

# How Presidential Speeches Affect Job Approval Ratings

By Mohamed Hassan



# Overview

- Explore the relationship between Presidential Speeches and a President's job approval ratings.
- Identify the frequency of words spoken in Presidential speeches.
- What constitutes a high and low job approval rating?
- Words associated with high and low job approval ratings.
- Similarities and differences between each President; does party affiliation make a difference in words spoken?

## **Data Sources**

- Presidential Speeches - Miller Center UVA
- Presidential Job Approval Ratings - Gallup

# Gallup

- Global analytics firm; began reporting on presidential job approval since 1938.
- Ratings data from Truman-Present.
- 1938-2008 - ratings based on reporting job approval ratings from discrete, multiday surveys.
- 2009 - 2017 - daily sampling and interviewing on tracking survey; 3-day rolling average.
- 2019 - reverted back to 1938-2008 methodology.

# Data Cleaning/EDA

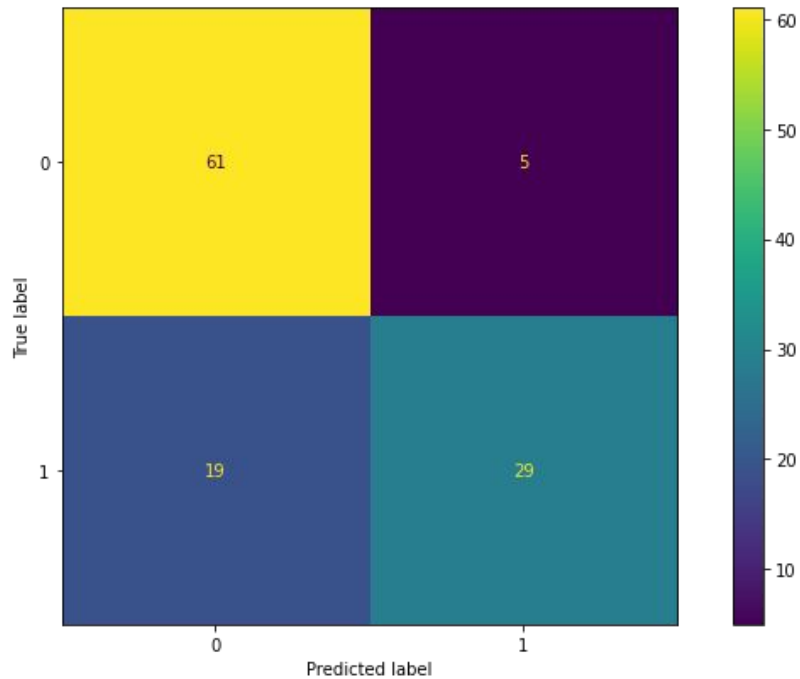
- Ratings and Speeches - Clinton, Bush, Obama Trump.
- Speeches - Date, President, Political Party, Speech Title, Transcript.
- Job approval ratings - Start/End Date, Approve, Disapprove, Unsure.
- High job approval rating  $> 50\%$ , low job approval ratings  $< 50\%$ .

# Initial Models Used

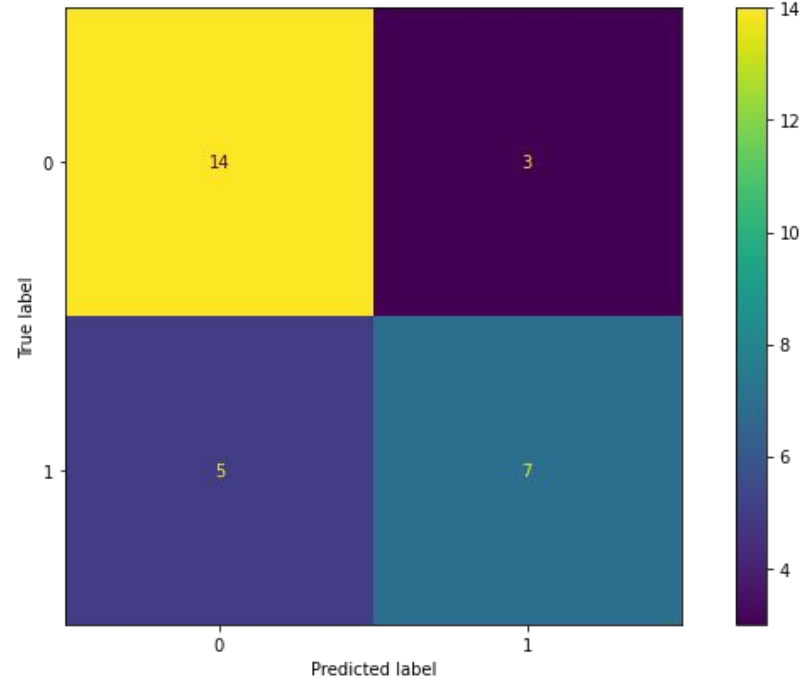
- K-Nearest Neighbors
- Bagging Tree
- Random Forest
- Naive Bayes
- Logistic Regression
- Decision Tree
- XG Boost

# Initial Model: K-Nearest Neighbors

Train Confusion Matrix



Test Confusion Matrix



# K-Nearest Neighbors

	precision	recall	f1-score	support
0	0.76	0.92	0.84	66
1	0.85	0.60	0.71	48
accuracy			0.79	114
macro avg	0.81	0.76	0.77	114
weighted avg	0.80	0.79	0.78	114

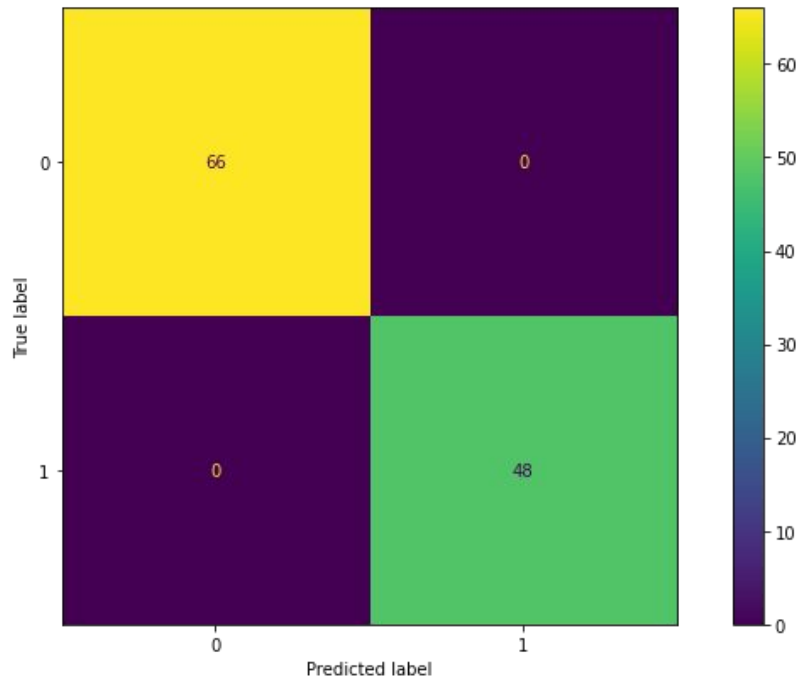
  

	precision	recall	f1-score	support
0	0.74	0.82	0.78	17
1	0.70	0.58	0.64	12
accuracy			0.72	29
macro avg	0.72	0.70	0.71	29
weighted avg	0.72	0.72	0.72	29

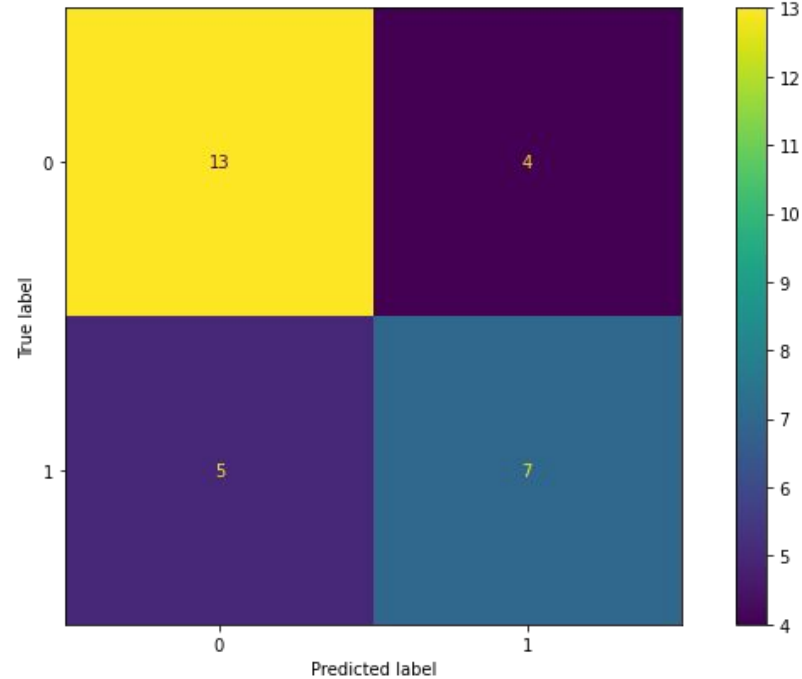


# Initial Model: Decision Tree

Train Confusion Matrix



Test Confusion Matrix



# Decision Tree

	precision	recall	f1-score	support
0	1.00	1.00	1.00	66
1	1.00	1.00	1.00	48
accuracy			1.00	114
macro avg	1.00	1.00	1.00	114
weighted avg	1.00	1.00	1.00	114

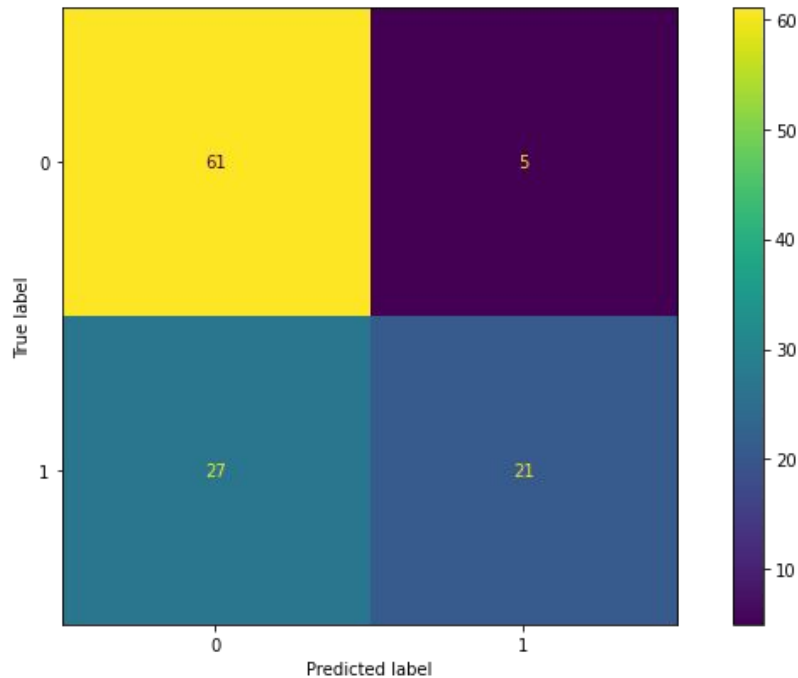
  

	precision	recall	f1-score	support
0	0.72	0.76	0.74	17
1	0.64	0.58	0.61	12
accuracy			0.69	29
macro avg	0.68	0.67	0.68	29
weighted avg	0.69	0.69	0.69	29

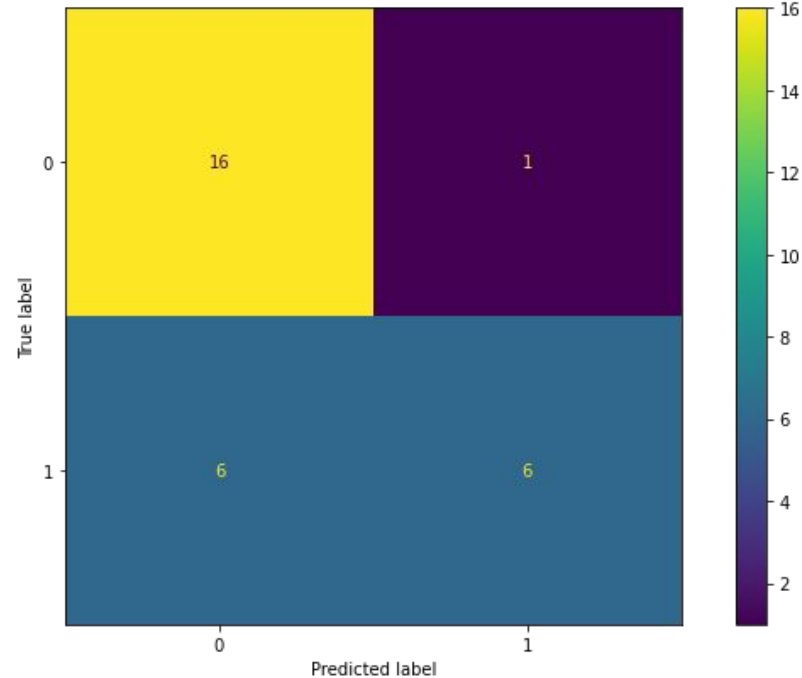
# Hyperparameter Tuning using GridSearch: KNN

## K-Nearest Neighbors

Train Confusion Matrix



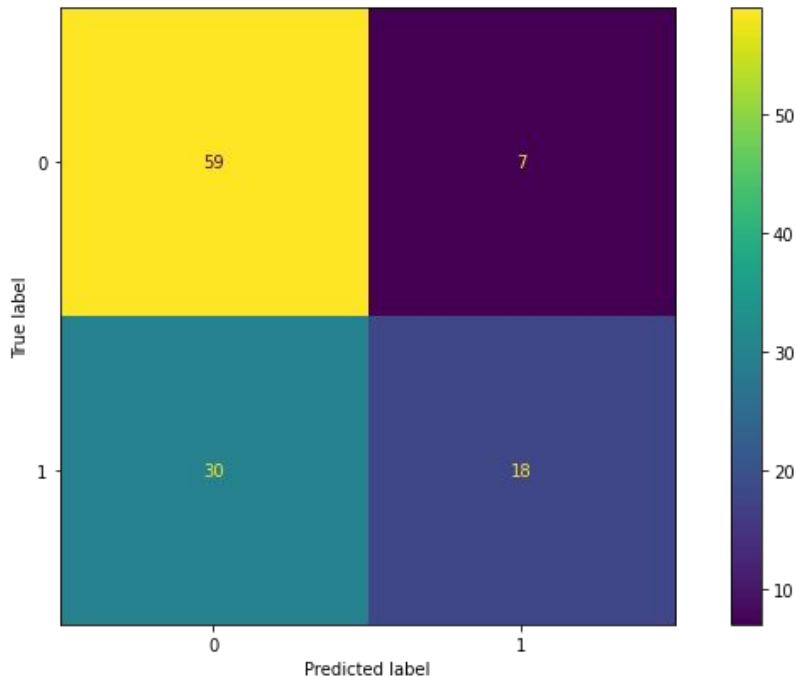
Test Confusion Matrix



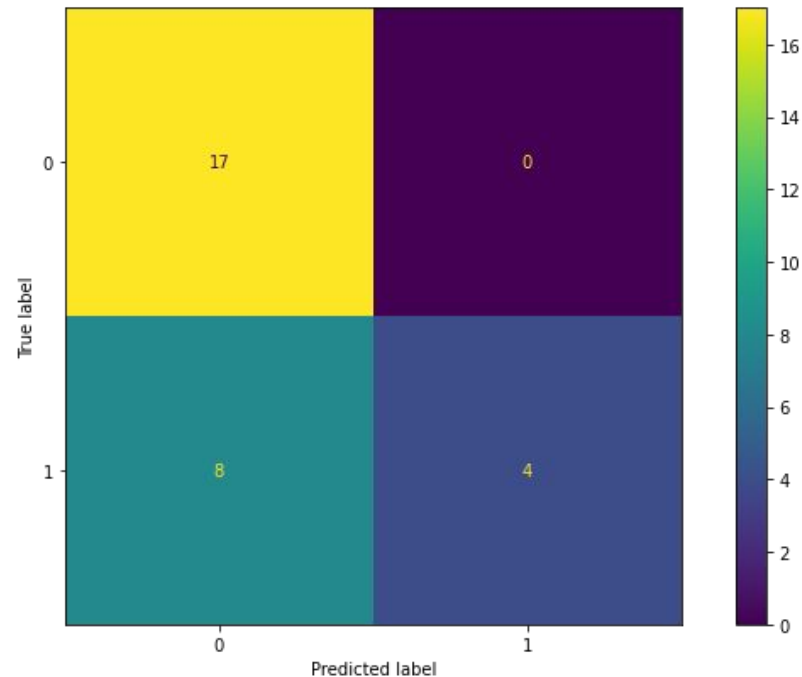
	precision	recall	f1-score	support
0	0.69	0.92	0.79	66
1	0.81	0.44	0.57	48
accuracy			0.72	114
macro avg	0.75	0.68	0.68	114
weighted avg	0.74	0.72	0.70	114
	precision	recall	f1-score	support
0	0.73	0.94	0.82	17
1	0.86	0.50	0.63	12
accuracy			0.76	29
macro avg	0.79	0.72	0.73	29
weighted avg	0.78	0.76	0.74	29

# Hyperparameter Tuning using GridSearch: Decision Tree

Train Confusion Matrix



Test Confusion Matrix

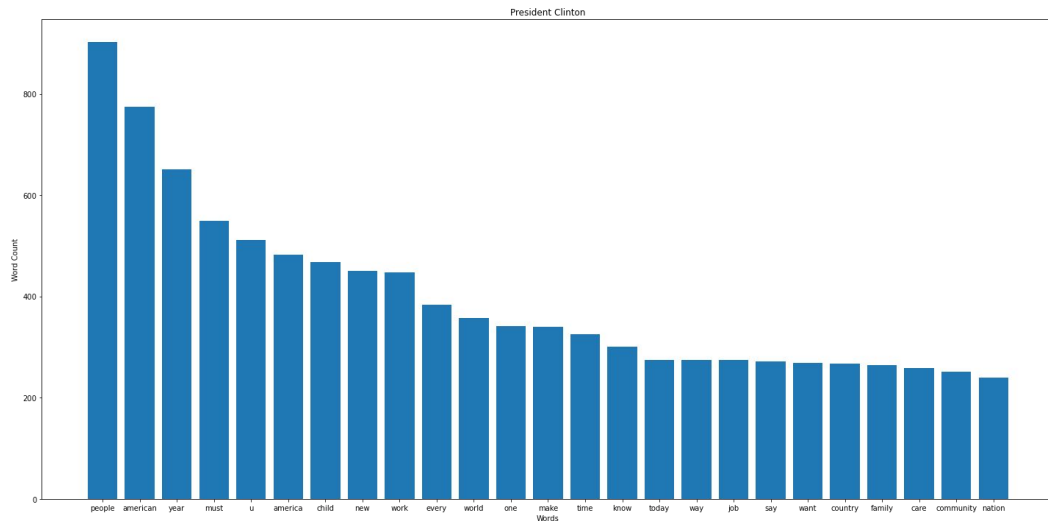
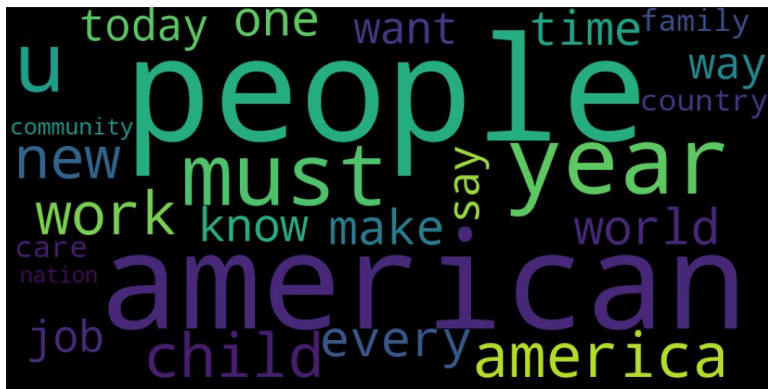


	precision	recall	f1-score	support
0	0.66	0.89	0.76	66
1	0.72	0.38	0.49	48
accuracy			0.68	114
macro avg	0.69	0.63	0.63	114
weighted avg	0.69	0.68	0.65	114
	precision	recall	f1-score	support
0	0.68	1.00	0.81	17
1	1.00	0.33	0.50	12
accuracy			0.72	29
macro avg	0.84	0.67	0.65	29
weighted avg	0.81	0.72	0.68	29

# Word Associations

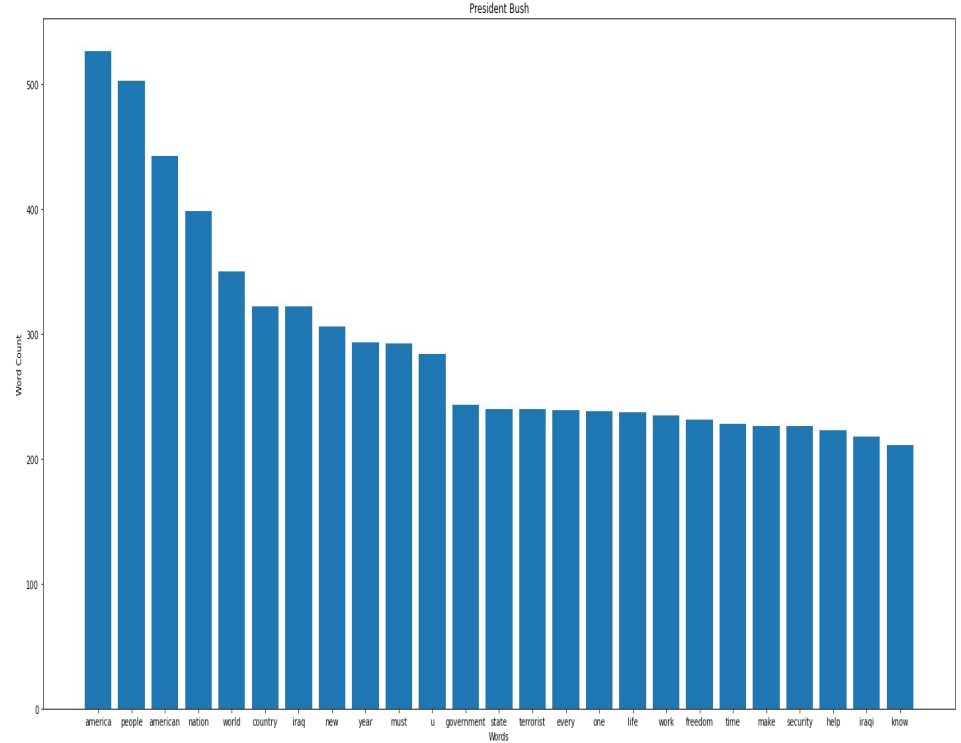
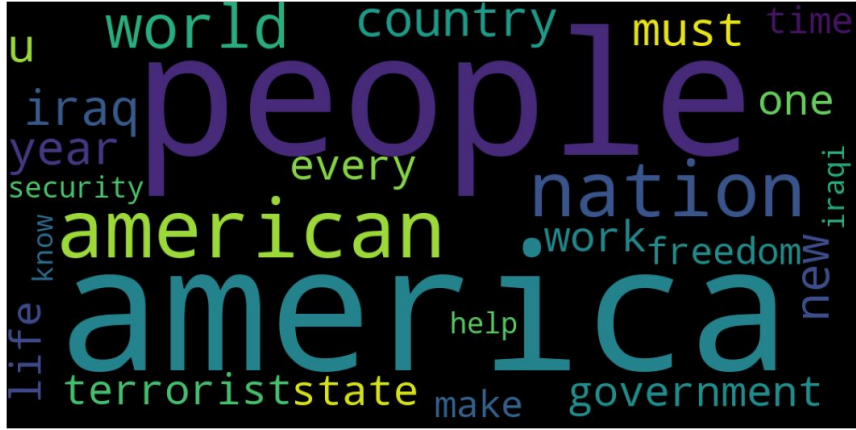
- Each President in dataset.
- Party affiliation (Democrat/Republican).
- High and low job approval ratings.

# Top 25 Words: President Clinton

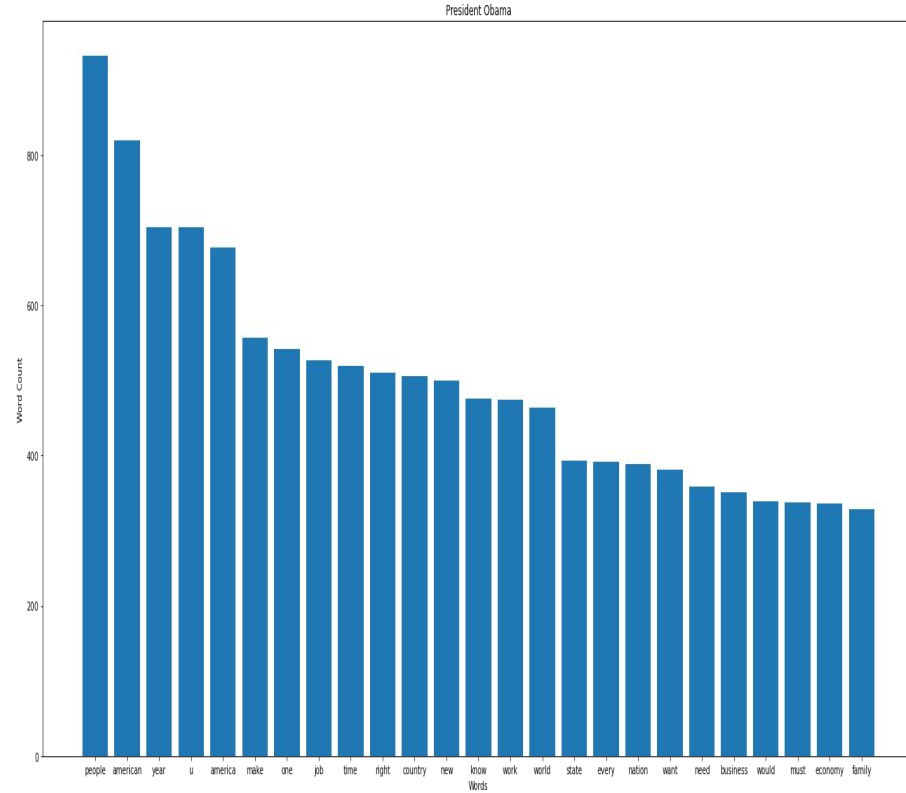
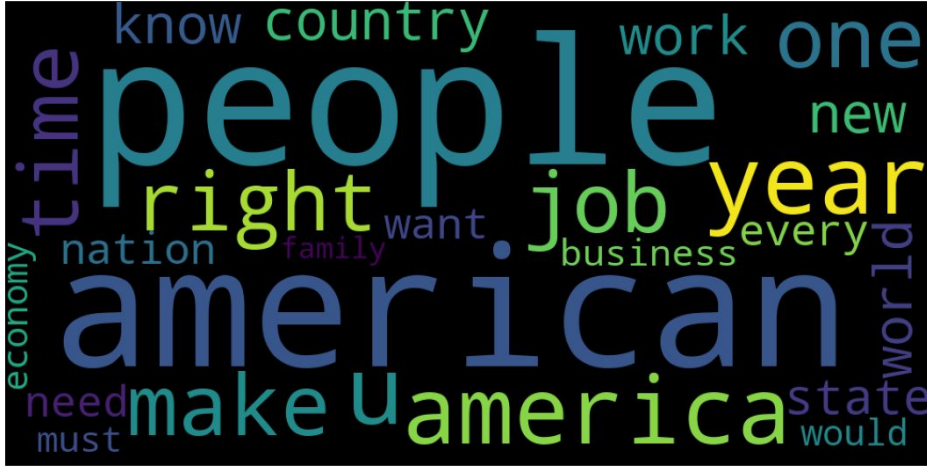




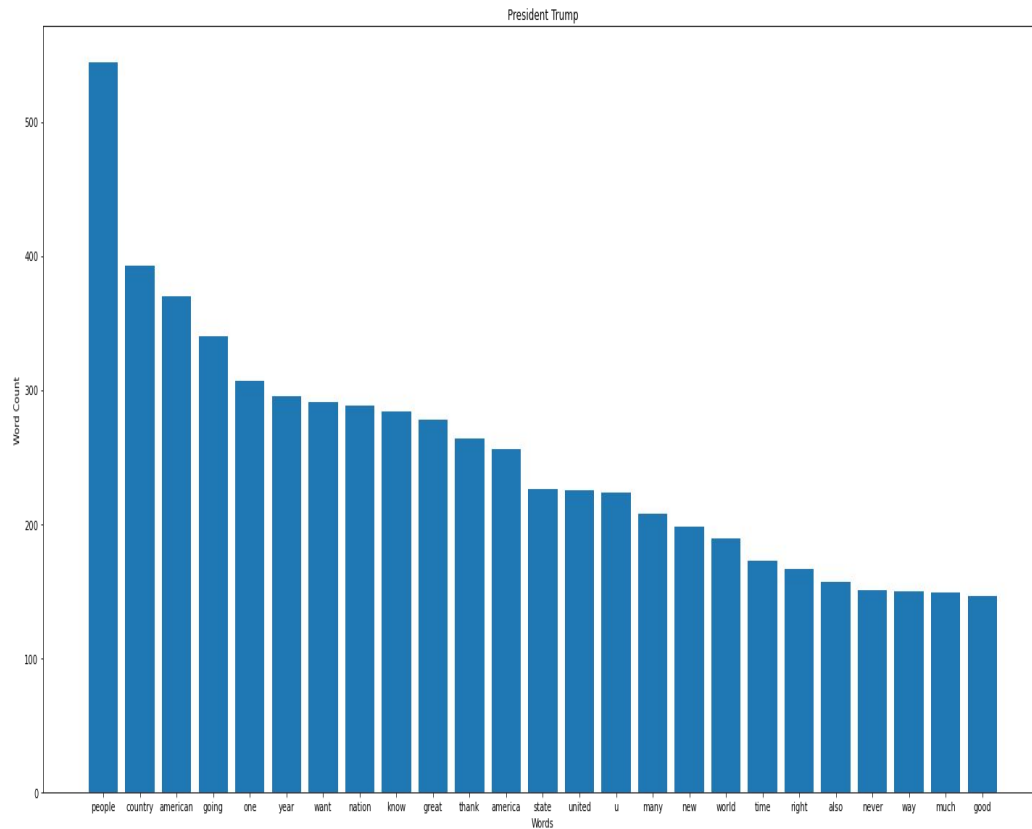
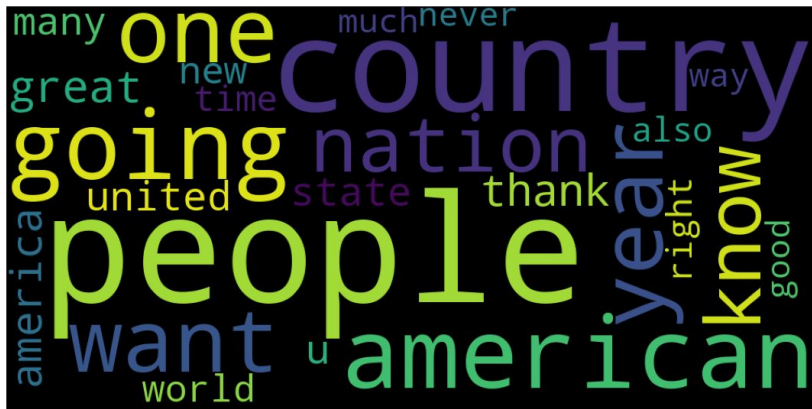
# President Bush



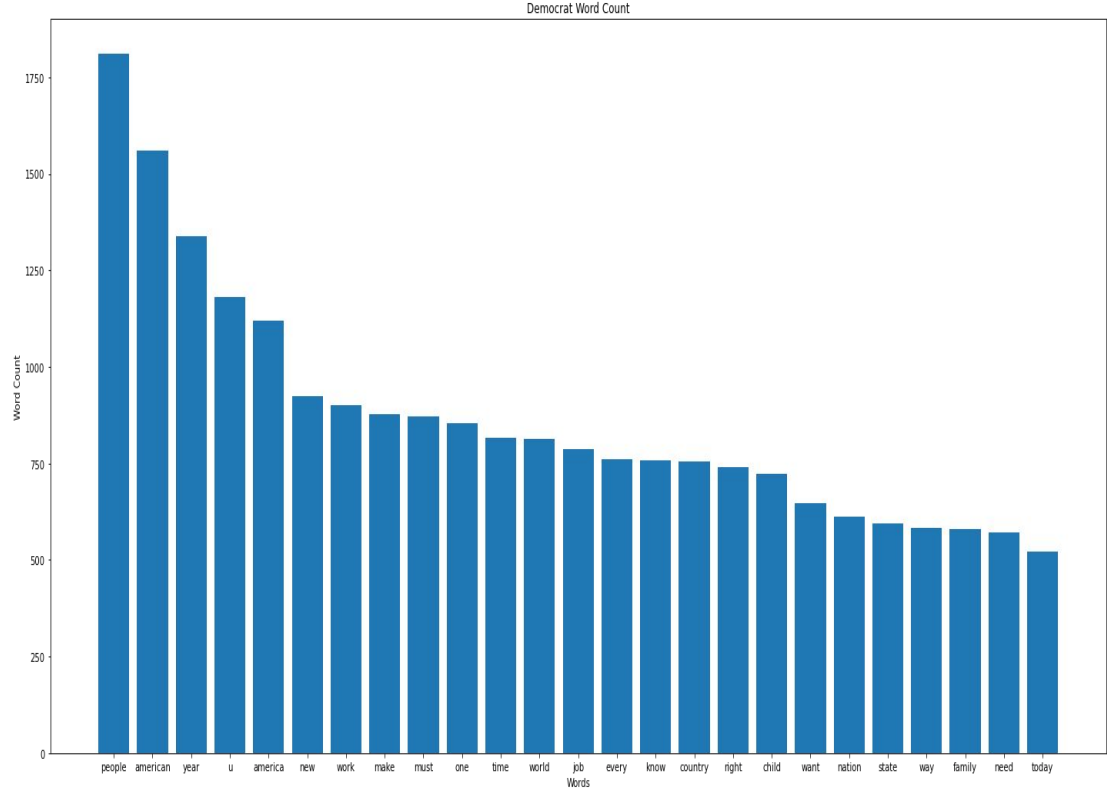
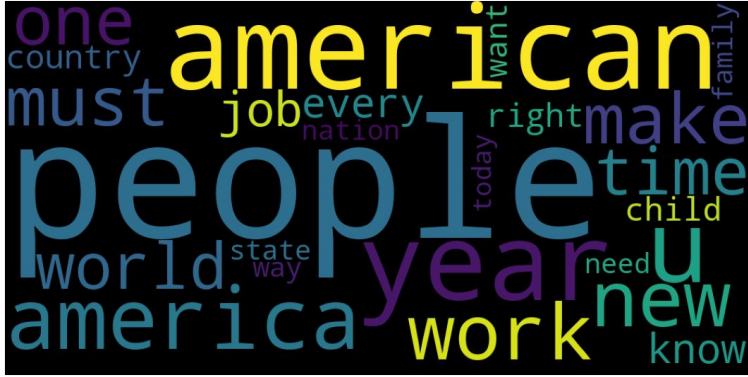
# President Obama



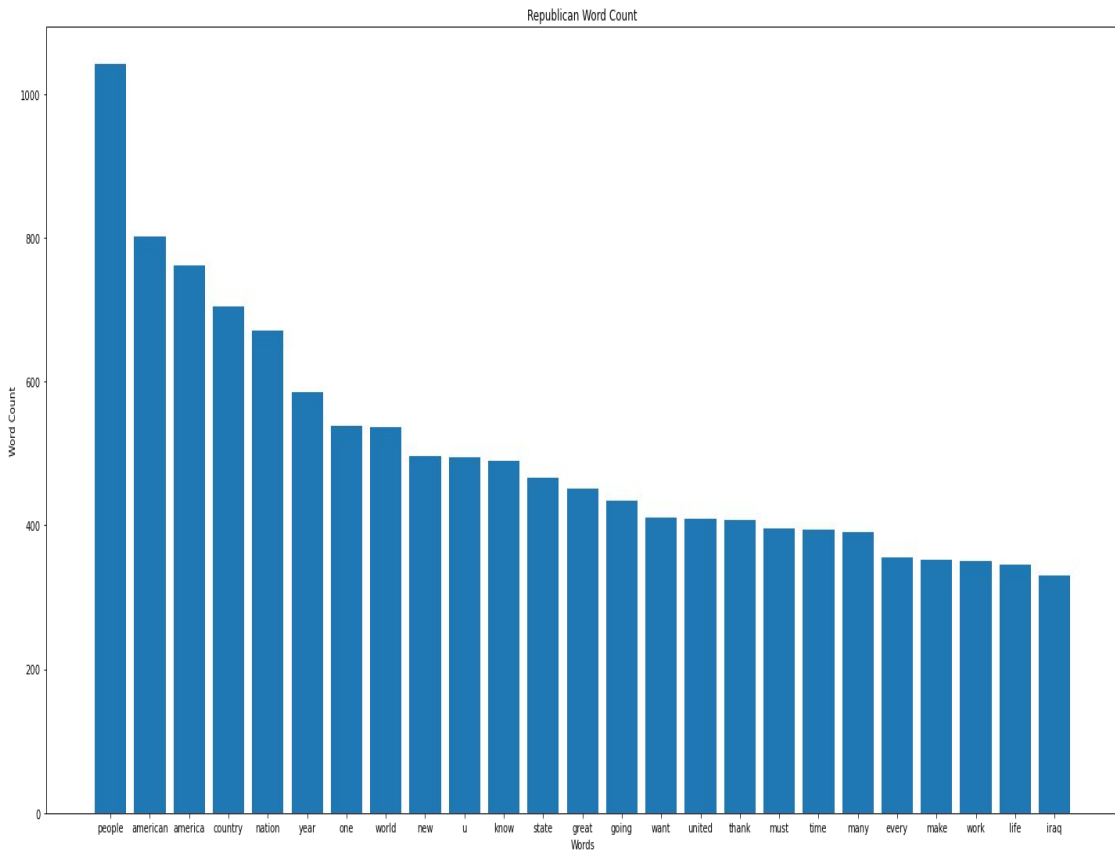
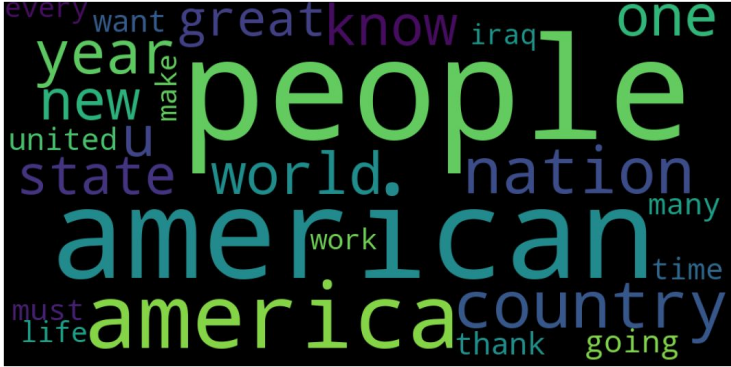
# President Trump



# Democrat



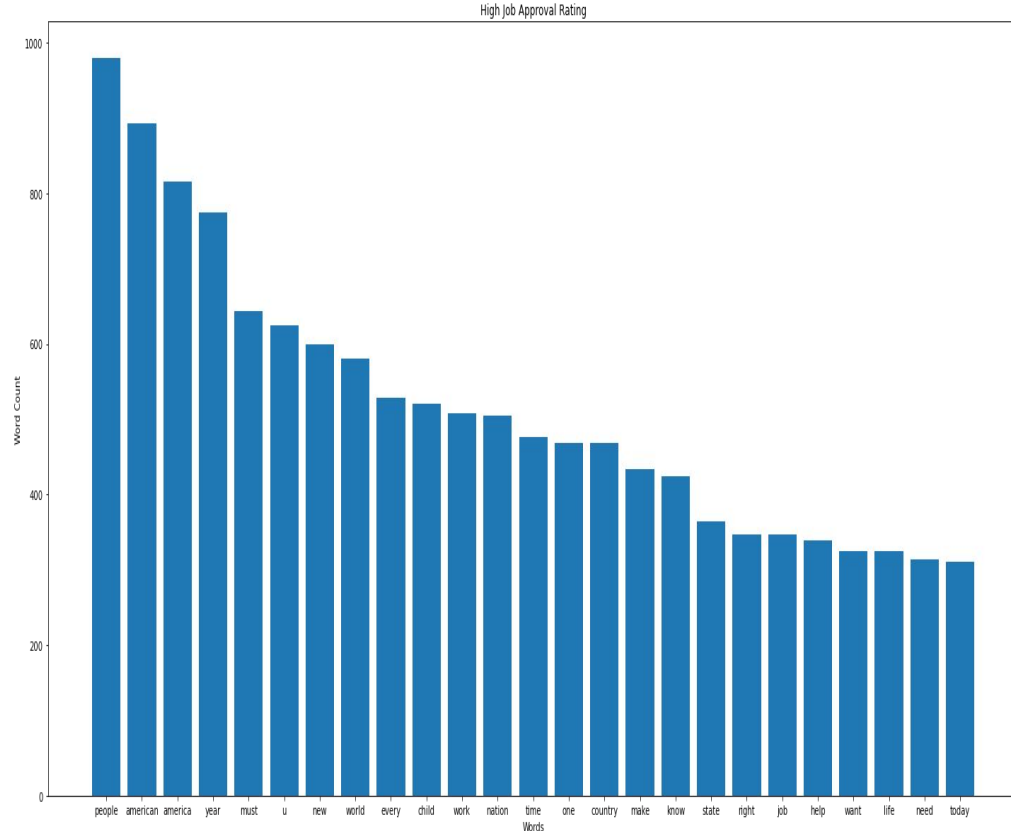
# Republican



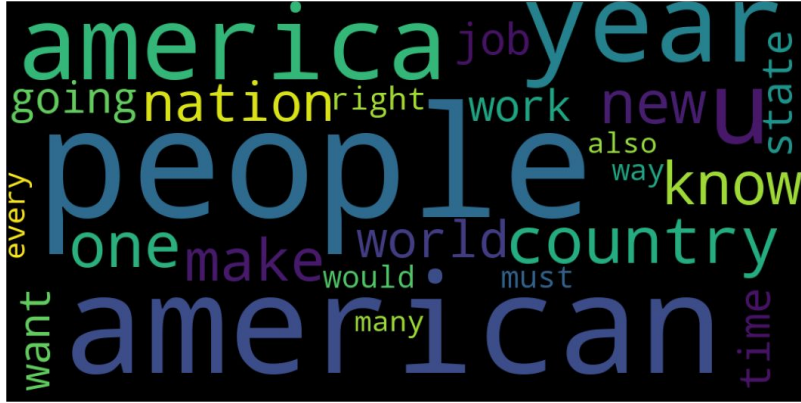
# High Job Approval Rating



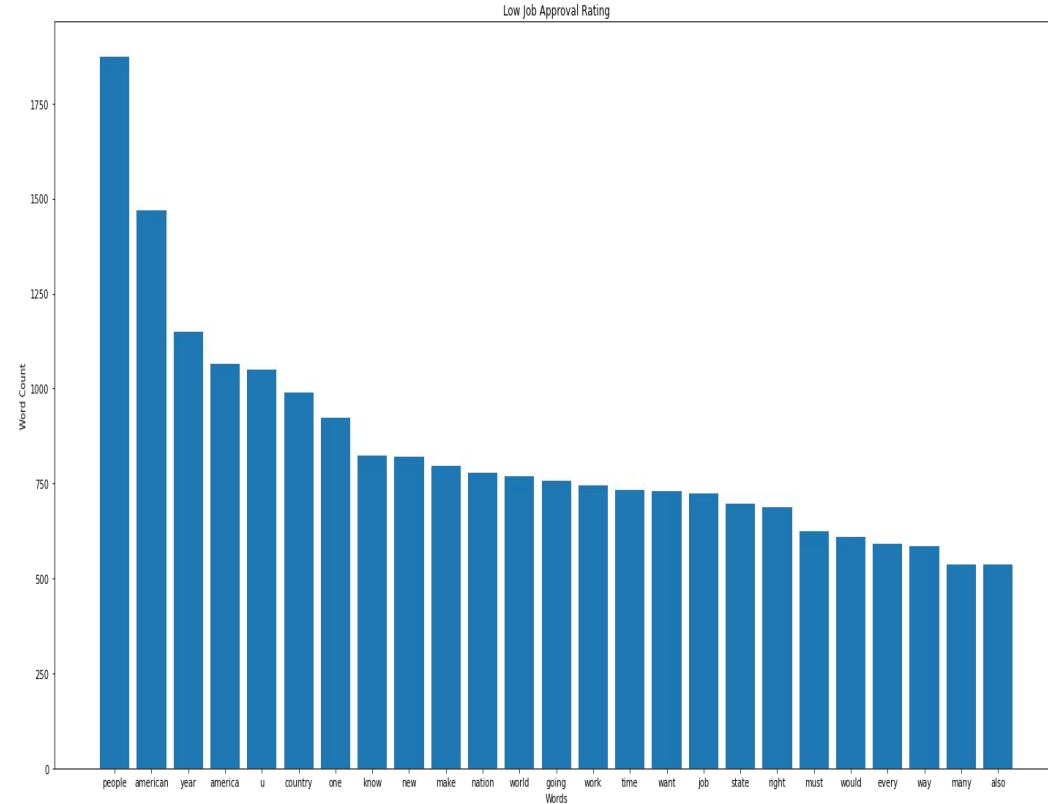
- Must
- Child
- Terms that emphasize children and communicates urgency.



## Low Job Approval Rating



- Country
- Job
- Us



# Conclusion

- KNN - best model to predict high approval ratings using speech transcripts.
- Most frequent words throughout speeches: People, American, America, Year; terms used to bring people together.
- Words that are more frequent in high than low job approval ratings in top 25: Must, Child. Life.
- Low job approval ratings: Country, Job, Us.
- Emphasizing children and communicating urgency - leads to high job approval ratings.
- Terms associated with low job approval ratings - used to attempt to bring people together and emphasize the economy; not enough to gain favorable rating.



# Next Steps

- Explore previous presidents and their speech transcripts.
- Analyze Trump's speeches towards end of his presidency.
- Has the pandemic affected what words are said by Trump/Biden?
- Look at bigrams and tri-grams to see if there are specific phrases presidents use.
- Look at other speeches given to see if there are similarities and/or differences.
- Analyze further how party affiliation impacts job approval ratings; similarities/differences?
- Relationship between speeches and the economy; frequency of words associated with high/low unemployment rates.

# Thank You!

<https://github.com/moham6839/American-Presidential-Speeches-NLP-Project>

