ldatwitter

October 27, 2020

1 In this notebook we run Latent Dirichlet Kernel on the political twitter data-set

[1]:
```
# This Python 3 environment comes with many helpful analytics libraries␣
 ↪installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/
 ↪docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list␣
 ↪all files under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 5GB to the current directory (/kaggle/working/) that gets␣
 ↪preserved as output when you create a version using "Save & Run All"
# You can also write temporary files to /kaggle/temp/, but they won't be saved␣
 ↪outside of the current session
```

```
/kaggle/input/democratvsrepublicantweets/TwitterHandles.csv
/kaggle/input/democratvsrepublicantweets/ExtractedTweets.csv
/kaggle/input/rapids/rapids.0.15.0
/kaggle/input/rapids/rapids.0.16.0
```

[2]:
```
import pandas as pd
import numpy as np
from sklearn.feature_extraction.text import CountVectorizer
import keras
import copy
import string
import copy
from matplotlib import pyplot as plt
```

[3]:

```
import string
import pandas as pd
tweets_df=pd.read_csv("/kaggle/input/democratvsrepublicantweets/ExtractedTweets.
 ↪csv")
tweets_df
tweets_df["Text"]=tweets_df["Tweet"].apply(lambda x: x.translate(str.
 ↪maketrans('', '', string.punctuation)).lower())
tweets_df["Tokenized"]=tweets_df["Text"].apply(lambda x: x.split(" "))
```

[4]:

```
def print_topics(model, count_vectorizer, n_top_words):
    words = count_vectorizer.get_feature_names()
    for topic_idx, topic in enumerate(model.components_):
        print("\nTopic #%d:" % topic_idx)
        print(" ".join([words[i]
                        for i in topic.argsort()[:-n_top_words - 1:-1]]))
```

[70]:

```
from sklearn.feature_extraction.text import CountVectorizer
corpus_D = list(tweets_df[tweets_df.Party=='Democrat']["Text"])
corpus_R = list(tweets_df[tweets_df.Party=='Republican']["Text"])
corpus = list(tweets_df["Text"])
N_feat=600
vect_D = CountVectorizer(max_features=N_feat)
vect_R = CountVectorizer(max_features=N_feat)
vect = CountVectorizer(max_features=N_feat)
X_D = vect_D.fit_transform(corpus_D)
X_R = vect_R.fit_transform(corpus_R)
X = vect.fit_transform(corpus)
#vect_D.get_feature_names()
```

2 Compute non-negative matrix factorization

[71]:

```
from sklearn.decomposition import NMF
nmf=NMF(n_components=2)
```

[72]:

```
cats=nmf.fit_transform(X)
prop=np.divide(cats,np.expand_dims(np.sum(cats,1),1))
cumulative=np.cumsum(prop,1)
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:2: RuntimeWarning:
invalid value encountered in true_divide
```

[73]:

```
tweets_df['Topics']=len(tweets_df)*[0]
tweets_df['Topics']=list(prop)
```

[74]:

```
tweets_df['Max_topic']=tweets_df['Topics'].apply(np.argmax)
#tweets_df
```

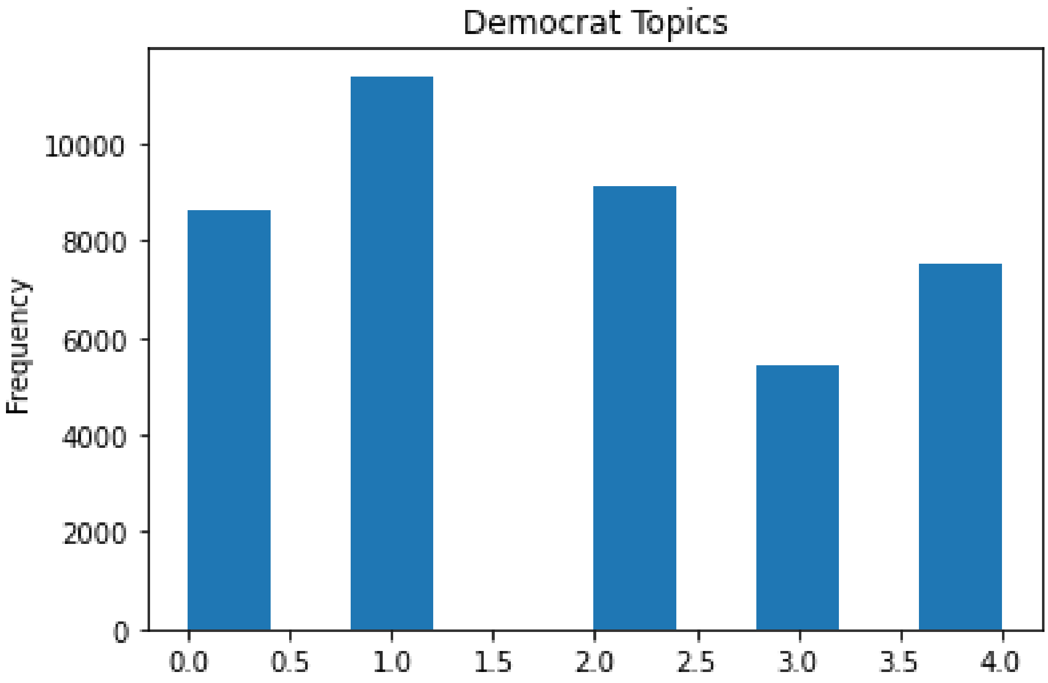
3 Democrat+Republican topic histograms

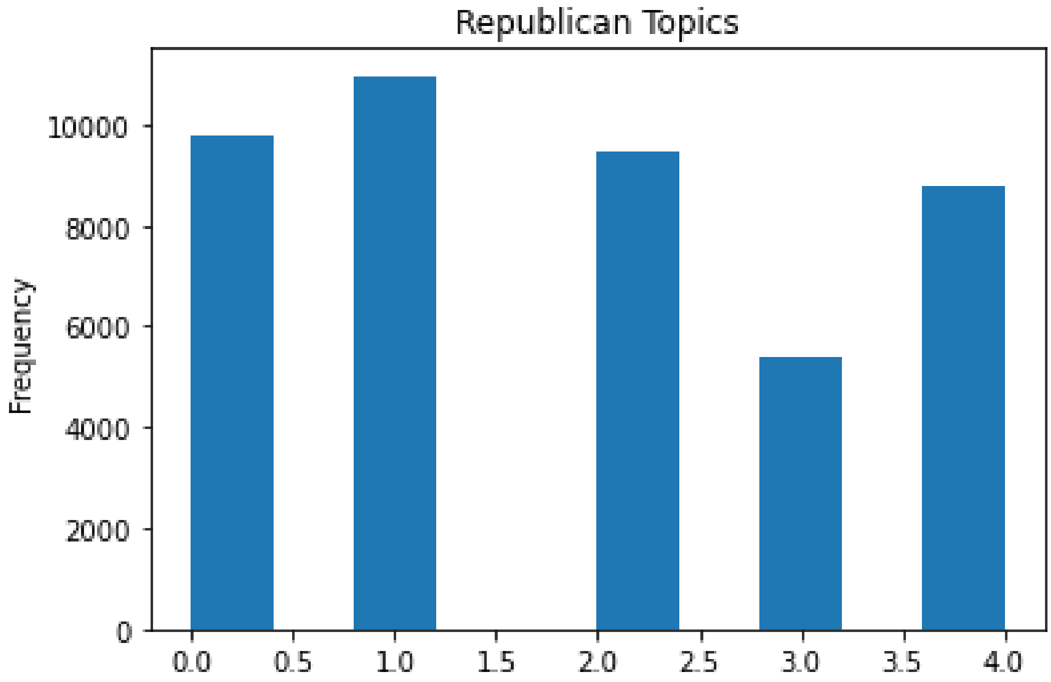
[75]:

```
tweets_df[tweets_df.Party=="Democrat"]['Max_topic'].plot.hist()
plt.title("Democrat Topics")
plt.figure()
tweets_df[tweets_df.Party=="Republican"]['Max_topic'].plot.hist()
plt.title("Republican Topics")
```

[75]:

```
Text(0.5, 1.0, 'Republican Topics')
```





[76]:
```
words=vect.get_feature_names()
nmf.components_[0,:]>1E-2
t=1E-1
print('topic1',np.array(words)[nmf.components_[0,:]>t])
print('topic2',np.array(words)[nmf.components_[1,:]>t])
print('topic3',np.array(words)[nmf.components_[2,:]>t])
print('topic4',np.array(words)[nmf.components_[3,:]>t])
print('topic5',np.array(words)[nmf.components_[4,:]>t])
```

```
topic1 ['2018' 'about' 'across' 'act' 'administration' 'against' 'american'
'amp'
 'are' 'as' 'at' 'be' 'bill' 'budget' 'but' 'by' 'committee'
 'congressional' 'country' 'cuts' 'day' 'deal' 'during' 'first' 'floor'
 'for' 'from' 'gop' 'goptaxscam' 'government' 'had' 'has' 'have' 'hearing'
 'here' 'house' 'housegop' 'hr' 'into' 'is' 'it' 'its' 'just' 'last' 'law'
 'most' 'new' 'news' 'not' 'now' 'on' 'over' 'passed' 'people' 'president'
 'rt' 'senate' 'since' 'states' 'tax' 'taxcutsandjobsact' 'that' 'the'
 'they' 'this' 'time' 'today' 'trump' 'under' 'united' 'us' 'vote' 'was'
 'watch' 'we' 'week' 'which' 'who' 'will' 'with' 'world' 'would' 'year']
topic2 ['about' 'access' 'all' 'am' 'amp' 'an' 'are' 'as' 'at' 'back' 'be'
'bill'
 'bipartisan' 'bring' 'but' 'by' 'can' 'colleagues' 'congratulations'
 'congress' 'continue' 'day' 'discuss' 'do' 'efforts' 'end' 'ensure'
 'fight' 'for' 'forward' 'from' 'get' 'give' 'glad' 'go' 'great' 'happy'
 'has' 'have' 'he' 'health' 'hear' 'help' 'his' 'honor' 'honored' 'house'
 'how' 'if' 'im' 'important' 'is' 'it' 'its' 'join' 'joined' 'keep' 'last'
 'learn' 'legislation' 'letter' 'look' 'looking' 'make' 'me' 'meet' 'more'
 'morning' 'must' 'my' 'national' 'need' 'new' 'not' 'office' 'on'
 'opportunity' 'or' 'our' 'out' 'people' 'potus' 'president' 'protect'
 'proud' 'provide' 'right' 'rt' 'school' 'see' 'should' 'so' 'speak'
 'stop' 'students' 'support' 'sure' 'take' 'talk' 'tax' 'thank' 'thanks'
 'that' 'their' 'them' 'they' 'this' 'time' 'to' 'today' 'together'
 'trump' 'up' 'us' 'veterans' 'visit' 'vote' 'want' 'was' 'we' 'week'
 'what' 'who' 'will' 'with' 'work' 'working' 'you' 'your']
topic3 ['about' 'across' 'all' 'am' 'america' 'american' 'americans' 'an' 'and'
 'are' 'as' 'at' 'be' 'been' 'better' 'bush' 'businesses' 'by' 'can'
 'care' 'children' 'communities' 'community' 'country' 'cuts' 'day' 'do'
 'economy' 'every' 'families' 'family' 'for' 'friend' 'friends' 'from'
 'funding' 'good' 'great' 'happy' 'has' 'have' 'he' 'health' 'hearing'
 'help' 'her' 'his' 'honor' 'how' 'if' 'important' 'is' 'it' 'its' 'jobs'
 'join' 'keep' 'leadership' 'life' 'like' 'local' 'make' 'many' 'me'
 'meeting' 'men' 'military' 'more' 'morning' 'must' 'my' 'nation' 'need'
 'new' 'news' 'no' 'not' 'now' 'on' 'other' 'our' 'out' 'people' 'potus'
 'prayers' 'president' 'protect' 'rt' 'safe' 'school' 'service' 'should'
 'small' 'so' 'staff' 'students' 'support' 'tax' 'thank' 'thanks' 'that'
 'their' 'there' 'these' 'they' 'this' 'those' 'thoughts' 'time' 'today'
 'trump' 'up' 'us' 'veterans' 'was' 'we' 'week' 'were' 'what' 'who' 'will'
 'wishing' 'with' 'women' 'work' 'working' 'years' 'you' 'your']
topic4 ['all' 'am' 'americans' 'amp' 'an' 'anniversary' 'are' 'as' 'be'
'because'
 'by' 'congress' 'day' 'family' 'first' 'great' 'has' 'have' 'he' 'his'
 'honor' 'importance' 'is' 'life' 'many' 'meeting' 'member' 'members'
 'millions' 'more' 'most' 'my' 'national' 'new' 'of' 'one' 'our' 'out'
 'part' 'passing' 'people' 'proud' 'rt' 'some' 'state' 'support' 'that'
 'their' 'this' 'today' 'us' 'was' 'we' 'who' 'with' 'women' 'year'
 'years']
topic5 ['about' 'all' 'am' 'america' 'amp' 'an' 'are' 'as' 'at' 'be' 'been'
'but'
 'by' 'can' 'colleagues' 'community' 'congress' 'country' 'county' 'day'
 'dc' 'district' 'first' 'for' 'from' 'good' 'great' 'hall' 'has' 'have'
 'he' 'hearing' 'here' 'high' 'history' 'honor' 'if' 'in' 'is' 'it' 'its'
 'jobs' 'join' 'joined' 'joining' 'just' 'last' 'live' 'many' 'me'
 'meeting' 'million' 'more' 'morning' 'my' 'new' 'news' 'no' 'not' 'now'
 'office' 'on' 'one' 'or' 'our' 'out' 'over' 'people' 'rt' 'school' 'so'
 'students' 'than' 'that' 'their' 'there' 'they' 'this' 'those' 'time'
 'today' 'town' 'tune' 'up' 'us' 'was' 'washington' 'we' 'week' 'were'
 'what' 'who' 'will' 'with' 'women' 'years' 'you' 'your']
```