

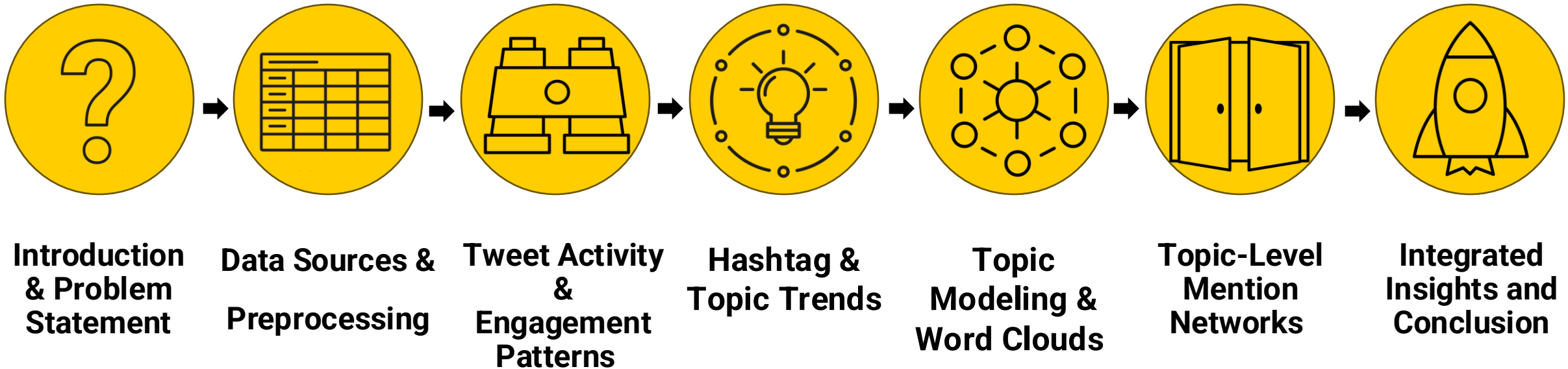
Group 6

Analyzing Political Discourse on Twitter

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Agenda



Research Questions & Motivation

To guide our analysis, we begin by clarifying our focus and why this time period matters.

Overview

- We analyze how political conversations emerged on Twitter between **Oct 2012–Dec 2014**.
- Focus on **Congressional accounts** and their public communication patterns.
- Combine **text analysis, temporal analysis, and social network analysis**.
- Goal: Understand **what topics were discussed, how engagement evolved, and who influenced information flow**.

Problem Statement / Aim

- Investigate how members of Congress used Twitter during 2012–2014.
- Identify **issue salience, changes in engagement, and party-level differences**.
- Measure how information spreads through **mention networks**.
- Understand which actors functioned as **central communicators**.

Why This Analysis Matters

- Captures political communication during Twitter's early rise in government use.
- Provides historical baseline before the major shifts of 2016+.
- Rich dataset (**245K tweets**, 548 user accounts).
- Combines **network and text analytics**, the two pillars of modern social analytics.
- Insights applicable to issues like **polarization, agenda setting, and public engagement**.

Implications of Results

- Reveals early digital influence patterns inside Congress.
- Highlights major topics and issue framing strategies.
- Identifies how engagement differed across parties over time.
- Shows which political figures acted as bridges in conversation networks.
- Helps explain how political narratives spread online.

Data Sources & Preprocessing

Before analyzing political behavior on Twitter, we first built a clean dataset that captures congressional activity from 2012–2014.

Data Sources

- Monthly Twitter archives from **Oct 2012 – Dec 2014** (27 months).
- 245,858 tweets** after removing retweets.
- 548 Congressional accounts** with party labels (D, R, I).
- Joined tweet-level and user-level datasets.

Sample of Data

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	user_id	created_at	screen_name	name	description	location	lang	followers_count	friends_count	listed_count	favourites_count	statuses_count	verified	protected	geo_enabled	time_zone	utc_offset	url	party
2	2.915E+09	#####	AkGovBillW	Governor B. Office	Official Twitter	Alaska	en	5870	550	190	115	1642	TRUE	FALSE	TRUE			http://t.co/I	
3	33537967	#####	amyklobuc	Amy Klobuchar	U.S. Senator from Minnesota		en	170717	91751	2493	24	5567	TRUE	FALSE	FALSE	Central Time	-18000	http://t.co/D	
4	1.378E+09	#####	AnthonyBrc	Anthony G. Congress	Mitchellville		en	6067	369	170	90	1878	TRUE	FALSE	TRUE	Eastern Time	-14400	https://t.co/D	
5	269992801	#####	AsaHutchins	Gov. Asa Hutchinson	Husband of Arkansas		en	25747	598	420	440	3778	TRUE	FALSE	TRUE	Central Time	-18000	https://t.co/R	
6	234797704	#####	AustinScott	Rep. Austin Scott	I am proud	Ashburn, Virginia	en	13048	313	735	12	2022	TRUE	FALSE	TRUE			http://t.co/R	
7	82453460	#####	BennieGTh	Rep. Bennie Thompson		Bolton, Mississippi	en	6707	428	484	27	756	TRUE	FALSE	FALSE	Eastern Time	-14400	http://t.co/D	
8	55677432	#####	BillCassidy	Bill Cassidy	U.S. Senator	Baton Rouge	en	20716	1187	1257	80	4526	TRUE	FALSE	TRUE	Central Time	-18000	http://t.co/R	
9	26103389	#####	BillHaslam	Gov. Bill Haslam	Governor of Tennessee		en	70622	7851	1209	25	1649	TRUE	FALSE	FALSE	Central Time	-18000	http://t.co/R	
10	15394954	#####	boblat	U.S. Rep. Bob Latta	Representative	Ohio	en	29159	5854	1267	468	5785	TRUE	FALSE	TRUE	Eastern Time	-14400	http://t.co/R	
11	30216513	#####	BradSherm	Rep. Brad Sherman	Proudly serving	Sherman, Oregon	en	23126	512	912	0	1117	TRUE	FALSE	FALSE	Pacific Time	-25200	https://t.co/D	
12	47747074	#####	brianschat	Brian Schatz	United States Senator		en	33198	1923	892	889	4508	TRUE	FALSE	TRUE	Hawaii	-36000	https://t.co/D	
13	36396752	#####	ButchOtter	Idaho Governor	If you are here	Boise, Idaho	en	16878	1662	555	15	1450	FALSE	FALSE	TRUE	Mountain Time	-21600	http://t.co/R	
14	305620929	#####	CallMeD	Dutch Ruppersburg	U.S. Congressman	Washington	en	11206	1350	616	244	2431	TRUE	FALSE	TRUE	Quito	-18000	http://t.co/D	
15	3.298E+09	#####	CaptClayHig	Captain Clay Higgins		Louisiana	en	4442	112	63	771	716	FALSE	FALSE	FALSE	Pacific Time	-25200	https://t.co/R	

Data Preprocessing

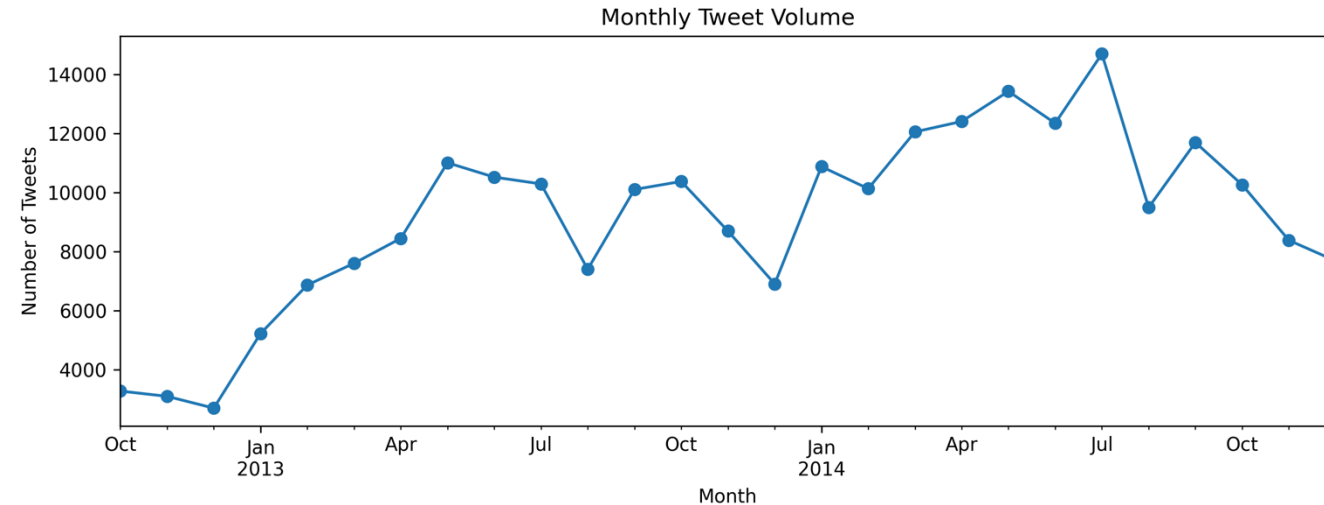
- Converted timestamps → monthly periods for temporal analysis.
- Removed retweets to focus on **original messaging**.
- Extracted hashtags and mentions.
- Created engagement metric: **likes + retweets**.
- Prepared text for topic modeling (stopwords, tokenization, filtering).

Tweet Activity & Engagement Patterns

With our data prepared, we begin by analyzing how active Congressional accounts were and how audiences engaged with them over time.

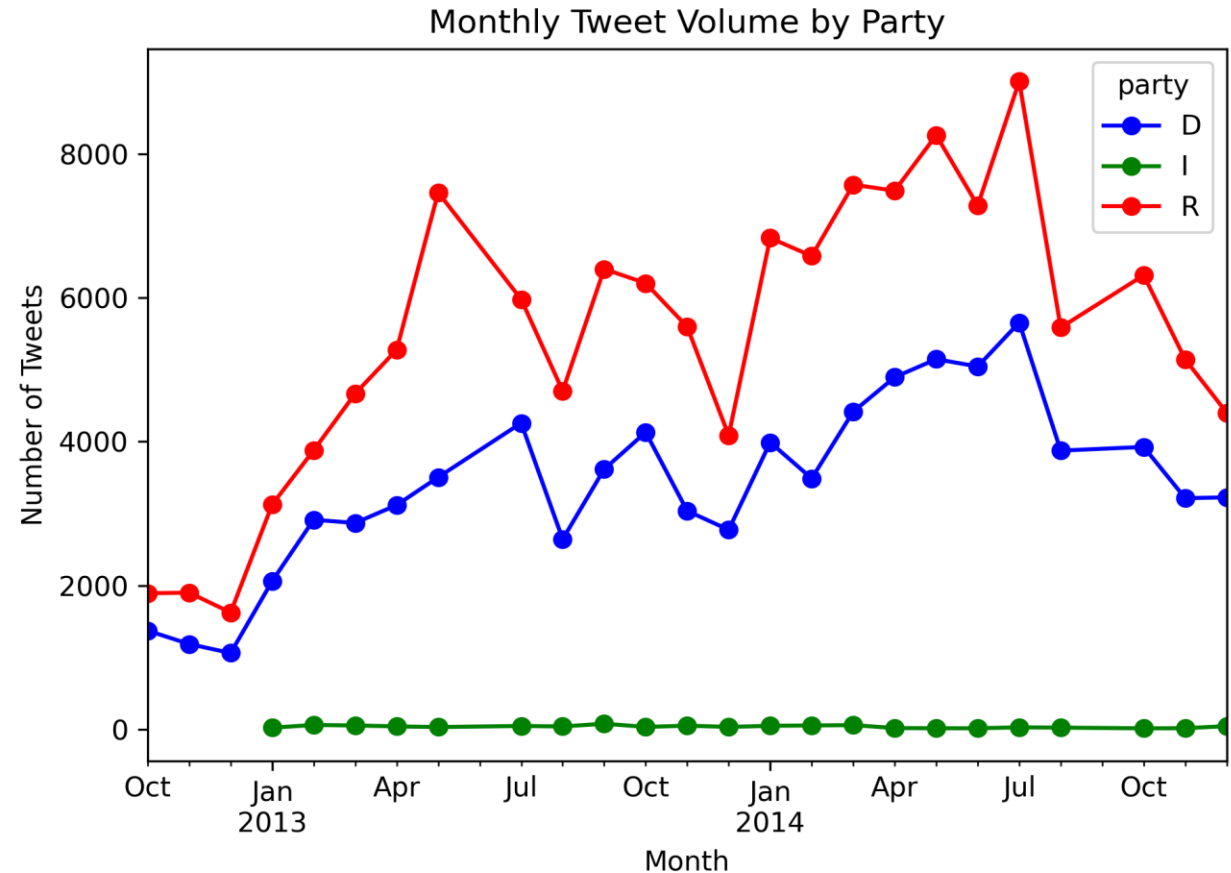
Tweet Volume Over Time

- Tweet activity rises sharply through 2013–2014.
- Peaks correspond to major legislative periods.
- Consistent activity provides strong foundation for longitudinal analysis.



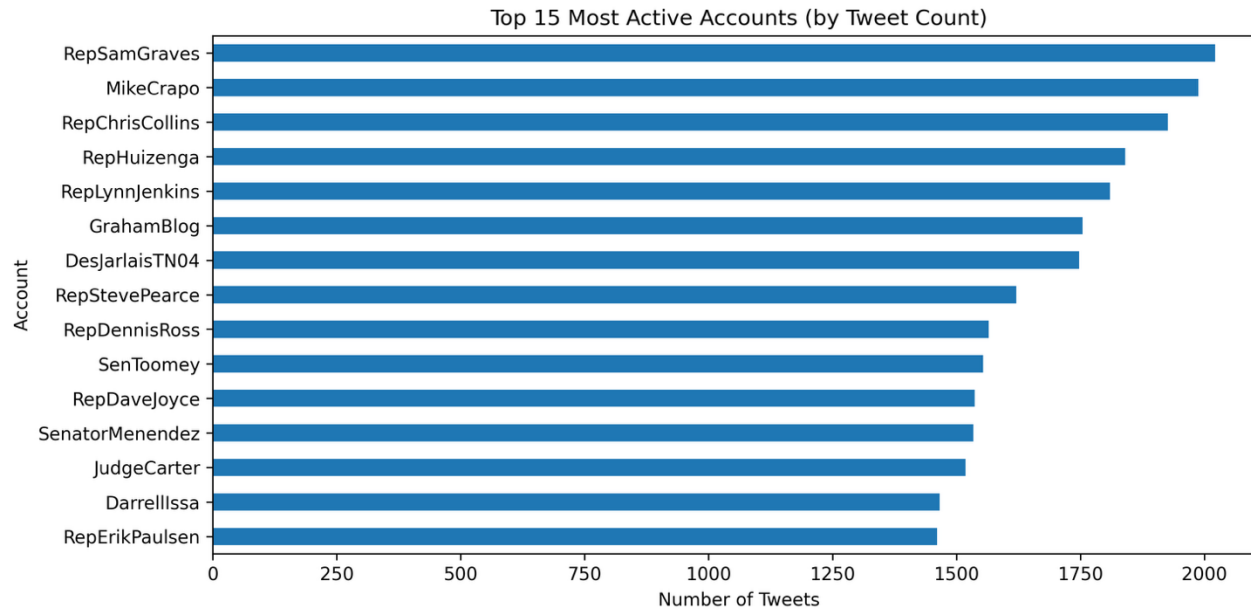
Tweet Volume by Party

- Republicans consistently tweeted more than Democrats.
- Independents show minimal volume but still included.
- Reflects different communication strategies.



Top 15 Most Active Members

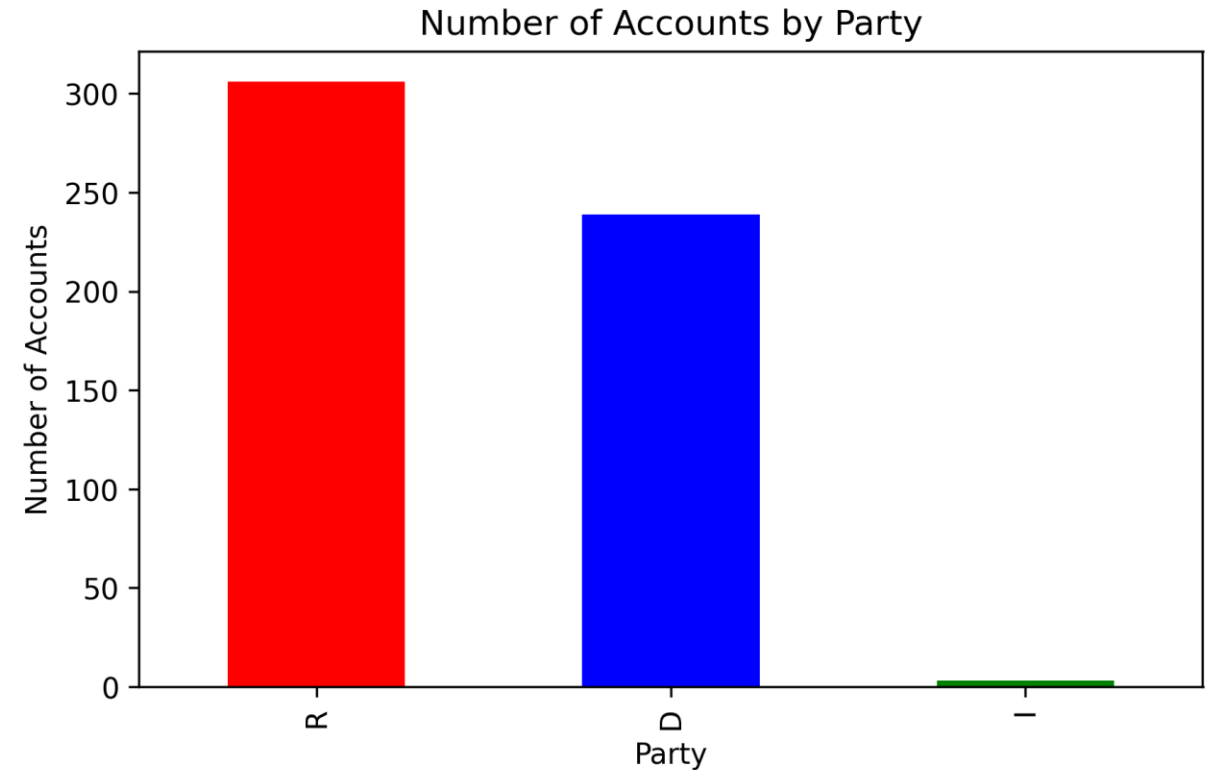
- Many top accounts belong to House members.
- Activity concentrated among a small subset of users.
- Important for interpreting influence and network structure.



Accounts per Party

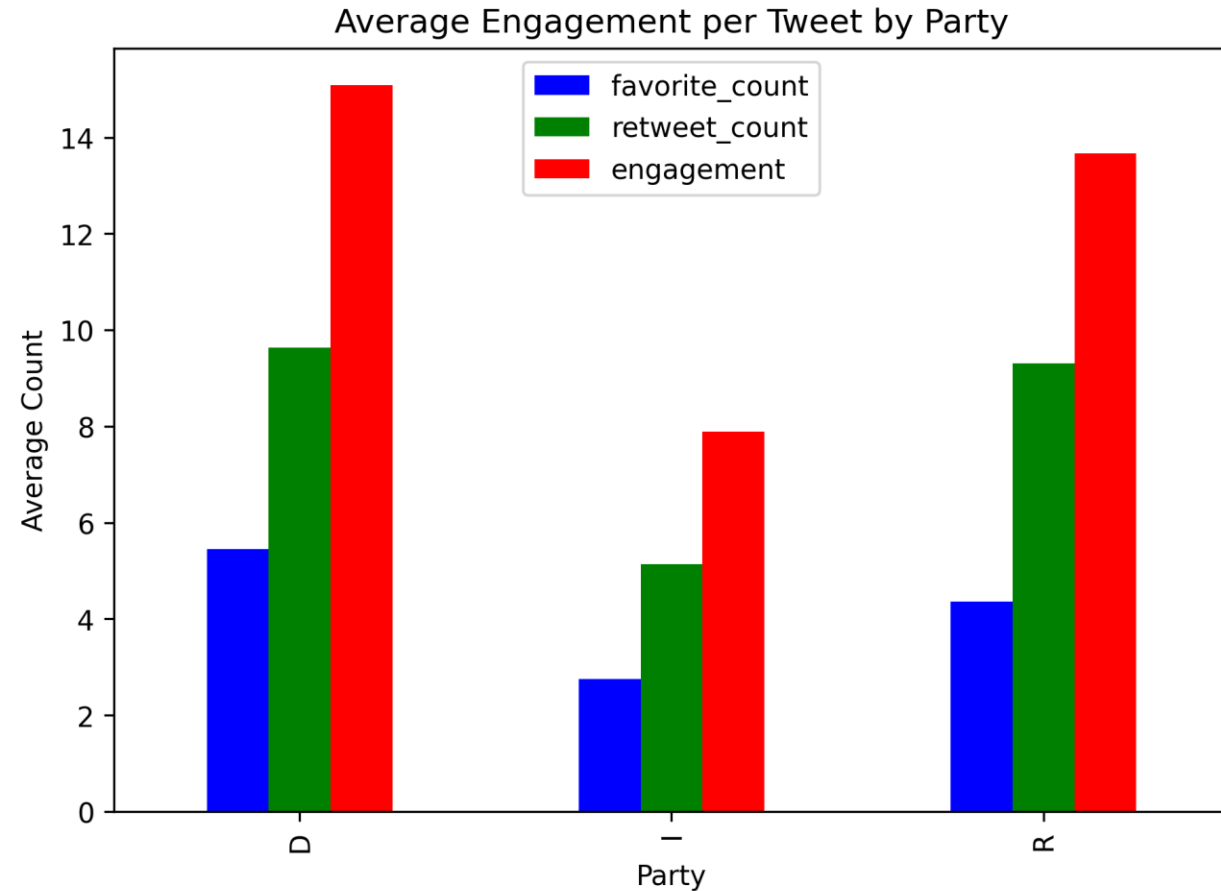
Number of Congressional Accounts by Party

- Republican accounts: 306
- Democratic accounts: 239
- Independent accounts: 3
- Reflects seat distribution and social media adoption.



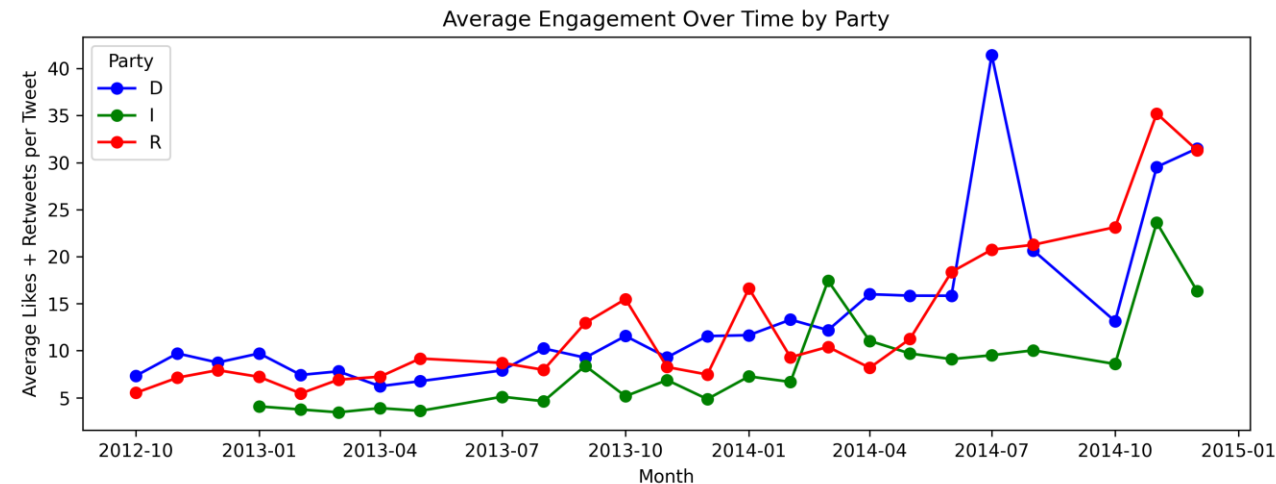
Engagement by Party

- Democrats receive the highest engagement per tweet.
- Republicans also receive strong engagement despite higher tweet volume.
- Independents show lower levels due to smaller audience base.



Engagement Over Time

- Engagement rises significantly in 2014.
- Spikes correlate with policy debates and national events.
- Suggests growing use of Twitter to mobilize public sentiment.

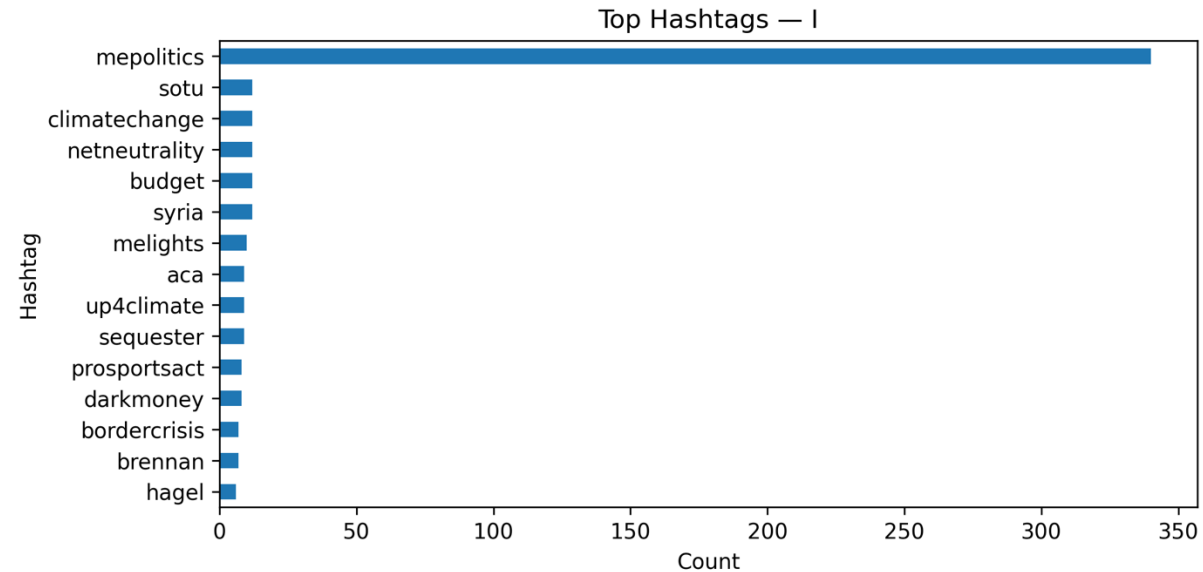


Hashtag Trends

Next, we explore the key issues that dominated congressional communication through hashtag analysis.

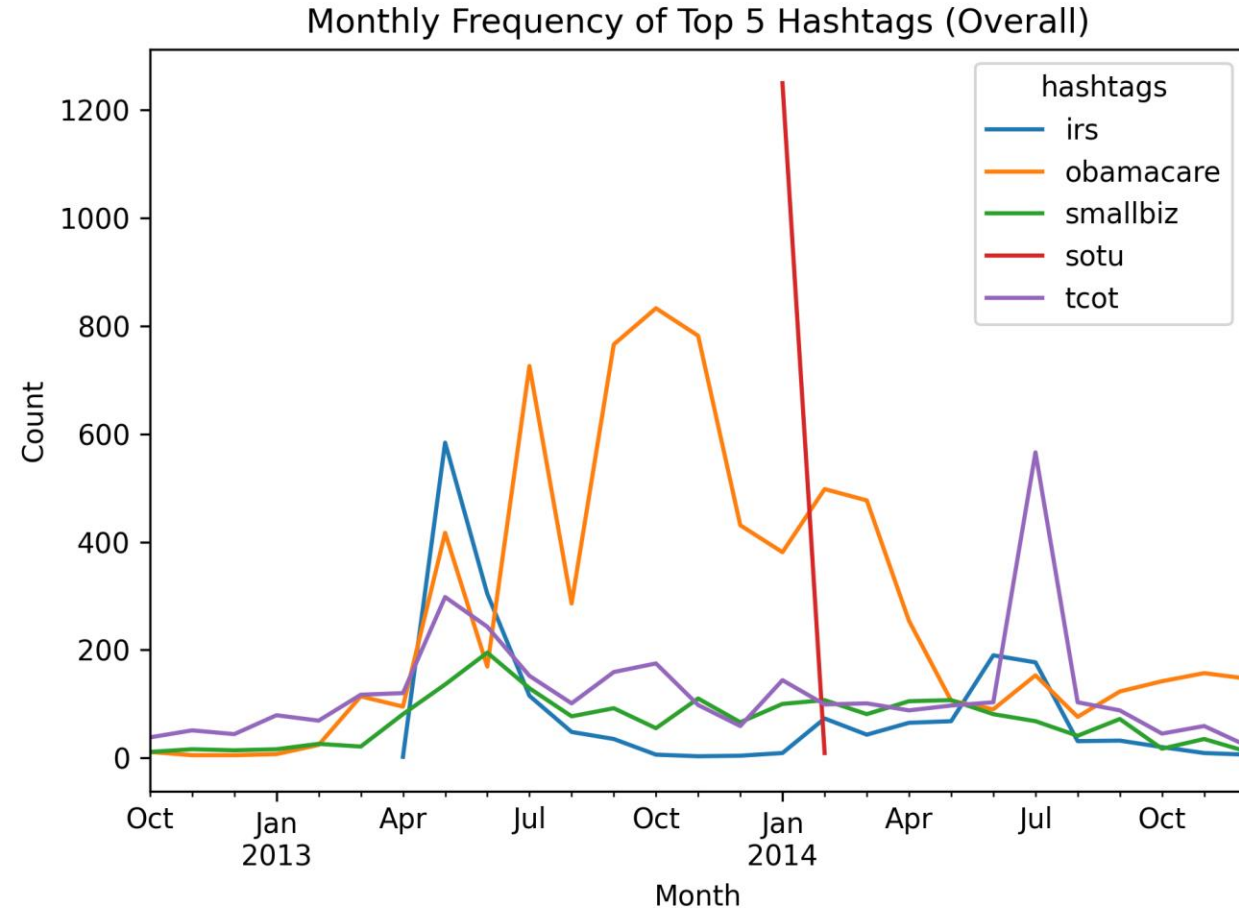
Most Frequent Hashtags

- #obamacare dominates discussion.
- Other major topics: #tcot, #smallbiz, #sotu, #irs.
- Represents policy priorities and partisan messaging.



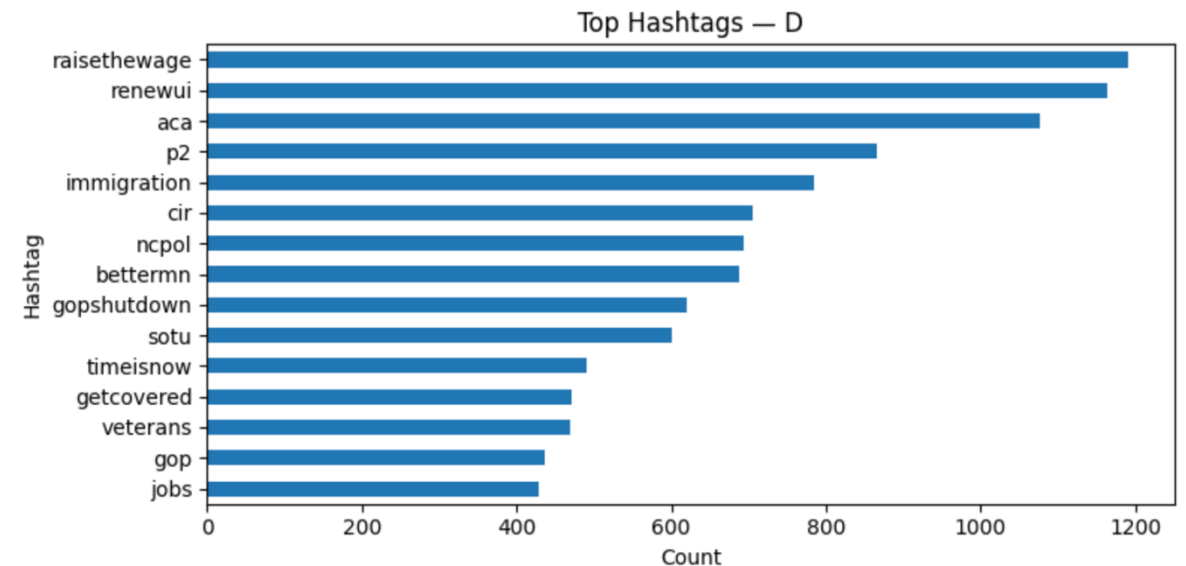
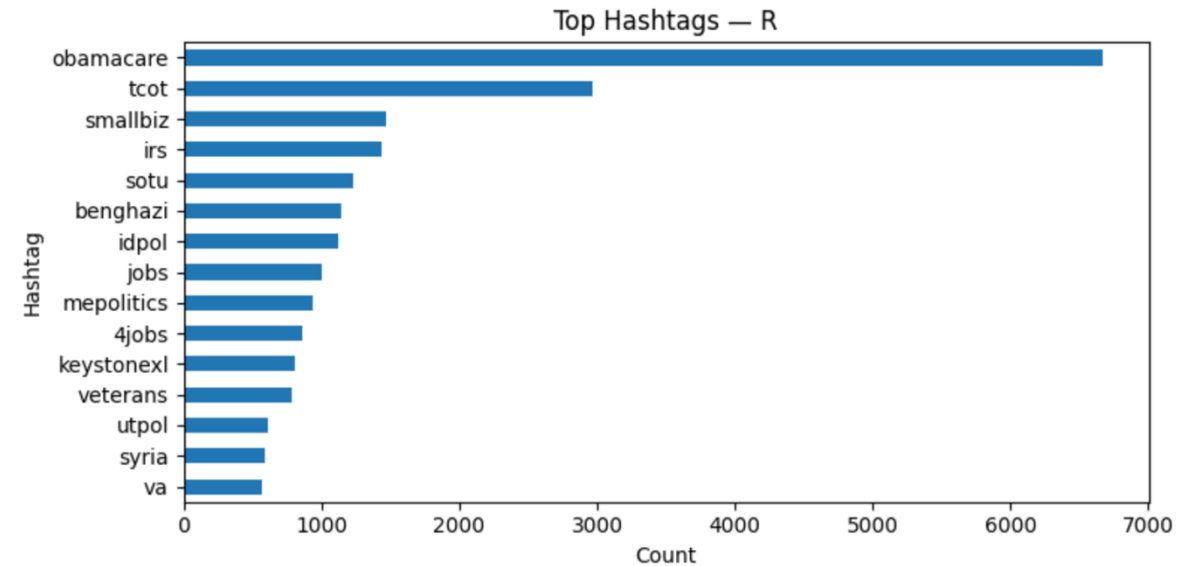
Issue Attention Over Time

- #obamacare shows repeated spikes during legislative debates.
- #irs peaks during early 2013 hearings.
- Issue salience shifts month to month.



Hashtags by Party

- Republicans emphasize #obamacare, #irs, #benghazi.
- Democrats highlight #raisethewage, #renewui, #veterans.
- Indicates clear partisan framing.

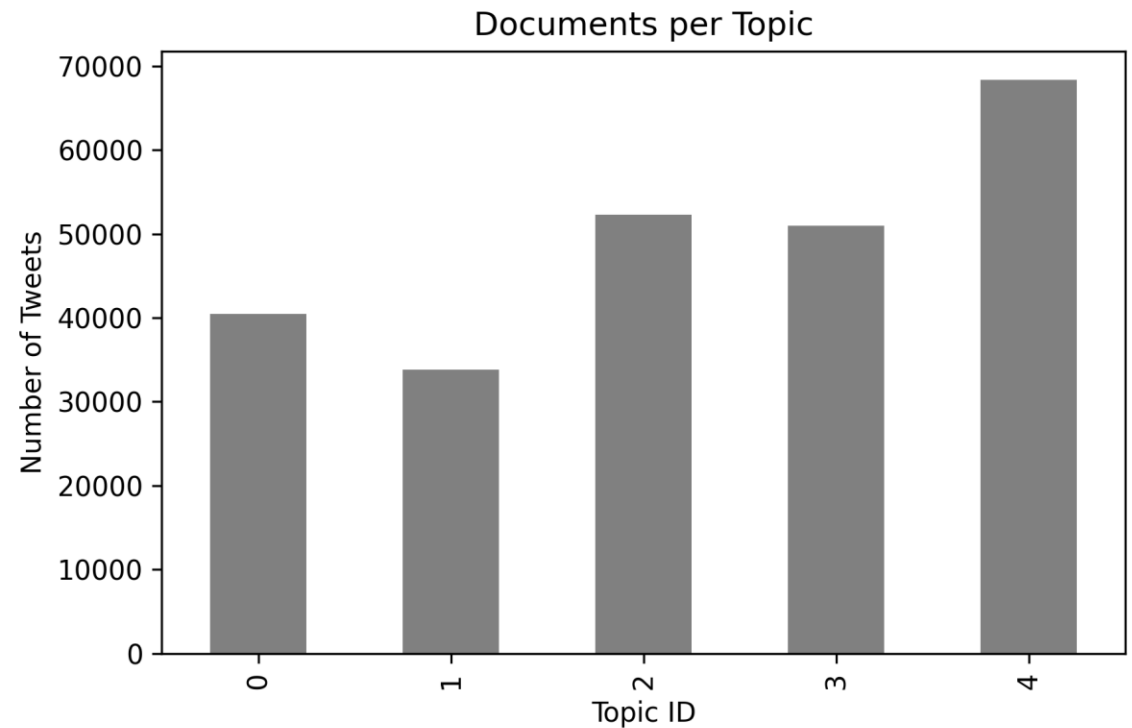


Topic Modeling, Word Clouds & Networks

To synthesize themes across hundreds of thousands of tweets, we apply topic modeling to identify the major issues being discussed.

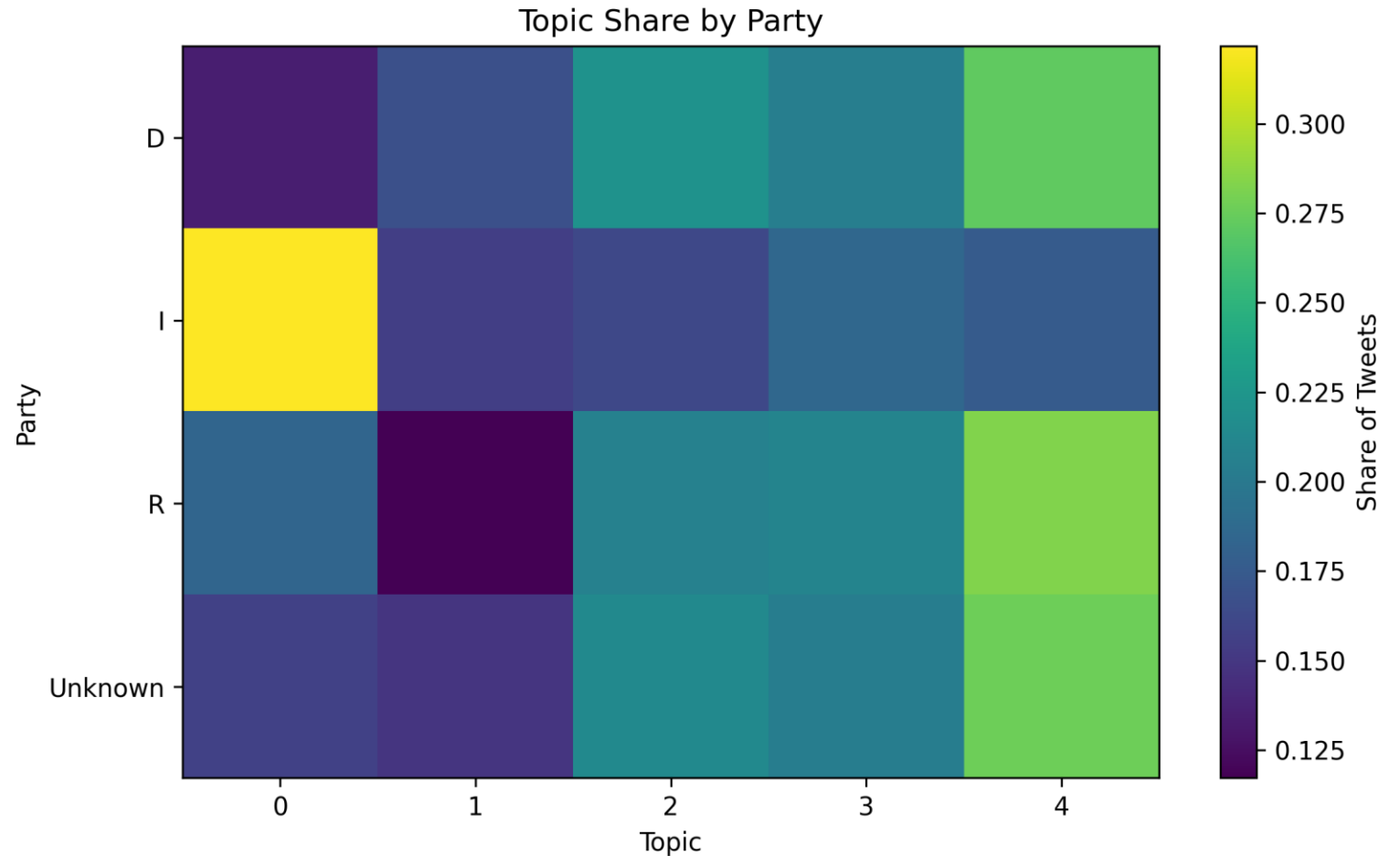
LDA Topic Overview

- Extracted **5 major topics** representing broad issue clusters.
- Topics include: hearings/live updates, jobs/economy, military/service, school/work, and Obamacare/policy debate.
- Large sample ensures stable topic structure.



Topic Share by Party

- Both parties contribute to all topics but with varying emphasis.
- Republicans strongly associated with **Topic 4** (Obamacare).
- Democrats more present in **Topic 1** (jobs, economy).
- Shows partisan issue prioritization.



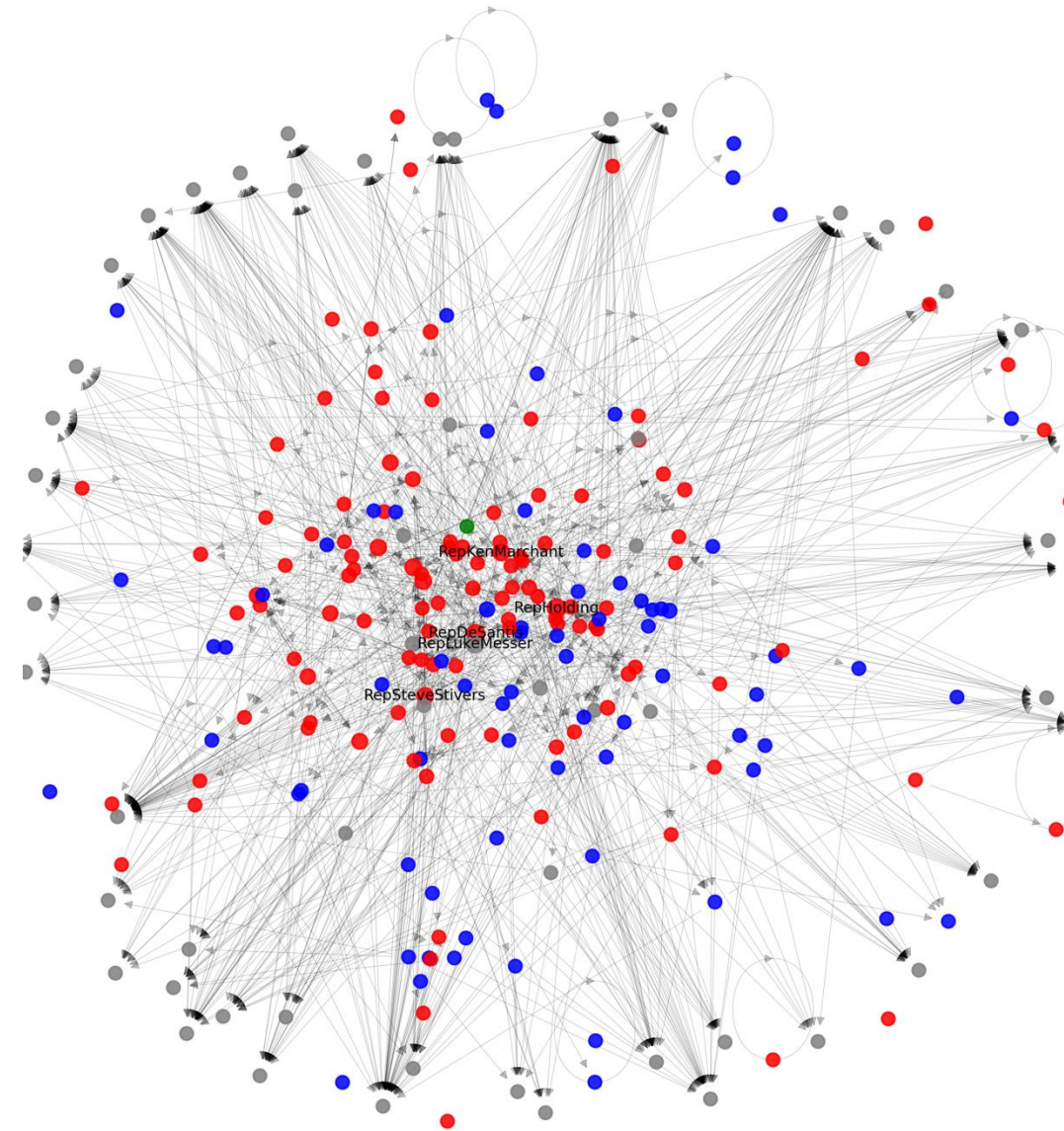
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A word cloud visualization of tweets from January 20, 2017. The most prominent words are "Great", "Today", "Need", "Thank", "Work", "Job", "Help", "Vote", "Proud", "Talk", "House", "State", "Live", "Congress", "Women", "Economy", "Watch", "Discuss", "Time", "Day", "New", "Action", "ICYMI", "Cut", "Read", "President", "I'm", "Continue", "Talk", "House", "Community", "Excited", "Night", "Home", "Joined", "White House", "Better", "Visit", "Senate", "Effort", "Raising The Wage", "Met", "Let", "End", "Thought", "Like", "Making", "People", "Shut Down", "Children", "Act", "Morning", "President Obama", "Looking Forward", "District", "Student", "Say". Other visible words include "service", "yesterday", "support", "families", "share", "America", "provide", "question", "school", "U.S.", "report", "important", "signed", "family", "legislation", "welcome", "country", "economy", "ACA", "hearing", "hope", "future", "good", "budget", "way", "best", "opportunity", "program", "honor", "immigration reform", "world", "thought", "like", "making", "people", "shut down", "children", "act", "morning", "president obama", "looking forward", "district", "student", "say", "raise the wage", "met", "let", "end", "thought", "like", "making", "people", "shut down", "children", "act", "morning", "president obama", "looking forward", "district", "student", "say".

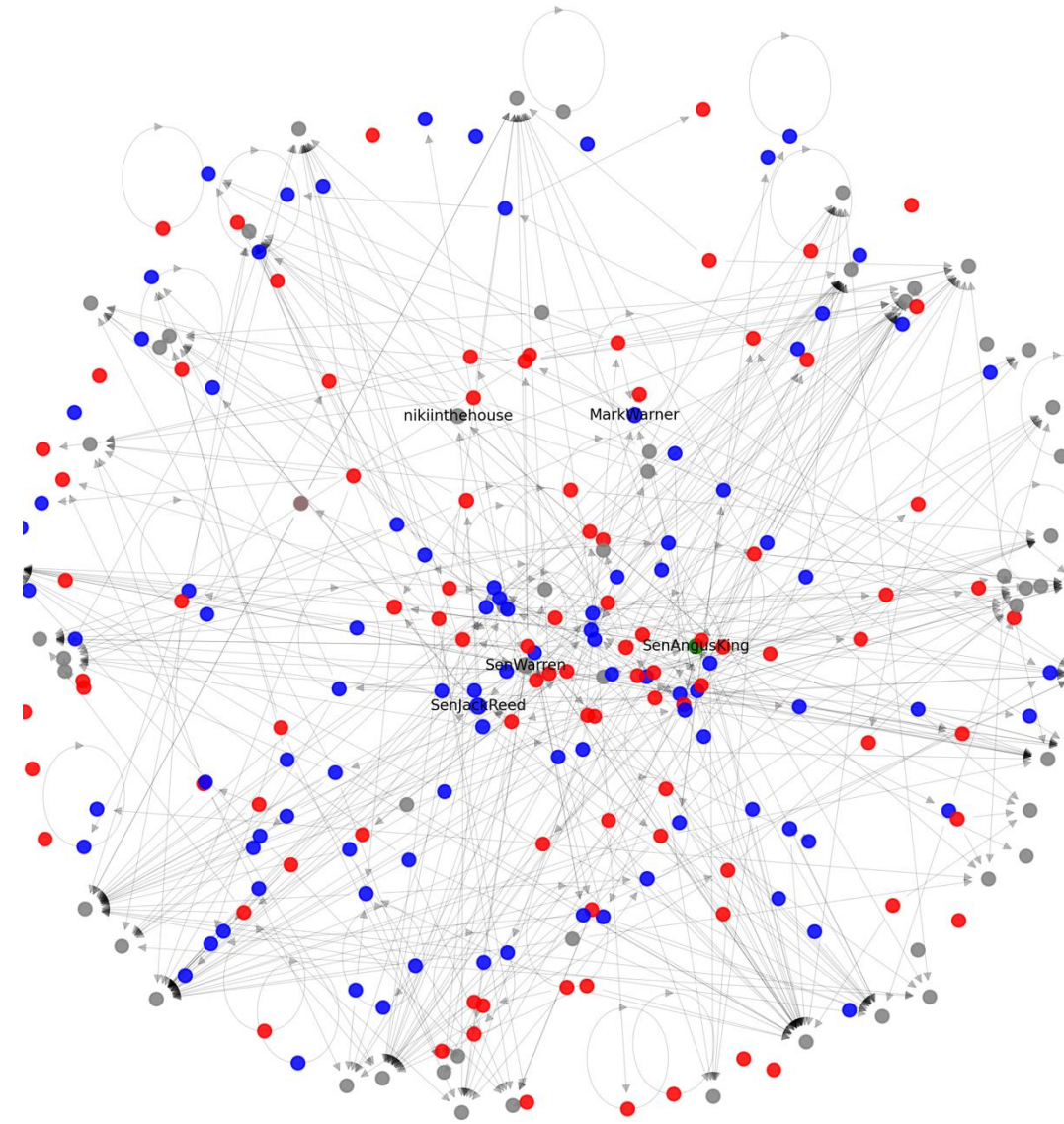
Topic 0 – Hearing/Event Updates

- Denser network with many cross-party mentions.
- Key bridges: RepHolding, RepDeSantis.
- Reflects procedural updates & announcements.



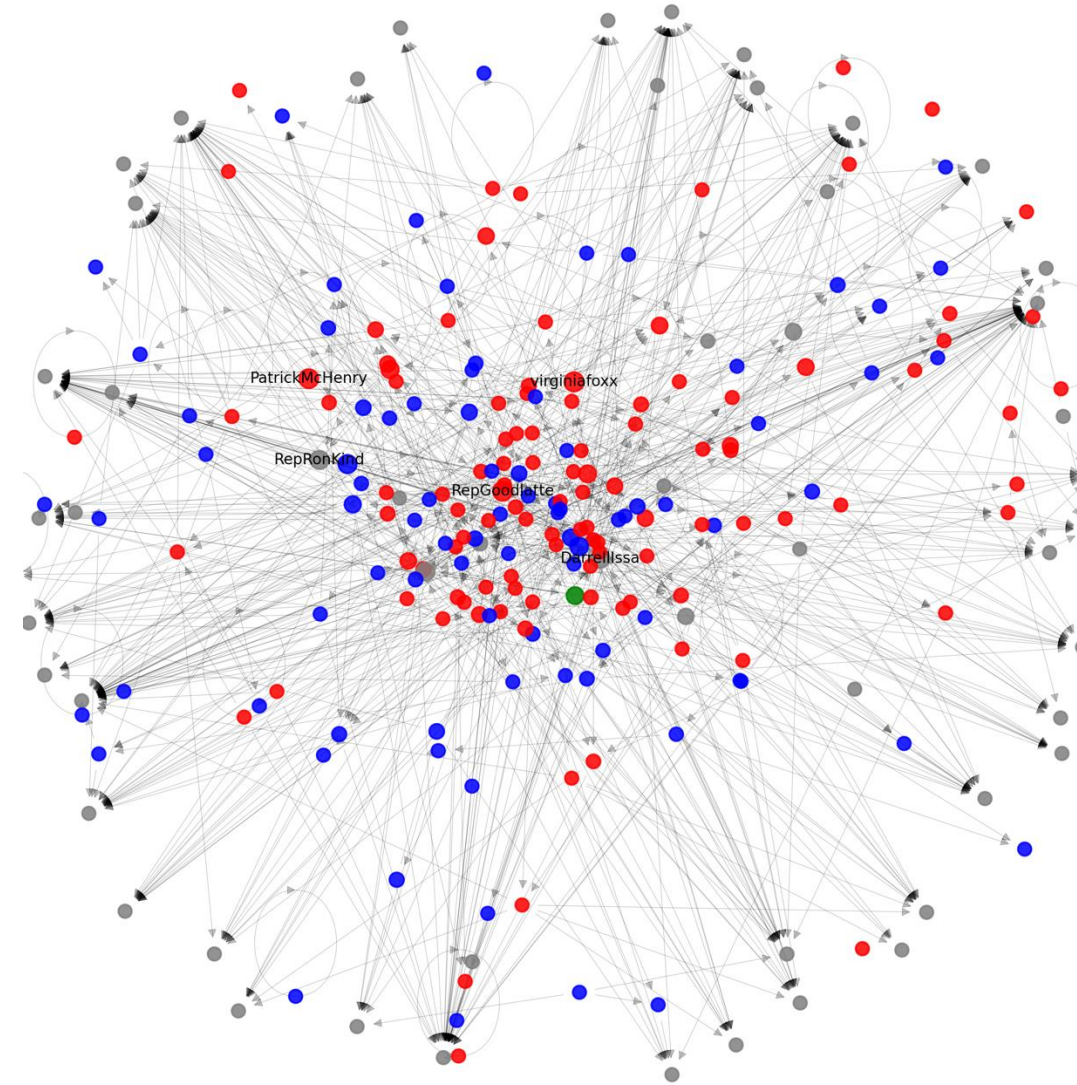
Topic 1 – Jobs & Economy

- More distributed structure.
- Key connectors: SenJackReed, SenWarren.
- Reflects bipartisan focus on economic messaging.



Topic 4 – Obamacare Debate

- Highly polarized with strong clustering.
- Top influencers: RepGoodlatte, virginiafoxx, DarrellIssa.
- Demonstrates partisan amplification.



Limitations & Conclusion

What our analysis cannot fully capture, and final takeaways on congressional political communication

Limitations

- No visibility into private interactions.
- Topic modeling abstracts nuanced political language.
- Mention networks based on explicit mentions only.

Lessons Learned

- Doing network analysis on this large of a scale is difficult and time consuming.
- Understanding of the value network analysis can bring in uncovering insights.

Key Takeaways

- Republicans tweet more, but Democrats receive higher engagement.
- Issue cycles heavily influence engagement spikes.
 - State of the Union, Election Seasons
- Mention networks identify influential communicators & bridge nodes.
- Congressional Twitter use became more structured and strategic over time.

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Questions?

Thank You!

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