```python
import pandas as pd
```

```python
df = pd.read_csv("drive/My Drive/Colab Notebooks/state-of-the-union.csv",names=["year","cc
```

```python
df["content"][0]
```

```
'George Washington\nJanuary 8, 1790\n\nFellow-Citizens of the Senate and House of Re
```

```python
# Import stopwords with scikit-learn
from sklearn.feature_extraction import text
stop = text.ENGLISH_STOP_WORDS
```

```python
import nltk
nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to /root/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
True
```

```python
from nltk.corpus import stopwords
stops = set(stopwords.words("english"))
```

```python
stops
```

```
  'should',
  "should've",
  'shouldn',
  "shouldn't",
  'so',
  'some',
  'such',
  't',
  'than',
  'that',
  "that'll",
  'the',
  'their',
  'theirs',
  'them',
  'themselves',
  'then',
  'there',
  'these',
  'they',
  'this',
  'those',
  'through',
  'to',
  'too',
  'under',
  'until',
  'up',
  've',
  'very',
  'was',
  'wasn',
  "wasn't",
  'we',
  'were',
  'weren',
  "weren't",
  'what',
  'when',
  'where',
  'which',
  'while',
  'who',
  'whom',
  'why',
  'will',
  'with',
  'won',
  "won't",
  'wouldn',
  "wouldn't",
  'y',
  'you',
  "you'd",
  "you'll",
  "you're",
  "you've",
  'your',
  'yours',
  'yourself',
  'yourselves'}
```

```
#removing non alphabets
df.content = df.content.str.replace("[^A-Za-z ]", " ")
df.head()
```

	year	content
0	1790	George Washington January Fellow Citi...
1	1790	State of the Union Address George Washington ...
2	1791	State of the Union Address George Washington ...
3	1792	State of the Union Address George Washington ...
4	1793	State of the Union Address George Washington ...

```
#!pip install --upgrade gensim
```

```
df.shape
```

```
(226, 2)
```

```python
from gensim.utils import import simple_preprocess

texts = df.content.apply(simple_preprocess)
```

```python
texts[0]
```

```
 'representatives',
 'embrace',
 'with',
 'great',
 'satisfaction',
 'the',
 'opportunity',
 'which',
 'now',
 'presents',
 'itself',
 'of',
 'congratulating',
 'you',
 'on',
 'the',
 'present',
 'favorable',
 'prospects',
 'of',
 'our',
 'public',
 'affairs',
 'the',
 'recent',
 'accession',
 'of',
 'the',
 'important',
 'state',
 'of',
 'north',
 'carolina',
 'to',
 'the',
 'constitution',
 'of',
 'the',
 'united',
 'states',
 'of',
 'which',
 'official',
 'information',
 'has',
 'been',
 'received',
 'the',
 'rising',
 'credit',
 'and',
 'respectability',
 'of',
 'our',
 'country',
 'the',
 'general',
 'and',
 'increasing',
 'good',
 'will',
 'toward',
```

```
  'the',
  'government',
  'of',
  'the',
  'union',
  'and',
  'the',
  'concord',
  'peace',
  'and',
  'plenty',
  'with',
  'which',
  'we',
  'are',
  'blessed',
  'are',
  'circumstances',
  'auspicious',
  'in',
  'an',
  'eminent',
  'degree',
  'to',
  'our',
  'national',
  'prosperity',
  'in',
  'resuming',
  'your',
  'consultations',
  'for',
  'the',
  'general',
  'good',
  'you',
  'can',
  'not',
  'but',
  'derive',
  'encouragement',
  'from',
  'the',
  'reflection',
  'that',
  'the',
  'measures',
  'of',
  'the',
  'last',
  'session',
  'have',
  'been',
  'as',
  'satisfactory',
  'to',
  'your',
  'constituents',
  'as',
  'the',
  'novelty',
  'and'
```

```
    'and ',
    'difficulty',
    'of',
    'the',
    'work',
    'allowed',
    'you',
    'to',
    'hope',
    'still',
    'further',
    'to',
    'realize',
    'their',
    'expectations',
    'and',
    'to',
    'secure',
    'the',
    'blessings',
    'which',
    'gracious',
    'providence',
    'has',
    'placed',
    'within',
    'our',
    'reach',
    'will',
    'in',
    'the',
    'course',
    'of',
    'the',
    'present',
    'important',
    'session',
    'call',
    'for',
    'the',
    'cool',
    'and',
    'deliberate',
    'exertion',
    'of',
    'your',
    'patriotism',
    'firmness',
    'and',
    'wisdom',
    'among',
    'the',
    'many',
    'interesting',
    'objects',
    'which',
    'will',
    'engage',
    'your',
    'attention',
    'that',
    'of',
```

```
      'providing',
      'for',
      'the',
      'common',
      'defense',
      'will',
      'merit',
      'particular',
      'regard',
      'to',
      'be',
      'prepared',
      'for',
      'war',
      'is',
      'one',
      'of',
      'the',
      'most',
      'effectual',
      'means',
      'of',
      'preserving',
      'peace',
      'free',
      'people',
      'ought',
      'not',
      'only',
      'to',
      'be',
      'armed',
      'but',
      'disciplined',
      'to',
      'which',
      'end',
      'uniform',
      'and',
      'well',
      'digested',
      'plan',
      'is',
      'requisite',
      'and',
      'their',
      'safety',
      'and',
      'interest',
      'require',
      'that',
      'they',
      'should',
      'promote',
      'such',
      'manufactories',
      'as',
      'tend',
      'to',
      'render',
      'them',
      'independent',
```

```
 'independent',
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 'others',
 'for',
 'essential',
 'particularly',
 'military',
 'supplies',
 'the',
 'proper',
 'establishment',
 'of',
 'the',
 'troops',
 'which',
 'may',
 'be',
 'deemed',
 'indispensable',
 'will',
 'be',
 'entitled',
 'to',
 'mature',
 'consideration',
 'in',
 'the',
 'arrangements',
 'which',
 'may',
 'be',
 'made',
 'respecting',
 'it',
 'it',
 'will',
 'be',
 'of',
 'importance',
 'to',
 'conciliate',
 'the',
 'comfortable',
 'support',
 'of',
 'the',
 'officers',
 'and',
 'soldiers',
 'with',
 'due',
 'regard',
 'to',
 'economy',
 'there',
 'was',
 'reason',
 'to',
 'hope',
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 'the',
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```
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'the',
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'of',
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'and',
'western',
'frontiers',
'from',
'their',
'depredations',
'but',
'you',
'will',
'perceive',
'from',
'the',
'information',
'contained',
'in',
'the',
'papers',
'which',
'shall',
'direct',
'to',
'be',
'laid',
'before',
'you',
'comprehending',
'communication',
'from',
'the',
'commonwealth',
'of',
'virginia',
'that',
'we',
'ought',
'to',
'be',
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'to',
'afford',
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'to',
'those',
'parts'
```

```
 parts ,
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'the',
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'and',
'if',
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'to',
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'the',
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'the',
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'by',
'such',
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'as',
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'in',
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'respect',
'in',
'the',
'manner',
'which',
'circumstances',
'may',
'render',
'most',
'conducive',
'to',
'the',
'public',
'good',
'and',
'to',
'this',
'end',
'that',
'the',
'compensation',
'to',
'be',
```

```
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'be',
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'to',
'the',
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'law',
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'the',
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'which',
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'may',
'be',
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'to',
'the',
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'of',
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'be',
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'rule'
```

```
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 'is',
 'an',
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 'of',
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 'and',
 'will',
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 'duly',
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 'to',
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 'of',
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 'commerce',
 'and',
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 'by',
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 'will',
 'not',
 'trust',
 'need',
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 'but',
 'can',
 'not',
 'forbear',
 'intimating',
 'to',
 'you',
 'the',
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 'of',
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 'encouragement',
 'as',
 'well',
 'to',
 'the',
 'introduction',
```

```
'of',
'new',
'and',
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'abroad',
'as',
'to',
'the',
'exertions',
'of',
'skill',
'and',
'genius',
'in',
'producing',
'them',
'at',
'home',
'and',
'of',
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'the',
'intercourse',
'between',
'the',
'distant',
'parts',
'of',
'our',
'country',
'by',
'due',
'attention',
'to',
'the',
'post',
'office',
'and',
'post',
'roads',
'nor',
'am',
'less',
'persuaded',
'that',
'you',
'will',
'agree',
'with',
'me',
'in',
'opinion',
'that',
'there',
'is',
'nothing',
'which',
'can',
'better',
'deserve',
```

```
  deserve ,
 'your',
 'patronage',
 'than',
 'the',
 'promotion',
 'of',
 'science',
 'and',
 'literature',
 'knowledge',
 'is',
 'in',
 'every',
 'country',
 'the',
 'surest',
 'basis',
 'of',
 'public',
 'happiness',
 'in',
 'one',
 'in',
 'which',
 'the',
 'measures',
 'of',
 'government',
 'receive',
 'their',
 'impressions',
 'so',
 'immediately',
 'from',
 'the',
 'sense',
 'of',
 'the',
 'community',
 'as',
 'in',
 'ours',
 'it',
 'is',
 'proportionably',
 'essential',
 'to',
 'the',
 'security',
 'of',
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 'it',
 'contributes',
 'in',
 'various',
 'ways',
 'by',
 'convincing',
 'those',
 'who',
```

```
'are',
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'with',
'the',
'public',
'administration',
'that',
'every',
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'end',
'of',
'government',
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'by',
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'enlightened',
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'of',
'the',
'people',
'and',
'by',
'teaching',
'the',
'people',
'themselves',
'to',
'know',
'and',
'to',
'value',
'their',
'own',
'rights',
'to',
'discern',
'and',
'provide',
'against',
'invasions',
'of',
'them',
'to',
'distinguish',
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'and',
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'of',
'lawful',
'authority',
'between',
'burthens',
'proceeding',
'from',
'disregard',
'to',
'their'.
```

```
    '....',
    'convenience',
    'and',
    'those',
    'resulting',
    'from',
    'the',
    'inevitable',
    'exigencies',
    'of',
    'society',
    'to',
    'discriminate',
    'the',
    'spirit',
    'of',
    'liberty',
    'from',
    'that',
    'of',
    'licentiousness',
    'cherishing',
    'the',
    'first',
    'avoiding',
    'the',
    'last',
    'and',
    'uniting',
    'speedy',
    'but',
    'temperate',
    'vigilance',
    'against',
    'encroachments',
    'with',
    'an',
    'inviolable',
    'respect',
    'to',
    'the',
    'laws',
    'whether',
    'this',
    'desirable',
    'object',
    'will',
    'be',
    'best',
    'promoted',
    'by',
    'affording',
    'aids',
    'to',
    'seminaries',
    'of',
    'learning',
    'already',
    'established',
    'by',
    'the',
    'institution',
```

```
'of',
'national',
'university',
'or',
'by',
'any',
'other',
'expedients',
'will',
'be',
'well',
'worthy',
'of',
'place',
'in',
'the',
'deliberations',
'of',
'the',
'legislature',
'gentlemen',
'of',
'the',
'house',
'of',
'representatives',
'saw',
'with',
'peculiar',
'pleasure',
'at',
'the',
'close',
'of',
'the',
'last',
'session',
'the',
'resolution',
'entered',
'into',
'by',
'you',
'expressive',
'of',
'your',
'opinion',
'that',
'an',
'adequate',
'provision',
'for',
'the',
'support',
'of',
'the',
'public',
'credit',
'is',
'matter',
'of',
'high',
```

```
    'importance',
    'to',
    'the',
    'national',
    'honor',
    'and',
    'prosperity',
    'in',
    'this',
    'sentiment',
    'entirely',
    'concur',
    'and',
    'to',
    'perfect',
    'confidence',
    'in',
    'your',
    'best',
    'endeavors',
    'to',
    'devise',
    'such',
    'provision',
    'as',
    'will',
    'be',
    'truly',
    'with',
    'the',
    'end',
    'add',
    'an',
    'equal',
    'reliance',
    'on',
    'the',
    'cheerful',
    'cooperation',
    'of',
    'the',
    'other',
    'branch',
    'of',
    'the',
    'legislature',
    'it',
    'would',
    'be',
    'superfluous',
    'to',
    'specify',
    'inducements',
    'to',
    'measure',
    'in',
    'which',
    'the',
    'character',
    'and',
    'interests',
```

```
        'of',
        'the',
        'united',
        'states',
        'are',
        'so',
        'obviously',
        'so',
        'deeply',
        'concerned',
        'and',
        'which',
        'has',
        'received',
        'so',
        'explicit',
        'sanction',
        'from',
        'your',
        'declaration',
        'gentlemen',
        'of',
        'the',
```

```python
def remove_stops(row):
    my_list = row
    meaningful_words = [w for w in my_list if not w in stops]
    return (meaningful_words)

texts=texts.apply(remove_stops)
```

```
        'proper',
```

```python
texts[0]
```

[→

```
   senate ,
   'house',
   'representatives',
   'embrace',
   'great',
   'satisfaction',
   'opportunity',
   'presents',
   'congratulating',
   'present',
   'favorable',
   'prospects',
   'public',
   'affairs',
   'recent',
   'accession',
   'important',
   'state',
   'north',
   'carolina',
   'constitution',
   'united',
   'states',
   'official',
   'information',
   'received',
   'rising',
   'credit',
   'respectability',
   'country',
   'general',
   'increasing',
   'good',
   'toward',
   'government',
   'union',
   'concord',
   'peace',
   'plenty',
   'blessed',
   'circumstances',
   'auspicious',
   'eminent',
   'degree',
   'national',
   'prosperity',
   'resuming',
   'consultations',
   'general',
   'good',
   'derive',
   'encouragement',
   'reflection',
   'measures',
   'last',
   'session',
   'satisfactory',
   'constituents',
   'novelty',
   'difficulty',
   'work',
   'allowed',
```

```
'hope',
'still',
'realize',
'expectations',
'secure',
'blessings',
'gracious',
'providence',
'placed',
'within',
'reach',
'course',
'present',
'important',
'session',
'call',
'cool',
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'promote',
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'tend',
'render',
'independent',
'others',
'essential'
```

```
 essential ',
 'particularly',
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 'supplies',
 'proper',
 'establishment',
 'troops',
 'may',
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 'entitled',
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 'arrangements',
 'may',
 'made',
 'respecting',
 'importance',
 'conciliate',
 'comfortable',
 'support',
 'officers',
 'soldiers',
 'due',
 'regard',
 'economy',
 'reason',
 'hope',
 'pacific',
 'measures',
 'adopted',
 'regard',
 'certain',
 'hostile',
 'tribes',
 'indians',
 'would',
 'relieved',
 'inhabitants',
 'southern',
 'western',
 'frontiers',
 'depredations',
 'perceive',
 'information',
 'contained',
 'papers',
 'shall',
 'direct',
 'laid',
 'comprehending',
 'communication',
 'commonwealth',
 'virginia',
 'ought',
 'prepared',
 'afford',
 'protection',
 'parts',
 'union',
 'necessary',
 'punish',
```

```
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'intercourse',
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'provisions',
'enable',
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'respect',
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'circumstances',
'may',
'render',
'conducive',
'public',
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'end',
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'may',
'employed',
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'foreign',
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'render',
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'foreigners',
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'admitted',
'rights',
'citizens',
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'uniform',
'rule',
'naturalization',
'uniformity',
'currency',
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```

```
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'attended',
'advancement',
'agriculture',
'commerce',
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'proper',
'means',
'trust',
'need',
'recommendation',
'forbear',
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'effectual',
'encouragement',
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'abroad',
'exertions',
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