

Text Summarization and Analysis: President's of the USA

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Introduction and Overview

The data in the world is increasing tremendously. Now is the time when we can get an infinite amount of data for any topic we seek. Automatic text summarization methods are greatly needed to address the ever-growing amount of text data available online to both better help discover relevant information and to consume relevant information faster.[1] Extracting summary of a detailed transcript is an abstract process. Automating such a process can help parse through a lot of data and help businesses better use their time to make crucial decisions.[2] This text summarization and analysis report pertains to the ‘State of Union Address’ and ‘Inaugural Address’ speeches of USA’s last six elected presidents.

In this report, we analyze:

- What keywords were used by each of the presidents and their frequency distribution
- How text ranking works and what were the highest ranked text phrases?
- Named-Entity recognition through parts-of-speech tagging
- What were the topics(agendas) involved in the speeches?
- What was the most dominant topic in each speech?
- What is the trend of Sentiment and Subjectivity of each of the presidents over the years?
- How to carry out text summarization and which model to employ?

Why do we need Text Summarization and what are the techniques involved?

So what is the driving force behind the development of such intricate tools to extract context and meaning from a text? To answer this question let's consider a pragmatic and relatable example. As graduate students, we refer to several research papers and often the research carried out is overwhelming in terms of content and complexity. Often we wish for a short-hand version of the entire text that delivers accurate context and also includes vital information. This is exactly what our project aims to deliver. To carry out Text Summarization, there are mainly 2 techniques to choose from:

- a) **Extractive Text Summarization:** Selecting relevant phrases from the input document and stitching them together to form a summary. For example, consider the source text:

Joseph and Mary rode on a donkey to attend the annual event in Jerusalem. In the city, Mary gave birth to a child named Jesus.

The extractive summary would be:

Joseph and Mary attend event Jerusalem. Mary birth Jesus.

- b) **Abstractive Text Summarization:** The abstractive text summarization algorithms create new phrases and sentences that relay the most useful information from the original text, keeping the original intent — just like humans do.

Source text: *Joseph and Mary rode on a donkey to attend the annual event in Jerusalem. In the city, Mary gave birth to a child named Jesus.*

Abstractive Summary: *Joseph and Mary came to Jerusalem where Jesus was born.*

We have carried out an extractive summarization of each president's speech using models like mobilebert & gensim summarizer and contrasted the obtained results with an abstractive summarization model of T5.

Requirements:

- Packages used and required installments
hdbscan==0.8.26, nltk==3.5, pyLDAvis==2.1.2, pytextrank==2.0.3, selenium==3.141.0, sentence-transformers==0.3.9, textblob==0.15.3, torch==1.7.0, torchvision==0.8.1+cu101, tqdm==4.41.1, transformers==3.5.1, umap-learn==0.4.6, vaderSentiment==3.3.2, wordcloud==1.5.0, yellowbrick==0.9.1
- Google colab compatibility
- Selenium for web scraping ([link](#))
- Chrome webdriver installation ([link](#))

Methodology:

The speech data for President's Ronald Reagan, George H W Bush, Bill Clinton, George H Bush, Barack Obama and Donald Trump were collected from this open [source](#). To avoid bias and focus on agenda's of each president in their tenure, we have chosen the 'Inaugural Address' and 'State of Union Address' speeches of all these presidents. The number of speeches chosen for each president might vary due to the number of years in their respective tenures.

The data was collected from each of the websites by using Selenium on Google Colab. Selenium is an umbrella project for a range of tools and libraries that enable and support the automation of web browsers. At the core of Selenium is WebDriver, an interface to write instruction sets that can be run interchangeably in many browsers. Selenium consists of many functional tools that enable a user to navigate and dynamically scrape data from web resources by using arguments like 'find_element_by_xpath', 'find_element_by_css_selector', etc to locate elements. We developed a python script that employs selenium to navigate through each link in a list of speeches for each president and

scrape the entire transcript. For clearly analysing a president's speech and to contrast the obtained results with another president, we have designed a user-input based architecture.

Text Sample Summary:

Input text used for summarization: What else to do? Write page numbers na in the table of contents. First assign page numbers to each page.

TranscripTranscript Thank you very much Thank you Thank you very much
 Madam Speaker Mr Vice President members of Congress the First Lady of the
 United States applause and my fellow citizens Three years ago we launched
 the great American comeback Tonight I stand before you to share the
 incredible results Jobs are booming incomes are soaring poverty is
 plummeting crime is falling confidence is surging and our country is
 thriving and highly respected again Applause America s enemies are on the
 run America s fortunes are on the rise and America s future is blazing
 bright The years of economic decay are over Applause The days of our
 country being used taken advantage of and even scorned by other nations
 are long behind us Applause Gone too are the broken promises jobless
 recoveries tired platitudes and constant excuses for the depletion of
 American wealth power and prestige In just three short years we have
 shattered the mentality of American decline and we have rejected the
 downsizing of America s destiny We have totally rejected the downsizing We
 are moving forward at a pace that was unimaginable just a short time ago
 and we are never ever going back Applause I am thrilled to report to you
 tonight that our economy is the best it has ever been Our military is
 completely rebuilt with its power being unmatched anywhere in the world
 and it s not even close Our borders are secure Our families are
 flourishing Our values are renewed Our pride is restored And for all of
 these reasons I say to the people of our great country and to the members
 of Congress The state of our Union is stronger than ever before Applause
 The vision I will lay out this evening demonstrates how we are building
 the world s most prosperous and inclusive society one where every citizen
 can join in America s unparalleled success and where every community can
 take part in America s extraordinary rise From the instant I took office I
 moved rapidly to revive the U S economy slashing a record number of job
 killing regulations enacting historic and record setting tax cuts and
 fighting for fair and reciprocal trade agreements Applause Our agenda is
 relentlessly pro worker pro family pro growth and most of all pro American
 Applause Thank you We are advancing with unbridled optimism and lifting
 our citizens of every race color religion and creed very very high Since
 my election we have created 7 million new jobs 5 million more than
 government experts projected during the previous administration Applause
 The unemployment rate is the lowest in over half a century Applause And
 very incredibly the average unemployment rate under my administration is

lower than any administration in the history of our country Applause True
 If we hadn't reversed the failed economic policies of the previous
 administration the world would not now be witnessing this great economic
 success Applause The unemployment rate for African Americans Hispanic
 Americans and Asian Americans has reached the lowest levels in history
 Applause African American youth unemployment has reached an all time low
 Applause African American poverty has declined to the lowest rate ever
 recorded Applause The unemployment rate for women reached the lowest level
 in almost 70 years And last year women filled 72 percent of all new jobs
 added Applause The veterans unemployment rate dropped to a record low
 Applause The unemployment rate for disabled Americans has reached an all
 time low Applause Workers without a high school diploma have achieved the
 lowest unemployment rate recorded in U S history Applause A record number
 of young Americans are now employed Applause Under the last administration
 more than 10 million people were added to the food stamp rolls Under my
 administration 7 million Americans have come off food stamps and 10
 million people have been lifted off of welfare Applause In eight years
 under the last administration over 300 000 working age people dropped out
 of the workforce In just three years of my administration 3 5 million
 people working age people have joined the workforce Applause Since my
 election the net worth of the bottom half of wage earners has increased by
 47 percent three times faster than the increase for the top 1 percent
 Applause After decades of flat and falling incomes wages are rising fast
 and wonderfully they are rising fastest for low income workers who have
 seen a 16 percent pay increase since my election Applause This is a blue
 collar boom Applause Real median household income is now at the highest
 level ever recorded Applause Since my election U S stock markets have
 soared 70 percent adding more than 12 trillion to our nation's wealth
 transcending anything anyone believed was possible This is a record It is
 something that every country in the world is looking up to They admire
 Applause Consumer confidence has just reached amazing new highs All of
 those millions of people with 401 k's and pensions are doing far better
 than they have ever done before with increases of 60 70 80 90 and 100
 percent and even more Jobs and investments are pouring into 9 000
 previously neglected neighborhoods thanks to Opportunity Zones a plan
 spearheaded by Senator Tim Scott as part of our great Republican tax cuts
 Applause In other words wealthy people and companies are pouring money
 into poor neighborhoods or areas that haven't seen investment in many
 decades creating jobs energy and excitement Applause This is the first
 time that these deserving communities have seen anything like this It's
 all working Opportunity Zones are helping Americans like Army veteran Tony
 Rankins from Cincinnati Ohio After struggling with drug addiction Tony
 lost his job his house and his family He was homeless But then Tony found
 a construction company that invests in Opportunity Zones He is now a top
 tradesman drug free reunited with his family and he is here tonight Tony
 keep up the great work Tony Applause Thank you Tony Our roaring economy
 has for the first time ever given many former prisoners the ability to get

a great job and a fresh start This second chance at life is made possible because we passed landmark criminal justice reform into law Everybody said that criminal justice reform couldn't be done but I got it done and the people in this room got it done Applause Thanks to our bold regulatory reduction campaign the United States has become the number one producer of oil and natural gas anywhere in the world by far Applause With the tremendous progress we have made over the past three years America is now energy independent and energy jobs like so many other elements of our country are at a record high Applause We are doing numbers that no one would have thought possible just three years ago Likewise we are restoring our nation's manufacturing might even though predictions were as you all know that this could never ever be done After losing 60 000 factories under the previous two administrations America has now gained 12 000 new factories under my administration with thousands upon thousands of plants and factories being planned or being built Applause Companies are not leaving they are coming back to the USA Applause The fact is that everybody wants to be where the action is and the United States of America is indeed the place where the action is Applause One of the biggest promises I made to the American people was to replace the disastrous NAFTA trade deal Applause In fact unfair trade is perhaps the single biggest reason that I decided to run for President Following NAFTA's adoption our nation lost one in four manufacturing jobs Many politicians came and went pledging to change or replace NAFTA only to do so and then absolutely nothing happened But unlike so many who came before me I keep my promises We did our job Applause Six days ago I replaced NAFTA and signed the brand new U S Mexico Canada Agreement into law The USMCA will create nearly 100 000 new high paying American auto jobs and massively boost exports for our farmers ranchers and factory workers Applause It will also bring trade with Mexico and Canada to a much higher level but also to be a much greater degree of fairness and reciprocity We will have that fairness and reciprocity And I say that finally because it's been many many years that we were treated fairly on trade Applause This is the first major trade deal in many years to earn the strong backing of America's labor unions Applause I also promised our citizens that I would impose tariffs to confront China's massive theft of America's jobs Our strategy has worked Days ago we signed the groundbreaking new agreement with China that will defend our workers protect our intellectual property bring billions and billions of dollars into our treasury and open vast new markets for products made and grown right here in the USA Applause For decades China has taken advantage of the United States Now we have changed that but at the same time we have perhaps the best relationship we've ever had with China including with President Xi They respect what we've done because quite frankly they could never really believe that they were able to get away with what they were doing year after year decade after decade without someone in our country stepping up and saying That's enough Applause Now we want to rebuild our country and that's exactly what we're doing We are rebuilding our country As we restore American leadership throughout the

world we are once again standing up for freedom in our hemisphere Applause
 That s why my administration reversed the failing policies of the previous
 administration on Cuba Applause We are supporting the hopes of Cubans
 Nicaraguans and Venezuelans to restore democracy The United States is
 leading a 59 nation diplomatic coalition against the socialist dictator of
 Venezuela Nicol s Maduro Applause Maduro is an illegitimate ruler a tyrant
 who brutalizes his people But Maduro s grip on tyranny will be smashed and
 broken Here this evening is a very brave man who carries with him the
 hopes dreams and aspirations of all Venezuelans Joining us in the Gallery
 is the true and legitimate President of Venezuela Juan Guaid Applause Mr
 President please take this message back to your homeland Applause Thank
 you Mr President Great honor Thank you very much Please take this message
 back that all Americans are united with the Venezuelan people in their
 righteous struggle for freedom Thank you very much Mr President Applause
 Thank you very much Socialism destroys nations But always remember Freedom
 unifies the soul Applause To safeguard American liberty we have invested a
 record breaking 2 2 trillion in the United States military Applause We
 have purchased the finest planes missiles rockets ships and every other
 form of military equipment and it s all made right here in the USA
 Applause We are also getting our allies finally to help pay their fair
 share Applause I have raised contributions from the other NATO members by
 more than 400 billion and the number of Allies meeting their minimum
 obligations has more than doubled And just weeks ago for the first time
 since President Truman established the Air Force more than 70 years
 earlier we created a brand new branch of the United States Armed Forces It
 s called the Space Force Applause Very important In the Gallery tonight we
 have a young gentleman And what he wants so badly 13 years old Iain
 Lanphier He s an eighth grader from Arizona Iain please stand up Iain has
 always dreamed of going to space He was the first in his class and among
 the youngest at an aviation academy He aspires to go to the Air Force
 Academy and then he has his eye on the Space Force As Iain says Most
 people look up at space I want to look down on the world Laughter and
 applause But sitting behind Iain tonight is his greatest hero of them all
 Charles McGee was born in Cleveland Ohio one century ago Charles is one of
 the last surviving Tuskegee Airmen the first black fighter pilots and he
 also happens to be Iain s great grandfather Applause Incredible story
 After more than 130 combat missions in World War Two he came back home to
 a country still struggling for civil rights and went on to serve America
 in Korea and Vietnam On December 7th Charles celebrated his 100th birthday
 Applause A few weeks ago I signed a bill promoting Charles McGee to
 Brigadier General And earlier today I pinned the stars on his shoulders in
 the Oval Office General McGee our nation salutes you Thank you sir
 Applause From the pilgrims to the Founders from the soldiers at Valley
 Forge to the marchers at Selma and from President Lincoln to the Reverend
 Martin Luther King Americans have always rejected limits on our children s
 future Members of Congress we must never forget that the only victories
 that matter in Washington are victories that deliver for the American

people Applause The people are the heart of our country their dreams are the soul of our country and their love is what powers and sustains our country We must always remember that our job is to put America first Applause The next step forward in building an inclusive society is making sure that every young American gets a great education and the opportunity to achieve the American Dream Yet for too long countless American children have been trapped in failing government schools To rescue these students 18 states have created school choice in the form of Opportunity Scholarships The programs are so popular that tens of thousands of students remain on a waiting list One of those students is Janiyah Davis a fourth grader from Philadelphia Janiyah Applause Janiyah s mom Stephanie is a single parent She would do anything to give her daughter a better future But last year that future was put further out of reach when Pennsylvania s governor vetoed legislation to expand school choice to 50 000 children Janiyah and Stephanie are in the Gallery Stephanie thank you so much for being here with your beautiful daughter Thank you very much Applause But Janiyah I have some good news for you because I am pleased to inform you that your long wait is over I can proudly announce tonight that an Opportunity Scholarship has become available it s going to you and you will soon be heading to the school of your choice Applause Now I call on Congress to give one million American children the same opportunity Janiyah has just received Pass the Education Freedom Scholarships and Opportunities Act because no parent should be forced to send their child to a failing government school Applause Every young person should have a safe and secure environment in which to learn and to grow For this reason our magnificent First Lady has launched the BE BEST initiative to advance a safe healthy supportive and drug free life for the next generation online in school and in our communities Thank you Melania for your extraordinary love and profound care for America s children Thank you very much Applause My administration is determined to give our citizens the opportunities they need regardless of age or background Through our Pledge to American Workers over 400 companies will also provide new jobs and education opportunities to almost 15 million Americans My budget also contains an exciting vision for our nation s high schools Tonight I ask Congress to support our students and back my plan to offer vocational and technical education in every single high school in America Applause To expand equal opportunity I am also proud that we achieved record and permanent funding for our nation s historically black colleges and universities Applause A good life for American families also requires the most affordable innovative and high quality healthcare system on Earth Before I took office health insurance premiums had more than doubled in just five years I moved quickly to provide affordable alternatives Our new plans are up to 60 percent less expensive and better Applause I ve also made an ironclad pledge to American families We will always protect patients with pre existing conditions Applause And we will always protect your Medicare and we will always protect your Social Security Always Applause The American patient should never be blindsided by medical bills

That is why I signed an executive order requiring price transparency Applause Many experts believe that transparency which will go into full effect at the beginning of next year will be even bigger than healthcare reform Applause It will save families massive amounts of money for substantially better care But as we work to improve Americans healthcare there are those who want to take away your healthcare take away your doctor and abolish private insurance entirely AUDIENCE Booo THE PRESIDENT One hundred thirty two lawmakers in this room have endorsed legislation to impose a socialist takeover of our healthcare system wiping out the private health insurance plans of 180 million very happy Americans To those watching at home tonight I want you to know We will never let socialism destroy American healthcare Applause Over 130 legislators in this chamber have endorsed legislation that would bankrupt our nation by providing free taxpayer funded healthcare to millions of illegal aliens forcing taxpayers to subsidize free care for anyone in the world who unlawfully crosses our borders These proposals would raid the Medicare benefits of our seniors and that our seniors depend on while acting as a powerful lure for illegal immigration That is what is happening in California and other states Their systems are totally out of control costing taxpayers vast and unaffordable amounts of money If forcing American taxpayers to provide unlimited free healthcare to illegal aliens sounds fair to you then stand with the radical left But if you believe that we should defend American patients and American seniors then stand with me and pass legislation to prohibit free government healthcare for illegal aliens Applause This will be a tremendous boon to our already very strongly guarded southern border where as we speak a long tall and very powerful wall is being built Applause We have now completed over 100 miles and have over 500 miles fully completed in a very short period of time Early next year we will have substantially more than 500 miles completed My administration is also taking on the big pharmaceutical companies We have approved a record number of affordable generic drugs and medicines are being approved by the FDA at a faster clip than ever before Applause And I was pleased to announce last year that for the first time in 51 years the cost of prescription drugs actually went down Applause And working together Congress can reduce drug prices substantially from current levels I ve been speaking to Senator Chuck Grassley of Iowa and others in Congress in order to get something on drug pricing done and done quickly and properly I m calling for bipartisan legislation that achieves the goal of dramatically lowering prescription drug prices Get a bill on my desk and I will sign it into law immediately Applause AUDIENCE H R 3 H R 3 H R 3 With unyielding commitment we are curbing the opioid epidemic Drug overdose deaths declined for the first time in nearly 30 years Applause Among the states hardest hit Ohio is down 22 percent Pennsylvania is down 18 percent Wisconsin is down 10 percent and we will not quit until we have beaten the opioid epidemic once and for all Applause Protecting Americans health also means fighting infectious diseases We are coordinating with the Chinese government and working closely together on

the coronavirus outbreak in China My administration will take all necessary steps to safeguard our citizens from this threat We have launched ambitious new initiatives to substantially improve care for Americans with kidney disease Alzheimer s and those struggling with mental health And because Congress was so good as to fund my request new cures for childhood cancer and we will eradicate the AIDS epidemic in America by the end of this decade Applause Almost every American family knows the pain when a loved one is diagnosed with a serious illness Here tonight is a special man beloved by millions of Americans who just received a Stage 4 advanced cancer diagnosis This is not good news but what is good news is that he is the greatest fighter and winner that you will ever meet Rush Limbaugh thank you for your decades of tireless devotion to our country Applause And Rush in recognition of all that you have done for our nation the millions of people a day that you speak to and that you inspire and all of the incredible work that you have done for charity I am proud to announce tonight that you will be receiving our country s highest civilian honor the Presidential Medal of Freedom Applause I will now ask the First Lady of the United States to present you with the honor Please Applause The Medal of Freedom is presented Applause Rush and Kathryn congratulations Thank you Kathryn As we pray for all who are sick we know that America is constantly achieving new medical breakthroughs In 2017 doctors at St Luke s Hospital in Kansas City delivered one of the earliest premature babies ever to survive Born at just 21 weeks and 6 days and weighing less than a pound Ellie Schneider was a born fighter Through the skill of her doctors and the prayers of her parents little Ellie kept on winning the battle of life Today Ellie is a strong healthy two year old girl sitting with her amazing mother Robin in the Gallery Ellie and Robin we are glad to have you with us tonight Applause Ellie reminds us that every child is a miracle of life And thanks to modern medical wonders 50 percent of very premature babies delivered at the hospital where Ellie was born now survive It s an incredible thing Thank you very much Applause Our goal should be to ensure that every baby has the best chance to thrive and grow just like Ellie That is why I m asking Congress to provide an additional 50 million to fund neonatal research for America s youngest patients Applause That is why I m also calling upon members of Congress here tonight to pass legislation finally banning the late term abortion of babies Applause Whether we are Republican Democrat or independent surely we must all agree that every human life is a sacred gift from God As we support America s moms and dads I was recently proud to sign the law providing new parents in the federal workforce paid family leave serving as a model for the rest of the country Applause Now I call on the Congress to pass the bipartisan Advancing Support for Working Families Act extending family leave to mothers and fathers all across our nation Applause Forty million American families have an average 2 200 extra thanks to our child tax credit Applause I ve also overseen historic funding increases for high quality child care enabling 17 states to help more children many of which have reduced or eliminated their waitlists

altogether Applause And I sent Congress a plan with a vision to further expand access to high quality child care and urge you to act immediately Applause To protect the environment days ago I announced that the United States will join the One Trillion Trees Initiative an ambitious effort to bring together government and private sector to plant new trees in America and all around the world Applause We must also rebuild America s infrastructure Applause I ask you to pass Senator John Barrasso s highway bill to invest in new roads bridges and tunnels all across our land I m also committed to ensuring that every citizen can have access to high speed Internet including and especially in rural America Applause A better tomorrow for all Americans also requires us to keep America safe That means supporting the men and women of law enforcement at every level including our nation s heroic ICE officers Applause Last year our brave ICE officers arrested more than 120 000 criminal aliens charged with nearly 10 000 burglaries 5 000 sexual assaults 45 000 violent assaults and 2 000 murders Tragically there are many cities in America where radical politicians have chosen to provide sanctuary for these criminal illegal aliens AUDIENCE Booo THE PRESIDENT In sanctuary cities local officials order police to release dangerous criminal aliens to prey upon the public instead of handing them over to ICE to be safely removed Just 29 days ago a criminal alien freed by the sanctuary city of New York was charged with the brutal rape and murder of a 92 year old woman The killer had been previously arrested for assault but under New York s sanctuary policies he was set free If the city had honored ICE s detainer request his victim would still be alive today The state of California passed an outrageous law declaring their whole state to be a sanctuary for criminal illegal immigrants a very terrible sanctuary with catastrophic results Here is just one tragic example In December 2018 California police detained an illegal alien with five prior arrests including convictions for robbery and assault But as required by California s Sanctuary Law local authorities released him Days later the criminal alien went on a gruesome spree of deadly violence He viciously shot one man going about his daily work He approached a woman sitting in her car and shot her in the arm and in the chest He walked into a convenience store and wildly fired his weapon He hijacked a truck and smashed into vehicles critically injuring innocent victims One of the victims is a terrible terrible situation died 51 year old American named Rocky Jones Rocky was at a gas station when this vile criminal fired eight bullets at him from close range murdering him in cold blood Rocky left behind a devoted family including his brothers who loved him more than anything else in the world One of his grieving brothers is here with us tonight Jody would you please stand Jody thank you Applause Jody our hearts weep for your loss and we will not rest until you have justice Senator Thom Tillis has introduced legislation to allow Americans like Jody to sue sanctuary cities and states when a loved one is hurt or killed as a result of these deadly practices Applause I ask Congress to pass the Justice for Victims of Sanctuary Cities Act immediately The United States of America should be a sanctuary for law

abiding Americans not criminal aliens Applause In the last three years ICE has arrested over 5 000 wicked human traffickers And I have signed nine pieces of legislation to stamp out the menace of human trafficking domestically and all around the globe My administration has undertaken an unprecedented effort to secure the southern border of the United States Applause Before I came into office if you showed up illegally on our southern border and were arrested you were simply released and allowed into our country never to be seen again My administration has ended catch and release Applause If you come illegally you will now be promptly removed from our country Applause Very importantly we entered into historic cooperation agreements with the governments of Mexico Honduras El Salvador and Guatemala As a result of our unprecedented efforts illegal crossings are down 75 percent since May dropping eight straight months in a row Applause And as the wall rapidly goes up drug seizures rise and the border crossings are down and going down very rapidly Last year I traveled to the border in Texas and met Chief Patrol Agent Raul Ortiz Over the last 24 months Agent Ortiz and his team have seized more than 200 000 pounds of poisonous narcotics arrested more than 3 000 human smugglers and rescued more than 2 000 migrants Days ago Agent Ortiz was promoted to Deputy Chief of Border Patrol and he joins us tonight Chief Ortiz please stand Applause A grateful nation thanks you and all of the heroes of Border Patrol and ICE Thank you very much Thank you Applause To build on these historic gains we are working on legislation to replace our outdated and randomized immigration system with one based on merit welcoming those who follow the rules contribute to our economy support themselves financially and uphold our values Applause With every action my administration is restoring the rule of law and reasserting the culture of American freedom Applause Working with Senate Majority Leader Mitch McConnell thank you Mitch and his colleagues in the Senate we have confirmed a record number of 187 new federal judges to uphold our Constitution as written This includes two brilliant new Supreme Court justices Neil Gorsuch and Brett Kavanaugh Thank you Applause And we have many in the pipeline Laughter and applause My administration is also defending religious liberty and that includes the constitutional right to pray in public schools Applause In America we don t punish prayer We don t tear down crosses We don t ban symbols of faith We don t muzzle preachers and pastors In America we celebrate faith we cherish religion we lift our voices in prayer and we raise our sights to the Glory of God Just as we believe in the First Amendment we also believe in another constitutional right that is under siege all across our country So long as I am President I will always protect your Second Amendment right to keep and bear arms Applause In reaffirming our heritage as a free nation we must remember that America has always been a frontier nation Now we must embrace the next frontier America s manifest destiny in the stars I am asking Congress to fully fund the Artemis program to ensure that the next man and the first woman on the Moon will be American astronauts using this as a launching pad to ensure that America is the first nation to plant its flag on Mars Applause My administration is also

strongly defending our national security and combating radical Islamic terrorism Applause Last week I announced a groundbreaking plan for peace between Israel and the Palestinians Recognizing that all past attempts have failed we must be determined and creative in order to stabilize the region and give millions of young people the chance to realize a better future Three years ago the barbarians of ISIS held over 20 000 square miles of territory in Iraq and Syria Today the ISIS territorial caliphate has been 100 percent destroyed and the founder and leader of ISIS the bloodthirsty killer known as al Baghdadi is dead Applause We are joined this evening by Carl and Marsha Mueller After graduating from college their beautiful daughter Kayla became a humanitarian aid worker She once wrote Some people find God in church Some people find God in nature Some people find God in love I find God in suffering I ve known for some time what my life s work is using my hands as tools to relieve suffering In 2013 while caring for suffering civilians in Syria Kayla was kidnapped tortured and enslaved by ISIS and kept as a prisoner of al Baghdadi himself After more than 500 horrifying days of captivity al Baghdadi murdered young beautiful Kayla She was just 26 years old On the night that U S Special Forces Operations ended al Baghdadi s miserable life the Chairman of the Joint Chiefs of Staff General Mark Milley received a call in the Situation Room He was told that the brave men of the elite Special Forces team that so perfectly carried out the operation had given their mission a name Task Force 8 14 It was a reference to a special day August 14th Kayla s birthday Carl and Marsha America s warriors never forgot Kayla and neither will we Thank you Applause Every day America s men and women in uniform demonstrate the infinite depth of love that dwells in the human heart One of these American heroes was Army Staff Sergeant Christopher Hake On his second deployment to Iraq in 2008 Sergeant Hake wrote a letter to his one year old son Gage I will be with you again he wrote to Gage I will teach you to ride your first bike build your first sand box watch you play sports and see you have kids also I love you son Take care of your mother I am always with you Daddy On Easter Sunday of 2008 Chris was out on patrol in Baghdad when his Bradley Fighting Vehicle was hit by a roadside bomb That night he made the ultimate sacrifice for our country Sergeant Hake now rests in eternal glory in Arlington and his wife Kelli is in the Gallery tonight joined by their son who is now a 13 year old and doing very very well To Kelli and Gage Chris will live in our hearts forever He is looking down on you now Thank you Applause Thank you very much Thank you both very much The terrorist responsible for killing Sergeant Hake was Qasem Soleimani who provided the deadly roadside bomb that took Chris s life Soleimani was the Iranian regime s most ruthless butcher a monster who murdered or wounded thousands of American service members in Iraq As the world s top terrorist Soleimani orchestrated the deaths of countless men women and children He directed the December assault and went on to assault U S forces in Iraq Was actively planning new attacks when we hit him very hard And that s why last month at my direction the U S military executed a flawless precision strike that

killed Soleimani and terminated his evil reign of terror forever Applause Our message to the terrorists is clear You will never escape American justice If you attack our citizens you forfeit your life Applause In recent months we have seen proud Iranians raise their voices against their oppressive rulers The Iranian regime must abandon its pursuit of nuclear weapons stop spreading terror death and destruction and start working for the good of its own people Because of our powerful sanctions the Iranian economy is doing very very poorly We can help them make a very good and short time recovery It can all go very quickly but perhaps they are too proud or too foolish to ask for that help We are here Let s see which road they choose It is totally up to them Applause As we defend American lives we are working to end America s wars in the Middle East In Afghanistan the determination and valor of our warfighters has allowed us to make tremendous progress and peace talks are now underway I am not looking to kill hundreds of thousands of people in Afghanistan many of them totally innocent It is also not our function to serve other nations as law enforcement agencies These are warfighters that we have the best in the world and they either want to fight to win or not fight at all We are working to finally end America s longest war and bring our troops back home Applause War places a heavy burden on our nation s extraordinary military families especially spouses like Amy Williams from Fort Bragg North Carolina and her two children six year old Elliana and three year old Rowan Amy works full time and volunteers countless hours helping other military families For the past seven months she has done it all while her husband Sergeant First Class Townsend Williams is in Afghanistan on his fourth deployment in the Middle East Amy s kids haven t seen their father s face in many months Amy your family s sacrifice makes it possible for all of our families to live in safety and in peace and we want to thank you Thank you Amy Applause But Amy there is one more thing Tonight we have a very special surprise I am thrilled to inform you that your husband is back from deployment He is here with us tonight and we couldn t keep him waiting any longer Applause AUDIENCE USA USA USA THE PRESIDENT Welcome home Sergeant Williams Thank you very much As the world bears witness tonight America is a land of heroes This is a place where greatness is born where destinies are forged and where legends come to life This is the home of Thomas Edison and Teddy Roosevelt of many great generals including Washington Pershing Patton and MacArthur This is the home of Abraham Lincoln Frederick Douglass Amelia Earhart Harriet Tubman the Wright Brothers Neil Armstrong and so many more This is the country where children learn names like Wyatt Earp Davy Crockett and Annie Oakley This is the place where the pilgrims landed at Plymouth and where Texas patriots made their last stand at the Alamo applause the beautiful beautiful Alamo The American nation was carved out of the vast frontier by the toughest strongest fiercest and most determined men and women ever to walk on the face of the Earth Our ancestors braved the unknown tamed the wilderness settled the Wild West lifted millions from poverty disease and hunger vanquished tyranny and fascism ushered the world to new heights of

science and medicine laid down the railroads dug out the canals raised up the skyscrapers And ladies and gentlemen our ancestors built the most exceptional republic ever to exist in all of human history and we are making it greater than ever before Applause This is our glorious and magnificent inheritance We are Americans We are pioneers We are the pathfinders We settled the New World we built the modern world and we changed history forever by embracing the eternal truth that everyone is made equal by the hand of Almighty God Applause America is the place where anything can happen America is the place where anyone can rise And here on this land on this soil on this continent the most incredible dreams come true This nation is our canvas and this country is our masterpiece We look at tomorrow and see unlimited frontiers just waiting to be explored Our brightest discoveries are not yet known Our most thrilling stories are not yet told Our grandest journeys are not yet made The American Age the American Epic the American adventure has only just begun Our spirit is still young the sun is still rising God s grace is still shining and my fellow Americans the best is yet to come Applause Thank you God Bless You And God Bless America Thank you very much Applause Thank you very much Thank you Thank you very much Madam Speaker Mr Vice President members of Congress the First Lady of the United States applause and my fellow citizens Three years ago we launched the great American comeback Tonight I stand before you to share the incredible results Jobs are booming incomes are soaring poverty is plummeting crime is falling confidence is surging and our country is thriving and highly respected again Applause America s enemies are on the run America s fortunes are on the rise and America s future is blazing bright The years of economic decay are over Applause The days of our country being used taken advantage of and even scorned by other nations are long behind us Applause Gone too are the broken promises jobless recoveries tired platitudes and constant excuses for the depletion of American wealth power and prestige In just three short years we have shattered the mentality of American decline and we have rejected the downsizing of America s destiny We have totally rejected the downsizing We are moving forward at a pace that was unimaginable just a short time ago and we are never ever going back Applause I am thrilled to report to you tonight that our economy is the best it has ever been Our military is completely rebuilt with its power being unmatched anywhere in the world and it s not even close Our borders are secure Our families are flourishing Our values are renewed Our pride is restored And for all of these reasons I say to the people of our great country and to the members of Congress The state of our Union is stronger than ever before Applause The vision I will lay out this evening demonstrates how we are building the world s most prosperous and inclusive society one where every citizen can join in America s unparalleled success and where every community can take part in America s extraordinary rise From the instant I took office I moved rapidly to revive the U S economy slashing a record number of job killing regulations enacting historic and record setting tax cuts and fighting for fair and reciprocal trade agreements Applause Our agenda is

relentlessly pro worker pro family pro growth and most of all pro American Applause Thank you We are advancing with unbridled optimism and lifting our citizens of every race color religion and creed very very high Since my election we have created 7 million new jobs 5 million more than government experts projected during the previous administration Applause The unemployment rate is the lowest in over half a century Applause And very incredibly the average unemployment rate under my administration is lower than any administration in the history of our country Applause True If we hadn't reversed the failed economic policies of the previous administration the world would not now be witnessing this great economic success Applause The unemployment rate for African Americans Hispanic Americans and Asian Americans has reached the lowest levels in history Applause African American youth unemployment has reached an all time low Applause African American poverty has declined to the lowest rate ever recorded Applause The unemployment rate for women reached the lowest level in almost 70 years And last year women filled 72 percent of all new jobs added Applause The veterans unemployment rate dropped to a record low Applause The unemployment rate for disabled Americans has reached an all time low Applause Workers without a high school diploma have achieved the lowest unemployment rate recorded in U S history Applause A record number of young Americans are now employed Applause Under the last administration more than 10 million people were added to the food stamp rolls Under my administration 7 million Americans have come off food stamps and 10 million people have been lifted off of welfare Applause In eight years under the last administration over 300 000 working age people dropped out of the workforce In just three years of my administration 3 5 million people working age people have joined the workforce Applause Since my election the net worth of the bottom half of wage earners has increased by 47 percent three times faster than the increase for the top 1 percent Applause After decades of flat and falling incomes wages are rising fast and wonderfully they are rising fastest for low income workers who have seen a 16 percent pay increase since my election Applause This is a blue collar boom Applause Real median household income is now at the highest level ever recorded Applause Since my election U S stock markets have soared 70 percent adding more than 12 trillion to our nation's wealth transcending anything anyone believed was possible This is a record It is something that every country in the world is looking up to They admire Applause Consumer confidence has just reached amazing new highs All of those millions of people with 401 k's and pensions are doing far better than they have ever done before with increases of 60 70 80 90 and 100 percent and even more Jobs and investments are pouring into 9 000 previously neglected neighborhoods thanks to Opportunity Zones a plan spearheaded by Senator Tim Scott as part of our great Republican tax cuts Applause In other words wealthy people and companies are pouring money into poor neighborhoods or areas that haven't seen investment in many decades creating jobs energy and excitement Applause This is the first time that these deserving communities have seen anything like this It is

all working Opportunity Zones are helping Americans like Army veteran Tony Rankins from Cincinnati Ohio After struggling with drug addiction Tony lost his job his house and his family He was homeless But then Tony found a construction company that invests in Opportunity Zones He is now a top tradesman drug free reunited with his family and he is here tonight Tony keep up the great work Tony Applause Thank you Tony Our roaring economy has for the first time ever given many former prisoners the ability to get a great job and a fresh start This second chance at life is made possible because we passed landmark criminal justice reform into law Everybody said that criminal justice reform couldn't be done but I got it done and the people in this room got it done Applause Thanks to our bold regulatory reduction campaign the United States has become the number one producer of oil and natural gas anywhere in the world by far Applause With the tremendous progress we have made over the past three years America is now energy independent and energy jobs like so many other elements of our country are at a record high Applause We are doing numbers that no one would have thought possible just three years ago Likewise we are restoring our nation's manufacturing might even though predictions were as you all know that this could never ever be done After losing 60 000 factories under the previous two administrations America has now gained 12 000 new factories under my administration with thousands upon thousands of plants and factories being planned or being built Applause Companies are not leaving they are coming back to the USA Applause The fact is that everybody wants to be where the action is and the United States of America is indeed the place where the action is Applause One of the biggest promises I made to the American people was to replace the disastrous NAFTA trade deal Applause In fact unfair trade is perhaps the single biggest reason that I decided to run for President Following NAFTA's adoption our nation lost one in four manufacturing jobs Many politicians came and went pledging to change or replace NAFTA only to do so and then absolutely nothing happened But unlike so many who came before me I keep my promises We did our job Applause Six days ago I replaced NAFTA and signed the brand new U S Mexico Canada Agreement into law The USMCA will create nearly 100 000 new high paying American auto jobs and massively boost exports for our farmers ranchers and factory workers Applause It will also bring trade with Mexico and Canada to a much higher level but also to be a much greater degree of fairness and reciprocity We will have that fairness and reciprocity And I say that finally because it's been many many years that we were treated fairly on trade Applause This is the first major trade deal in many years to earn the strong backing of America's labor unions Applause I also promised our citizens that I would impose tariffs to confront China's massive theft of America's jobs Our strategy has worked Days ago we signed the groundbreaking new agreement with China that will defend our workers protect our intellectual property bring billions and billions of dollars into our treasury and open vast new markets for products made and grown right here in the USA Applause For decades China has taken advantage of the United States Now we have changed that but at

the same time we have perhaps the best relationship we've ever had with China including with President Xi. They respect what we've done because quite frankly they could never really believe that they were able to get away with what they were doing year after year decade after decade without someone in our country stepping up and saying That's enough Applause Now we want to rebuild our country and that's exactly what we're doing We are rebuilding our country As we restore American leadership throughout the world we are once again standing up for freedom in our hemisphere Applause That's why my administration reversed the failing policies of the previous administration on Cuba Applause We are supporting the hopes of Cubans Nicaraguans and Venezuelans to restore democracy The United States is leading a 59 nation diplomatic coalition against the socialist dictator of Venezuela Nicol's Maduro Applause Maduro is an illegitimate ruler a tyrant who brutalizes his people But Maduro's grip on tyranny will be smashed and broken Here this evening is a very brave man who carries with him the hopes dreams and aspirations of all Venezuelans Joining us in the Gallery is the true and legitimate President of Venezuela Juan Guaid Applause Mr President please take this message back to your homeland Applause Thank you Mr President Great honor Thank you very much Please take this message back that all Americans are united with the Venezuelan people in their righteous struggle for freedom Thank you very much Mr President Applause Thank you very much Socialism destroys nations But always remember Freedom unifies the soul Applause To safeguard American liberty we have invested a record breaking 2.2 trillion in the United States military Applause We have purchased the finest planes missiles rockets ships and every other form of military equipment and it's all made right here in the USA Applause We are also getting our allies finally to help pay their fair share Applause I have raised contributions from the other NATO members by more than 400 billion and the number of Allies meeting their minimum obligations has more than doubled And just weeks ago for the first time since President Truman established the Air Force more than 70 years earlier we created a brand new branch of the United States Armed Forces It's called the Space Force Applause Very important In the Gallery tonight we have a young gentleman And what he wants so badly 13 years old Iain Lanphier He's an eighth grader from Arizona Iain please stand up Iain has always dreamed of going to space He was the first in his class and among the youngest at an aviation academy He aspires to go to the Air Force Academy and then he has his eye on the Space Force As Iain says Most people look up at space I want to look down on the world Laughter and applause But sitting behind Iain tonight is his greatest hero of them all Charles McGee was born in Cleveland Ohio one century ago Charles is one of the last surviving Tuskegee Airmen the first black fighter pilots and he also happens to be Iain's great grandfather Applause Incredible story After more than 130 combat missions in World War Two he came back home to a country still struggling for civil rights and went on to serve America in Korea and Vietnam On December 7th Charles celebrated his 100th birthday Applause A few weeks ago I signed a bill promoting Charles McGee to

Brigadier General And earlier today I pinned the stars on his shoulders in the Oval Office General McGee our nation salutes you Thank you sir Applause From the pilgrims to the Founders from the soldiers at Valley Forge to the marchers at Selma and from President Lincoln to the Reverend Martin Luther King Americans have always rejected limits on our children's future Members of Congress we must never forget that the only victories that matter in Washington are victories that deliver for the American people Applause The people are the heart of our country their dreams are the soul of our country and their love is what powers and sustains our country We must always remember that our job is to put America first Applause The next step forward in building an inclusive society is making sure that every young American gets a great education and the opportunity to achieve the American Dream Yet for too long countless American children have been trapped in failing government schools To rescue these students 18 states have created school choice in the form of Opportunity Scholarships The programs are so popular that tens of thousands of students remain on a waiting list One of those students is Janiyah Davis a fourth grader from Philadelphia Janiyah Applause Janiyah's mom Stephanie is a single parent She would do anything to give her daughter a better future But last year that future was put further out of reach when Pennsylvania's governor vetoed legislation to expand school choice to 50 000 children Janiyah and Stephanie are in the Gallery Stephanie thank you so much for being here with your beautiful daughter Thank you very much Applause But Janiyah I have some good news for you because I am pleased to inform you that your long wait is over I can proudly announce tonight that an Opportunity Scholarship has become available it's going to you and you will soon be heading to the school of your choice Applause Now I call on Congress to give one million American children the same opportunity Janiyah has just received Pass the Education Freedom Scholarships and Opportunities Act because no parent should be forced to send their child to a failing government school Applause Every young person should have a safe and secure environment in which to learn and to grow For this reason our magnificent First Lady has launched the BE BEST initiative to advance a safe healthy supportive and drug free life for the next generation online in school and in our communities Thank you Melania for your extraordinary love and profound care for America's children Thank you very much Applause My administration is determined to give our citizens the opportunities they need regardless of age or background Through our Pledge to American Workers over 400 companies will also provide new jobs and education opportunities to almost 15 million Americans My budget also contains an exciting vision for our nation's high schools Tonight I ask Congress to support our students and back my plan to offer vocational and technical education in every single high school in America Applause To expand equal opportunity I am also proud that we achieved record and permanent funding for our nation's historically black colleges and universities Applause A good life for American families also requires the most affordable innovative and high quality healthcare system on Earth

Before I took office health insurance premiums had more than doubled in just five years I moved quickly to provide affordable alternatives Our new plans are up to 60 percent less expensive and better Applause I ve also made an ironclad pledge to American families We will always protect patients with pre existing conditions Applause And we will always protect your Medicare and we will always protect your Social Security Always Applause The American patient should never be blindsided by medical bills That is why I signed an executive order requiring price transparency Applause Many experts believe that transparency which will go into full effect at the beginning of next year will be even bigger than healthcare reform Applause It will save families massive amounts of money for substantially better care But as we work to improve Americans healthcare there are those who want to take away your healthcare take away your doctor and abolish private insurance entirely AUDIENCE Booo THE PRESIDENT One hundred thirty two lawmakers in this room have endorsed legislation to impose a socialist takeover of our healthcare system wiping out the private health insurance plans of 180 million very happy Americans To those watching at home tonight I want you to know We will never let socialism destroy American healthcare Applause Over 130 legislators in this chamber have endorsed legislation that would bankrupt our nation by providing free taxpayer funded healthcare to millions of illegal aliens forcing taxpayers to subsidize free care for anyone in the world who unlawfully crosses our borders These proposals would raid the Medicare benefits of our seniors and that our seniors depend on while acting as a powerful lure for illegal immigration That is what is happening in California and other states Their systems are totally out of control costing taxpayers vast and unaffordable amounts of money If forcing American taxpayers to provide unlimited free healthcare to illegal aliens sounds fair to you then stand with the radical left But if you believe that we should defend American patients and American seniors then stand with me and pass legislation to prohibit free government healthcare for illegal aliens Applause This will be a tremendous boon to our already very strongly guarded southern border where as we speak a long tall and very powerful wall is being built Applause We have now completed over 100 miles and have over 500 miles fully completed in a very short period of time Early next year we will have substantially more than 500 miles completed My administration is also taking on the big pharmaceutical companies We have approved a record number of affordable generic drugs and medicines are being approved by the FDA at a faster clip than ever before Applause And I was pleased to announce last year that for the first time in 51 years the cost of prescription drugs actually went down Applause And working together Congress can reduce drug prices substantially from current levels I ve been speaking to Senator Chuck Grassley of Iowa and others in Congress in order to get something on drug pricing done and done quickly and properly I m calling for bipartisan legislation that achieves the goal of dramatically lowering prescription drug prices Get a bill on my desk and I will sign it into law immediately Applause AUDIENCE H R 3 H

R 3 H R 3 With unyielding commitment we are curbing the opioid epidemic Drug overdose deaths declined for the first time in nearly 30 years Applause Among the states hardest hit Ohio is down 22 percent Pennsylvania is down 18 percent Wisconsin is down 10 percent and we will not quit until we have beaten the opioid epidemic once and for all Applause Protecting Americans health also means fighting infectious diseases We are coordinating with the Chinese government and working closely together on the coronavirus outbreak in China My administration will take all necessary steps to safeguard our citizens from this threat We have launched ambitious new initiatives to substantially improve care for Americans with kidney disease Alzheimer s and those struggling with mental health And because Congress was so good as to fund my request new cures for childhood cancer and we will eradicate the AIDS epidemic in America by the end of this decade Applause Almost every American family knows the pain when a loved one is diagnosed with a serious illness Here tonight is a special man beloved by millions of Americans who just received a Stage 4 advanced cancer diagnosis This is not good news but what is good news is that he is the greatest fighter and winner that you will ever meet Rush Limbaugh thank you for your decades of tireless devotion to our country Applause And Rush in recognition of all that you have done for our nation the millions of people a day that you speak to and that you inspire and all of the incredible work that you have done for charity I am proud to announce tonight that you will be receiving our country s highest civilian honor the Presidential Medal of Freedom Applause I will now ask the First Lady of the United States to present you with the honor Please Applause The Medal of Freedom is presented Applause Rush and Kathryn congratulations Thank you Kathryn As we pray for all who are sick we know that America is constantly achieving new medical breakthroughs In 2017 doctors at St Luke s Hospital in Kansas City delivered one of the earliest premature babies ever to survive Born at just 21 weeks and 6 days and weighing less than a pound Ellie Schneider was a born fighter Through the skill of her doctors and the prayers of her parents little Ellie kept on winning the battle of life Today Ellie is a strong healthy two year old girl sitting with her amazing mother Robin in the Gallery Ellie and Robin we are glad to have you with us tonight Applause Ellie reminds us that every child is a miracle of life And thanks to modern medical wonders 50 percent of very premature babies delivered at the hospital where Ellie was born now survive It s an incredible thing Thank you very much Applause Our goal should be to ensure that every baby has the best chance to thrive and grow just like Ellie That is why I m asking Congress to provide an additional 50 million to fund neonatal research for America s youngest patients Applause That is why I m also calling upon members of Congress here tonight to pass legislation finally banning the late term abortion of babies Applause Whether we are Republican Democrat or independent surely we must all agree that every human life is a sacred gift from God As we support America s moms and dads I was recently proud to sign the law providing new parents in the federal workforce paid family leave serving

as a model for the rest of the country Applause Now I call on the Congress to pass the bipartisan Advancing Support for Working Families Act extending family leave to mothers and fathers all across our nation Applause Forty million American families have an average 2 200 extra thanks to our child tax credit Applause I've also overseen historic funding increases for high quality child care enabling 17 states to help more children many of which have reduced or eliminated their waitlists altogether Applause And I sent Congress a plan with a vision to further expand access to high quality child care and urge you to act immediately Applause To protect the environment days ago I announced that the United States will join the One Trillion Trees Initiative an ambitious effort to bring together government and private sector to plant new trees in America and all around the world Applause We must also rebuild America's infrastructure Applause I ask you to pass Senator John Barrasso's highway bill to invest in new roads bridges and tunnels all across our land I'm also committed to ensuring that every citizen can have access to high speed Internet including and especially in rural America Applause A better tomorrow for all Americans also requires us to keep America safe That means supporting the men and women of law enforcement at every level including our nation's heroic ICE officers Applause Last year our brave ICE officers arrested more than 120 000 criminal aliens charged with nearly 10 000 burglaries 5 000 sexual assaults 45 000 violent assaults and 2 000 murders Tragically there are many cities in America where radical politicians have chosen to provide sanctuary for these criminal illegal aliens AUDIENCE Booo THE PRESIDENT In sanctuary cities local officials order police to release dangerous criminal aliens to prey upon the public instead of handing them over to ICE to be safely removed Just 29 days ago a criminal alien freed by the sanctuary city of New York was charged with the brutal rape and murder of a 92 year old woman The killer had been previously arrested for assault but under New York's sanctuary policies he was set free If the city had honored ICE's detainer request his victim would still be alive today The state of California passed an outrageous law declaring their whole state to be a sanctuary for criminal illegal immigrants a very terrible sanctuary with catastrophic results Here is just one tragic example In December 2018 California police detained an illegal alien with five prior arrests including convictions for robbery and assault But as required by California's Sanctuary Law local authorities released him Days later the criminal alien went on a gruesome spree of deadly violence He viciously shot one man going about his daily work He approached a woman sitting in her car and shot her in the arm and in the chest He walked into a convenience store and wildly fired his weapon He hijacked a truck and smashed into vehicles critically injuring innocent victims One of the victims is a terrible terrible situation died 51 year old American named Rocky Jones Rocky was at a gas station when this vile criminal fired eight bullets at him from close range murdering him in cold blood Rocky left behind a devoted family including his brothers who loved him more than anything else in the world One of his

grieving brothers is here with us tonight Jody would you please stand Jody thank you Applause Jody our hearts weep for your loss and we will not rest until you have justice Senator Thom Tillis has introduced legislation to allow Americans like Jody to sue sanctuary cities and states when a loved one is hurt or killed as a result of these deadly practices Applause I ask Congress to pass the Justice for Victims of Sanctuary Cities Act immediately The United States of America should be a sanctuary for law abiding Americans not criminal aliens Applause In the last three years ICE has arrested over 5 000 wicked human traffickers And I have signed nine pieces of legislation to stamp out the menace of human trafficking domestically and all around the globe My administration has undertaken an unprecedented effort to secure the southern border of the United States Applause Before I came into office if you showed up illegally on our southern border and were arrested you were simply released and allowed into our country never to be seen again My administration has ended catch and release Applause If you come illegally you will now be promptly removed from our country Applause Very importantly we entered into historic cooperation agreements with the governments of Mexico Honduras El Salvador and Guatemala As a result of our unprecedented efforts illegal crossings are down 75 percent since May dropping eight straight months in a row Applause And as the wall rapidly goes up drug seizures rise and the border crossings are down and going down very rapidly Last year I traveled to the border in Texas and met Chief Patrol Agent Raul Ortiz Over the last 24 months Agent Ortiz and his team have seized more than 200 000 pounds of poisonous narcotics arrested more than 3 000 human smugglers and rescued more than 2 000 migrants Days ago Agent Ortiz was promoted to Deputy Chief of Border Patrol and he joins us tonight Chief Ortiz please stand Applause A grateful nation thanks you and all of the heroes of Border Patrol and ICE Thank you very much Thank you Applause To build on these historic gains we are working on legislation to replace our outdated and randomized immigration system with one based on merit welcoming those who follow the rules contribute to our economy support themselves financially and uphold our values Applause With every action my administration is restoring the rule of law and reasserting the culture of American freedom Applause Working with Senate Majority Leader Mitch McConnell thank you Mitch and his colleagues in the Senate we have confirmed a record number of 187 new federal judges to uphold our Constitution as written This includes two brilliant new Supreme Court justices Neil Gorsuch and Brett Kavanaugh Thank you Applause And we have many in the pipeline Laughter and applause My administration is also defending religious liberty and that includes the constitutional right to pray in public schools Applause In America we don't punish prayer We don't tear down crosses We don't ban symbols of faith We don't muzzle preachers and pastors In America we celebrate faith we cherish religion we lift our voices in prayer and we raise our sights to the Glory of God Just as we believe in the First Amendment we also believe in another constitutional right that is under siege all across our country So long as I am President I will always protect your Second

Amendment right to keep and bear arms Applause In reaffirming our heritage as a free nation we must remember that America has always been a frontier nation Now we must embrace the next frontier America s manifest destiny in the stars I am asking Congress to fully fund the Artemis program to ensure that the next man and the first woman on the Moon will be American astronauts using this as a launching pad to ensure that America is the first nation to plant its flag on Mars Applause My administration is also strongly defending our national security and combating radical Islamic terrorism Applause Last week I announced a groundbreaking plan for peace between Israel and the Palestinians Recognizing that all past attempts have failed we must be determined and creative in order to stabilize the region and give millions of young people the chance to realize a better future Three years ago the barbarians of ISIS held over 20 000 square miles of territory in Iraq and Syria Today the ISIS territorial caliphate has been 100 percent destroyed and the founder and leader of ISIS the bloodthirsty killer known as al Baghdadi is dead Applause We are joined this evening by Carl and Marsha Mueller After graduating from college their beautiful daughter Kayla became a humanitarian aid worker She once wrote Some people find God in church Some people find God in nature Some people find God in love I find God in suffering I ve known for some time what my life s work is using my hands as tools to relieve suffering In 2013 while caring for suffering civilians in Syria Kayla was kidnapped tortured and enslaved by ISIS and kept as a prisoner of al Baghdadi himself After more than 500 horrifying days of captivity al Baghdadi murdered young beautiful Kayla She was just 26 years old On the night that U S Special Forces Operations ended al Baghdadi s miserable life the Chairman of the Joint Chiefs of Staff General Mark Milley received a call in the Situation Room He was told that the brave men of the elite Special Forces team that so perfectly carried out the operation had given their mission a name Task Force 8 14 It was a reference to a special day August 14th Kayla s birthday Carl and Marsha America s warriors never forgot Kayla and neither will we Thank you Applause Every day America s men and women in uniform demonstrate the infinite depth of love that dwells in the human heart One of these American heroes was Army Staff Sergeant Christopher Hake On his second deployment to Iraq in 2008 Sergeant Hake wrote a letter to his one year old son Gage I will be with you again he wrote to Gage I will teach you to ride your first bike build your first sand box watch you play sports and see you have kids also I love you son Take care of your mother I am always with you Daddy On Easter Sunday of 2008 Chris was out on patrol in Baghdad when his Bradley Fighting Vehicle was hit by a roadside bomb That night he made the ultimate sacrifice for our country Sergeant Hake now rests in eternal glory in Arlington and his wife Kelli is in the Gallery tonight joined by their son who is now a 13 year old and doing very very well To Kelli and Gage Chris will live in our hearts forever He is looking down on you now Thank you Applause Thank you very much Thank you both very much The terrorist responsible for killing Sergeant Hake was Qasem Soleimani who provided the deadly roadside bomb

that took Chris's life. Soleimani was the Iranian regime's most ruthless butcher, a monster who murdered or wounded thousands of American service members in Iraq. As the world's top terrorist, Soleimani orchestrated the deaths of countless men, women, and children. He directed the December assault and went on to assault U.S. forces in Iraq. Was actively planning new attacks when we hit him very hard. And that's why last month, at my direction, the U.S. military executed a flawless precision strike that killed Soleimani and terminated his evil reign of terror forever. Applause. Our message to the terrorists is clear: You will never escape American justice. If you attack our citizens, you forfeit your life. Applause. In recent months, we have seen proud Iranians raise their voices against their oppressive rulers. The Iranian regime must abandon its pursuit of nuclear weapons, stop spreading terror, death, and destruction, and start working for the good of its own people. Because of our powerful sanctions, the Iranian economy is doing very, very poorly. We can help them make a very good and short time recovery. It can all go very quickly, but perhaps they are too proud or too foolish to ask for that help. We are here. Let's see which road they choose. It is totally up to them. Applause. As we defend American lives, we are working to end America's wars in the Middle East. In Afghanistan, the determination and valor of our warfighters has allowed us to make tremendous progress, and peace talks are now underway. I am not looking to kill hundreds of thousands of people in Afghanistan; many of them are totally innocent. It is also not our function to serve other nations as law enforcement agencies. These are warfighters that we have the best in the world, and they either want to fight to win or not fight at all. We are working to finally end America's longest war and bring our troops back home. Applause. War places a heavy burden on our nation's extraordinary military families, especially spouses like Amy Williams from Fort Bragg, North Carolina, and her two children, six-year-old Elliana and three-year-old Rowan. Amy works full time and volunteers countless hours helping other military families. For the past seven months, she has done it all while her husband, Sergeant First Class Townsend Williams, is in Afghanistan on his fourth deployment in the Middle East. Amy's kids haven't seen their father's face in many months. Amy, your family's sacrifice makes it possible for all of our families to live in safety and in peace, and we want to thank you. Thank you, Amy. Applause. But Amy, there is one more thing. Tonight, we have a very special surprise. I am thrilled to inform you that your husband is back from deployment. He is here with us tonight, and we couldn't keep him waiting any longer. Applause. AUDIENCE: USA, USA, USA. THE PRESIDENT: Welcome home, Sergeant Williams. Thank you very much. As the world bears witness tonight, America is a land of heroes. This is a place where greatness is born, where destinies are forged, and where legends come to life. This is the home of Thomas Edison and Teddy Roosevelt, of many great generals including Washington, Pershing, Patton, and MacArthur. This is the home of Abraham Lincoln, Frederick Douglass, Amelia Earhart, Harriet Tubman, the Wright Brothers, Neil Armstrong, and so many more. This is the country where children learn names like Wyatt Earp, Davy Crockett, and Annie Oakley. This

is the place where the pilgrims landed at Plymouth and where Texas patriots made their last stand at the Alamo applause the beautiful beautiful Alamo The American nation was carved out of the vast frontier by the toughest strongest fiercest and most determined men and women ever to walk on the face of the Earth Our ancestors braved the unknown tamed the wilderness settled the Wild West lifted millions from poverty disease and hunger vanquished tyranny and fascism ushered the world to new heights of science and medicine laid down the railroads dug out the canals raised up the skyscrapers And ladies and gentlemen our ancestors built the most exceptional republic ever to exist in all of human history and we are making it greater than ever before Applause This is our glorious and magnificent inheritance We are Americans We are pioneers We are the pathfinders We settled the New World we built the modern world and we changed history forever by embracing the eternal truth that everyone is made equal by the hand of Almighty God Applause America is the place where anything can happen America is the place where anyone can rise And here on this land on this soil on this continent the most incredible dreams come true This nation is our canvas and this country is our masterpiece We look at tomorrow and see unlimited frontiers just waiting to be explored Our brightest discoveries are not yet known Our most thrilling stories are not yet told Our grandest journeys are not yet made The American Age the American Epic the American adventure has only just begun Our spirit is still young the sun is still rising God s grace is still shining and my fellow Americans the best is yet to come Applause Thank you God Bless You And God Bless America Thank you very much Applause

Summarized output: We were able to reduce the original text of 13,084 words by 98 % to 200 words,

Thank you very much. Tonight, I stand before you to share the incredible results. Jobs are booming, incomes are soaring, poverty is plummeting, crime is falling, confidence is surging, and our country is thriving and highly respected again. (Applause.) America's enemies are on the run, America's fortunes are on the rise, and America's future is blazing bright. The years of economic decay are over. Madam Speaker, Mr. Vice President, members of Congress, the First Lady of the United States-(applause)-and my fellow citizens: Three years ago, we launched the great American comeback. (Applause.) The days of our country being used, taken advantage of, and even scorned by other nations are long behind us. (Applause.)

Exploratory Data Analysis

What is Text Analytics ?

Text analytics is the automated process of translating large volumes of unstructured text into quantitative data to uncover insights, trends, and patterns. It is the methodology and process followed to derive quality and actionable information and insights from textual data. In text-analytics, statistical and machine learning algorithms are primarily used to (1) classify, cluster, and summarize information, (2) to perform sentiment analysis, entity extraction and recognition, as well as similarity analysis and relation modeling.

Data Cleaning

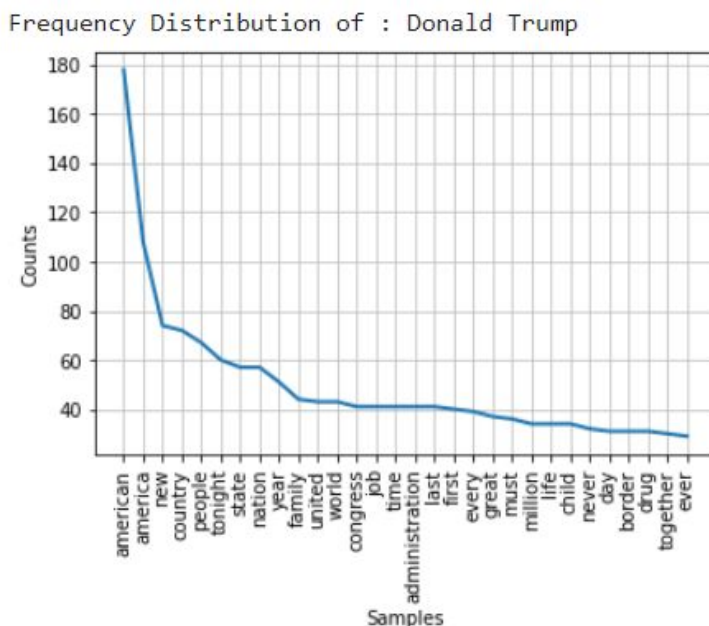
In order to obtain accurate and consistent results, it is important to thoroughly clean and format the text data before we begin our text analytics.

- We first remove all emails, new line characters and single quotes from our scraped text using regular expressions.
- Next, we format all the text into lowercase for our next phase in data cleaning i.e; word tokenizing and removing stopwords. A token is an instance of a sequence of characters in some particular document that are grouped together as a useful semantic unit for processing ^[4].
- Now the filtered speech consisting of cleaned tokens is Lemmatized using the WordNetLemmatizer from the 'nltk' library. Lemmatization refers to morphological analysis of words, normally aiming to remove inflectional endings only and to return the base or dictionary form of a word, which is known as the lemma . If confronted with the token 'saw', lemmatization would attempt to return either 'see' or 'saw' depending on whether the use of the token was as a verb or a noun ^[5].

Word Frequency Distribution

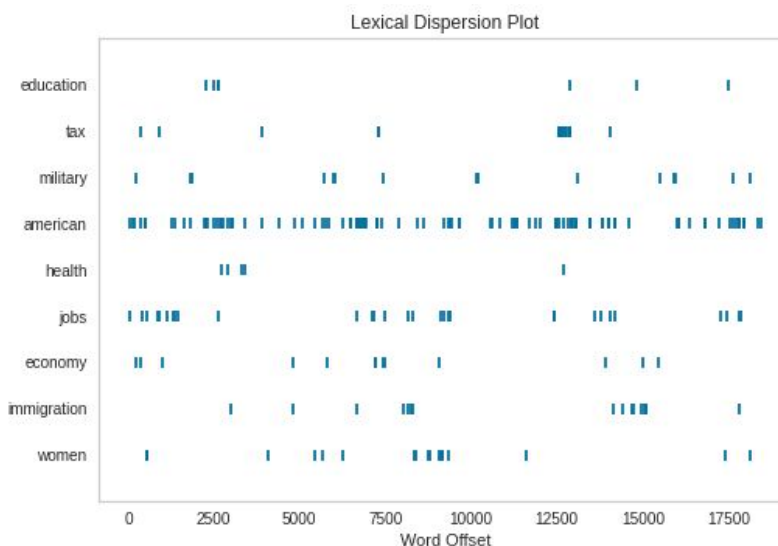
After tokenizing a text, the first figure we can calculate is the word frequency. By word frequency we indicate the number of times each token occurs in a text. It is important to look at the word frequency, as one could have a perceived idea of which words were used extensively in a speech and can deduce what the speech is about.

The following is the word frequency distribution plot for one of President Donald Trump's speeches using the 'FreqDist' function from the 'nltk.probability' library:



Lexical Dispersion Plot

The ‘Yellowbrick’ library in Python allows visualizing the word dispersion in a corpus or text under study. Below is a lexical dispersion plot that shows how many times a particular word appears in a corpus from beginning to end and at what density. The target words we chose to analyze for each of our president’s are **education**, **tax**, **military**, **american**, **health**, **jobs**, **economy**, **immigration** and **women**.



The above Lexical Plot is based on user-defined target words to analyze the word frequencies. Though one could plot a similar visualization for all the word occurrences, it would become increasingly difficult for a user to observe occurrences and density of each word. The next visualization is an effective way to portray the occurrences of all words in a text corpus.

A few keywords obtained for overall significance on the main subject for president Trump's reference speech:

```
america,news,national,country,million new,year ago launched great
american,world,force,child, border secure family
```

A few keywords and their scores obtained for weighted significance using the **mz_keywords()** function with key topics, with a threshold value of 0.001(filters out values having lesser scores) are:

```
('job', 0.006334634237987257),
('sanctuary', 0.005702006685392069),
('healthcare', 0.0050546214095650915),
('rate', 0.00440494512590107),
('unemployment', 0.00440494512590107),
('people', 0.004355471379502612),
('child', 0.004249898593063444),
('american', 0.004053759429355293),
('year', 0.00399053738747906),
('administration', 0.0038934945044937787)
```

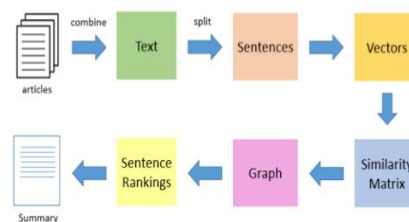
We have obtained keywords in our text and also know which keywords contribute significantly to the context of the speech through the weighted significance model. Keywords do provide a powerful insight into the topic of discussion in a speech. But knowing what phrases in the text contributed significantly gives a better understanding of the context of a speaker.

Text Rank

TextRank is used for extractive text summarization. It is based on PageRank as the first search-ordering algorithm used by Google to order search results. It works on the principle of ranking pages based on the total number of other pages referring to a given page. With TextRank, the text units (most likely sentences) are ranked by similarity to a given sentence.

The TextRank algorithm works as follows:

1. Reads and extracts text from documents.
2. Splits text into sentences.
3. Converts sentences into vectors.
4. Converts each word in a sentence into a vector.
5. Finds the vector for the entire sentence – one approach would be averaging the word vectors.
6. Calculates a similarity matrix among sentences. This is a matrix that measures how similar sentences are to each other.
7. Creates a graph from the similarity matrix.
8. Ranks the sentences by graph importance.
9. Selects the top sentences by graph importance.



The ‘pytextrank’ module is a python implementation of TextRank as a ‘spacy’ pipeline extension to extract top-ranked phrases from a text. The results obtained from the text ranking are as follows:

Rank	Count	Text
0.0488	3	many many years
0.0482	4	american families
0.0459	53	america
0.0449	1	american lives
0.0448	1	god bless america
0.0445	1	american auto jobs
0.0442	1	american healthcare
0.0440	3	new jobs
0.0439	2	marsha america
0.0428	7	last year
0.0426	1	rural america
0.0424	1	american taxpayers
0.0422	1	american justice
0.0418	2	american patients
0.0417	1	american freedom

Topic Modeling

Topic Modelling is the task of using unsupervised learning to extract the main topics (represented as a set of words) that occur in a collection of documents.^[3] Topic modeling can be performed using two algorithms:

Non-negative Matrix Factorization(NMF)

NMF has been widely used as a clustering method especially for document data, and as a topic modeling method. NMF can also be used for dimensionality reduction, source separation, or topic extraction using sklearn’s ‘decomposition’ class. NMF can be applied to topic modeling, where the input is term-document matrix--typically normalized TF-IDF. The goal of NMF is to find two non-negative matrices (W, H) whose product approximates the nonnegative matrix X. NMF has two main advantages when compared to LDA: 1)There are completely deterministic algorithms for its resolution. 2)NMF allows for easier tuning and manipulation of its parameters.

The topics obtained by employing the NMF model(n_components= 20) are as follows:

```

Topic 1:
growth,people,defense,help,budget,life,tonight,day,economic,america
Topic 2:
freedom,people,spending,hope,growth,economic,day,child,tonight,american
Topic 3:
president,time,world,let,economic,great,american,people,day,government

```

Topic 4:
 freedom, deficit, defense, help, hope, budget, life, child, tonight, people

Topic 5:
 american, opportunity, deficit, growth, defense, life, day, economic, free, let

Topic 6:
 president, time, world, government, deficit, great, rate, help, free, freedom

Topic 7: job, soviet, freedom, world, spending, life, help, child, free, year

Topic 8: rate, spending, life, growth, hope, defense, day, child, tonight, world

Topic 9:
 spending, deficit, day, hope, growth, defense, life, economic, tonight, time

Topic 10:
 reform, million, today, great, deficit, growth, day, tonight, free, family

Topic 11:
 opportunity, economy, rate, spending, growth, economic, tonight, day, child, federal

Topic 12:
 soviet, president, economy, hope, spending, growth, day, tonight, economic, tax

Topic 13: government, new, american, state, reform, tax, great, day, economic, work

Topic 14:
 god, opportunity, program, soviet, growth, spending, economic, tonight, child, congress

Topic 15:
 state, congress, work, president, national, great, opportunity, day, defense, nation

Topic 16:
 opportunity, hope, spending, help, growth, deficit, life, free, tonight, state

Topic 17: opportunity, history, job, help, rate, hope, defense, budget, child, new

Topic 18: ago, today, history, economy, growth, spending, help, hope, child, future

Topic 19:
 government, freedom, national, reform, today, soviet, great, budget, economic, peace

Topic 20:
 opportunity, president, rate, deficit, growth, defense, day, free, budget, program

As NMF is a deterministic model, we don't have a way to modify the probabilities to see how the key terms vary within each topic. For better Topic coherence, we can try a probabilistic model like LDA.

Latent Dirichlet Allocation (LDA)

Latent Dirichlet Allocation (LDA) is a generative probabilistic model of a corpus. The basic idea is that documents are represented as random mixtures over latent topics, where each topic is characterized by a distribution over words. It is a particularly popular method for fitting a topic model. It treats each document as a mixture of topics, and each topic as a mixture of words. This allows documents to “overlap” each other in terms of content, rather than being separated into discrete groups, in a way that mirrors the typical use of a natural language. The probabilistic topic model estimated by LDA consists of two tables (matrices):

- The first table describes the probability or chance of selecting a specific part when sampling a particular topic (category).
- The second table describes the chance of selecting a specific topic when sampling a particular document or composite.

There are two hyperparameters required in LDA:

- The alpha controls the mixture of topics for any given document. Turn it down, and the documents will likely have less of a mixture of topics. Turn it up, and the documents will likely have more of a mixture of topics.
- The beta hyperparameter controls the distribution of words per topic. Turn it down, and the topics will likely have fewer words. Turn it up, and the topics will likely have more words.

Ideally, we want our composites to be made up of only a few topics and our parts to belong to only some of the topics. Usually, alpha and beta are typically set below 1.

To find the best LDA model, we created a ‘Pipeline’ containing the TfidfVectorizer and the LDA model in it. We then employed ‘GridSearchCV’ to iterate through a list of parameter options(decay_rate, n_components) and cross validate our model by performing several permutations and combinations to obtain the best ‘Log Likelihood Score’ and ‘Perplexity Score’. Log Likelihood value is a measure of goodness of fit for any model. Higher the value, better is the model. Perplexity in language modeling usually refers to how well can the model predict the next word, not part of the training set. Hence, a lower perplexity score implies an accurate model.

Hence, ideally, we want a higher Log-Likelihood score and a low perplexity score.

Number Of Topics	Perplexity Score
0	10
1	15
2	20
3	25
4	30
5	35

Best Log Likelihood Score: -4528.304797837314

Best Parameters: {'cv__max_features': 50, 'cv__min_df': 1, 'lda__learning_decay': 0.7, 'lda__learning_method': 'online', 'lda__n_components': 10, 'lda__n_jobs': -1}

After finding the best parameters for the LDA model and substituting them, we obtain the following topics:

Topic #0:

america family ago tax government today rate growth spending american
people life million world dream child new free future billion

Topic #1:

great opportunity god job agreement tax government today rate growth
 spending life american people million world dream new child free

Topic #2:

federal congress budget deficit history billion work tax rate government
 today spending growth people american life million world dream new

Topic #3:

new future free child defense dream reform peace time tax government today
 rate growth spending life american people million world

Topic #4:

let president tax government today rate growth spending american people
 life million world dream new child free billion future defense

Topic #5:

year nation economy america tax government rate today growth spending life
 people american million world dream child new future free

Topic #6:

state work peace day future tax government today rate growth spending
 people life american million world dream new child free

Topic #7:

time economic hope soviet national work tax rate government today growth
 spending people american life million world dream new child

Topic #8:

government american people world tax life growth spending rate today
 million dream child new deficit free future defense reform history

Topic #9:

freedom program help tonight year tax rate government today growth
 spending people life american million world dream new child free

By comparing the results of topics obtained from NMF and LDA, it is clear that our GridSearchCV did a fantastic job of clustering the given text into appropriate topics.

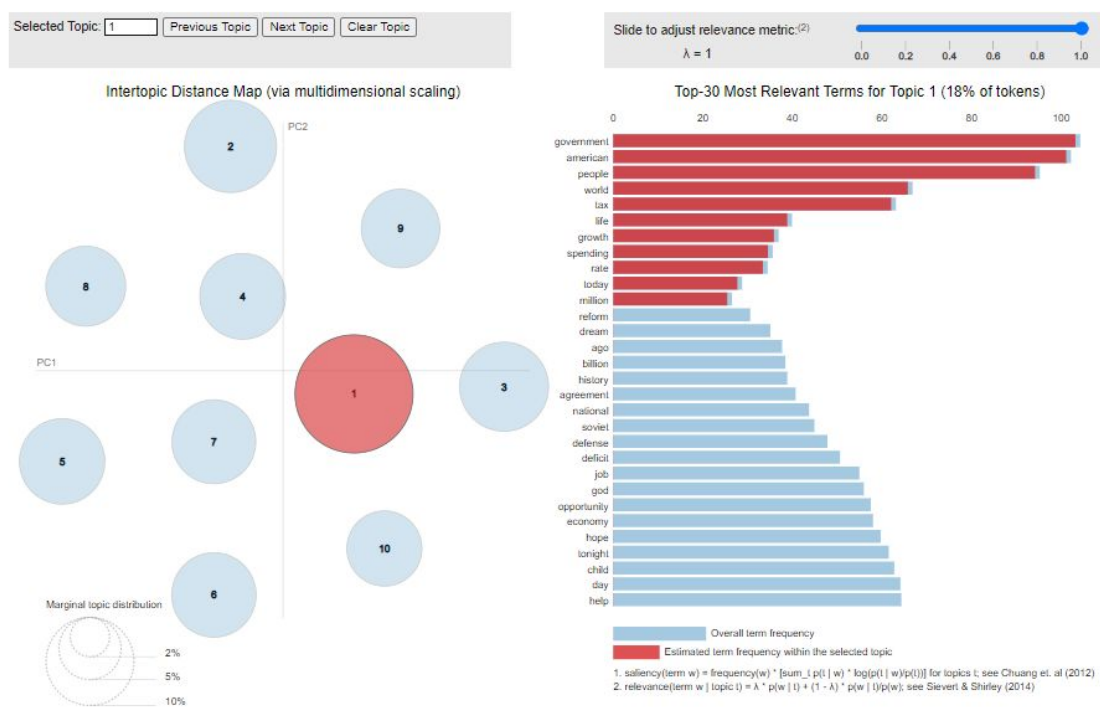
Most Dominant Topic:

Using the current LDA model, we have found the most dominant topic in each of the 9 speech documents. From the results obtained, 'Topic 0' was found to be the most dominant topic.

	Topic0	Topic1	Topic2	Topic3	Topic4	Topic5	Topic6	Topic7	Topic8	Topic9	dominant_topic
Doc0	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc1	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc2	0.050000	0.050000	0.050000	0.050000	0.550000	0.050000	0.050000	0.050000	0.050000	0.050000	4
Doc3	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc4	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc5	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc6	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc7	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc8	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0
Doc9	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0.100000	0

PYLDA visualization for Topic Modeling:

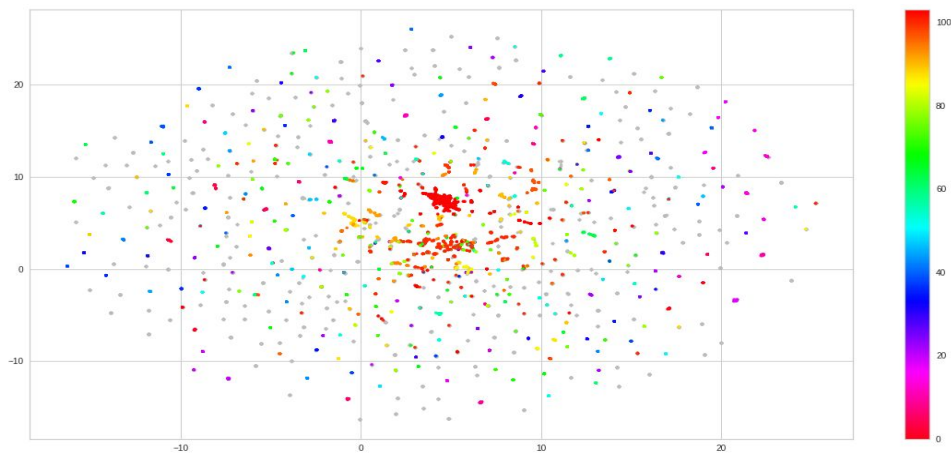
The pyLDavis visualization provides a global view of the topics (and how they differ from each other), while at the same time allowing for a deep inspection of the terms most highly associated with each individual topic [8].



The numbered circles represent the Topic numbers. In the above plot, the selected Topic is #1. The blue bars represent the “Overall word Frequency” in the corpus and the red bars indicate the frequency of respective words in that particular topic. The ‘ λ ’ slider allows to rank the terms according to term relevance. By default, the terms of a topic are ranked in decreasing order according to their topic-specific probability ($\lambda = 1$). Moving the slider allows to adjust the rank of terms based on how discriminatory (or "relevant") they are for the specific topic [9]. The uniqueness of pyLDavis lies in the fact that it is a probabilistic model with increased probability of predicting a word pertaining to a topic. It portrays whether the data is homogeneous/ if the data consists of a spectrum of topics.

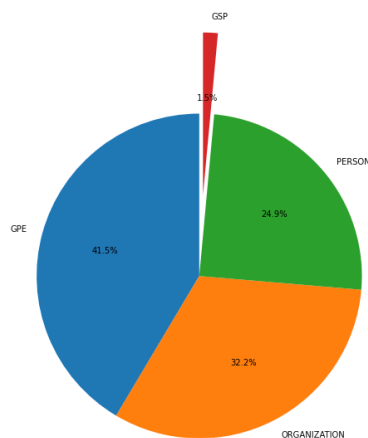
HDBSCAN Clustering

HDBSCAN - Hierarchical Density-Based Spatial Clustering of Applications with Noise. Performs DBSCAN over varying epsilon values and integrates the result to find a clustering that gives the best stability over epsilon.[11] This allows HDBSCAN to find clusters of varying densities (unlike DBSCAN), and be more robust to parameter selection.[11] In practice this means that HDBSCAN returns a good clustering straight away with little or no parameter tuning -- and the primary parameter, minimum cluster size, is intuitive and easy to select. HDBSCAN is ideal for exploratory data analysis; it's a fast and robust algorithm that you can trust to return meaningful clusters (if there are any).[11] As the HDBSCAN gives out the clusters, we also implemented the algorithm to see the clusters and the output is as follows:



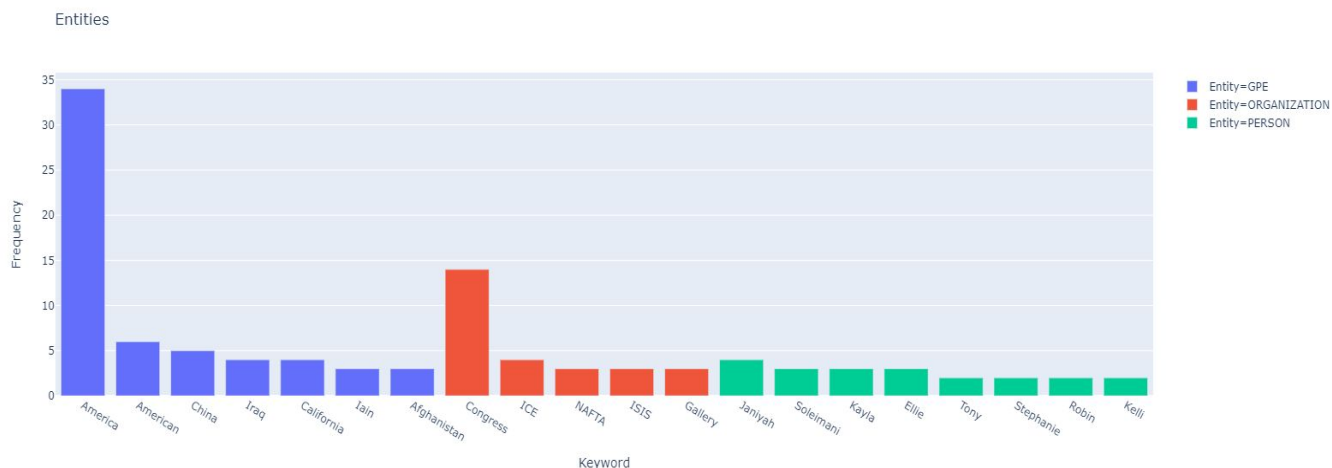
Named-Entity Recognition

Named Entity Recognition (NER), also known as entity chunking/extraction, is a popular technique used in information extraction to identify and segment the named entities and classify or categorize them under various predefined classes ^[10].



The above pie chart represents the distribution of entities in the reference speech text. Here, GPE refers to a Geographic-Political Entity and GSP refers to a Geographic-Social-Political Entity. From the

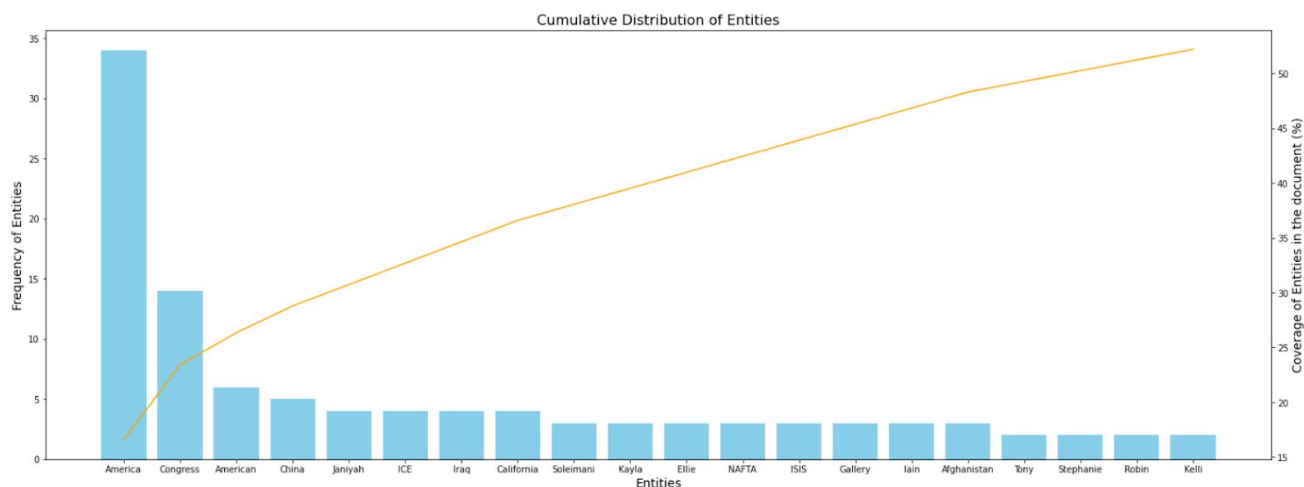
visualization, we can infer that President Trump's speech contained major chunks of organization, person names and GPE's.



A bar-graph representing the distribution of entities, color-coded on type of entity.

Pareto Diagram

A Pareto chart is a bar graph. The lengths of the bars represent frequency and are arranged with longest bars on the left and the shortest to the right. In this way the chart visually depicts which situations are more significant ^[12].



The yellow line graph represents the percentage of each entity in the entire document. Cumulatively, it represents the percentage of these entities in the entire document. For example, the entity 'America' had 35 occurrences in the document(left y-axis) but constituted only 15%(right y-axis) of the entire document. Overall, the entities selected here constitute about 50 % of the entire document. From this visualization, we can see the weightages of each entity to the entire document.

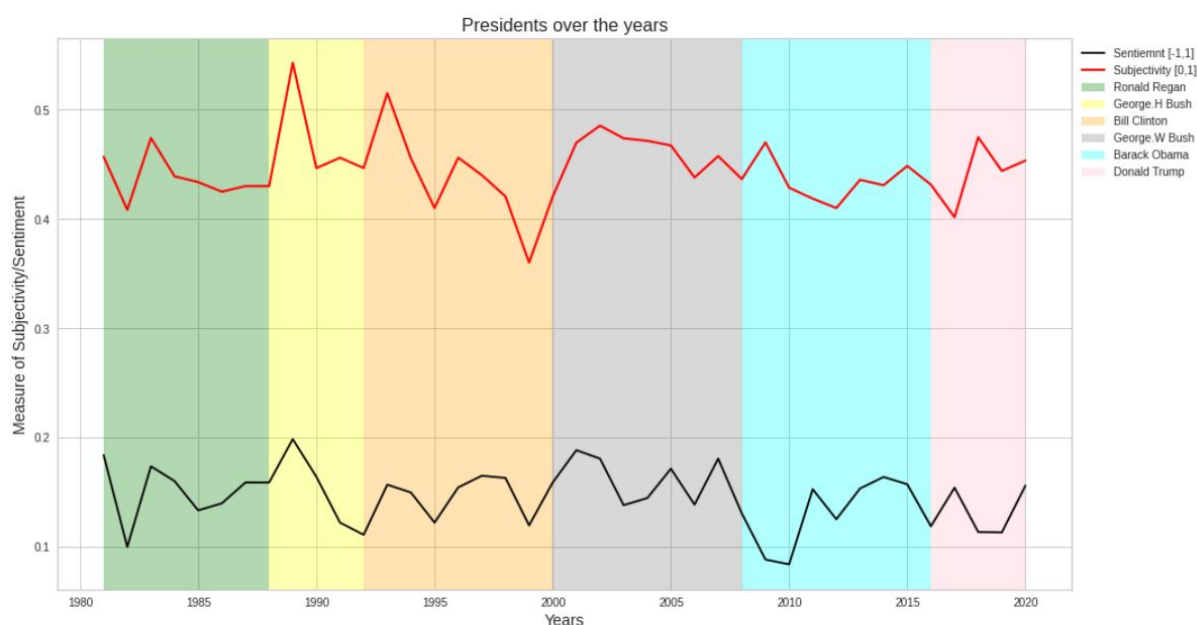
Sentiment Analysis

Sentiment Analysis is the interpretation and classification of emotions (positive, negative, and neutral) within text data using text analytics. Sentiment analysis requires complex text treatment to identify patterns in opinions and behaviors, match identified patterns with sentiment classes, and derive the degree of subjectivity and polarity.

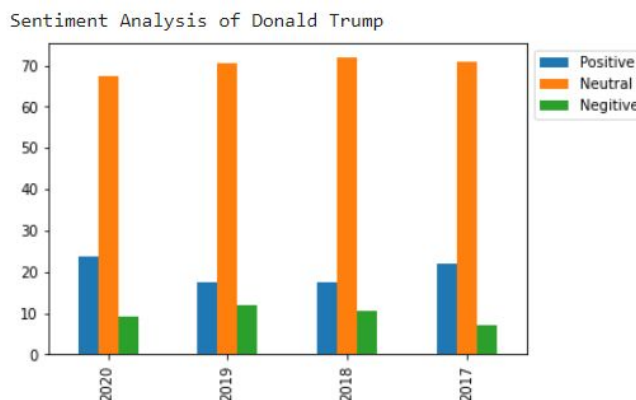
Subjectivity: Closely related to sentiment analysis is subjectivity detection, which requires identifying the parts of a text that express subjective opinions, as well as other non-factual content such as speculation and hypotheticals ^[13].

Objectivity: Facts are objective expressions about entities, events and their properties. They are not biased and are universally true.

TextBlob is a library that can deliver the Subjectivity and Sentiment values for any given transcript. The plot below shows the trend of Subjectivity and measure of Sentiment of President's over the years. The red line graph represents Subjectivity ranging from 0 to 1 (1 meaning totally Subjective). The black line graph represents Sentiment ranging from -1 to 1 (1 meaning positive sentiment). The background has been color-coded to effectively portray the tenure of each of the presidents.



From the visualization, Bill Clinton had the least Subjective speech with a score 0.36 i.e; his speech consisted of more facts rather than personal opinions. George H. Bush had the highest Subjective speech. All the speeches were fairly equal with neutral sentiment but George H Bush had the highest positive sentiment speech with a score of 0.2. Barack Obama had the least positive sentiment speech with a score of nearly 0.06. The plot below is a detailed sentiment analysis of president trump through his tenure, made using VADER Sentiment Analysis model.



Text Summarization

The models we used for summarizing the text are:

- Mobilbert
- Distilbert
- Bertbase
- Gensim Summarizer
- T5

The original transcript given to all the models is the same reference speech of President Trump. Lets see how each of the models performed.

Mobilebert:

Like the original BERT, MobileBERT is task-agnostic, that is, it can be generically applied to various downstream NLP tasks via simple fine-tuning. Basically, MobileBERT is a thin version of BERT_LARGE, while equipped with bottleneck structures and a carefully designed balance between self-attentions and feed-forward networks.

Summarized text:

Thank you very much. Tonight, I stand before you to share the incredible results. Jobs are booming, incomes are soaring, poverty is plummeting, crime is falling, confidence is surging, and our country is thriving and highly respected again. (Applause.) America's enemies are on the run, America's fortunes are on the rise, and America's future is blazing bright. The years of economic decay are over. Madam Speaker, Mr. Vice President, members of Congress, the First Lady of the United States-(applause)-and my fellow citizens: Three years ago, we launched the great American comeback. (Applause.) The days of our country being used, taken advantage of, and even scorned by other nations are long behind us. (Applause.)

Distilbert:

It is similar to its counterparts in terms of performance. The key advantage is that it is possible to reduce the size of a BERT model by 40%, while retaining 97% of its language understanding capabilities and being 60% faster. To leverage the inductive biases learned by larger models during pre-training, it introduces a triple loss combining language modeling, distillation and cosine-distance losses.

Summarized text:

Madam Speaker, Mr. Vice President, members of Congress, the First Lady of the United States—(applause)—and my fellow citizens: Three years ago, we launched the great American comeback. America's enemies are on the run, America's fortunes are on the rise, and America's future is blazing bright. The years of economic decay are over. In just three short years, we have shattered the mentality of American decline, and we have rejected the downsizing of America's destiny. (Applause.) Gone too are the broken promises, jobless recoveries, tired platitudes, and constant excuses for the depletion of American wealth, power, and prestige. Jobs are booming, incomes are soaring, poverty is plummeting, crime is falling, confidence is surging, and our country is thriving and highly respected again. (Applause.) And for all of these reasons, I say to the people of our great country and to the members of Congress: The state of our Union is stronger than ever before. (Applause.)

Bertbase:

It is similar to other bert models but has slight differences. Special features include 102 languages, 12-layer, 768-hidden, 12-heads, and 110M parameters.

Summarized text:

(Applause.) The years of economic decay are over. In just three short years, we have shattered the mentality of American decline, and we have rejected the downsizing of America's destiny. (Applause.) Our military is completely rebuilt, with its power being unmatched anywhere in the world—and it's not even close. We are moving forward at a pace that was unimaginable just a short time ago, and we are never, ever going back. (Applause.) And for all of these reasons, I say to the people of our great country and to the members of Congress: The state of our Union is stronger than ever before. Gone too are the broken promises, jobless recoveries, tired platitudes, and constant excuses for the depletion of American wealth, power, and prestige. The days of our country being used, taken advantage of, and even scorned by other nations are long behind us.

Gensim Summarizer:

The gensim implementation is based on the popular “TextRank” algorithm. Gensim's summarization only works for English for now, because the text is pre-processed so that stopwords are removed and the words are stemmed, and these processes are language-dependent ^[14].

Summarized text:

(Applause.) With the tremendous progress we have made over the past three years, America is now energy independent, and energy jobs, like so many other elements of our country, are at a record high. And just weeks ago, for the first time since President Truman established the Air Force more than 70 years earlier, we created a brand-new branch of the United States Armed Forces. And, Rush, in recognition of all that you have done for our nation, the millions of people a day that you speak to and that you inspire, and all of the incredible work that you have done for charity, I am proud to announce tonight that you will be receiving our country's highest civilian honor, the Presidential Medal of Freedom. To protect the environment, days ago I announced that the United States will join the One Trillion Trees Initiative, an ambitious effort to bring together government and private sector to plant new trees in America and all around the world. Just 29 days ago, a criminal alien freed by the sanctuary city of New York was charged with the brutal rape and murder of a 92-year-old woman. The United States of America should be a sanctuary for law-abiding Americans, not criminal aliens.

T5

It is an Abstractive Summarizer with a transformer model from Google that is trained in an end-to-end manner with text as input and modified text as output. This model was included in the analysis to contrast over the summarized text of all the above mentioned extractive summarizers.

Summarized text:

in just three years, we have shattered the mentality of american decline. we are moving forward at a pace that was unimaginable just short time ago, and we're never, ever going back. i am thrilled to report to you tonight that our economy is the best it has ever been. our military is completely rebuilt, with its power being unmatched anywhere in the world—and it's not even close. Our borders are secure, our families are flourishing. We are advancing with unbridled optimism

Issue Management

There were a couple of issues we faced while developing the code. Initially, the platform used to develop the code was a Jupyter Notebook. But we faced an issue with 'git cloning' where we were not able to detect the model directory in the git repository, where the pre-trained models and network weights were present. Thus, the code was migrated to Google Colaboratory. Later, the challenge was to set up Selenium. Selenium uses a chromedriver application to navigate and locate elements on a website. It is usually installed in the local drive and Google Colab does not support the 'path' argument to redirect it to

the physical disk. Thus, we had to install other dependencies like 'chromium' to use Selenium. Another issue was implementation of intent detection. Intent detection can be implemented by training the model on the text and defining the intents according to the requirements. Due to lack of trained examples of intents, intent detection was not implemented.

Appendix A (All keywords obtained from gensim keywords without weighted significance)

abroad'	approval'	charles'
achieve'	approved'	chief'
achieved'	arrested'	chiefs'
achievements'	arrests'	child'
achieves'	artificial'	children'
achieving'	ashlee'	china'
act'	assault'	cities'
acted'	assaulted'	city'
acting'	assaults'	civilian'
action'	audience'	civilians'
actions'	beautiful'	class'
acts'	beauty'	close'
added'	best'	closed'
adding'	biggest'	closely'
administratio n'	border'	closes'
administratio ns'	borders'	closing loopholes'
advance'	brave man'	color'
advanced'	braved'	come'
advancing'	bravely'	coming'
afford'	bring'	communism'
affordable'	bringing'	communities'
agent'	brother'	community'
agents'	brothers'	companies'
agreement'	build'	company'

aid'	building'	completed'
aids'	buildings'	completely'
alice'	business'	congress'
alien'	california'	constant'
allied'	camp'	corey'
allies'	camps'	cost'
amazing'	cancer'	costing'
america'	cancers'	costs'
american'	care'	countless'
americans'	caring'	countries'
amy'	caught'	country'

court justices'	elizabeth'	forces'
create nearly'	ellie'	foreign policy'
created'	elvin'	forever'
creating'	end'	free'
criminal justice reform'	ended'	freedom'
criminals'	ending'	freedoms'
critical'	ends'	friendship'
critically'	endure'	friendships'
cut'	endured'	fully'
cutting'	enforcement'	fund'
dangers'	entire'	funding'
daughter'	entirely'	gang'
daughters'	epidemic'	gangs'
day'	especially'	general'
days'	exist'	generals'
death'	existing'	generates'
deaths'	exists'	generation

		'
decade'	expand'	generation s'
decades'	expanding'	generic drugs'
defeat'	extraordinary'	generously '
defeated'	factories'	gets'
defense'	factory'	getting'
diego'	fair'	girl'
disease'	fairness'	girls'
diseases'	families'	gives'
dream'	family'	giving'
dreamed'	far better'	god'
dreams'	federal'	good news'
drug'	fellow'	goodness'
duty'	fight'	goods'
economic'	fighting'	govern'
economy'	final'	government '
education'	finally'	government s'
effort'	force'	grace'
efforts'	forced'	great'

greater'	illegal aliens forcing taxpayers'	journeys'
greatest hero'	illegally'	juan'
greatness'	immediate'	judah'
health insurance'	immediately'	justin'
healthcare'	immigrant'	kayla'
heart'	immigrants'	kenton'
hearts'	immigrated'	kill'
help'	immigration'	killed'

helped'	include'	killings'
helping'	includes'	kim'
herman'	including'	korean'
heroes'	income'	land'
heroin'	incomes'	landed'
high'	increase'	landing'
highs'	increased'	later'
hire'	increases'	law'
hired'	incredible'	lawful'
historic'	incredibly'	laws'
historically'	industries'	leader'
history'	industry'	leaders'
home'	infrastructure'	legislation'
homes'	initiative'	legislators'
honor'	initiatives'	level'
honored'	innocent'	levels'
honoring'	iran'	life'
honors'	isis'	like'
hope'	janiyah'	likes'
hopes'	job killing'	live'
hoping'	jobs'	lived'
hospital'	join'	lives'
hospitals'	joined'	living'
human'	joining'	local officials'
hurricane'	joins'	long'
iain'	joshua'	longer'
ice officers'	journey'	lost'

louisiana'	murdered'	parties'
low'	murders'	party'
lower'	nafta'	pass'
lowering'	named'	passed'

major'	names'	past'
majority'	namo'	patient'
makes'	nation'	patients'
making'	national'	pay'
massive'	nations'	paying'
massively'	natural gas'	people'
meaning'	nature'	percent'
means'	navy'	pillar'
medical'	need'	pillars'
medics'	needed'	place'
member'	needs'	placed'
men'	neil'	places'
military'	net'	plan'
million new'	north'	planned'
millions'	nuclear'	planning'
missile'	office'	plans'
missiles'	officer'	police'
modern'	official'	policies'
modernize'	officially '	political'
moment'	ohio'	politicians'
momentous'	old'	politics'
moments'	open vast'	potential'
month'	opened'	potentially'
months'	opening'	poverty'
moral'	openly'	powerful'
mother'	opportunit ies'	powers'
mothers'	opportunit y'	practice'
moved'	order'	practices'
moving'	ordered'	precision'

multiple'	otto'	president members'
murder'	parent'	pressure'

murdered'	parties'	price'	reformed'	senator'
murders'	party'	prices'	reforming'	sentence'
nafta'	pass'	pricing'	reforms'	sentenced '
named'	passed'	prison'	regime'	sentencin g'
names'	past'	prisoner'	regimes'	sergeant'
namo'	patient'	prisoners'	release dangerous'	set'
nation'	patients'	prisons'	released'	setting tax cuts'
national'	pay'	private'	repeatedly'	seven'
nations'	paying'	pro worker'	republic'	sex'
natural gas'	people'	promise'	right'	single'
nature'	percent'	promised'	rights'	small businesse s'
navy'	pillar'	promises'	rise'	social'
need'	pillars'	protect'	rising'	socialism '
needed'	place'	protected'	rocky'	socialist '
needs'	placed'	protecting'	rule'	soleimani '
neil'	places'	protection'	ruler'	special'
net'	plan'	protects'	rulers'	staff'
north'	planned'	proudly'	rules'	stand'
nuclear'	planning'	provide'	russia'	standing'
office'	plans'	provided'	ryan'	stands'

officer'	police'	providing'	safe'	start'
official'	policies'	public'	safely'	started'
officially '	political'	radical left'	sanctuary'	starting'
ohio'	politicians'	raise'	save'	state'
old'	politics'	raised'	saved'	stated'
open vast'	potential'	raises hiring'	saving'	states applause'
opened'	potentially'	range murdering'	savings'	step'
opening'	poverty'	rates'	school'	stepping'
openly'	powerful'	real'	schools'	steps'
opportunit ies'	powers'	recent'	second'	steve'
opportunit y'	practice'	recently'	secretary'	strong'
order'	practices'	recognize'	secure'	struggle'
ordered'	precision'	recognized'	secured'	strugglin g'
otto'	president members'	recognizing'	secures'	student'
parent'	pressure'	record'	security'	students'
parents'	preston'	recorded'	senate'	support'

supported'	tremendous progress'	wound'
supporting'	unemployment rate'	wounded'
supportive'	unfair'	wounds'
taken'	unfairness'	year'
taxes'	unlimited'	years ago'
taxpayer funded'	vanquished'	young']
term'	vegas'	
terms'	veteran'	
terrible'	veterans'	

terror'	violent'	
terrorism'	wage'	
terrorist'	wages'	
terrorists'	waging'	
texas'	wall'	
thank'	walls'	
thanks'	want'	
thing'	wanted'	
things'	wants'	
time'	war'	
times'	wars'	
today'	washington'	
tonight'	wealth power'	
tony'	welcome'	
total'	welcoming'	
totally'	wife'	
trade agreements'	woman'	
trading'	women'	
traffickers'	wonderful'	
trafficking'	wonders'	
train'	work'	
trained'	worked'	
training'	workers'	
transcript'	working'	
treatment'	works'	
treatments'	world'	

Appendix B (All keywords obtained from mz_keywords with weighted significance)

President Donald Trump

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President Barack Obama

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