

```
In [ ]: # Code taken from Week 2 Session Activity.
```

```
In [54]: # installing relevant libraries
```

```
!pip install pandas  
!pip install sklearn
```

Requirement already satisfied: pandas in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (1.5.2)

Requirement already satisfied: python-dateutil>=2.8.1 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from pandas) (2.8.2)

Requirement already satisfied: pytz>=2020.1 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from pandas) (2022.6)

Requirement already satisfied: numpy>=1.20.3 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from pandas) (1.23.5)

Requirement already satisfied: six>=1.5 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from python-dateutil>=2.8.1->pandas) (1.16.0)

Requirement already satisfied: sklearn in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (0.0.post1)

```
In [55]: !pip3 install -U scikit-learn scipy matplotlib
```

Requirement already satisfied: scikit-learn in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (1.2.0)

Requirement already satisfied: scipy in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (1.9.3)

Requirement already satisfied: matplotlib in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (3.6.2)

Requirement already satisfied: numpy>=1.17.3 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from scikit-learn) (1.23.5)

Requirement already satisfied: joblib>=1.1.1 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from scikit-learn) (1.2.0)

Requirement already satisfied: threadpoolctl>=2.0.0 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from scikit-learn) (3.1.0)

Requirement already satisfied: cycler>=0.10 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (0.11.0)

Requirement already satisfied: packaging>=20.0 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (22.0)

Requirement already satisfied: pyparsing>=2.2.1 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (3.0.9)

Requirement already satisfied: contourpy>=1.0.1 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (1.0.6)

Requirement already satisfied: pillow>=6.2.0 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (9.3.0)

Requirement already satisfied: python-dateutil>=2.7 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (2.8.2)

Requirement already satisfied: fonttools>=4.22.0 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (4.38.0)

Requirement already satisfied: kiwisolver>=1.0.1 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from matplotlib) (1.4.4)

Requirement already satisfied: six>=1.5 in /Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages (from python-dateutil>=2.7->matplotlib) (1.16.0)

In [56]: `nltk.download('wordnet')`

```
[nltk_data] Downloading package wordnet to
[nltk_data]   /Users/kzaromytidou/nltk_data...
[nltk_data]   Package wordnet is already up-to-date!
```

Out[56]: True

In [57]: `import pandas as pd`
`import nltk`
`from nltk.stem.wordnet import WordNetLemmatizer`
`from sklearn.feature_extraction import stop_words as stop_words`
`from sklearn.metrics.pairwise import cosine_similarity as cosine`
`from sklearn.feature_extraction.text import TfidfVectorizer`
`from sklearn.feature_extraction.text import CountVectorizer`
`from sklearn.decomposition import LatentDirichletAllocation`
`from nltk.tokenize.casual import casual_tokenize`

```
import pandas as pd
import re
from sklearn.decomposition import TruncatedSVD
```

```
In [58]: # #Reading the CSV file into a pandas dataframe
data_from_csv = pd.read_csv('data/Putin_Tweets.csv', encoding='utf-8')
data_from_csv.sample(5) #show a sample of 5 rows
```

```
Out[58]:
```

	UserScreenName	UserName	...	Image I
3828	susan D	@footballsuz1564	...	
8959	Jeff the	@DemannFunk	...	
5964	Chip Taylor	@ChipTaylor17	...	
4907	Senate Foreign Relations Committee	@SFRCDems	...	['https://pbs.twimg.com/profile_images/106191
9208	Salvatore #OndaCivica #FBPEGlobal	@salfasanop	...	['https://pbs.twimg.com/profile_images/46549

5 rows x 11 columns

```
In [59]: #showing how many rows and columns are included in the data file.
np.shape(data_from_csv)
```

```
Out[59]: (10737, 11)
```

```
In [41]: #firstly change an existing column with the name 'Text' to 'Source' as the
df1 = data_from_csv.rename(columns={'Text': 'source'})
df1
```

Out [41]:

	UserScreenName	UserName	...	
0	Free Syrian Memes	@FreeSyrianMemes	...	['https://pbs.twimg.com/media/FIDMAkeXsA
1	ciciu	@_ciciulena	...	
2	TOM	@lonestarmoocher	...	['https://pbs.twimg.com/media/FICgVy4VgA
3	Tom London	@TomLondon6	...	
4	Ukemonde	@ukemonde	...	['https://pbs.twimg.com/media/FIDHb0SXM
...	
10732	RoCo STOP PUTIN!	@RoCoGB	...	['https://pbs.twimg.com/profile_images/
10733	Stefan Resists Putin	@StefanK1117	...	['https://pbs.twimg.com/profile_images/
10734	Comrade Misty is Putin's Buddy	@SarcasmStardust	...	['https://pbs.twimg.com/card_img/154866
10735	Dr Putin parody russian president	@TheSigmaMaleDoc	...	['https://pbs.twimg.com/profile_images
10736	RoCo STOP PUTIN!	@RoCoGB	...	

10737 rows x 11 columns

In [60]:

```
#now rename the column 'Embedded_text' to 'text' to better use in the pro
df = df1.rename(columns={'Embedded_text': 'text'})
df
```

Out [60]:

	UserScreenName	UserName	...	
0	Free Syrian Memes	@FreeSyrianMemes	...	['https://pbs.twimg.com/media/FIDMAkeXsA
1	ciciu	@_ciciulena	...	
2	TOM	@lonestarmoocher	...	['https://pbs.twimg.com/media/FICgVy4VgA
3	Tom London	@TomLondon6	...	
4	Ukemonde	@ukemonde	...	['https://pbs.twimg.com/media/FIDHb0SXM
...	
10732	RoCo STOP PUTIN!	@RoCoGB	...	['https://pbs.twimg.com/profile_images/
10733	Stefan Resists Putin	@StefanK1117	...	['https://pbs.twimg.com/profile_images/
10734	Comrade Misty is Putin's Buddy	@SarcasmStardust	...	['https://pbs.twimg.com/card_img/154866
10735	Dr Putin parody russian president	@TheSigmaMaleDoc	...	['https://pbs.twimg.com/profile_images
10736	RoCo STOP PUTIN!	@RoCoGB	...	

10737 rows x 11 columns

In []: *# Applying LSA. following the code from "NLP Week 2.2-Lecture.ipynb" notebook*

Now, let's apply LSA.

Grab some code from the "NLP Week 2.2-Lecture.ipynb" notebook to do the following:

- Create count vectors for your corpus, using a tokenizer of your choice (e.g., possibly Louis' custom tokenizer, or perhaps another one you think will be good for this task)
- Create tf-idf vectors from the count vectors
- Centre the vectorized documents by subtracting the mean
- Use TruncatedSVD to compute the LSA topic vectors. Use 10 topics and 30 iterations to start with.
- Explore the results.
 - Do the topics seem to correspond to movie genres, to types of reviews, or anything else?
 - Do the topic weights for individual reviews seem to make sense to you?
- Try changing the number of topics to fewer (e.g., 3?) or more (e.g., 20) and explore how this changes the results.
- Optional bonus: Can you write some code that allows you to construct a query for this corpus? It should use cosine similarity to find the movie review(s) that best match a text string you provide.

```
In [43]: #Creating count vectors for the corpus.
lem = WordNetLemmatizer()
def my_tokeniser(doc):
    #Split on spaces
    tokens = re.split(r'[-\s.,;!?]+', doc)
    return [lem.lemmatize(t.lower()) for t in tokens if not t in stop_words]
```

```
In [44]: # Using a tokenizer
tfidf_vectoriser = TfidfVectorizer(tokenizer=my_tokeniser)
```

```
In [45]: # Create tf-idf vectors from the count vectors
tfidf = tfidf_vectoriser.fit_transform(df["text"])
#Save list of unique tokens (vocab) for later
vocab = tfidf_vectoriser.get_feature_names_out()
tfidf_df = pd.DataFrame(tfidf.todense(), columns = vocab)
print(tfidf.todense().shape)
```

```
/Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages/sklearn/feature_extraction/text.py:528: UserWarning: The parameter 'token_pattern' will not be used since 'tokenizer' is not None
warnings.warn(
(10737, 40394)
```

```
In [46]: #Centring the vectorized documents by subtracting the mean
tfidf_df = tfidf_df - tfidf_df.mean()
```

```
In [47]: #Selecting the amount of topics
num_topics = 5
```

```
pd.options.display.max_columns=num_topics
labels = ['topic{}'.format(i) for i in range(num_topics)]
```

In [48]: labels

Out[48]: ['topic0', 'topic1', 'topic2', 'topic3', 'topic4']

In [49]: *#Calculating the topics*
 svd = TruncatedSVD(n_components = num_topics, n_iter = 100)
 svd_topic_vectors = svd.fit_transform(tfidf_df.values)

In [50]: svd_topic_vectors_df = pd.DataFrame(svd_topic_vectors, columns=labels)
 svd_topic_vectors_df.sample(10)

Out[50]:

	topic0	topic1	topic2	topic3	topic4
8635	-0.016524	0.037609	-0.016443	-0.075015	0.001281
9155	-0.096730	-0.034389	-0.000352	-0.022098	-0.008409
4136	-0.025853	0.011770	-0.035068	-0.035704	0.037031
6854	0.055518	-0.022813	0.115357	0.044891	0.032662
2261	0.082534	-0.006170	0.072877	-0.010984	0.027822
5809	0.045710	-0.049622	-0.015528	0.026464	0.008322
7217	0.011676	-0.045691	-0.027386	-0.015149	-0.017180
6345	0.075423	0.058743	-0.032145	0.111943	-0.026938
5653	-0.004764	-0.075769	-0.026904	0.069425	-0.012882
2007	-0.004880	0.025897	0.008604	-0.048398	-0.004206

In [51]: *#Calculating and printing how much does each topic apply to each token*
 topic_weights = pd.DataFrame(svd.components_.T, index=vocab, columns=labels)
 topic_weights.sample(20)

Out [51]:

	topic0	topic1	topic2	topic3	topic4
theft	0.001578	0.000934	0.001068	-0.001402	0.000585
@atluck	0.000102	0.000681	0.000158	-0.000122	0.000152
checker	-0.000712	0.000125	-0.000103	-0.000917	-0.000638
liberall	-0.000107	0.000824	-0.000459	0.000520	-0.000586
barrons	0.000194	-0.000084	0.000471	-0.000471	0.000126
charismatic	-0.000482	-0.000091	0.001114	0.000654	0.000693
358	-0.000402	-0.000069	0.000011	-0.000660	0.000282
runnin	0.000206	0.000613	-0.000724	0.001594	0.001034
transparency	0.000231	0.000107	0.001195	-0.000828	0.000361
president	0.173807	-0.047690	0.341018	-0.016224	0.100096
ups	0.000024	0.000780	0.000002	0.000722	0.000739
"president	0.000573	-0.000212	0.000124	-0.000389	-0.000374
china's	0.002856	-0.000481	0.002170	-0.002604	-0.002625
com/jayrosen_nyu/s...	-0.000070	0.000656	-0.000241	0.000133	-0.000115
wonder...	-0.000191	0.000282	0.000002	-0.000291	-0.000121
insider	-0.000436	0.001079	0.000805	-0.003800	0.000090
variant...	0.000111	0.000799	0.000029	0.000015	-0.000170
redeploys	-0.000366	-0.000205	-0.000427	0.000013	-0.000336
quickly	0.002792	-0.004771	-0.006582	0.001099	-0.002252
impotence	0.000202	0.000467	0.000147	0.000416	-0.000515

In [52]: `short_text = [t[:50] for t in df["text"]]`In [53]: `#Calculating and printing much does each topic apply to each tweet
svd_topic_vectors_df = pd.DataFrame(svd_topic_vectors, columns=labels, in
svd_topic_vectors_df.sample(40)`

Out [53]:

	topic0	topic1	topic2	topic3	topic4
Replying to \n@NBCPolitics\nWorking for Putin. \nWe	-0.124987	-0.070067	-0.013211	0.005478	0.062008
"I fear that Putin is very likely to invade," Schi	0.103125	-0.043814	0.038158	-0.002889	-0.006661
Genocide in Ukraine: Vladimir Putin just gave his	0.107341	-0.067725	-0.061400	-0.015674	0.036024
Replying to \n@Mickangelo\n and \n@IAPonomarenko\nwea	-0.002056	-0.041532	-0.027316	-0.008728	0.030199
Replying to \n@mark_b_goode\n @pointofsucces\n and 2	-0.077857	-0.009644	0.164212	0.069630	-0.032437
Ukraine and Poland used to be one country. My ance	0.076429	-0.051810	-0.031611	0.049165	-0.017586
I think the territorial claims argument is oversta	0.057420	0.064120	0.012939	0.003061	0.014292
Replying to \n@MisterChipT\nHitler did the same thin	-0.114835	-0.033034	0.010645	0.017606	-0.126828
Replying to \n@TheRickWilson\nHow long before we get	-0.071458	-0.017905	0.003672	-0.019615	-0.089763
Replying to \n@xrisii\nDid it ever occur to you that	0.027187	0.009684	0.098575	0.084761	0.022982
This is terrific. An unimpeachable case showing a	0.036877	0.066649	0.007166	-0.024846	0.016600
We will never forget: #Putin is a war criminal.\n10	0.043919	0.008474	-0.084176	-0.036861	0.009931
If Putin decides to attack the western Ukraine, we	0.031010	-0.025618	-0.017644	-0.027002	0.030307
Replying to \n@carpediemer52\n and \n@JuliaDavisNews\n	-0.066418	-0.009682	0.005986	-0.028063	-0.012169
Btw: Putin effectively has 45,000 Belarusian troop	0.079252	-0.069665	-0.027787	0.018781	-0.094592
Putin's paedophiles.\nRussian terrorism at its wors	0.039703	0.109169	-0.032727	0.004478	-0.021085
Replying to \n@Robertamnesia\nThis is a glorious day	-0.058078	0.019498	-0.001936	-0.011198	-0.063798
Biden: Putin cannot remain in power\n\nMedia: OOOOOO	-0.017173	0.007856	0.037612	0.002862	0.007866
When Donald Trump was President the United States	0.009359	0.019273	0.125107	0.028225	0.019039
"Putin may not exactly know what he wants, but he	0.107419	-0.053926	-0.031013	0.026470	-0.032302

	topic0	topic1	topic2	topic3	topic4
Europe is set to sanction Putin's rumored girlfrie	0.035801	0.013265	-0.013274	-0.069076	0.011808
7/ If #Putin believes that he has taken an all-or-	0.004979	0.013822	0.007799	-0.047929	-0.065704
Time and again, President Biden has turned to our	0.032111	0.028385	0.077419	-0.007168	-0.051331
FLASHBACK \nHomeland Security warned that Russia wi	-0.003998	0.005753	0.088797	0.041181	-0.055530
Replying to \n@spinning_will\nLol. Your Supreme Cour	-0.066975	-0.003476	0.005117	-0.026278	-0.003184
Replying to \n@twistopherrobin\nI know. This intervi	-0.095936	-0.042574	0.008261	0.040820	-0.122133
News from ex-Chancellor and Putin friend Gerhard	0.031408	-0.002191	0.003325	-0.015316	-0.006931
Replying to \n@Angry_Staffer\nThe media seems to be	-0.051567	-0.002996	0.038181	-0.011589	-0.068397
CBC 'experts' claim\nthat Tamara Lich, financed by	0.006807	0.086293	-0.008846	-0.021558	0.009271
Replying to \n@SamRamani2\nThat's getting it's backw	-0.043416	-0.092756	-0.033449	0.057504	0.061134
When last fall \n@Apple\nacquiesced to Putin's desp	0.088219	0.048928	-0.091436	0.046273	0.025570
This is a critical point from \n@anneapplebaum\n - t	0.080145	0.071432	-0.065389	0.063736	0.004948
You have racists on here rooting for Brittney Grin	0.023616	-0.013693	0.079150	0.061672	-0.070849
Replying to \n@sarahrainsford\n and \n@Andy_Scollick\n	-0.091684	-0.045905	-0.012009	-0.000131	0.060673
Stopping Putin will Make America Great Again. Voti	-0.019198	0.033692	0.016056	-0.010320	-0.004030
If I were Zelensky I'd want a parade of celebs tra	0.015616	0.076515	-0.018905	0.038717	0.028368
I was asked today about the civilian trainings in	0.115114	0.055606	-0.081831	0.078109	0.015470
Where are all the "experts" who claimed #Putin wou	0.127297	-0.052018	0.026134	-0.015722	-0.005722
Putin names possible reason for Russia-NATO war ht	0.062855	-0.081886	-0.096201	0.089700	-0.068100
Replying to \n@petergodofsky\n @eigenrobot\n and 2 ot	-0.025168	-0.084841	-0.069658	0.079827	-0.035367

In [23]: *#Printing the highest scoring tweets for each topic*

```

for topic in labels:
    print("_____ " + topic)
    print(df["text"].values[svd_topic_vectors_df[topic].argsort().values[
_____topic0
["Putin cannot be allowed to unilaterally expand Russia's territory in E
astern Europe. A Russian cyber attack on Ukraine is his first move. The
U.S. must stand up to this dictator to prevent a Russian takeover of Ukr
aine.\nreuters.com\nCyberattack hits Ukraine as U.S. warns Russia could
be prepping for war\nThe United States said it feared Russia was prepari
ng a pretext to invade Ukraine if diplomacy fails to meet its objective
s, after a massive cyberattack splashed Ukrainian government websites wi
th a...\n2\n3\n7"]
'A message from Russians against the invasion of Ukraine \n\nWar is not
Russia. War is Vladimir Putin and his government. That is why we, Russia
n socialists and communists, are against this criminal war\njacobin.com
\nA Message From Russians Against the War\nWar is not Russia. War is Put
in and his government. That is why we, Russian socialists and communist
s, are against this criminal war.\n2\n7\n11']
_____topic1
["Putin has a whole puppet show going on.\nQuote Tweet\nBrown Eyed Susan
\n@smc429\n · Jul 14\nThere's a meme for everything..\nShow this thread
\n5\n16"]
'Putin must be shitting himself.\nQuote Tweet\nFill Your Boots\n@Milita
ryBanter\n · Feb 11\nShow this thread\n6\n29']
_____topic2
['Putin wants Biden to LOOK Bad bc he wants Trump to be our President ag
ain! Putin has never had a president before that wanted to FRENCH KISS h
im like Trump does! ~\n1\n2\n7']
'D. Trump was the first Vice President in the Trump family. The Preside
nt of America from 2016 to 2020 was Putin.\n1\n5']
_____topic3
['This tweet is as harmful as it is dumb, because it green lights Russia
n aggression. How about working to stop the war between Russia and Ukrai
ne by DETERRING Putin.\nQuote Tweet\nPresident Biden\n@POTUS\nUnited Sta
tes government official\n · Mar 11\nI want to be clear: We will defend e
very inch of NATO territory with the full might of a united and galvaniz
ed NATO.\n\nBut we will not fight a war against Russia in Ukraine.\n\nA
direct confrontation between NATO and Russia is World War III. And somet
hing we must strive to prevent.\n18\n35\n184']
'In which Joe Biden tells Putin that any country not in NATO is fair ga
me\nQuote Tweet\nPresident Biden\n@POTUS\nUnited States government offic
ial\n · Mar 11\nI want to be clear: We will defend every inch of NATO te
rritory with the full might of a united and galvanized NATO.\n\nBut we w
ill not fight a war against Russia in Ukraine.\n\nA direct confrontatio
n between NATO and Russia is World War III. And something we must strive
to prevent.\n1\n2\n9']
_____topic4
['It seems that Trump is as untouchable as Putin. \n1\n1\n4']
'Putin \n1\n4']

```

In [24]: `df.iloc[0]["text"]`

Out[24]: 'Halt Russian aggression with 2-day shipping on ATGMs to Syrian rebels, Ukraine, Poland, Finland, and anyone else who wants to send a wire-guided "fuck Putin"\n3\n35'

In [25]: `svd_topic_vectors_df.iloc[0]`

```
Out[25]: topic0    0.045870
        topic1   -0.019814
        topic2   -0.005545
        topic3   -0.003467
        topic4   -0.076924
        Name: Halt Russian aggression with 2-day shipping on ATG, dtype: float64
```

```
In [26]: #Printing the highest scoring words for each topic.
num_terms = 20
for i in range(num_topics):
    print("__topic " + str(i) + "__")
    topicName = "topic" + str(i)
    weightedlist = topic_weights.get(topicName).sort_values()[-num_terms:]
    print(weightedlist.index.values)

__topic 0__
['nato' 'state' 'tweet' 'official' 'quote' '.' 'biden' 'ukrainian' 'say'
 'putin's' 'invasion' 'u' 's' 'vladimir' 'com' 'president' 'russia' 'wa
r'
 'russian' 'ukraine']
__topic 1__
['#demvoice1' '#ukraine' '3' '#putin' 'republican' 'twitter' 'feb' 'gas'
 'trump' 'price' 'mar' 'apr' 'jun' 'jan' '&' 'jul' 'thread' '.' 'quote'
 'tweet']
__topic 2__
['white' 'gop' 'russian' 'leader' 'house' 'meeting' 'election' 'joe' 'sa
y'
 'republican' 'said' 'donald' 'com' 'u' 's' 'putin' 'vladimir' 'biden'
 'president' 'trump']
__topic 3__
['think' 'country' 'know' 'thread' '&' '2' 'like' 'just' 'biden' 'putin'
 '1' 'war' 'want' 'nato' '.' 'quote' 'tweet' 'russia' 'ukraine' 'trump']
__topic 4__
['joe' 'inflation' '9' 'ukrainian' 'price' 'crime' 'putin's' '6' '5'
 'quote' '.' 'biden' 'tweet' 'vladimir' 'trump' 'russian' 'war'
 'president' '4' '1']
```

```
In [ ]: #Applying Latent Dirichlet Allocation, using the code from the lecture no
```

```
In [27]: #Calculating LDA on the Bag Of Words
count_vectoriser = CountVectorizer(tokenizer=my_tokeniser)
bag_of_words = count_vectoriser.fit_transform(df["text"])
vocab = count_vectoriser.get_feature_names_out()

print(bag_of_words.todense().shape)
```

```
/Users/kzaromytidou/opt/miniconda3/envs/nlp/lib/python3.9/site-packages/
sklearn/feature_extraction/text.py:528: UserWarning: The parameter 'toke
n_pattern' will not be used since 'tokenizer' is not None'
  warnings.warn(
(10737, 40394)
```

```
In [28]: lda = LatentDirichletAllocation(n_components=num_topics,
                                         random_state=123,
                                         learning_method='batch')
```

```
In [29]: lda_topics = lda.fit_transform(bag_of_words)
```

```
In [30]: #Calculate how much does each topic apply to each tweet
```

```
lda_topic_vectors_df = pd.DataFrame(lda_topics, columns=labels)
lda_topic_vectors_df.sample(10)
```

Out [30]:

	topic0	topic1	topic2	topic3	topic4
9568	0.004735	0.004720	0.500989	0.484858	0.004696
3319	0.008533	0.583892	0.008505	0.008644	0.390426
8664	0.445962	0.543628	0.003477	0.003478	0.003455
10537	0.006600	0.006731	0.702240	0.277835	0.006594
3538	0.018552	0.926025	0.018411	0.018648	0.018363
8647	0.005596	0.005636	0.005661	0.977603	0.005503
6566	0.015578	0.937647	0.015646	0.015537	0.015593
10730	0.003808	0.003767	0.308203	0.105147	0.579076
9710	0.010297	0.497554	0.010264	0.471578	0.010306
1308	0.005805	0.005876	0.976562	0.005931	0.005826

In [31]: `df["text"][4323]`

Out [31]: '#Russia\nUkr Media:\n#Putin begins blackmailing Europe for #gas payments in #rubles. According to Reuters, gas pumping through the Yamal-Europe gas pipeline has fallen to zero.\n3\n4\n16'

In [32]: *#Calculating and printing the highest scoring reviews for each topic*
for topic **in** labels:
 print(topic)
#Get last songs 10 in list (highest scoring for each topic)
 print(df["text"].values[lda_topic_vectors_df[topic].argsort().values[

topic0

['4 months later Sri Lanka has collapsed due to lack of fuel, Europe is back to burning coal to prepare for a dark winter, and people are starting to starve worldwide. \n\nHow many billions in lost tax revenue now fuel Putin's war machine \n@Tzporah\n? \n\n#GreenLeapForward in action\nQuote Tweet\nTzporah Berman\n@Tzporah\n · Mar 9\nPlanet is quite literally, on fire, worlds leading scientists, economists, Nobel laureates etc call for immediate end expansion oil, gas & coal & absolute emissions and production decline & @globeandmail has an editorial on how world needs more Cdn oil & gas? Disgusted. #cdnpoli\n6\n19\n40'

".\n@POTUS\n announced at #NATO today, the U.S. is prepared to commit more than \$1 billion in humanitarian assistance to help get relief to millions of Ukrainians affected by the war in Ukraine. We are #UnitedWithUkraine and the people in Ukraine in the face of Putin's aggression.\nQuote Tweet\nThe White House\n@WhiteHouse\n · Mar 24\nToday, the United States is announcing that we are prepared to provide more than \$1 billion in new funding towards humanitarian assistance for those affected by Russia's war in Ukraine and its severe impacts around the world: <https://whitehouse.gov/briefing-room/statements-releases/2022/03/24/fact-sheet-the-biden-administration-announces-new-humanitarian-development-and-democracy-assistance-to-ukraine-and-the-surrounding-region/...>\n17\n27\n101"

'Kiev is under Russian attack. #Kyiv #Kiev \n#Russia #Putin #Moskva #BlackSea #MarNero #Guerra #Guerre #War #Ukraine #UkraineWar #RussianUkrainianWar #UkraineRussianWar #Tempesta #StoptheStorm #StopWar #NoWar\nQuote Tweet\nNoticias de Ucrania 24 horas\n@UKR_token\n · Apr 15\n#URGENTE #KYIV #KIEV \n\n#Kiev bajo ataque, se reportó una fuerte explosión.\n\nLas alarmas de ataque aéreo están sonando toda la noche, sin embargo no se había registrado ningún ataque, hasta hace apenas pocos minutos que una fuerte explosión sacudió la ciudad\n7\n4'

"My blood boils indeed to hear European politicians eager to repeat the mistakes of 2014, and every appeasement up to Putin's fresh invasion on Feb 24. Concessions make dictators bolder. If you really want peace, do everything possible to help Ukraine win now.\nQuote Tweet\nBert Blocken\n@realBertBlocken\n · Jul 13\nGarry Kasparov (@Kasparov63), luis in de pels v Kremlin. De oud-wereldkampioen schaken verwijt landen als Duitsland & Frankrijk veel te afwachtende houding in oorlog in @Ukraine \n"Mijn bloed kookt als ik naar hun praatjes luister." \nSame here.\n#ukraine\nhttps://hbvl.be/cnt/dmf20220713_95342878...\n42\n451\n2,041"

'Russia - Ukraine war: I see humans but no humanity. Rest In Peace, humanity. RIP. Innalillahi. \n\nAre you happy now, Putin? May Karma Putin Mampus meets his god soon. Amen. Ameen. Inshallah. \n\nWatch. Brigadir J Donetsk Luhansk asin Nico Laos #Kherson #HIMARS #StopRussiaNOW\nQuote Tweet\nHerry\n@HerryNapit\n · Jul 13\nRussia: Putin sends Russian soldiers as cannon fodder in Ukraine. Beware of Ukrainian HIMARS. #HIMARS #Kherson #StopRussiaNOW #RussiaIsATerroristState #Putin #Russia #Russian #Russia #Russie #Russland #Ukraine #Ukraina #Ucrania #Ucraina #Путін #Россія #Україна #أوكراينا #روسيا twitter.com/HerryNapit/sta...\n2\n5\n14'

'Putin & others have spoken & written publicly abt how the 'SMO' is to restore historic Russian lands, 'denazify' Ukraine, & destroy Ukraine's political project & identity. The arg that 'all this' (invasion & war crimes) is bc NATO didn't accept Rus demands is hard to sustain\nQuote Tweet\nBenAris\n@bneeditor\n · Jun 29\nJeez. Nato full of war talk. Cold War ii. But we cld have avoided all this if only accepted rus demand of no nato. Today still only a commit to "keep door open" for #ukraine which is meaningless. #Russia was offering an entire new security deal... now this will go on 4 generations\nShow this thread\n3\n6\n44'

'Gas just hit \$4.53 and is now down 50 cents (!!!!) in the past month. \n\nGas prices have now dropped 10 percent since June, leaving ALL of the rise above normal levels due to Putin.\n\nIf you are mad about inflation and high gas prices you should be mad at Putin and his enablers.\nQuote

te Tweet\nSimon Rosenberg\n@SimonWDC\n · Jul 10\nSome gas math: \n\n1/20/21 – \$2.40 a gallon\n1/1/22 – \$3.22\n6/16/22 – \$5.03\n7/10/22 – \$4.68, down 35 cents in last 3 weeks\n\n69% of the increase in gas prices came from Putin. \n\nRefusal of Rs to acknowledge benefits his war against the Ukraine and the West, betrays our natl interest.\nShow this thread\n5\n39\n73'

'According to TASS, citing the Commander-in-Chief of the Navy, Admiral Nikolai Evmenov, conscripts WERE on board the Moskva. Putin lying again. I assume the translation (ref they will be fired) is that survivors will be able to end conscription in May/ JuneIF they survived.\nQuote Tweet\nЖурнал DOXA\n@doxa_journal\n · Apr 16\nТАСС со ссылкой на главнокомандующего ВМФ адмирала Николая Евменова пишет, что на борту затонувшего крейсера «Москва» были срочники.\n\nПо словам адмирала, их уволят «в соответствии с законом с мая по июнь».\n\nРанее Путин неоднократно заверял, что срочники не воюют в Украине.\n1\n7\n13'

'In \n@ynetnews\n: "Hillel Neuer said U.N. commission of inquiry chair Navi Pillay is not impartial and even signed a petition, in June 2020, to impose sanctions on Israel." \n\n"It's like appointing Vladimir Putin to investigate the war in Ukraine," Neuer said.\nynet.co.il\nמשרד החוץ האזרחי של ישראל\nלדוח האו"ם: התגובות קשות, חברי הוועדה נגועים באנטי-ישראליות הואשמה ב"כיבוש נצח" של השטחים הפלסטיניים, במשרד החוץ אמרו כי בארה"ב ובברזיל יש תגובות קשות נגד הדוח של האו"ם ומעודדים מכך שאין לו סיקור משמעותי בעולם... \n1\n8\n18'

'22 years before today's rocket attack on #Kramatorsk station, the Russians launched a missile attack on the market in #Grozny (21.10.1999) and said that "the #Chechens blew themselves up".\nIt's not "Putin made #Russians like that". They were like that before him.\n\n#Ukraine\nQuote Tweet\nІнформація України/Ukraine\n@i_army_org\n · Apr 8\n21.10.1999, за 22 года до сегодняшнего ракетного обстрела вокзала в Краматорске, россияне нанесли ракетный удар по рынку в Грозном и заявили, что "чеченцы сами себя взорвали". Путин стал президентом 31.12.1999.\nЭто не "Путин сделал такими россияне". Они такими были и до него.\n11\n15']

topic1

["Of course, Xi didn't need Putin to tell him a full-scale invasion of Ukraine was imminent.\nRead policy into China's denial, not evidence about knowledge.\nLikewise read policy/posture into Putin's choice of what to communicate to Xi.\nAsian giants' relationship not like ours w/them.\nQuote Tweet\nTheresa Fallon\n@TheresaAFallon\n · Apr 30\n"So did Putin tip off Xi Jinping that he was about to launch a full-scale invasion of Ukraine? Absolutely not, says China, but it's hard to imagine that there would have not been even just a hint of what was to come to such an important neighbour." \nhttps://bbc.co.uk/news/world-europe-61272203...\nShow this thread\n2\n1\n2"]

'I told you what would happen before the US proxy war started.\n\nRussia is winning. Putin's strategy to weaken the US, NATO and EU plays out as predicted. The no-gas EU winter will collapse global markets and ring in a new multipolar order (BRICS+). USD dominance ends. #PutinChess\nQuote Tweet\nKim Dotcom\n@KimDotcom\n · Jan 26\nEnd of US Empire? A thread\n\nVladimir Putin has ruled Russia since 1999 and is the 2nd longest serving current European President. You simply don't survive that long if you don't have a unique skill set. That's why nobody should underestimate Putin's strategic move in Ukraine.\nShow this thread\n160\n601\n1,897'

'Replying to \n@TristanSnell\n"Bill Barr cooperating with #January6th committee. Is there a bus large enough for the sheer quantity of people #Barr might throw under it?" \n\nhttps://twitter.com/RuanoFaxas/status/1527429707536510976...\n#ELECTION #CAPITOL #COUP #TERRORISM #GOP #MAGA #TRUMP #PENCE #PUTIN #RUSSIA #BIDEN #HILLARY #CLINTON #FBI #CIA #DOJ\nQuote Tweet\nFernando Ruano Faxas\n@RuanoFaxas\n · May 20\nReplying to @TristanSnell\n"658 panes of glass in the ground floors of the #Capitol. Only 12 were not reinforced prior to #January6th. The insurrectionists knew EXACTLY

Y where those weak points were. Because they were given advance help – b y pro-#Trump members of Congress" <https://twitter.com/RuanoFaxas/status/1527391208682795009...> \n#Loudermilk\n2\n3\n6'

"blah blah blah\n\nGerman Chancellor Scholz says what happened in Bucha is terrible. Chancellor Scholz also refused to stop Nord Stream 2 until much too late. Chancellor Scholz needs to finally step up and stop funding Putin's regime with petrodollars.\nQuote Tweet\nBundeskanzler Olaf Scholz\n@Bundeskanzler\nRegierungsvertreter*in aus Deutschland\n · Apr 3\nFurchtbare und grauenerregende Aufnahmen erreichen uns aus der #Ukraine. Erschossene Zivilisten, darunter Frauen, Kinder und Alte, in #Butscha, das bis vor wenigen Tagen vom russischen Militär kontrolliert worden ist. 1/2\nShow this thread\n4"

"Replying to \n@StillDelvingH\n @KyivIndependent\n and 7 others\nJust so we're clear: It was always the plan\nIf Putin had managed to take Ukraine –it would have been the plan\nStarving the developing countries –and feed in exchange of favours \nRussia is set to lose Oil&Gas –its everything\nIt needed a new global monopoly: \nIt found one.\nQuote Tweet\nJack Nicas\n@jacknicas\n · Mar 20\nSome more worrisome stats:\n\nSince Russia invaded Ukraine, wheat prices have increased by 21%, barley by 33% and some fertilizers by 40%.\n\nThe UN said the war's impact on the food market could cause another 7.6 million to 13.1 million people to go hungry.\nhttps://nytimes.com/2022/03/20/world/americas/ukraine-war-global-food-crisis.html?unlocked_article_code=AAAAAAAAAAAAACEIPuomT1JKd6J17Vw1cRCfTTMqmxCdW_PiXftm3iWka3D0DmwaiPsSGYyMvE7IaLBibNIomCmYXtZANrJqW_Voi-Bb0EZkT0ympZyI3Z8fIj40ssSzQmYldrbIwPzAXLPC0_0fstg_q2pQ6H0zy9RqCJg3IrIFlhvcFlIl-13SNYzr0WEeEjxoN5jagkVZ97FTwEzZKY_KW9U2UIM9SAZhDW7AcxSrsZDwMvXyJA nupGJAZCCLvGT2d943I86b5fMNARNaX5J30waZa0wOVRWiEzctDfV9BmTJPULr5qrbfLrSHrcK9zPg8H6hf16jWmURRw9Zmku278w4nBr0Z0w&smid=url-share...\nShow this thread\n2\n6\n15"

"Replying to \n@MsQuitoSwarm\n @WinnieT04070814\n and 2 others\nIf you want to compare UAF to RAF:\n\nOne is a hodge-podge of ethnic racists, released felons, militarily untrained national guardsmen, draftees, civil police (& now women) plus finally the actual professional army\n\nIn contrast, RAF is a professional army\nQuote Tweet\nPutin's shirt\n@MsQuitoSwarm\n · Jul 9\n#UAF took #StaraKrasnyanka nursing home hostage, set it on fire before retreating, burning many alive\n\nSurprise, surprise...no t\nWhen since #Kiev started assaulting the #Donbas 8 yrs ago hasn't #NATO-trained #UAF terrorized civilians?\n\n#UkrainianWarCrimes\n<https://apnews.com/article/russia-ukraine-united-nations-bears-government-and-politics-6d04e2ef9d873f98826264eb47ebc690...>\n1\n1"

"What Putin does now will affect all of us (Russians). Not sure how we will fix it. That when you speak Russian to someone, it doesn't mean you want to kill him. But we must fix it. By doing good things I believe..." \nQuote Tweet\nMaria Kuznetsova\n@maria_de_forest\n · Mar 30\nГрузинская война шла 3 дня, украинская идёт уже 8 лет. «И то, что сейчас творит Путин, скажется на всех. И непонятно, как потом это исправлять, что если ты говоришь на русском, то это не значит, что ты хочешь их убить. На д этим надо будет думать». @ESK001\nShow this thread\n3\n2\n12'

'Sergei Mironov, allegedly FSB officer, & Putin loyalist from St. Petersburg (dumb) & leader of the Putin support party Just Russia calls for CSTO troops to stay in Kazakhstan to counter "extremism." Is this a Putin trial balloon?\nQuote Tweet\nСергей Миронов\n@mironov_ru\n · Jan 6\nСилы ОДКБ могут стать базой для формирования в Казахстане системы противодействия экстремизму, в том числе для защиты русскоязычного населения. Предлагаю рассмотреть вопрос присутствия военных ОДКБ в республике на постоянной основе. Это принесёт мир и спокойствие на годы вперёд.\n5\n20\n34'

'Ukrainian Union of Journalists complained that due to high gas prices, most regional and local newspapers in Ukraine are not able to pay for heating in editorial offices using new tariffs.\nWill Russia be blamed again? "Putin & Gazprom are strangling freedom of speech in Ukraine." \nQuote

Tweet\nРадио Стыдоба\n@RadioStydoba\n · Jan 18\nТак и вижу заголовки западных СМИ:\n\n"Путин и Газпром душат свободу слова на Украине".\n\nУкраинский союз журналистов пожаловался, что из-за высоких цен на газ большинство региональных и местных газет Украины не в состоянии платить за отопление в редакциях по новым тарифам.\n2\n4'

"Azov Battalion is crawling with Neo-Nazis – and that does NOT invalidate Ukraine’s struggle nor does it mean Putin’s better (spoiler: he is n’t). \n\nEspecially if you’re American – you’re dim and know fuckall about Nazis if you think Azov and Ukraine are synonymous. \n\nAsk me why.\nQuote Tweet\nThe Provost / سيدة الفتنة / Amanda Rogers\n@MsEntropy\n · Feb 13, 2021\nAWD's Jarrett Smith\n\n– Specialist, US Army (tactical / combat training) \n– Tried to fight with the Azov Battalion in Ukraine\n\nPled guilty in 2020 to: \n– disseminating info on how to build explosives and weapons of mass destruction (etc)\n\nhttps://npr.org/2019/09/23/763544037/kansas-soldier-charged-with-teaching-bomb-making-to-far-right-extremists?t=1569355938259...\nShow this thread\n3\n22\n77"]

topic2

['Fox News lies? You don’t say.\n\nHannity, Ingraham & Tucker are crooks. Murdoch is a criminal.\n\nThe propaganda work they did & are still doing for right-wing extremists & the GOP is extremely harmful for America.\n\nThey are killing democracy. They are destroying America.\n\n#DemVoice1\nQuote Tweet\nTony #DemVoice1\n@TonyHussein4\n · Jul 13\nSean Hannity lied to you. He knew it was Trump supporters, but he blamed Antifa.\n\nLaura Ingraham lied to you. She knew they were MAGA supporters, but she blamed Antifa.\n\nRupert Murdoch’s Fox News network, lied to you.\n\n#DemVoice1 #Fresh\nShow this thread\n13\n148\n277']

'Oh, that’s what it feels like to be held hostage by a 300-year old turtle. \n\nI always wondered.\n\nLet’s call the Dem Midterm SWAT Team and end the hostage situation.\n\n#VoteBlueToSaveAmerica\n#DemVoice1\nQuote Tweet\nBrenda46 – Build Back Better\n@kinley_brenda\n · Jul 11\nDems trying to pass \$52B US Innovation & Competition Act that invests in US science, tech & research to free us from China\n\nMcConnell will kill unless Dems back off on budget pkg to fund Medicare with 3.8% tax on \$400K/yr income & allow them to negotiate drug prices\n#DemVoice1\n1\n30\n34'

"It's wonderful watching Peter Doocy stand up to Psaki. Watch video below.\n\nPeter Doocy clashes with Psaki over NCAA swimming rules, Putin War Crimes, and Florida Gender Instruction Law (don't say Gay).\n\nbreaking911.com\nWATCH: Doocy clashes with Psaki over NCAA swimming rules, Putin war crimes and Florida gender-ins...\nFox News reporter Peter Doocy asks Jen Psaki about swimming rules in the NCAA, charging Putin with war crimes and Florida’s so-called ‘Don’t say gay bill.’ Facebook Comments\n5\n31\n29"

'Do U really understand that we are fighting BOTH #Putin & #Trump’s #MAGAGQP to save democracy. The battle started before 2016 & continues to this day. #BadOdds #SaveDemocracyNow #GQPPutin #KrauseCares #IaPolitics #IaSen \n\n@iowademocrats\nQuote Tweet\nBob Krause\n@KrauseForIowa\n · Jan 23\nWanna know why intel on 2016 election interference was non-partisan? "Britain has primary responsibility for intercepting #Russia" commo, and thus "played a major role in exposing Russian interference in 2016 elections." #IaPolitics #IaSen #NotFakeNews. https://nytimes.com/2022/01/22/world/europe/ukraine-russia-coup-britain.html?auth=login-google...\n1\n6\n12'

'MAC is scared & confused\nWe need to SAVE him\nPlease good people \nPlease can YOU make a #pledge for MAC?\nCan you #adopt MAC?\nNeed a 501c3 Rescue to SAVE him\nHe needs YOUR HELP\nQuote Tweet\nRoCo STOP PUTIN!\n@RoCoGB\n · Jul 9\nSAVE SENIOR\nMAC\n#06-778\nDies 7/12 – NO EXT\nWe must stop this\nOnce owned – found with collar saying “adopt me”\nIt’s just\nPlease HELP Save MAC\nHe needs #pledges\nCan YOU #adopt MAC?\nGorg bred – Black Mouth Cur\nNeutered, HW–\nMAC just needs TLC from loving human YOU?\nShow this thread\n6\n51\n32'

'79 days since \n@maddow\n broke news that Durham, a senior office at DOJ, is running a revenge campaign for trump...filing false charges against lawyer who advised the FBI about communication between Trump Org & Putin's Alfa Bank.\n\nWhy hasn't Garland fired him?\nQuote Tweet\nThomas Kaine\n@thomaskaine5\n · Oct 30, 2021\nWOW. Did you see @maddow. \n\nJohn Durham, high level DOJ officer, indicted lawyer who brought FBI, communication between Trump Org & Putin's Alfa bank. Durham said it was made up. But all along Durham knew it to be true. \n\nQuestion is, 'What is Garland going to do about it?'\"n9\n24'

'Big Tech censors strike again – nixing key interview with Capitol rioter: If YouTube banned every post with “misinformation,” much of its content would come down, including every speech from President Joe “Putin’s price hike” Biden. https://nypost.com/2022/06/07/big-tech-censors-strike-again-nixing-key-interview-with-capitol-rioter/?utm_source=twitter_sitebuttons&utm_medium=site%20buttons&utm_campaign=site%20buttons... via \n@nypost\nnypost.com\nBig Tech censors strike again – nixing key interview with Capitol...\nBig Tech’s partisan censors have struck again. This time it was YouTube’s hatchet-men scrubbing The Post’s widely watched interview of fur-clad Capitol rioter Aaron Mostofsky outside the Senate...\n6'

'67 days since \n@maddow\n broke news that Durham, a senior office at DOJ, is running a revenge campaign for trump...filing false charges against lawyer who advised the FBI about communication between Trump Org & Putin's Alfa Bank.\n\nWhy hasn't Garland fired him?\nQuote Tweet\nThomas Kaine\n@thomaskaine5\n · Oct 30, 2021\nWOW. Did you see @maddow. \n\nJohn Durham, high level DOJ officer, indicted lawyer who brought FBI, communication between Trump Org & Putin's Alfa bank. Durham said it was made up. But all along Durham knew it to be true. \n\nQuestion is, 'What is Garland going to do about it?'\"n4\n17\n29'

'69 days since \n@maddow\n broke news that Durham, a senior office at DOJ, is running a revenge campaign for trump...filing false charges against lawyer who advised the FBI about communication between Trump Org & Putin's Alfa Bank.\n\nWhy hasn't Garland fired him?\nQuote Tweet\nThomas Kaine\n@thomaskaine5\n · Oct 30, 2021\nWOW. Did you see @maddow. \n\nJohn Durham, high level DOJ officer, indicted lawyer who brought FBI, communication between Trump Org & Putin's Alfa bank. Durham said it was made up. But all along Durham knew it to be true. \n\nQuestion is, 'What is Garland going to do about it?'\"n3\n25\n45'

'MSNBC Guest Michael McFaul Apologizes for 'Mistaken' Comparison of Putin to Hitler on 'The Rachel Maddow Show' <https://msn.com/en-us/tv/news/msnbc-guest-michael-mcfaul-apologizes-for-mistaken-comparison-of-putin-to-hitler-on-the-rachel-maddow-show/ar-AAUZzY2?ocid=msedgntp...> Apology not accepted, over a billion people have the same opinion, so you're correct in your opinion, Putin is like Hitler, only worse\nmsn.com\nMSNBC Guest Michael McFaul Apologizes for 'Mistaken' Comparison of Putin to Hitler on 'The Rachel...\nMSNBC guest and former U.S. Ambassador to Russia Michael McFaul apologized Saturday for comparing Russian President Vladimir Putin to Adolf Hitler. "I made a mistake. I apologize. I will never make...\n113\n189\n704']

topic3

["Replying to \n@RadioFreeTom\nWhat do you think about these claims that RUSSIA'S security services tipped off Ukraine about assassination plot against Zelenskyy?\n\nIf true, internal warning shot to Putin, right?\n\nAnd if not, solid feint by Ukraine.\nQuote Tweet\nA.Z. Foreman: serious philology, silly behavior\n@azforeman\n · Mar 3\n“Danilov said he was thankful for members of Russia’s Federal Security Service who alerted Ukrainian officials to the assassination plot.”\n\nPutin has got some major principle/agent problems if this is what happened. \n\nhttps://washingtonpost.com/world/2022/03/02/zelensky-russia-ukraine-assassination-attempt-foiled/?utm_campaign=wp_post_most&utm_medium=email&utm_source=newsletter&wpisrc=nl_most&carta-url=https%3A%2F%2Fs2.washingtonpost.com%2Fcar-ln-

tr%2F36343b0%2F621fa9379d2fda34e7b56e50%2F5a75f340ade4e257cb6f88e1%2F16%2F70%2F621fa9379d2fda34e7b56e50&fbclid=IwAR2c0J6FKF8QHTLZGQ6-xanzMa_NbQ4idKl90STr6Iwp-Dn40hVlWfkihpM... \nShow this thread\n3\n1\n21"

"Macron suggested Ukraine give up some of its sovereignty to allow Putin to save face, says Zelensky https://news.yahoo.com/macron-suggested-ukraine-sovereignty-allow-154400551.html?soc_src=social-sh&soc_trk=tw&tsrc=twtr... via \n@Yahoo\n Just NO!! What's wrong with you. Putin's a war criminal guilty of horrendous atrocities. No one caves to that mad man. Save your own face now.\nnews.yahoo.com\nMacron suggested Ukraine give up some of its sovereignty to allow Putin to save face, says Zelensky\nFrench President Emmanuel Macron suggested Ukraine should compromise on its sovereignty in order to allow Russian dictator Vladimir Putin to save face, President Volodymyr Zelensky, said in an...\n1\n3"

'Putin's strategic genius has reawakened \n@NATO\n, brought more US troops to Europe and made Ukrainians turn against Russia. It's hard to know what he'll do next to make Russia weaker but no doubt he'll try. He's a disaster for the Russian people, except his gang of thieves.\nQuote Tweet\nU.S. Army Europe and Africa\n@USArmyEURAF\n · Feb 6\n(1/2) #WeAreNATO | #StrongerTogether\n\nEarlier today, MG Christopher Donahue, commanding general of @82ndABNDiv, & BG Wojciech Marchwica, chief of staff of operational command of the armed forces, met in #Poland following the first arrival of #paratroopers from the U.S.!\nShow this thread\n16\n25\n166'

'Ex-Trump National Security Advisor Michael Flynn was fined \$38,557 by the Army for attending a 2015 Moscow gala with Putin https://news.yahoo.com/ex-trump-national-security-advisor-152119002.html?soc_src=social-sh&soc_trk=tw&tsrc=twtr... via \n@Yahoo\n How do you feel about Flynn, a US Army lieutenant general, dining with Putin at the Moscow Gala. Was the monetary fine OK?\nnews.yahoo.com\nEx-Trump National Security Advisor Michael Flynn was fined \$38,557 by the Army for attending a 2015...\nInvestigators found that Flynn received nearly \$450,000 in compensation from both Russian and Turkish interests in 2015, The Washington Post reported.\n9\n16\n22'

'In an alternate scenario \n@RALee85\n recently posited, Putin invades Ukraine in a punitive expedition but then withdraws and avoids occupying Ukrainian territory. This intriguing risk scenario follows model Deng Xiaoping pursued in 1979 Sino-Vietnamese War, with seizure of Lang Son.\nQuote Tweet\nSimon Boyi Chen\n@simonbchen\n · Dec 17, 2020\nSino-Vietnamese War of 1979 culminated in capture of Lang Son, Vietnamese provincial capital. Under direction of Xu Shiyu, Chinese communist army in subsequent withdrawal conducted a brutal and ruthless scorched-earth campaign, destroying industry, infrastructure, and utilities [twitter.com/simonbchen/en/sta... \n4\n7\n29'](https://twitter.com/simonbchen/status/139729...)

"Elisa's reporting on the Church's long-standing ties to WCF, an anti-gay hate group, has been top notch. The group is also propping up Putin. Part 3: The REAL Gay Agenda: Homophobia, Russian Fascism, and the LDS Church in Eastern Europe <https://wheatandtares.org/2022/03/10/part-3-the-real-gay-agenda-homophobia-russian-fascism-and-the-lds-church-in-eastern-europe/>... via \n@WheatnTweet\nwheatandtares.org\nPart 3: The REAL Gay Agenda: Homophobia, Russian Fascism, and the LDS Church in Eastern Europe\nLast week, I posted parts 1 and 2 of a discussion about the LDS Church's involvement with the World Congress of Families. Part 1 gives an overview of the origins of WCF and its global anti-LGBT ad...\n5"

'So parts of FSB have gone rogue on Putin, chief of SVR looks daggers at Putin after public humiliation from Putin, head of military looked same, soldiers mutiny, Oligarchs hate Putin, mass arrests, Navalny hero in jail, \$1m bounty on Putin life, Russ Air force not fully engaged..\nQuote Tweet\nKath\n@mopeng\n · Mar 4\nCracks appearing with Russia's FS B.\n"Two different outfits have been sent to kill the Ukrainian president – mercenaries of the Kremlin-backed Wagner group and Chechen special f

orces. Both have been thwarted by anti-war elements within Russia's Federal Security Service (FSB)."
 Show this thread

'Russian President Putin makes mid night run to the Kremlin. This looks like it may be related to the Lithuanian President refusing to step back from partial blockading of Kaliningrad. This may be the beginning – that sad feeling ... #Russia #NATO #Lithuania #Ukraine #War #cdnpoli
 Quote Tweet
 @alQurainkwt · Jun 26
 عاجل / \n\n#روسي
 مصدر مسؤول
 حقًا شيء ما حصل يتخذ
 سبب التحرك الحالي للرئيس
 بوتين خطير للغاية
 وسائل إعلام روسية: الرئيس بوتين يصل إلى
 رئيس
 روسيا
 Putin
 Russia
 Ukraine
 الكرمليين بشكل مفاجئ لسبب غير معروف
 \n1\n3\n4'

"Biden urges Putin war crimes trial after Bucha killings
<https://reuters.com/world/biden-says-putin-is-war-criminal-calls-war-crimes-trial-2022-04-04/...> YES! 'U.S. President Joe Biden accused Putin of war crimes & called for a trial. Nat Sec Advisor Jake Sullivan told reporters U.S. would build a case at International Criminal Court or another venue.'
 reuters.com
 Biden urges Putin war crimes trial after Bucha killings
 U.S. President Joe Biden on Monday accused Russian President Vladimir Putin of war crimes and called for a trial, adding to the global outcry over civilian killings in the Ukrainian town of Bucha as...

"Sen. Rubio led members of the Senate NATO Observer Group in urging POTUS to use the #NATO–Russia Council meeting to deter Putin's invasion of #Ukraine & make clear that the U.S. will not accept Putin's demands to dictate NATO's decision-making.
 Read
 rubio.senate.gov
 Rubio Leads Bipartisan Senators in Urging POTUS to Make Clear that U.S. Stands with Eastern...
 Washington, D.C. – U.S. Senators Marco Rubio (R-FL), Jeanne Shaheen (D-NH), Thom Tillis (R-NC), Chris Coons (D-DE), Joni Ernst (R-IA), Jeff Merkley (D-OR), Mike Rounds (R-SD), Cory Booker (D-NJ), and...

topic4

["@Kris_Sacrebleu @ShelbyKStewart @jsavite @thismamatweets This article was on Kris' timeline so she's already seen it. The whole world needs to see it. This is the horror of Putin's war. Please RT it...
 Quote Tweet
 Olga Tokariuk @olgatokariuk · Mar 18
 A chilling report about Ukrainian children targeted by Russians: 'Lying just a few feet away was 15-year-old Masha Feshchenko. A light sheet draped over her body clearly showed the outline of a stump where her right leg had been amputated above the knee'.
https://telegraph.co.uk/global-health/terror-and-security/many-russians-dont-believe-pictures-real-ukrainian-children/?fbclid=IwAR02XAJLAjkaH1-a7sRTlx2-QgMgX07SUV_mW_v8XQ5qy6CH2F39wXEHEZE...
 Show this thread

"Make sure to target the ones that have the following stickers, comrade s!
 Lone Star Armory (Uneducated South)
 Protected by Glock (Austrian Nazis)
 Leupold (L looks like part of a Swastika)
 Schmidt & Bender (Nazis)
 CZ (Z...Putin Stan)
 Geissele (Probs Nazis)
 Daniel Defense (Misogyny)
 Quote Tweet
 Adbusters @Adbusters · Apr 6
 Time to do something about SUVs.
 They're the 2nd-largest contributor to the increase in global CO2 emissions since 2010, more than aviation.
 This is a gentle escalation of methods to drive the urgency of this climate crisis home and engender a systemic aversion to SUVs.
 Show this thread

'ROOSTER #A346855
 Polite Reminder – asking on behalf of WILMA's Dogs TX
 Pledge payments
 Please would you be able to check your records, we appreciate notifications can be easily missed!
 bf18900
 \$20
 BoiseIdahoHomes
 \$50
 Cindy7Lewis
 \$25
 cldesjarlais
 \$10
 infoidol19
 \$100
 Quote Tweet
 RoCo STOP PUTIN!
 RoCoGB · Jul 7
 ROOSTER
 is SAFE
 #A346855
 Saved by
 WILMA's Dogs TX
 Just waiting on Vet recommendations for treatment & then I'll update you all
 Thank you ALL for pledging, sharing & caring for ROOSTER
 Please honour your pledges ASAP via Rescue link:
<http://wilmasdogs.com/donate>
 Show this thread

"3 important news, just connect dots
 1. <https://twitter.com/GoldTele>

graph_/status/1486165062905651202...\n\n2. PUTIN: RUSSIA HAS SOME ADVANTAGES IN CRYPTO MINING\n\n3. Gold-Backed Stablecoins to Circumvent Sanctions\nhttps://twitter.com/fomocapdao/status/1485441904733036553?s=20...\n\n// Think what sanctions mean for countries opposing West, think again ..\nQuote Tweet\nFomocap\n@fomocapdao\n · Jan 24\nInteresting ..\nDeputy Chair Insists Gold-Backed Stablecoins & Crypto-Mining Be Allowed In Russia 'To Circumvent Sanctions'\nhttps://zerohedge.com/crypto/duma-deputy-chair-insists-gold-backed-stablecoins-crypto-mining-allowed-russia-circumven...\n4\n5\n33"

'Polite Reminder - asking on behalf of WILMA's Dogs TX\nPledge payments\nPlease would you be able to check your records, we appreciate notifications can be easily missed!\n@AngelysseA\n \$25\n@avlav9\n \$25\n@BoiseIdahoHomes\n \$25\n@infoidol19\n \$100\n@ohrles\n \$35\n@Ray17210\n \$50\nTY RS VP\nQuote Tweet\nRoCo STOP PUTIN!\n@RoCoGB\n · Jul 6\nBRIAN is FREE\n#A346984\nSaved by\nWILMA's Dogs TX\nHe's out of the shelter & as soon as I have Vet update I'll tweet\nThanks for pledging, sharing & caring for BRIAN\nPlease honour your pledges ASAP via Rescue link: \nhttp://wilmasdogs.com/donate\nShow this thread\n2\n10\n11'

'The girl was raped aged 9 and the judge declined to hold the rapist without bond. He's still in jail because the bond is \$2m but that's not the point. He's not the alleged rapist either. DNA of fetus confirmed.\nQuote Tweet\nJerry Dunleavy\n@JerryDunleavy\n · Jul 13\n"Detectives spoke to Fuentes... and Fuentes admitted to having sexual contact with the girl... The 10-year-old also told police Fuentes was the father... Meyer said the girl had just turned 10 recently, meaning she was likely impregnated at 9 years old."\nhttps://dispatch.com/story/news/2022/07/13/columbus-man-charged-rape-10-year-old-led-abortion-in-indiana/10046625002/...\nShow this thread\n1\n3\n14'

'JERSEY\nI'm so very sorry to be the bearer of bad news,\nFrom the shelter:\n"Jersey was not doing well, her health severely declining & we felt she was in pain & suffering. Due to her condition, we helped her cross the rainbow bridge humanely & with love"\nRIP JERSEY\nQuote Tweet\nRoCo STOP PUTIN!\n@RoCoGB\n · Jul 14\nWARNING GRAPHIC IMAGE\nIMMEDIATE RESCUE\nJERSEY\n#A347600\nNASTY open mass on head, found wandering st, likely dumped because she needs Medical care\n#CorpusChristi #TX\nAge 5\nNeglected, unloved\nNot in great shape\nDENTAL issues, susp arthritis HW+\nHELP\n#pledges desperately needed\nShow this thread\n34\n57\n64'

"The Minister President of Saxony and Deputy Leader of the Christian Democratic Union (CDU) says Germany's basis of prosperity will collapse without gas from Russia. He's calling for an immediate ceasefire and negotiations with Putin.\nQuote Tweet\nMichael Bröcker\n@MichaelBroecker\n · Jul 8\nOhne Gas aus Russland bricht Basis für Wohlstand zusammen\nWaffenstillstand und Verhandlungen mit #Putin jetzt\nAuch in @CDU gibt es die andere Meinung zu #Russland\n@MPKretschmer im @ThePioneerDe Podcast von @gaborsteingart \nhttps://thepioneer.de/originals/thepioneer-briefing-economy-edition/podcasts/wir-werden-es-bitter-zu-spüren-bekommen... Pic: @Twelectra\n78\n208\n268"

'The Grace Love Mercy protection sovereignty of Our Father Almighty God is upon Homeland Russia Glory Glory Glory hallelujah President Putin Glory Glory Glory hallelujah Amen all United daily globally in Peace healing understanding for life humanity Human Rights affairs Globally.\nQuote Tweet\nZhandra Rodríguez\n@zhorro4\n · Apr 24\n"VLADIMIR será el Señor del Mundo". -Baba Vanga.\nAhora la UE pagará en Rublos: petróleo, gas, carbón, titanio, tierras raras, fertilizantes, alimentos y un largo etcétera más. UE deberá comprar los rublos al Banco Central de la Federación de Rusia. El Amadísimo Putin ganó. \n4\n5'

'Historically Tuva wasn't even part of Russia. It was part of Qing Chinese Empire, and was remorselessly ripped away from China by a rapacious Tsarist Imperial Russia, as Qing dynasty collapsed in 1911. More ethnic minority peoples sacrificed for Putin's war in faraway Europe.\nQuote Tw

eet\nRob Lee\n@RALee85\n · Mar 30\nAi-Kherel Kuular and Arzhaan Mongush from the 55th Mountain Motorized Rifle Brigade were both killed in Ukraine (Kuular on March 21).\nhttps://tuvaonline.ru/2022/03/28/prishla-tragicheskaya-vest-o-gibeli-dvuh-voennosluzhaschih-iz-tuvy.html...\nhttps://vk.com/operation.z2022?z=photo-211028285_457243034%2Falbum-211028285_00%2Frev...\nhttps://vk.com/operation.z2022?z=photo-211028285_457243035%2Falbum-211028285_00%2Frev...\nhttps://mk-tuva.ru/incident/2022/03/27/tuva-aykhere-l-kuular-i-arzhaan-mongush-pogibli-v-ukraine.html...\nhttps://smartik.ru/kyzyl/post/159839953...\n3\n4\n14']

In [33]: *#Calculating the most relevant tokens for each topic*

```
for i, topic in enumerate(lda.components_):
    print("topic " + str(i) + ":")
    #Geting the last n tokens (highest values)
    print(vocab[topic.argsort()[-num_terms:]])
```

```
topic 0:
['gas' '7' '6' "putin's" '&' '4' '2' 'nato' '1' 'russian' 'putin's' '3'
 'com' 'quote' '.' 'tweet' 'war' 'russia' 'ukraine' 'putin']
topic 1:
['7' 'just' '4' '5' "putin's" "it's" '6' 'like' 'russian' '.' 'quote'
 'tweet' 'war' '3' 'russia' 'ukraine' '2' 'replying' '1' 'putin']
topic 2:
['just' '7' 'time' "putin's" 'like' '6' 'ukraine' '.' 'quote' 'biden'
 'tweet' '&' '3' '4' '5' '2' '1' 'trump' 'replying' 'putin']
topic 3:
['u' 's' "putin's" 'putin's' 'invasion' 'ukrainian' 'say' '&' '3' '4'
 '2'
 'russia' 'president' 'vladimir' 'war' 'com' '1' 'ukraine' 'russian'
 'putin']
topic 4:
['know' 'trump' '8' '9' 'people' '&' 'like' 'ukraine' 'just' '5' '.'
 'quote' 'tweet' 'russia' '4' '1' '3' '2' 'replying' 'putin']
```