23,778. 14. Chris Buescher, Ford, 200, 86, 30, \$23,399. 15. Darrell Wallace Jr., Ford, 199, 81.3, 29, \$23,746. 16. Jeremy Clements, Chevrolet, 199, 72, 28, \$22,944, 17. Ryan Sieg, Chevrolet, 199, 74.4, 27, \$22,741, 18. Dakoda 55.5, 21, \$21,851, 24, J.J. Yeley, Toyota, 197, 57.8, 20, \$21,751, 25, Blake Koch, Toyota, 197,

1. Joey Logano, Ford, 200 laps, 150 rating, 0 oints, \$81,148, 2, Matt Kenseth, Toyota, 200, 200, 116, 0, \$42,789. 4. Austin Dillon, Chevrolet, 200, 114.7, 0, \$34,112. 5. Erik Jones, Toyota, 200, 111.8, 0, \$34,114. 6. Ty Dillon, Chev-rolet, 200, 100.3, 38, \$30,477. 7. Chase Elliott, Chevrolet, 200, 103, 37, \$29,998. 8. Brendan Gaughan, Chevrolet, 200, 92.4, 36, \$27,895. Regan Smith, Chevrolet, 200, 98.2, 35,
 \$26,736.
 10. Brian Scott, Chevrolet, 200,
 100.2, 34, \$26,676.
 11. Daniel Suarez, Toyota, 200, 91, 33, \$25,967. 12. Elliott Sadler, Ford.

points, \$81,148. 2. Matt Kenseth, Toyota, 200, 126.8, 0, \$60,886. 3. Kevin Harvick, Chevrolet 200, 116, 0, \$42,789, 4. Austin Dillon, Chevrolet, 200, 114,7, 0, \$34,112, 5, Erik Jones, Toyorolet, 200, 114.7, 0, \$34,112. 5. Erik Jones, Toyo-ta, 200, 111.8, 0, \$34,114. 6. Ty Dillon, Chev-rolet, 200, 100.3, 38, \$30,477. 7. Chase Elliott, Chevrolet, 200, 103, 37, \$29,998. 8. Brendan Gaughan, Chevrolet, 200, 92.4, 36, \$27,895. 9. Regan Smith, Chevrolet, 200, 98.2, 35, \$26,736. 10. Brian Scott, Chevrolet, 200, 100.2, 34, \$26,676. 11. Daniel Suarez, Toyota,

rolet, 200, 100.3, 38, \$30,477.7. Chase Elliott, Chevrolet, 200, 103, 30, 30, 477.7. Rendand R

 91, 33, \$25,967.
 12. Elliott Sadler, Ford,
 200, 85,5, 32, \$26,460.
 13. Ryan Reed, Ford, 200, 79.4, 31,
 \$23,778.
 14. Chris Buescher, Ford, 200, 86, 30,
 \$23,399.
 15. Darrell Wallace Jr., Ford, 199, 81.3, 29, \$23,746. 16. Jeremy Clements, Chevrolet, 199, 72, 28, \$22,944. 17. Ryan Sieg, Chevrolet, 199, 74,4, 27, \$22,741. 18. Dakoda

Surface: Hard-Outdoor

MEN'S SINGLES (second round)-Philipp Kohlschreiber (26), Germany, d. Tim Smyczek, 6-3, 6-1; Kevin Anderson (16), South Africa, d. Federico Delbonis, Argentina, 7-5, 6-4; Juan Monaco, Argentina, d. Marin Cilic (10), Croatia, 6-4, 6-4; Fernando Verdasco (28), Spain, d James Duckworth, Australia, 6-2, 7-6 (3); Kei Nishikori (5), Japan, d. Ryan Harrison, 6-4, 6-4; Thanasi Kokkinakis, Australia, d Guillermo Gar-cia-Lopez (23), Spain, 7-5, 5-7, 6-3; Ernests Gulbis (14), Latvia, d. Daniel Gimeno-Traver, Spain, 6-4, 6-1; Andy Murray (4), Britain, d. Vasek Pospisil, Canada, 6-1, 6-3; Adrian Mannari-no, France, d. Fabio Fognini (19), Italy, 7-6 (8), 6-3; Albert Ramos-Vinolas, Spain, d. Julien Benneteau (25), France, 6-2, 6-3; Pablo Cuevas (20), Uruguay, d. Jarkko Nieminen, Finland, 4-6, 7-5, 6-0; David Ferrer (8), Spain, d. Ivan Dodig, Croatia, 4-6, 6-1, 7-6 (6); Bernard Tomic (32), Australia, d. Borna Coric, Croatia, 6-3, 6-4; John Isner (18), d. Jurgen Melzer, Austria, 6-3, 6-4; Novak Djokovic (1), Serbia, d. Marcos Baghdatis, Cyprus, 6-1, 6-3. WOMEN'S SINGLES (second round)—Ana Iva-

WWMNY SANINLES (second round)—And Rea-mond of the second round)—And Ream-stan, 6-3, 6-1: Sara Errani (11), Italy d. 24bu Lin, China, 6-0, 4-6, 6-2; Flavia Pennetta (15), Italy d. Madison Brengle, 6-4, 6-2; Sabine Liscki (6-4), Bellinda Bercia (31), Switzerland, d. Bojana Irvanovski Serbia 6-2, 7-6 (21): Carolina Wor-

Isner (18), d. Jurgen Meizer, Austria, 6-3, 6-4 Novak Djokovic (1), Serbia, d. Marcos Baghdatis, XFINITY Series Cyprus, 6-1, 6-3 Cyprus, 6-1, 6-3 MEN'S SINGLES (second round) - Philipp Kohlschreiber (26), Germany, d. Tim Smyczek,

6-3, 6-1; Kevin Anderson (16), South Africa, d. 6-3, 6-1, Kevili Allueison (10), South Alrica, d. Federico Delbonis, Argentina, 7-5, 6-4; Juan Monaco, Argentina, d. Marin Cilic (10), Croatia, 6-4, 6-4; Fernando Verdasco (28), Spain, d. James Duckworth, Australia, 6-2, 7-6 (3); Kei Nishikori (5), Japan, d. Ryan Harrison, 6-4, 6-4; Thanasi Kokkinakis, Australia, d Guillermo Gar-Thanasi Kokkinakis, Australia, d Guillermo Gar-cia-Lopez (23), Spain, 7-5, 5-7, 6-3; Ernests Gulbis (14), Latvia, d. Daniel Gimeno-Traver, Spain, 6-4, 6-1; Andy Murray (4), Britain, d. Va-sek Pospisil, Canada, 6-1, 6-3; Adrian Mannarino, France, d. Fabio Fognini (19), Italy, 7-6 (8) 6-3: Albert Ramos-Vinolas, Spain, d. Julien Ben neteau (25), France, 6-2, 6-3; Pablo Cuevas (20), Uruguay, d. Jarkko Nieminen, Finland, 4-6, (20), Uruguay, d. Jankko Nieminen, Finland, 4-6, 7-5, 6-0; David Ferrer (3), Spain, d. Ivan Dodig, Croatia, 4-6, 6-1, 7-6 (6); Bernard Tomic (32), Australia, d. Borna Coric, Croatia, 6-3, 6-4; John Isner (18), d. Jurgen Melzer, Austria, 6-3, 6-4; Novak Djokovjc (1), Serbia, d. Marcos Baghdatis,

WOMEN'S SINGLES (second round)-Ana Iva www.MN - Les (second round) - Ans ike - Ans - An

Axalta Faster. Tougher. Brighter. 200 At Avendale, Ariz. Track: 1-mile oval

Track: 1-mile oval
1. Joey Logano, Ford, 200 laps, 150 rating, 0
points, \$81,148. 2. Matt Kenseth, Toyota, 200,
126.8. 0, \$60,886. 3. Kevin Harvick, Chevrolet,
200, 116, 0, \$42,789. 4. Austin Dillon, Chevrolet, 200, 114. 7, 0, \$34,112. 5. Erik Jones, Toyota, 200, 111.8, 0, \$34,114. 6. Ty Dillon, Chevrolet, 200, 100.3, 38, \$30,477. 7. Chase Elliott, Chevrolet, 200, 103, 37, \$29,998. 8. Brendan 9. Regan Smith, Chevrolet, 200, 98.2, 35, \$26,736, 10. Brian Scott, Chevrolet, 200 100.2, 34, \$26,676. 11. Daniel Suarez, Toyota 100. 2-3. 3. 225.967. 12 Bellie Staffer, Toylor, 200, 85.5, 32, \$26.460.
13. Ryan Reed, Ford, 200, 79.4, 31, 823,778. 14. Chris Buescher, Ford, 200, 86.30, \$23,399. 15. Darrell Wallace Jr., Ford, 199, \$13, 29, \$23,746. 16. Jeremy Clements, Chev-

\$22,109. 22. Cale Conley, Toyota, 197, 56.7, 22 \$21,978. 23. Harrison Rhodes, Chevrolet, 197 55.5, 21. \$21,851. 24. J.J. Yeley, Toyota, 197 57.8.20. \$21.751. 25. Rlake Koch, Toyota, 197

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Natural Language Processing Final Report

Courtney Fiala and Anders Maraviglia

\$22,109. 22. Cale Conley, Toyota, 197, 56.7, 22, \$21,978. 23. Harrison Rhodes, Chevrolet, 197, 55.5, 21. \$21,851. 24. JJ. Yeley, Toyota, 197, \$21,751. 25. Blake Koch, Toyota, 197,

1. Joey Logano, Ford, 200 laps, 150 rating, 0

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126.8, 0, \$60,886. 3. Kevin Harvick, Chevrolet, 200, 116, 0, \$42,789. 4. Austin Dillon, Chevta, 200, 111.8, 0. \$34.114. 6. Ty Dillon, Chevrolet, 200, 100.3, 38, \$30,477. 7. Chase Elliott, Chevrolet, 200, 103, 37, \$29,998. 8. Brendan Gaughan, Chevrolet, 200, 92.4, 36, \$27,895. 9. Regan Smith, Chevrolet, 200, 98.2, 35, \$26,736. 10. Brian Scott, Chevrolet, 200,

df. Lucie Hradecka, Czech Republic, 6-2, 6-2. WOMEN'S SINGLES (second round)-Ana IvawWMEN'S SINGLES (second round)—Ana Iva-novic (5), Serbla, d. Tulla Pulintseva Kazakh, Kazakh, China, 6-0, 4-6, 6-2; Flavia Pennetta (15), Italy d. Madison Brengle, 6-4, 6-2; Sabine Lisicki (24), Germany, d. Roberta Vinci, Italy, 6-1, 5-7, 6-4; Belinda Bencic (31), Switzerland, d. Bojana Cyprus. 6-1. 6-3.

9. Regan Smith, Chevrolet, 200, 98.2, 35, \$26,736. 10. Brian Scott, Chevrolet, 200, 100.2, 34, \$26,676. 11. Daniel Suarez, Toyota, 200, 91, 33, \$25,967. 12. Elliott Sadler, Ford 200, 85.5, 32, \$26,460. 13. Ryan Reed, Ford, 200, 79.4.

\$23,778. 14. Chris Buescher, Ford, 200, 86, 30, \$23,399. 15. Darrell Wallace Jr., Ford, 199, 81.3, 29, \$23,746. 16. Jeremy Clements, Chev-

## Motivation

- RCOS project that is working on an app that displays news articles with differing viewpoints on the same theme
- There are sites that present opposing viewpoints for a theme – but they are hand selected
  - Thus it would be useful to have an automated system
- We used an in-depth theme extraction and sentiment analysis approach that created clusters of articles

## **Difficulties**

- Limited number of daily AlchemyAPI calls
- Entities and keywords from AlchemyAPI very specific
  - Resolution is to add taxonomy data
  - Possible future resolution is to incorporate WSD
- Sentiment values from AlchemyAPI very generic (only options are Positive/Negative/Neutral and weight)
  - Resolution is to add emotion scores

## Input and Output

#### Input

Set of news articles

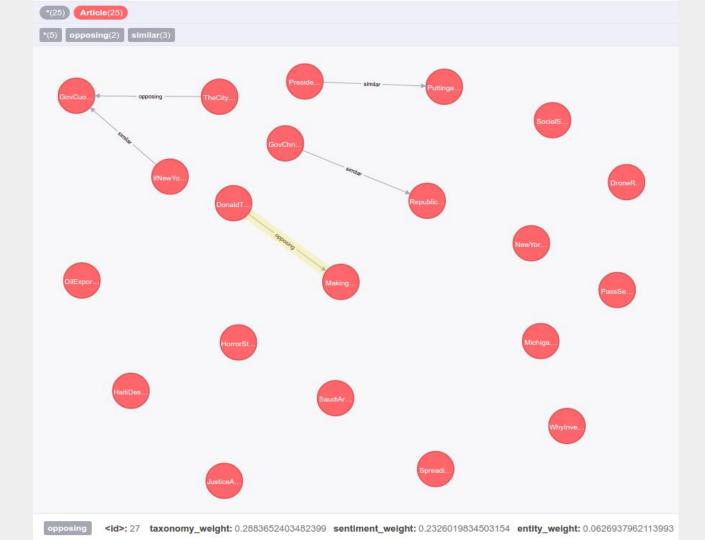
#### Output

- Graph of article relationships with edges quantified by weights:
  - Entities and Keywords
  - Taxonomy
  - Sentiment
  - Emotions

## Experimentation

- Determine aggregation method and weighting scheme to combine data from multiple sentences into a single article score set
- Determine thresholds for comparisons between articles to maximize cluster quality

	Entites/Keywords	Taxonomy	Sentiment	Emotion
Threshold	0.06	0.25	0.12	0.12



## Node Data Example

 Detailed data from article nodes can be accessed through the interactive visualization entities \$40, 40-year-old law, texas, earnings, fuels, measures, greenhouse gas emissions, congress, solar energy, oil companies, climate harm. environmentalists, republicans, oil industry, important program, fund, demand, president, water conservation fund, friends, response, change, energy policy, crude oil, restrictions, land, current law, places, global supply, higher prices, country, industry, gasoline, wildlife refuges, export limits, natural areas, democratic lawmakers, place, time, businesses, barrel, example, profits, big swing] [(empty), ecology, natural gas, renewable energy, energy, business and industrial, diesel fuel, oil and gas prices, executive branch, investing, travel, government, legislation, tourist destinations, family taxonomies and parenting, earnings, endangered species, national parks, wind energy, biology, oil, finance, food and drink, funds, company, zoology, nuclear power, hedge fund, stocks, solar energy, legal issues, science, law, govt and politics, pollution] OilExportsandRenewableEnergy title

### Discussion and Future Work

Did not meet our stretch goal of organization viewpoint analysis

#### **Plans**

- Complete article-level named entity extraction and method for extracting organizational viewpoints
- Run tests on larger dataset
- Build fully interactive visualization tool for end users

# Questions?