyzed using the

statistical programming language R. The objective of the analysis was to identify which

speeches are similar through a cluster analysis. K-means is a common method that helps

to separate data into groups. In this application the distance between inaugural addresses

shapes understanding of how similar or different inaugural addresses are from one

another.

K-means works in the following way, as described by Robert Kabacoff:

1. Select K centroids

2. Assign each data point to its closest centroid

3. Recalculate the centroids as the average of all data points in a cluster

4. Assign data points to their closest centroids

5. Continue steps 3 and 4 until the observations aren't re-assigned or the

   maximum number of interactions is reached. [31]

To assist in K-means clustering, the R package from author Fabiran Mundt's "factoextra"

was used. First to identify the number of clusters, the fviz_nbclust() method was used to

create an "elbow plot" (Figure 3.1). The objective was "to define clusters such that the

total intra-cluster variation is minimized." [32] Or in other words, the idea is that adding

another cluster would not improve the total of the sum of squares.[33] The total within sum

of squares of the clust

---

[31] Kabacoff, Robert, "R In Action", 378-379.
[32] Data Novia, "Determining the Optimal Number of Clusters: 3 Must Know Methods".
[33] Ibid.

So through examination of the elbow plot, the "bend" can be seen appearing at 4. While other methods can be used to determine cluster size, the results can be subjective and must be interpreted for appropriateness with the content of the data under analysis.

The clustering analysis shows that there are three main groupings of presidential inaugural addresses when considering the 5 lexical tone variables.   Cluster 2 has some inaugural addresses that score well in activity; notably Barack Obama's second inaugural shows much higher scores in these areas then his first inaugural.   Cluster 4 contains many historically great speeches.   Interestingly, most of these coincidentally have excellent reach scores.   Cluster 3 contains many ordinary speeches and is densely concentrated. Notable exceptions here are George Washington's first inaugural and Jefferson's first inaugural.   Woodrow Wilson scored in extremes low in activity and commonality but very high on optimism.   In essence, we have three main clusters and 1 outlier (Wilson's 2nd) who does fit into any of the other 3 clusters.

The fviz_cluster() method was used to plot the clustering result in a dimensional plot (Figure 3.2), with shape and color helping to identify our principal 3 clusters plus our main outlier. Principal component analysis (PCA) serves to reduce multivariate data and simplify it to something that can be visualized in 2 dimensions, while attempting to minimize the loss of information as much as possible.[34]

---

[34] Kassambara, Alboukadel. "PCA - Principal Component Analysis Essentials"
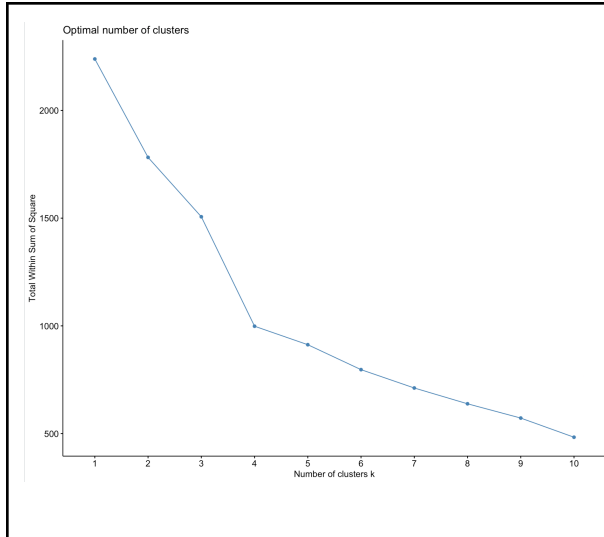
Figure 3.1
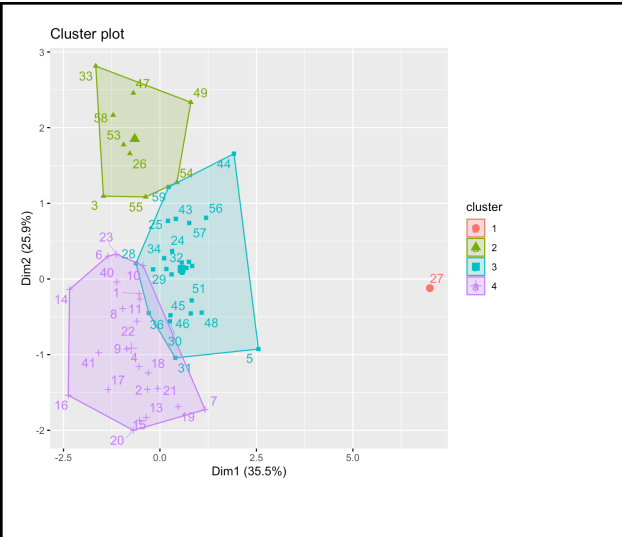
Figure 3.2

Examining Dimension 1 and Dimension 2 further we can see how each dimension accounts for several of the 5 variables:

Dimension 1 (35.5%)	Dimension 2 (25.9%)
<pre> Correlation p.value Activity 0.8769545 8.654422e-20 Commonality 0.5740434 2.000520e-06 Optimism -0.7617317 2.459187e-12</pre>	<pre> Correlation p.value Certainty 0.7866108 1.535251e-13 Realism 0.6959491 9.423922e-10 Optimism -0.2619069 4.508831e-02 Commonality -0.3531819 6.072680e-03</pre>

Figure 3.3

We can say that Dimension 1 accounts for 35.5% of the total variance, and Activity and Commonlity contribute in a positive direction, while Optimism also contributes but in an opposite direction. Dimension 2 only explains 25.9% of the variance, with Certainty and Realism contribute the most, and Optimism & Commonality contributing in the opposite direction.

We can further examine the PCA through a correlation circle, a type of variable correlation plot (Figure 3.4).   This tells something about the correlation between the 5

master variable results as scored for the 59 inaugurals by DICTION. We can see how the

master variables indeed have a good amount of spread about them, indicating their

independence.
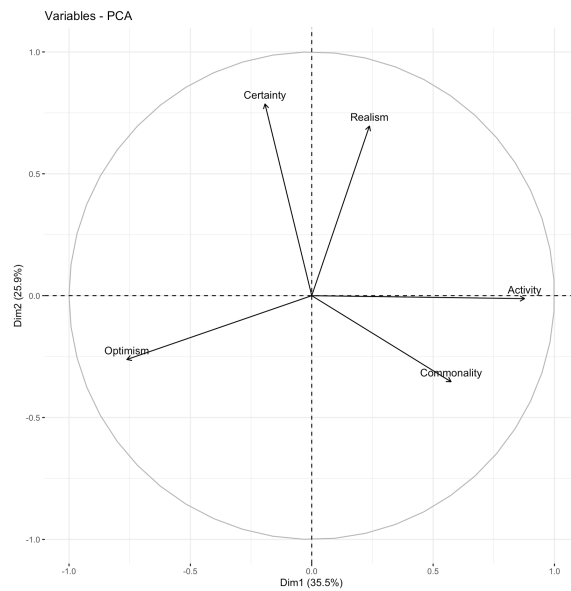
Figure 3.4

With K-means and PCA as background, one can better understand the placement of the

inaugural addresses in the scatterplot layout. Despite the PCA showing low (below 36%)

amounts of variance explanation, we still have enough meaningful separation with the

inaugural addresses to show similarities and differences between them.

VISUAL DESIGN:

PART 1: TITLE & INTRODUCTION

Figure 4.0, "Introduction"

The title "My Fellow Citizens..." is taken from the opening lines of many of the inaugural addresses, where a president is addressing the citizens directly. Set in a display font, "Remsen Script", the title evokes a late 18th century tone, similar to the handwriting of time of the first inaugural in 1789 (see Figure 4.1). Together with the historical portraits, this visual establishes in the audience a sense of history that leads up to our current moment. Titles and other text here are set in EB Garamond, an old-style typeface

that saw a revival in the 20th century. The choice is meant to evoke a classic typeface that could evoke any era of American history.

|	
Washington's handwritten first inaugural [35]	Remsen Script, by Monotype Imaging.
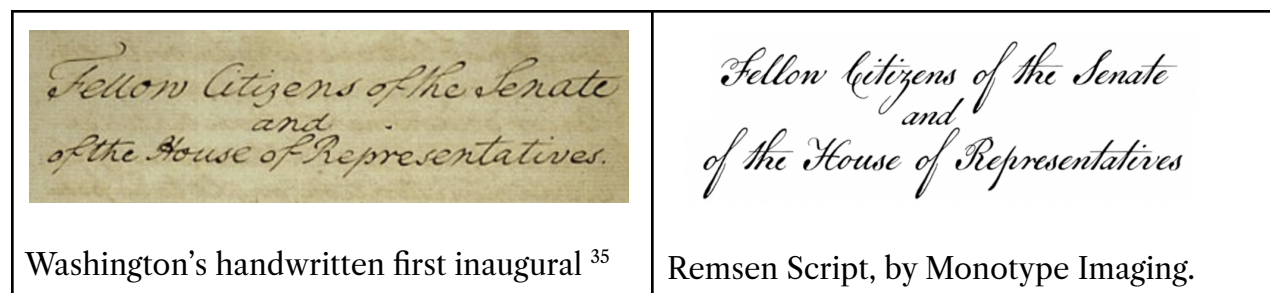
Figure 4.1

The portraits in the interface represent each president and his inaugural. Not every president however, made an inaugural address.   The portraits form an interface, where a mouse-over event will update the title directly to display the president's name, the inaugural number (if they made more than one), and display facts about the president, the inauguration, the setting, or show a famous quotation.   Most of these facts are sourced verbatim from Jim Bendat's book "Democracy's Big Day." Presidents who did not make inaugural are given a "shake" animation to reinforce that some presidents did not make an inaugural address (usually due to emergency swearing in after a prior president death or resignation).   The purpose of this introduction is to facilitate historical content exploration at an overview level. Only a tiny amount of actual inaugural speech quotes are available, and they are hidden amongst some of the most famous (Kennedy, Roosevelt)

---

[35] National Archives and Records Administration, "Featured Document Display: George Washington's First Inaugural Address."

or recent (Trump).   These serve to make connections to content the audience may be

likely to already have some familiarity with.   Since a general audience is assumed to have

some existing familiarity with the presidents, here one may start with a president they are

familiar with, or look around and discover something else potentially interesting.   The

only way for the audience to proceed is to click a president who made an inaugural

address.

PART 2: EXPLORE CONTENT
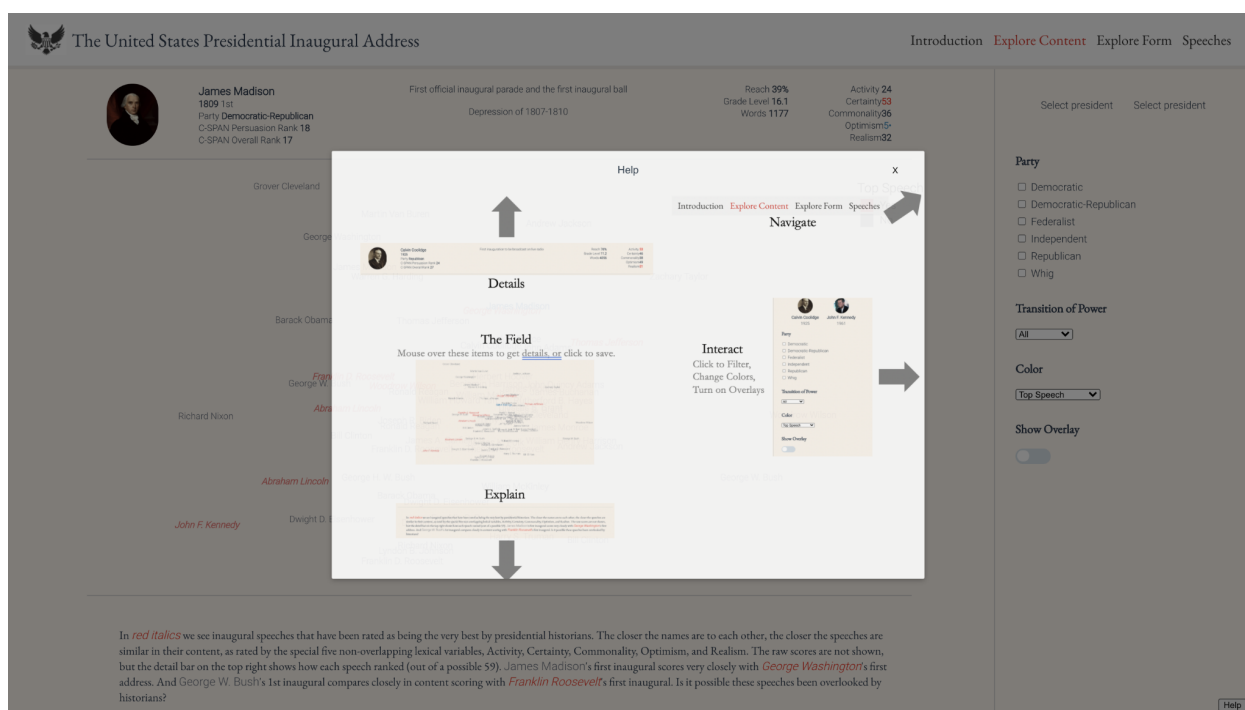
Figure 5.0

Recalling Schneiderman's mantra, the audience proceeds from "Overview first" to "zoom

and filter."   Upon first time entry into "Explore Content", the audience is presented with

a modal help window. The serves to orient one to the parts of the interface and present

options for exploration.   The audience closes the modal, clicking an "X" on the upper

right and begins.
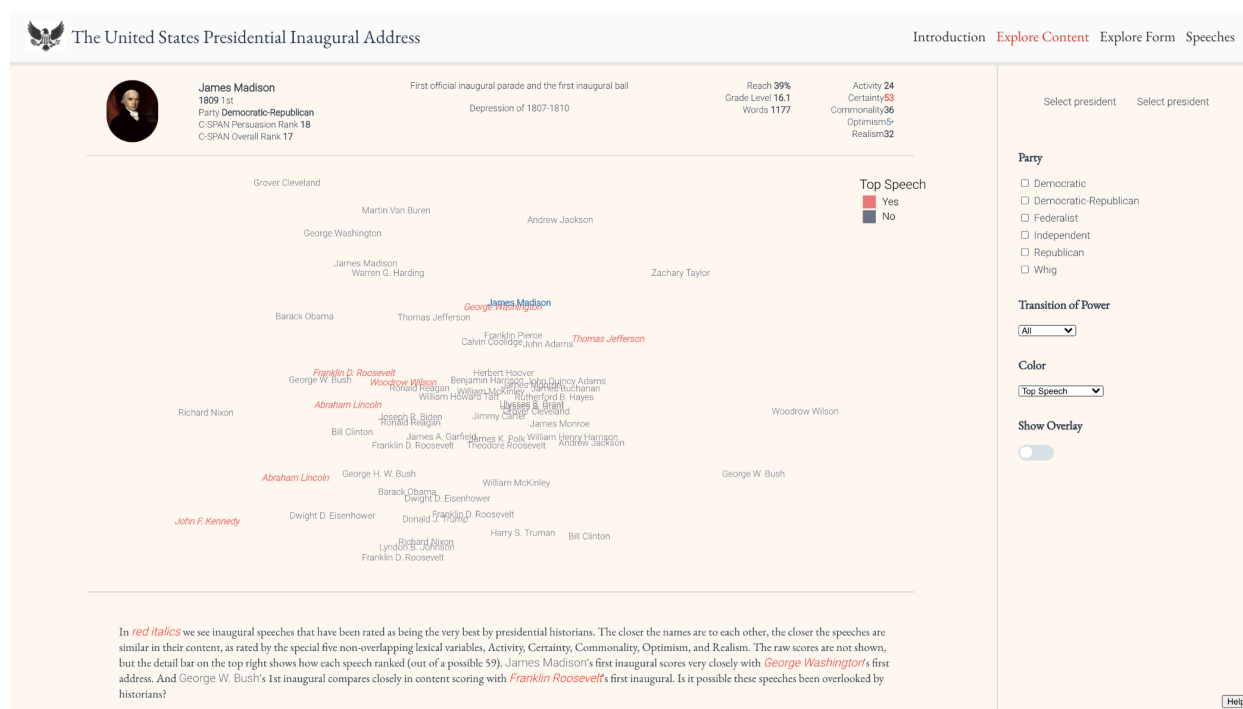
Figure 5.1, "Explore Form"

Upon closure of the Help modal, the audience is thrust into the "Explore Form"

exploration vehicle. A word map, a form of textual scatterplot, displays and arranges the

names of presidents.   Some presidents appear twice who made more than one inaugural.

Placement in the word map is determined by the clustering analysis described earlier.

Some adjustments have been made manually: Woodrow Wilson's second inaugural on the

far right appears less of an outlier than it should be (it has been moved leftward), but this

adjustment serves to avoid overcrowding remaining inaugurals and maintains the overall

readability of the display.   Other president names have been slightly jittered to improve

readability. Again, the precision of spatial distance here is not a priority, and as such, no

axis or axis labels exist.   However, enough spatial integrity must be maintained to be useful in making comparisons.

The selected president from the Introduction screen is highlighted in bold blue, and display details are presented at the top. A 3 second delay prevents the user from changing this selection on entry.   The default highlighting of other speeches shows historical "top rated" speeches in red italics, with other speeches in dark grey.   These color choices engage the audience's preattentive visual processing.   Right away, the audience is invited to make a comparison, and probably the most crucial comparison of the entire project: How do historically "great" speeches compare with one just selected, and with others?   The user may now judge spatial proximity between the selected president and the "red italics" or "great" speeches.   By hovering over president names, the audience may read more details, facts, and statistics regarding each of the inaugurals.
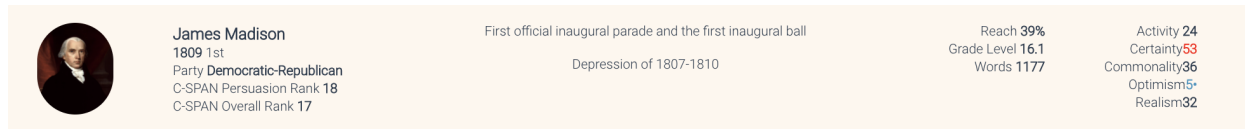

Figure 5.2, "Details Bar."

The details bar (Figure 5.2) displays a portrait, name, year, number of the inaugural, party, and historian evaluations. The "C-SPAN Persuasion Rank" is included so the audience may begin to reason about the president's overall persuasiveness against the score rankings provided on the right side.   The five master diction variables are presented as rankings, with red color highlighting a particularly low ranking, and a blue number

(with a bullet added) indicating a particularly high ranking. The rankings avoid audience confusion by not having to interpret the raw DICTION scores.

The Reach score "is a measure of the proportion of an audience who can understand the speech easily, and is calibrated against literate general public. A Reach score of 100% would be readable by about 85% of the general public."[36] Grade level employed here is the Flesch-Kincaid level and is used to assess "the proximate reading grade level of a text. The Flesch-Kincaid grade level is equivalent to a US grade level of education required to be able to understand a text."[37] These and other definitions are available through the display as tooltips.

In the sidebar (Figure 5.3), the words "Select president" appear until the audience clicks on a presidential name, saving the inaugural address (and displaying the portrait, name, and inaugural year). This is the act of "filtering" before one later may "zoom" on the inaugural speeches themselves. Traditional data filters on the speeches are also present. The "Party" filter allows the audience to reduce clutter in the word map display. "Transition of Power" is a filter to show only inaugurals made during significant historical transitions. "Color" allows the user to call upon specific variables - using color to highlight by variable. "Color" also changes the explanatory text along the bottom of the screen. The "overlay" draws shapes & optional text over the top of the word map. The principle here is one of "proportional engagement guided analytics". The more a user engages with the interface, the more the system displays narrative text or other images in

[36] Readable.com, "Frequently Read Articles."

[37] Readable KnowledgeBase, "What Is the Flesch-Kincaid Grade Level?"

response to the audience's prompt.   Thus, the system corresponds and reciprocates proportionally with the level of audience engagement.

The typefaces used here are a mix of EB Garamond used in the introduction, for titles, main headers, and long narrative next. The typeface Roboto is used for data elements, for legibility at smaller sizes, and its sans-serif style distinguishing it from the rest of the display.

Figure 5.3, "Sidebar."

In Explore Form (Figure 5.4) the audience is presented with another scatterplot, this time focusing on speech form.   Along the X axis, time in years is presented, and along the Y Axis, the Flesch-Kincaid Grade Level.   The audience clearly sees that as time progresses, speech grade levels decrease. As in "Explore Content", changing color selections changes the narrative along the bottom.   An overlay chunks the data into era segments, allowing for comparisons in groups.   The audience is invited to again mouse

over and explore details & make comparisons. This time they can do so under a different context than the prior screen, facilitating more opportunities for interaction & discovery.
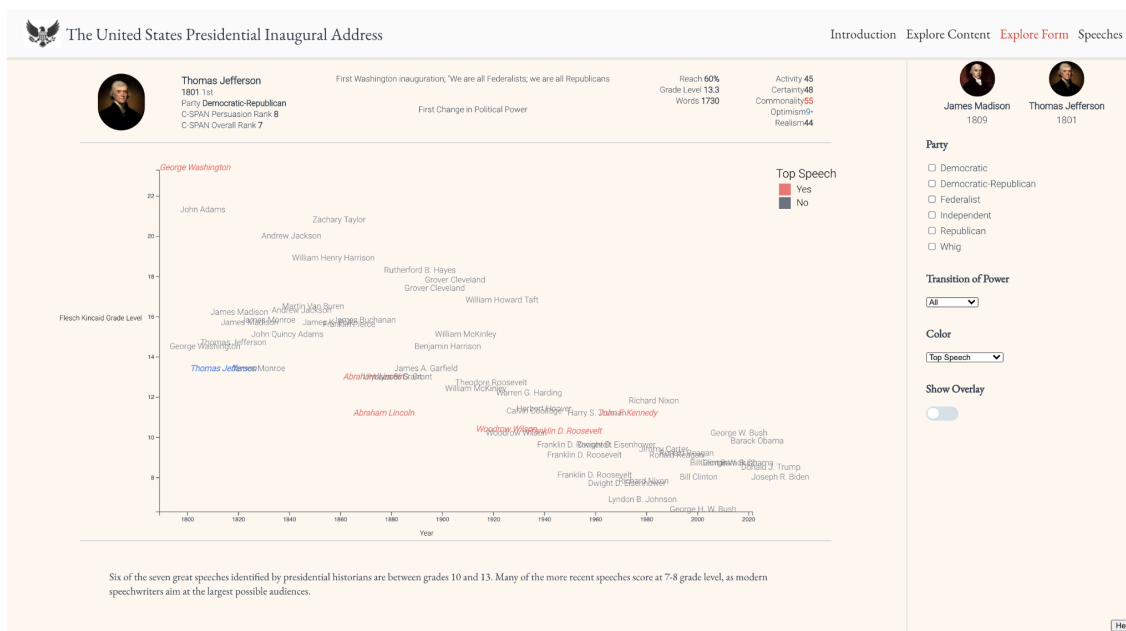

Figure 5.4, "Explore Form."

As the audience enters the "Speeches" (Figure 5.5) portion of the interface, the audience feels a sense of the "final step". Finally, armed with prior knowledge and ideas from the areas of "Introduction", "Explore Content", and "Explore Form", the audience is ready to review speeches in detail. New details emerge that would have felt excessive or burdensome previously: the exact building location of the speech, the weather at the time of the inaugural, the number (and presidential inaugural ranking) of difficult words, the estimated time in minutes of the speech. The speech itself is presented and can be compared with the data & contextual elements on the right. A switch button allows the audience to bring up the second selected inaugural speech. If the audience enters this area without selecting any inaugurals prior, one will be presented with a portrait selector

similar as in the introduction.

Figure 5.5, "Speeches."

IMPLEMENTATION

"My Fellow Citizens…" was developed using the following technologies:

Technology	Description	Usage in Project
Excel 16 for MAC	Commercial spreadsheet	Data assembly, joining, cleaning
Tableau Desktop 2020.02	Commercial data visualization tool	Exploratory data analysis
R Studio 1.4 with R 4.0.3	Open Source Statistical tool	Exploratory data analysis, Clustering
DICTION 7.2	Commercial text analytics tool	Content & Tone analysis
JSON	Data Format	All data accessed by Vue app available in JSON format
Vue.js 3	Open Source JavaScript Framework	Foundation for My Fellow Citizens web application
Vue Tippy	Open Source Tooltip generator for Vue	Tool-tips

Vueform Toggle	Open Source Toggle switch for Vue	Overlay selector
D3.js 6	Open Source SVG graphics	Word maps, scatterplot, overlays
Git	Open Source versioning	Version control
Github	Commercial repository & hosting	Repository & project web host

Figure 6.0

Vue.js was chosen for its large community and easy learning curve. Vue's core feature is reusable components. In "My Fellow Citizens..." components are especially re-used across the Explore Content, Explore Form, and Speeches sections. The includes all the main interface components, including the main Navigation, the Sidebar, the Footer, but especially the Scatterplot elements. The scatterplot components include sub-components for the X Axis, Y Axis, and each data point itself. The componentized approach allows for maximum re-use for future development. "My Fellow Citizens..." is easily expandable for future development due to this approach.

Vue functionality employed also included Vue router. Two JSON files are utilized, the first for the Introduction page, and a more complex second one for the rest of the interface. From the first page, an ID is passed as a parameter that is utilized into the Explore Content page. Other state management is handled with components passing down data to sub-components.

D3.js was used in conjunction with Vue, as it allows ease of controlling scalable vector graphics within HTML's document object model. The word map/ scatterplot components benefit from access to D3's functions, and make customizing it with text styles (for example the italics and coloring) straightforward. The color legends and

overlays are also drawn in D3, demonstrating the versatility and flexibility of the package. Because Vue is extensible with plugins, it is straightforward to add open source tool tips and toggle features through add-on packages.

Conclusion

"My Fellow Citizens..." allows its audience to explore its topic at multiple levels, with an overview, filter, then zoom and details-on-demand approach. It carefully shares its insights in response to user activity, and does not emphatically state its conclusions or tell its audience what those conclusions ought to be. It is friendly and welcoming in its introduction, but also quickly raises its cognitive load and invites its audience to grapple with its content. The presented analysis itself serves as a prompt for further audience participation. Pre-loaded insights & guidance are revealed in proportion with the level of audience engagement. Ultimately, it is the audience's agency that is preserved throughout. To really gain the most from "My Fellow Citizens...", one must explore the site fully, and repeat each section with several passes.

The DICTION tone analysis combined with the visual word map provides the most unique contribution to the study of presidential inaugural addresses. Speeches having similarities in tonal expression or sentence length or structure however is only a starting point to evaluate speeches. Moments in time, that is, the setting of the transition and the events surrounding it are also important. Washington's first inaugural is hailed by

historians as a great speech, but it is terse, was directed at Congress, and would not be very well understood today by wide audiences.   Modern presidents and speechwriters clearly have sought to expand their reach by simplifying their message. What's revealing is that no historian has rated any inaugural speech "great" since John F. Kennedy's 1961 inaugural address, a speech already 60 years old.   This particular speech scored very high in Commonality & Realism but exceptionally low in Optimism (amongst all other inaugurals).   So can "My Fellow Citizens…" tell us something about how historians may regard the more recent speeches?

One message to current and future speechwriters & presidents may be the presidential inaugural speech itself represents an enormous opportunity, but has rarely failed to impress its audiences. It is notable that 5 of the 7 "great" speeches identified score well in Activity and quite low in Optimism.   Activity, or the "avoidance of inertia" is a hallmark of high ranking Lincoln, Kennedy, and Franklin Roosevelt inaugurals. Barrack Obama's 2nd inaugural address scores 7th overall in Activity and also first in Commonality, a trait that is shared with both Kennedy and Franklin Roosevelt. It will be interesting what future historians may consider regarding Obama's second inaugural speech. However, Obama in his second inaugural, lacked the gravitas moment he had with his first inaugural, as the nation's first African-American president.

A similar argument can be made of George W. Bush's first inaugural address. George W. Bush's reputation seems to actually grow in stature with each passing year out of office. His tonal scores for his first inaugural are much more acutely aligned with some of the greatest speeches, such as Roosevelt's first, Lincoln's second, and Wilson's second.

But George W. Bush's biggest presidential moment came after his inaugural address, the September 11th, 2001 destruction of the World Trade Center in New York City.

Ultimately, it is prompting these kinds of "second looks" and re-considerations that is at the heart of the "My Fellow Citizens…" project.   It is this prompting of re-engagement with the material and this outweighs any individual and specific insight. Ultimately, speech evaluation still remains both art and science. In "My Fellow Citizens…" it is through the engagement of the "science" that causes one to reconsider the "art."

Appendix

Future Enhancements:

- Use custom DICTION dictionaries, such as Patriotic terms, Party References, Voter references, Leader references, & Religious terms. [38]

- Speechwriter analysis such as styles and influence.

- Speechwriter quotes and perspective on the Presidents and their speeches.

- Richard Brath style visualizations that incorporate inaugural speech text, as another audience prompt to engage with the speech content directly.

- Speech text highlighting. For example, coloring all difficult words, or key words that match to the tonal variables.

- Swap out text corpus, for example, switch to State of the Union addresses.

- Audience participation to save their own insights or annotate the data further.

- Adjustments to text analytics for historical periods; many text analytics tools are geared for modern writing.

---

[38] Hart, Childers, and Lind, 15.

Bibliography

The Presidential Inaugural Addresses:

Avalon Project at Yale Law School, Lillian Goldman Library
https://avalon.law.yale.edu/subject_menus/inaug.asp (Retrieved March 10, 2021)

The American Presidency Project at University of California Santa Barbara
https://www.presidency.ucsb.edu/documents/presidential-documents-archive-guidebook/inaugural-addresses (Retreived March 10, 2021)

Other Resources:

    Allen, William. "Making Corpus Data Visible: Visualising Text with Research Intermediaries." *Corpora* 12, no. 3 (November 2017): 459–82. https://doi.org/10.3366/cor.2017.0128. UK: Edinburgh University Press

    Bendat, Jim. *Democracy's Big Day: the Inauguration of Our President, 1789-2013*. Bloomington, IN: iUniverse, Inc., 2012.

    Boller, Paul F. *Presidential Inaugurations*. San Diego, CA: Harcourt, Inc., 2002.

    Bostock, Mike, Shan Carter, and Matthew Ericson. "At the National Conventions, the Words They Used." The New York Times. The New York Times, September 7, 2012. https://archive.nytimes.com/www.nytimes.com/interactive/2012/09/06/us/politics/convention-word-counts.html.

    Brath, Richard, and Ebad Banissi. "Using Typography to Expand the Design Space of Data Visualization." *She Ji: The Journal of Design, Economics, and Innovation* 2, no. 1 (2016): 59–87. https://doi.org/10.1016/j.sheji.2016.05.003.

    Brath, Richard. *Visualizing with Text*. AK Peters Visualization Series. Boca Raton, FL: CRC Press, 2020.

Chen, Wen. "A Critical Discourse Analysis of Donald Trump's Inaugural Speech from the Perspective of Systemic Functional Grammar." *Theory and Practice in Language Studies* 8, no. 8 (August 2018): 966–72. https://doi.org/http://dx.doi.org/10.17507/tpls.0808.07.

DICTION 7.2 Help Manual. Digitext, Inc., 2013.

"Featured Document Display: George Washington's First Inaugural Address." National Archives and Records Administration. National Archives and Records Administration. Accessed May 15, 2021. https://museum.archives.gov/featured-document-display-george-washingtons-first-inaugu ral-address.

Hart, Roderick P., Jay P. Childers, and Colene J. Lind. *Political Tone: How Leaders Talk and Why*. Chicago, IL: The University of Chicago Press, 2013.

Hearst, Marti A., Emily Pederson, Lekha Patil, Elsie Lee, Paul Laskowski, and Steven Franconeri. "An Evaluation of Semantically Grouped Word Cloud Designs," 2019. https://doi.org/10.31219/osf.io/3eutf.

Kabacoff, Robert I. *R In Action: Data Analysis and Graphics with R*. Shelter Island, NY: Manning Publications Co., 2015.

Kassambara, Alboukadel. "PCA - Principal Component Analysis Essentials." Statistical tools for high-throughput data analysis, September 23, 2017. http://www.sthda.com/english/articles/31-principal-component-methods-in-r-practical-gui de/112-pca-principal-component-analysis-essentials/.

Lim, Elvin T. *The Anti-Intellectual Presidency: the Decline of Presidential Rhetoric from George Washington to George W. Bush*. New York, NY: Oxford University Press, 2012. Physical Copy at NYU: Main Collection Offsite E176.1 .L457 2008

Manovich, Lev. *Cultural Analytics*. Cambridge, MA: The MIT Press, 2020. "Readable.com: Frequently Read Articles." Readable KnowledgeBase. Accessed May 15, 2021. https://help.readable.com/en/.

Schneiderman, Ben. "A Grander Goal: A Thousand-Fold Increase in Human Capabilities," 1996, 4–10. Retrieved Online (http://www.ifp.illinois.edu/nabhcs/abstracts/shneiderman.html) on March 19, 2021

Schwabish, Jonathan A. *Better Data Visualizations: a Guide for Scholars, Researchers, and Wonks*. New York, NY: Columbia University Press, 2021.

Webster, Noah. "Webster's Dictionary 1828 - Inaugurate." Websters Dictionary 1828, March 2020. http://webstersdictionary1828.com/Dictionary/inaugurate.

"What Is the Flesch-Kincaid Grade Level?" Readable KnowledgeBase. Accessed May 15, 2021.
https://help.readable.com/en/article/what-is-the-flesch-kincaid-grade-level-19346gi/.

Whissell, Cynthia, and Lee Sigelman. "The Times and the Man as Predictors of Emotion and Style in the Inaugural Addresses of U.S. Presidents." *Computers and the humanities* 35, no. 3 (August 1, 2001): 255–72.

"Determining The Optimal Number Of Clusters: 3 Must Know Methods." Datanovia, October 21, 2018.
https://www.datanovia.com/en/lessons/determining-the-optimal-number-of-clusters-3-must-know-methods/#elbow-method.