

CSCI 572 Assignment 4 Report

1. Steps followed in the assignment:

- Installed Oracle VirtualBox and Ubuntu 16.04 LTS
- Downloaded and unzipped Solr 7.3.3 in Ubuntu
- Downloaded the google drive folder with HTML files for fox news website along with the mapping csv file.
- Started Solr server, created a new core 'myexample'. Modified config files, 'managed-scheme.xml'.
- Tried indexing based on just 5 html files as a test.
- Indexed all the HTML files in the 'foxnews' folder.
- Tried some basic queries on this index.
- Installed Apache and PHP on ubuntu using instructions given in FAQ no. 48.
- Cloned the git repository (<https://github.com/PTCInc/solr-php-client.git>) for making HTTPS requests to Solr into a folder.
- Modified the php file given in the writeup to only display items that are required (Title, URL, ID, Desc)
- Placed my front-end.php file into the above git folder and started php server from this location.
- Searched queries using the PHP user interface, made sure all fields are displayed as required in the assignment write up.
- Modified the ExtractLinks.java file given in the write-up.
- Created 2 hashmaps, one from URL to csv file and vice versa.
- Extracted all links from html files from folder and matched them with csv file name equivalents.

- Created and outputted edgelist as edges.txt
- Wrote python file 'MakePageRanks.py' using networkx library to convert edgelist into dictionary containing PageRank. PageRank values were computed using the PageRank function of networkx library using the following parameters:

```
nx.pagerank(G, alpha=0.85, personalization = None, max_iter=30,  
tol=1e-06, nstart=None, weight= 'weight', dangling=None)
```

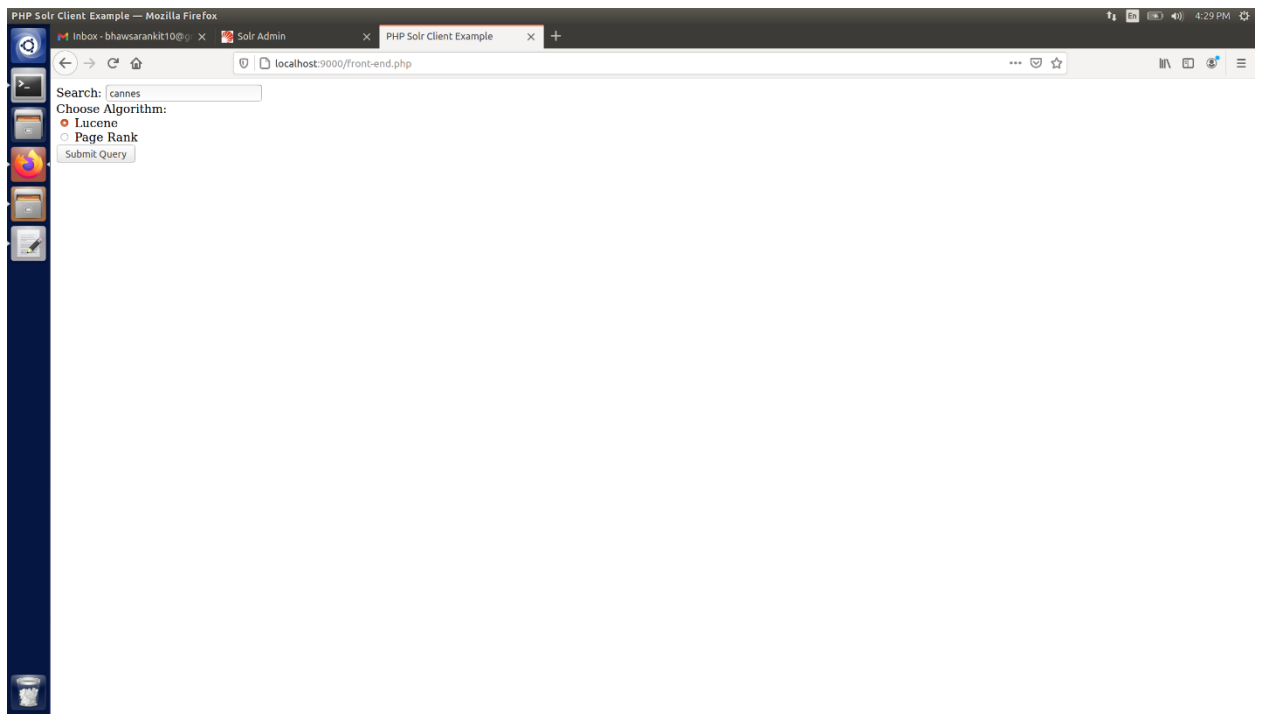
- Stored page rank value and file names in external_pageRankFile.txt
- Place external page rank file in the solr core folder inside the data folder.
- Modified config files, 'managed-schema.xml' and 'solr-config.xml' and verified working of PageRank algorithm in Solr.
- Added radio buttons functionality in php front end.

2. Why some pages have higher PageRank values than others:

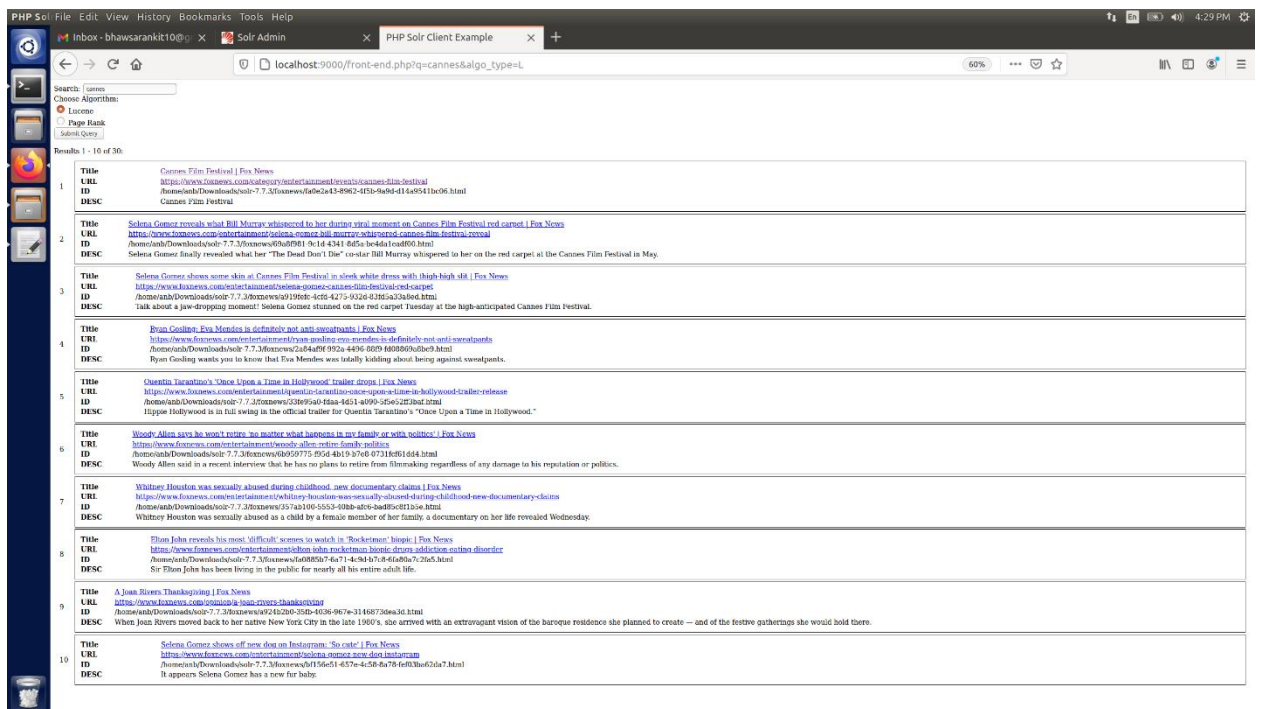
PageRank scores are a way to rank webpages. The higher the PageRank of a page, the more authoritative it is. Some pages have higher page rank than others because more webpages link to it. For example, a page having more in-links will be seen as reputable (as a lot a page's reference it), and the reputable page should have a high page rank. On the other hand, if a webpage has few inward facing links, it means its content is not verified because not a lot of people cite it. Such a page should have a low page rank score.

3. Flow of single query:

Home Page:



Lucene Search Results:



PageRank Results:

PHP Solr Client Example — Mozilla Firefox	
Inbox - bhawsarankit10@... x Solr Admin x PHP Solr Client Example x +	
localhost:9000/front-end.php?q=cannes&algo_type=PR	
Search [terms] Choose Algorithm: Lucene Page Rank Submit Query	
Results 1 - 10 of 30:	
1	<p>Title Roman Polanski accused of 'extremely violent' rape of French women in 1977 when she was 18, report Fox News</p> <p>URL https://www.foxnews.com/entertainment/roman-polanski-rape-1977</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/8665761e-59d9-4962-866d-09a4d6c0a2865.html</p> <p>DESC Roman Polanski is facing new sexual assault allegations.</p>
2	<p>Title Ryan Gosling: Eva Mendes is definitely not anti-sweatpants Fox News</p> <p>URL https://www.foxnews.com/entertainment/ryan-gosling-eva-mendes-is-definitely-not-anti-sweatpants</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/2a84d9f9-992a-449c-8d5f-8d006050b0c8.html</p> <p>DESC Ryan Gosling wants you to know that: Eva Mendes was totally kidding about being against sweatpants.</p>
3	<p>Title Julie Andrews says therapy 'saved' her life after her first marriage ended Fox News</p> <p>URL https://www.foxnews.com/entertainment/julie-andrews-therapy-saved-her-life</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/9222049c-0129-455d-995f-9c6c49c131d.html</p> <p>DESC Julie Andrews revealed it was therapy that saved "The Sound of Music" star's life after her first marriage came to an end in 1967.</p>
4	<p>Title Whitney Houston was sexually abused during childhood, new documentary claims Fox News</p> <p>URL https://www.foxnews.com/entertainment/whitney-houston-was-sexually-abused-during-childhood-new-documentary-claims</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/357ab100-5553-40bb-af6c-ba085c0f1b5e.html</p> <p>DESC Whitney Houston was sexually abused as a child by a female member of her family, a documentary on her life revealed Wednesday.</p>
5	<p>Title Selena Gomez poses with mom, sister in rare family photo... Couldn't love this more Fox News</p> <p>URL https://www.foxnews.com/entertainment/selena-gomez-mom-sister-rare-photo</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/2db1d501-09d1-4aa2-90e4-e31042d0460c.html</p> <p>DESC Girl met! Selena Gomez was spotted with her mom and sister at a concert over the weekend.</p>
6	<p>Title Sharon Stone Rocks Bikini: See Her Many Angles Looks Fox News</p> <p>URL https://www.foxnews.com/entertainment/sharon-stone-rocks-bikini-see-her-many-angles-looks</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/09651477-3edf-4743-a053-3c705d4b121.html</p> <p>DESC At age 55, actress Sharon is proudly flaunting her swimsuit-ready body in a tiny bikini for the cover of Shape Magazine. PHOTOS: Sharon Stone's Body-Hugging Dress To Movie Premiere But the road to aging gracefully was rough for the sultry "Basic Instinct" star. PHOTOS: 8 Celebs Over 40 Who Look Better With Age "It hasn't been easy," Stone tells Shape. "There was a point in my 4th when I went into the bathroom with a bottle of wine, kicked the door and said, 'I'm not coming out until I can totally accept the way I look right now.'" READ: Sharapov's Stylish In Your 40s And Beyond Fortunately for us, Stone did eventually come out, but not without shedding some tears first. "I examined my face in the magnifying mirror, and I looked at my body, and I cried and cried and cried," she confessed, as reported by ET Online. "Then I said to myself, 'You're going to get old now. How do you want to do that?'" PHOTOS: The Age-Defying Christine Bleckley And how she does it. Stone kept her fabulous figure in the top shape! According to E!, she wanted to take control of her body by saying "f--- it a dance," which means working out at the gym daily. Lots of stretching, and dancing. Keeping her diet. Stone admits to indulging in "portobello steak, rib eyes, and New York strip" only because she has a "very low cholesterol and very low blood pressure." However, she is conscious of her eating habits by preparing clean food "as simply as possible," as well as eating fish. READ: What To Eat In Your 40s, 50s And Beyond However, there is one thing that she's given up on. Prepare to grab the tissues. "I used to love wine, but I can't drink at all now," says Stone. "I think, at a certain point, it's better for women not to have any alcohol because it can make your face, breast, and midsection get very bloated." READ: Julianne Moore's Pub After 50 Secrets While Stone's method of being the best she can be at her age may not work for everyone, the glowing results show. See some of Stone's angles looks below.</p>
7	<p>Title Dwayne 'The Rock' Johnson's Sister Dwayne 'The Rock' Johnson's Sister Fox News</p> <p>URL https://www.foxnews.com/entertainment/dwayne-johnson-sister-dwayne-rocky-is-hospital</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/4174ed77-8d36-4074-91b4-6a06c0c909c6.html</p> <p>DESC Sylvester Stallone and Dwayne Johnson may be the best of friends now, but Sly didn't always love the Swedish born karate champion.</p>
8	<p>Title Michael Moore endorses Bernie Sanders: 'He isn't afraid to say capitalism is the problem' Fox News</p> <p>URL https://www.foxnews.com/entertainment/michael-moore-endorses-bernie-sanders</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/1c1e755f-1e41-4d2d-9762-4132a0d85493.html</p> <p>DESC Documentary filmmaker Michael Moore endorsed Sen. Bernie Sanders, I-Vt., for president on Friday. He said Sanders isn't "afraid" to say that capitalism is the problem.</p>
9	<p>Title Elton John reveals his most 'difficult' scenes to watch in 'Rocketman': biopic Fox News</p> <p>URL https://www.foxnews.com/entertainment/elton-john-rock-movie-biopic-draws-attention-to-mental-disorder</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/0a0813a7-4b71-499b-8708-6b40ba7c2ba3.html</p> <p>DESC Sir Elton John has been living in the public for nearly all his entire adult life.</p>
10	<p>Title Cannes Film Festival Fox News</p> <p>URL https://www.foxnews.com/culture/cannes-film-festival</p> <p>ID /home/anh/Downloads/solr-7.7.3/foxnews/0a0813a7-4b71-499b-8708-6b40ba7c2ba3.html</p>

Webpage:

Ryan Gosling: Eva Mendes is definitely not anti-sweatpants | Fox News — Mozilla Firefox

Inbox - bhawsarankit10@... x Solr Admin x PHP Solr Client Example x **Ryan Gosling: Eva Mendes** x +

https://www.foxnews.com/entertainment/ryan-gosling-eva-mendes-is-definitely-not-anti-sweatpants

To play video, you may need to install the required video codecs.

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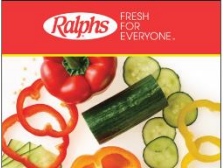
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VIRAL · Published May 2, 2016 11:19am EDT

Ryan Gosling: Eva Mendes is definitely not anti-sweatpants

By | New York Post

Facebook Twitter Reddit YouTube Email

4. Table for comparing algorithms:

Excel Sheet for this table has also been provided for easy-to-read access.

Query	S r. N o.	Lucene Search	PageRank Search
Cannes	1	https://www.foxnews.com/category/entertainment/events/cannes-film-festival	https://www.foxnews.com/entertainment/french-woman-roman-polanski-rape-1975
	2	https://www.foxnews.com/entertainment/selena-gomez-bill-murray-whispered-cannes-film-festival-reveal	https://www.foxnews.com/entertainment/ryan-gosling-eva-mendes-is-definitely-not-anti-sweatpants
	3	https://www.foxnews.com/entertainment/selena-gomez-cannes-film-festival-red-carpet	https://www.foxnews.com/entertainment/julie-andrews-therapy-saved-my-life
	4	https://www.foxnews.com/entertainment/ryan-gosling-eva-mendes-is-definitely-not-anti-sweatpants	https://www.foxnews.com/entertainment/whitney-houston-was-sexually-abused-during-childhood-new-documentary-claims
	5	https://www.foxnews.com/entertainment/quentin-tarantino-once-upon-a-time-in-hollywood-trailer-release	https://www.foxnews.com/entertainment/selena-gomez-mom-sister-concert
	6	https://www.foxnews.com/entertainment/woody-allen-retire-family-politics	https://www.foxnews.com/entertainment/sharon-stone-rocks-bikini-see-her-many-ageless-looks
	7	https://www.foxnews.com/entertainment/whitney-houston-was-sexually-abused-during-childhood-new-documentary-claims	https://www.foxnews.com/entertainment/dolph-lundgren-sylvester-stallone-rocky-iv-hospital

	8	https://www.foxnews.com/entertainment/elton-john-rocketman-biopic-drugs-addiction-eating-disorder	https://www.foxnews.com/entertainment/michael-moore-endorses-bernie-sanders
	9	https://www.foxnews.com/opinion/a-joan-rivers-thanksgiving	https://www.foxnews.com/entertainment/elton-john-rocketman-biopic-drugs-addiction-eating-disorder
	10	https://www.foxnews.com/entertainment/selena-gomez-new-dog-instagram	https://www.foxnews.com/category/entertainment/events/cannes-film-festival
Congress	1	https://www.foxnews.com/us/navy-vet-donates-gold-star-families-stories-to-library-of-congress	https://www.foxnews.com/opinion
	2	https://www.foxnews.com/opinion/judge-andrew-napolitano-congress-constitutional-power-declare-war	https://www.foxnews.com/tech
	3	https://www.foxnews.com/politics/jon-stewart-blasts-congress-over-9-11-fund-hearing-drove-me-nuts-there-were-empty-seats	https://www.foxnews.com/category/world/conflicts
	4	https://www.foxnews.com/opinion/rep-andy-biggs-congress-debt-ceiling-budget-deal	https://www.foxnews.com/category/politics/foreign-policy
	5	https://www.foxnews.com/opinion/gutfeld-congress-attacking-zuckerberg	https://www.foxnews.com/official-polls

	6	https://www.foxnews.com/opinion/andy-biggs-congress-judges-immigration-laws	https://www.foxnews.com/category/politics/executive
	7	https://www.foxnews.com/faith-values/bible-school-drew-brees-day-congress	https://www.foxnews.com/category/tech/topics/security
	8	https://www.foxnews.com/category/us/congress	https://www.foxnews.com/opinion/mike-huckabee-lets-fight-for-fabricated-structural-steel-manufacturing-jobs
	9	https://www.foxnews.com/opinion/bradley-blakeman-trade-pact-with-canada-and-mexico-offers-incredible-benefits-congress-should-approve-it	http://www.foxnews.com/trending
	10	https://www.foxnews.com/politics/trump-tells-congress-to-immediately-approve-mexico-canada-trade-deal-says-us-moving-past-stupid-years-of-trade-policy	https://www.foxnews.com/media/elijah-cummings-seat-kimberly-klacik-baltimore-election-republican
Democrats	11	https://www.foxnews.com/opinion/rnc-chair-mcdaniel-democrats-impeachment-vote-is-baseless-political-vendetta-trump-did-nothing-wrong	https://www.foxnews.com/opinion
	12	https://www.foxnews.com/politics/democrats-arent-actually-impeaching-the-president-yet-but-they-are-digging-deep	https://www.foxnews.com/us
	13	https://www.foxnews.com/opinion/david-bossie-baseless-trump-	https://www.foxnews.com

	<u>impeachment-inquiry-by-desperate-democrats-makes-dramatic-flip-flop</u>	
4	<u>https://www.foxnews.com/politics/federal-judge-house-democrats-mazars-subpoena-trump-financial-record</u>	<u>https://www.foxnews.com/politics</u>
5	<u>https://www.foxnews.com/opinion/rep-andy-biggs-lipstick-impeachment</u>	<u>https://www.foxnews.com/category/politics/elections</u>
6	<u>https://www.foxnews.com/media/democrats-disdain-working-class-trump-jr-fox-friends</u>	<u>https://www.foxnews.com/category/world/scandals</u>
7	<u>https://www.foxnews.com/opinion/liz-harrington-democrats-holding-soviet-style-show-trial-to-overthrow-trump-not-an-impeachment-inquiry</u>	<u>https://www.foxnews.com/category/world/conflicts</u>
8	<u>https://www.foxnews.com/opinion/donald-trump-jr-democrats-immigration-radical-ideology</u>	<u>https://www.foxnews.com/category/politics/foreign-policy</u>
9	<u>https://www.foxnews.com/opinion/hans-von-spakovsky-in-trump-impeachment-probe-democrats-refuse-to-follow-nixon-and-clinton-precedents</u>	<u>https://www.foxnews.com/category/politics/senate</u>
10	<u>https://www.foxnews.com/opinion/david-bossie-trump-impeachment-vote-is-democratic-declaration-of-war-republicans-must-declare-war-on-dems</u>	<u>https://www.foxnews.com/category/politics/house-of-representatives</u>

Patriot Movement	1	https://www.foxnews.com/politics/trump-antifa-terrorist-portland-protests	https://www.foxnews.com/science
	2	https://www.foxnews.com/world/iranian-cruise-missiles-drones-saudi-oil	https://www.foxnews.com
	3	https://www.foxnews.com/media/fox-nation-patriot-awards-american-heroes-st-petersburg	https://www.foxnews.com/tech
	4	https://www.foxnews.com/media/fox-nation-patriot-awards	https://www.foxnews.com/category/entertainment/movies
	5	https://www.foxnews.com/media/marine-vet-most-valuable-patriot-awards-congress	https://www.foxnews.com/category/science/planet-earth
	6	https://www.foxnews.com/faith-values/veterans-serve-disaster-relief	https://www.foxnews.com/entertainment/gwyneth-paltrow-relationship-harvey-weinstein
	7	https://www.foxnews.com/media/tomi-lahren-patriot-awards-fox-nation	https://www.foxnews.com/politics/aoc-bloomberg-purchase-election
	8	https://www.foxnews.com/entertainment/netflix-pulls-patriot-act-with-hasan-minhaj-episode-after-getting-valid-legal-complaint-from-saudi-arabia	https://www.foxnews.com/world/ukraine-russia-separatists-pullback
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	12	https://www.foxnews.com/opinion/tom-del-beccaro-republicans-must-win-the-impeachment-trial-and-they-can-by-following-these-five-steps	https://www.foxnews.com
	13	https://www.foxnews.com/politics/republicans-hunter-biden-ukraine-whistleblower-impeachment-witness	https://www.foxnews.com/politics
	14	https://www.foxnews.com/politics/house-republicans-plan-to-call-adam-schiff-to-testify-in-impeachment-inquiry-call-him-a-fact-witness	https://www.foxnews.com/category/politics/elections
	15	https://www.foxnews.com/politics/trump-settles-score-with-republicans-who-didnt-embrace-him-in-midterms	https://www.foxnews.com/category/world/scandals
	16	https://www.foxnews.com/politics/republicans-impeachment-hearings-lineup	https://www.foxnews.com/category/world/conflicts
	17	https://www.foxnews.com/politics/bill-weld-thrilled-other-	https://www.foxnews.com/category/politics/senate

		republicans-are-challenging-trump-in-primary	
	8	https://www.foxnews.com/entertainment/chelsea-handler-republicans-colorado-school-shooting	https://www.foxnews.com/category/politics/house-of-representatives
	9	https://www.foxnews.com/opinion/matt-gorman-kavanaugh-republicans	https://www.foxnews.com/official-polls
	10	https://www.foxnews.com/opinion/newt-gingrich-house-republicans-2020-retirements	https://www.foxnews.com/politics
Senate	11	https://www.foxnews.com/politics/trump-senate-trial-impeachment-inquiry-reporters-notebook	https://www.foxnews.com/opinion
	12	https://www.foxnews.com/category/politics/2020-senate-races	https://www.foxnews.com/world
	13	https://www.foxnews.com/media/jeff-sessions-former-embattled-trump-attorney-general-announces-bid-for-old-us-senate-seat	https://www.foxnews.com/us
	14	https://www.foxnews.com/opinion/newt-gingrich-left-viciously-attacks-mcconnell-because-hes-successful-senate-leader-and-trump-ally	https://www.foxnews.com/science
	15	https://www.foxnews.com/faith-values/pastor-andrew-brunson-senate-trump-prayer	https://www.foxnews.com/shows

	6	https://www.foxnews.com/politics/jeff-sessions-alabama-senate-campaign-expected	https://www.foxnews.com/health
	7	https://www.foxnews.com/politics/trump-sessions-against-senate-run-alabama	https://www.foxnews.com/travel
	8	https://www.foxnews.com/category/politics/elections/senate	https://www.foxnews.com/entertainment
	9	https://www.foxnews.com/politics/virginia-democrat-accused-of-sex-with-teen-secretary-wins-state-senate-seat	https://www.foxnews.com
	10	https://www.foxnews.com/media/trump-senate-mike-pence-joe-scarborough	https://www.foxnews.com/tech
Olympics 2020	1	https://www.foxnews.com/sports/alex-morgan-2020-olympics-child-birth	https://www.foxnews.com/opinion
	2	https://www.foxnews.com/sports/naomi-osaka-us-citizenship-japan-2020-olympics	https://www.foxnews.com/entertainment
	3	https://www.foxnews.com/category/sports/olympics	https://www.foxnews.com
	4	https://www.foxnews.com/tech/russian-hackers-attack-possible-olympic-ban	https://www.foxnews.com/tech
	5	https://www.foxnews.com/category/sports/soccer	https://www.foxnews.com/politics

	6	https://www.foxnews.com/person/c/barnini-chakraborty	https://www.foxnews.com/category/health/heart-health
	7	https://www.foxnews.com/category/person/alex-morgan	https://www.foxnews.com/lifestyle
	8	https://www.foxnews.com/category/sports/tennis	https://www.foxnews.com/category/entertainment/tv
	9	https://www.foxnews.com/sports/kikkan-randall-new-york-city-marathon-skiing-cancer	https://www.foxnews.com/category/tech/topics/video-games
	10	https://www.foxnews.com/sports	https://www.foxnews.com/category/politics/elections
Stock	1	https://www.foxnews.com/tech/jeff-bezos-to-be-no-2-richest-behind-bill-gates-after-amazon-stock-drop	https://www.foxnews.com
	2	https://www.foxnews.com/transcript/cavuto-looking-back-at-the-stock-market-crash-30-years-ago	https://www.foxnews.com/category/us/economy
	3	https://www.foxnews.com/transcript/cavuto-the-markets-are-easier-to-take-stock-of-than-life	https://www.foxnews.com/science/revolutionary-war-rifle-stolen-50-years-ago-on-display
	4	https://www.foxnews.com/category/shows/your-world/transcript/common-sense	https://www.foxnews.com/entertainment/demi-lovato-first-interview-year
	5	https://www.foxnews.com/category/tech/companies/amazon	https://www.foxnews.com/media/chris-wallace-elizabeth-warren-medicare-for-all-plan
	6	https://www.foxnews.com/person/c/gordon-chang	https://www.foxnews.com/tech/hp-recalls-more-laptop-lithium-ion-

			batteries-after-reports-of-overheating-melting-and-charring
	7	https://www.foxnews.com/category/tech/companies/microsoft	https://www.foxnews.com/tech/heres-how-the-trump-tariffs-hike-may-affect-prices-for-pc-parts
	8	https://www.foxnews.com/category/person/sheryl-sandberg	https://www.foxnews.com/category/tech/companies/amazon
	9	https://www.foxnews.com/auto/fiat-chrysler-sales-boss-reid-bigland-sues-company-for-violating-whistleblower-protections	https://www.foxnews.com/opinion/max-lucado-fearless-parenting
	10	https://www.foxnews.com/sports/royals-hire-ex-cardinals-skipper-mike-matheny-as-manager	https://www.foxnews.com/auto/electric-ford-mustang-lithium
Virus	1	https://www.foxnews.com/tech/computer-virus-cripples-tribune-publishing-los-angeles-times	https://www.foxnews.com/science
	2	https://www.foxnews.com/science/deadly-seal-virus-spreading-melting-arctic-ice	https://www.foxnews.com/category/science/wild-nature
	3	https://www.foxnews.com/health/connecticut-third-mosquito-eee-death	https://www.foxnews.com/category/tech/topics/computers
	4	https://www.foxnews.com/category/tech/topics/virus	https://www.foxnews.com/category/science/planet-earth
	5	https://www.foxnews.com/health/eee-eastern-equine-encephalitis-massachusetts-man-killed	https://www.foxnews.com/science/deadly-seal-virus-spreading-melting-arctic-ice

6	https://www.foxnews.com/health/what-is-norovirus-3-things-to-know-about-the-vomit-inducing-bug	https://www.foxnews.com/science/sandra-orangutan-legal-personhood-new-home-florida
7	https://www.foxnews.com/health/pregnant-women-who-get-flu-shot-are-less-likely-to-be-hospitalized-from-virus-cdc-says	https://www.foxnews.com/science/ancient-shipwrecks-stone-pyramid-anchors-discovered-greek-island
8	https://www.foxnews.com/category/health/infectious-disease/zika	https://www.foxnews.com/science/earths-mantle-and-crust-are-in-a-fiery-battle-to-the-death-of-supercontinents
9	https://www.foxnews.com/health/flu-season-2019-vaccine	https://www.foxnews.com/science/mammoth-traps-prehistoric-mexico
10	https://www.foxnews.com/health/british-mom-son-flu	https://www.foxnews.com/science/mercury-transit-2019-what-to-know

5. **Overlap Graph:**

After running a python script on the above table, I found the following overlap statistics:

```
{'Cannes': 4,
'Congress': 0,
'Democrats': 0,
'Patriot Movement': 0,
'Republicans': 0,
'Senate': 0,
'Olympics 2020': 0,
```

'Stock': 1,
'Virus': 1}

Overlap Graph:

