Some common terms to remember:

1. Corpus - Paragrapgh
2. Vocabulary - Unique word
3. Document - one row
4. Word - one word

Bag of words

In [1]:
```
import numpy as np
import pandas as pd
```

In [2]:
```
df = pd.DataFrame({"text":["people watch dswithbappy",
                           "dswithbappy watch dswithbappy",
                           "people write comment",
                            "dswithbappy write comment"],"output":[1,1,0,0]})

df
```

Out[2]:

	text	output
0	people watch dswithbappy	1
1	dswithbappy watch dswithbappy	1
2	people write comment	0
3	dswithbappy write comment	0

In [3]:
```
from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer()
```

In [4]:
```
bow = cv.fit_transform(df['text'])
```

In [5]:
```
#vocabulary
print(cv.vocabulary_)
```

```
{'people': 2, 'watch': 3, 'dswithbappy': 1, 'write': 4, 'comment': 0}
```

In [10]:
```
bow.toarray()
```

Out[10]:
```
array([[0, 1, 1, 1, 0],
       [0, 2, 0, 1, 0],
       [1, 0, 1, 0, 1],
       [1, 1, 0, 0, 1]])
```

In [ ]:
```
print(bow[0].toarray())
print(bow[1].toarray())
print(bow[2].toarray())
```

```
[[0 1 1 1 0]]
[[0 2 0 1 0]]
[[1 0 1 0 1]]
```

In [8]:
```
# new
cv.transform(['Bappy watch dswithbappy']).toarray()
```

Out[8]:
```
array([[0, 1, 0, 1, 0]])
```

In [ ]:
```
X = bow.toarray()
y = df['output']
```

In [ ]:
```

```

N-grams

In [11]:
```
df = pd.DataFrame({"text":["people watch dswithbappy",
                           "dswithbappy watch dswithbappy",
                           "people write comment",
                            "dswithbappy write comment"],"output":[1,1,0,0]})

df
```

Out[11]:

	text	output
0	people watch dswithbappy	1
1	dswithbappy watch dswithbappy	1
2	people write comment	0
3	dswithbappy write comment	0

In [12]:
```
# BI grams
from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer(ngram_range=(2,2))
```

In [13]:
```
bow = cv.fit_transform(df['text'])
```

In [14]:
```
print(cv.vocabulary_)
```

```
{'people watch': 2, 'watch dswithbappy': 4, 'dswithbappy watch': 0, 'people write': 3,
'write comment': 5, 'dswithbappy write': 1}
```

In [ ]:
```
print(bow[0].toarray())
print(bow[1].toarray())
print(bow[2].toarray())
```

```
[[0 0 1 0 1 0]]
[[1 0 0 0 1 0]]
[[0 0 0 1 0 1]]
```

In [15]:
```
#Ti gram
# BI grams
from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer(ngram_range=(3,3))
```

In [16]:
```
bow = cv.fit_transform(df['text'])
```

In [ ]:
```
print(cv.vocabulary_)
```

```
{'people watch dswithbappy': 2, 'dswithbappy watch dswithbappy': 0, 'people write comme
nt': 3, 'dswithbappy write comment': 1}
```

In [ ]:
```
print(bow[0].toarray())
print(bow[1].toarray())
print(bow[2].toarray())
```

```
[[0 0 1 0]]
[[1 0 0 0]]
[[0 0 0 1]]
```

TF-IDF (Term frequency- Inverse document frequency)

In [ ]:
```
df = pd.DataFrame({"text":["people watch dswithbappy",
                           "dswithbappy watch dswithbappy",
                           "people write comment",
                            "dswithbappy write comment"],"output":[1,1,0,0]})

df
```

Out[20]:

	text	output
0	people watch dswithbappy	1
1	dswithbappy watch dswithbappy	1
2	people write comment	0
3	dswithbappy write comment	0

In [ ]:
```
from sklearn.feature_extraction.text import TfidfVectorizer
tfid= TfidfVectorizer()
```

In [ ]:
```
tfid.fit_transform(df['text']).toarray()
```

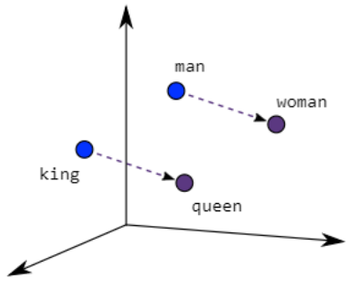
Out[22]:
```
array([[0.        , 0.49681612, 0.61366674, 0.61366674, 0.        ],
       [0.        , 0.8508161 , 0.        , 0.52546357, 0.        ],
       [0.57735027, 0.        , 0.57735027, 0.        , 0.57735027],
       [0.61366674, 0.49681612, 0.        , 0.        , 0.61366674]])
```

In [ ]:
```
print(tfid.idf_)
```

```
[1.51082562 1.22314355 1.51082562 1.51082562 1.51082562]
```

Word2Vec

Word2Vec creates vectors of the words that are distributed numerical representations of word features – these word features could comprise of words that represent the context of the individual words present in our vocabulary. Word embeddings eventually help in establishing the association of a word with another similar meaning word through the created vector.



In [1]:
```
import warnings
warnings.filterwarnings("ignore", category=FutureWarning)
```

In [2]:
```
import numpy as np
import pandas as pd
import gensim
import os
```

In [3]:
```
!pip install --upgrade gensim --user
```

```
Requirement already satisfied: gensim in c:\users\shehryar gondal\appdata\roaming\python
\python310\site-packages (4.3.2)
Requirement already satisfied: smart-open>=1.8.1 in d:\anaconda setup\lib\site-packages
(from gensim) (5.2.1)
Requirement already satisfied: numpy>=1.18.5 in d:\anaconda setup\lib\site-packages (from
gensim) (1.23.5)
Requirement already satisfied: scipy>=1.7.0 in d:\anaconda setup\lib\site-packages (from
gensim) (1.10.0)

WARNING: Ignoring invalid distribution -orch (d:\anaconda setup\lib\site-packages)
WARNING: Ignoring invalid distribution -orch (d:\anaconda setup\lib\site-packages)
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WARNING: Ignoring invalid distribution -orch (d:\anaconda setup\lib\site-packages)
WARNING: Ignoring invalid distribution -orch (d:\anaconda setup\lib\site-packages)
```
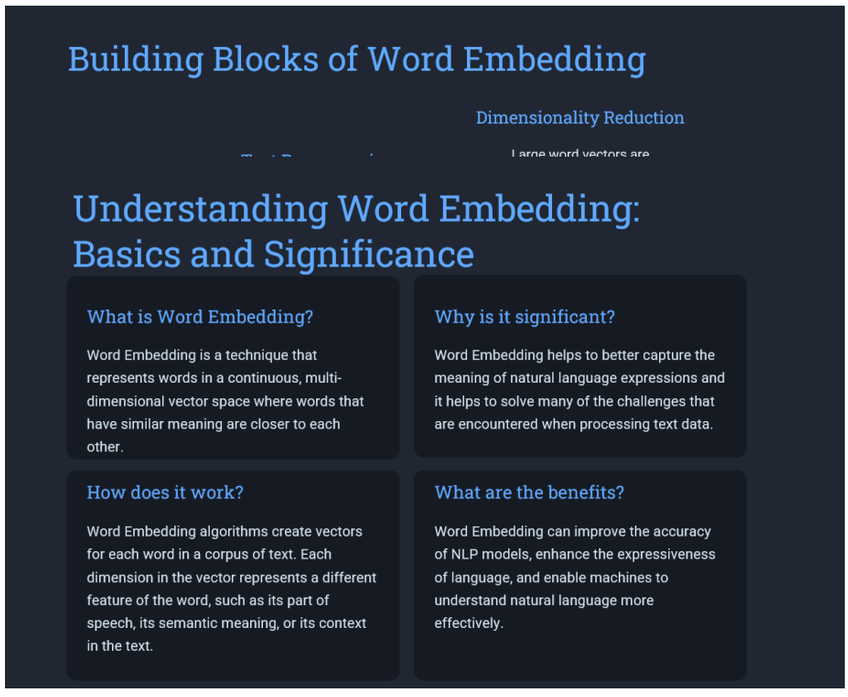

In [4]:
```
from nltk import sent_tokenize
from gensim.utils import simple_preprocess
import nltk
nltk.download('punkt')
```

```
[nltk_data] Downloading package punkt to C:\Users\Shehryar
[nltk_data]     Gondal\AppData\Roaming\nltk_data...
[nltk_data]   Unzipping tokenizers\punkt.zip.
```

Out[4]: True



In [ ]:
```
```

In [6]:
```
import os
from nltk.tokenize import sent_tokenize
from gensim.utils import simple_preprocess  # Assuming you're using gensim for preprocessi

# Initialize an empty list to store the tokenized sentences
story = []

# Specify the directory containing your text files
```

In [ ]:

In [6]:
```
import os
from nltk.tokenize import sent_tokenize
from gensim.utils import simple_preprocess  # Assuming you're using gensim for preprocessi

# Initialize an empty list to store the tokenized sentences
story = []

# Specify the directory containing your text files
data_directory = 'data1/'

# Iterate through files in the directory
for filename in os.listdir(data_directory):
    if filename == '.ipynb_checkpoints':
        continue  # Skip the .ipynb_checkpoints directory if present
    with open(os.path.join(data_directory, filename), 'r', encoding='utf-8') as file:
        corpus = file.read()
        raw_sentences = sent_tokenize(corpus)
        for sentence in raw_sentences:
            story.append(simple_preprocess(sentence))
```

In [7]:
```
story
```

Out[7]:
```
[['game',
  'of',
  'thrones',
  'book',
  'one',
  'of',
  'song',
  'of',
  'ice',
  'and',
  'fire',
  'by',
  'george',
  'martin',
  'prologue',
  'we',
  'should',
  'start',
  'back',
```

In [8]:
```
len(story)
```

Out[8]:
```
8356
```

In [9]:
```
story
```

In [10]:
```
story[0]
```

Out[9]:
```
[['game',
  'of',
  'thrones',
  'book',
  'one',
  'of',
  'song',
  'of',
  'ice',
  'and',
  'fire',
  'by',
  'george',
  'martin',
  'prologue',
  'we',
  'should',
  'start',
  'back',
```

Out[10]:
```
['game',
 'of',
 'thrones',
 'book',
 'one',
 'of',
 'song',
 'of',
 'ice',
 'and',
 'fire',
 'by',
 'george',
 'martin',
 'prologue',
 'we',
 'should',
 'start',
 'back',
 'gared',
 'urged',
 'as',
 'the',
 'woods',
 'began',
 'to',
 'grow',
 'dark',
 'around',
 'them']
```

In [11]:
```
model = gensim.models.Word2Vec(
    window=10,
    min_count=2
)
```

In [9]:
```
story
```

In [10]:
```
story[0]
```

Out[9]:
```
[['game',
 'of',
 'thrones',
 'book',
 'one',
 'of',
 'song',
 'of',
 'ice',
 'and',
 'fire',
 'by',
 'george',
 'martin',
 'prologue',
 'we',
 'should',
 'start',
 'back',
 'gared',
 'urged',
 'as',
 'the',
 'woods',
 'began',
 'to',
 'grow',
 'dark',
 'around',
 'them']
```

In [11]:
```
model = gensim.models.Word2Vec(
    window=10,
    min_count=2
)
```

In [12]:
```
model.build_vocab(story)
```

In [13]:
```
model.train(story, total_examples=model.corpus_count, epochs=model.epochs)
```

Out[13]:
```
(322595, 447775)
```

In [14]:
```
model.wv.most_similar('daenerys')
```

Out[14]:
```
[('still', 0.9993206262588501),
 ('two', 0.9992164373397827),
 ('dothraki', 0.9992116689682007),
 ('an', 0.9992004036903381),
 ('above', 0.9991950988769531),
 ('while', 0.9991921186447144),
 ('other', 0.9991881251335144),
 ('castle', 0.999164879322052),
 ('then', 0.9991580247879028),
 ('three', 0.9991518259048462)]
```

In [15]:
```
model.wv.similarity('arya','sansa')
```

Out[15]:
```
0.9997436
```

In [16]:
```
model.wv['deep'].shape
```

Out[16]:
```
(100,)
```

In [17]:
```
vec = model.wv.get_normed_vectors()
```

In [18]:
```
vec
```

Out[18]:
```
array([[-0.12478705,  0.06850963,  0.10970236, ..., -0.09639692,
         0.07652823,  0.0394804 ],
       [-0.11689644,  0.06340289,  0.10848914, ..., -0.09198184,
         0.07238222,  0.03124547],
       [-0.07155877,  0.03460521,  0.09148999, ..., -0.08466641,
         0.06697579,  0.00204907],
       ...,
       [-0.05747115,  0.14610448,  0.13229322, ..., -0.10777298,
         0.06255373,  0.06095371],
       [-0.07182547,  0.06408214,  0.06909133, ..., -0.10851807,
         0.05367512, -0.00807478],
       [ 0.00190406,  0.09480352,  0.01514295, ..., -0.07081555,
         0.07665265, -0.00382668]], dtype=float32)
```

In [19]:
```
model.wv.get_normed_vectors().shape
```

Out[19]:
```
(3840, 100)
```

In [20]:
```
y = model.wv.index_to_key
```

In [21]:
```
len(y)
```

Out[21]:
```
3840
```

In [22]:
```
y
```

```
['tyrion',
 'hand',
 'we',
 'then',
 'do',
 'than',
 'now',
 'down',
 'never',
 'made',
 'by',
 'see',
 'told',
 'boy',
 'father',
 'here',
 'only',
 'sansa',
 'brother',
 'an',
```

In [23]:
```
from sklearn.decomposition import PCA
```

In [24]:
```
pca = PCA(n_components=3)
```

In [25]:
```
X = pca.fit_transform(model.wv.get_normed_vectors())
```

In [26]:
```
X
```

Out[26]:
```
array([[-1.4590222e-02, -2.1133895e-01, -4.7438904e-03],
       [-2.7601445e-02, -1.6377506e-01, -9.5280139e-03],
       [-5.2432995e-02,  2.0638121e-02,  1.0925694e-04],
       ...,
```

```
        0.06697579,  0.00204907],
       ...,
       [-0.05747115,  0.14610448,  0.13229322, ..., -0.10777298,
        0.06255373,  0.06095371],
       [-0.07182547,  0.06408214,  0.06909133, ..., -0.10851807,
        0.05367512, -0.00807478],
       [ 0.00190406,  0.09480352,  0.01514295, ..., -0.07081555,
        0.07665265, -0.00382668]], dtype=float32)
```

In [22]:
```
y
```

```
 'tyrion',
 'hand',
 'we',
 'then',
 'do',
 'than',
 'now',
 'down',
 'never',
 '[illegible]',
 'by',
 'see',
 'told',
 'boy',
 'father',
 'here',
 'only',
 'sansa',
 'brother',
 'an',
```

In [19]:
```
model.wv.get_normed_vectors().shape
```

Out[19]:
```
(3840, 100)
```

In [20]:
```
y = model.wv.index_to_key
```

In [21]:
```
len(y)
```

Out[21]:
```
3840
```

In [23]:
```
from sklearn.decomposition import PCA
```

In [24]:
```
pca = PCA(n_components=3)
```

In [25]:
```
X = pca.fit_transform(model.wv.get_normed_vectors())
```

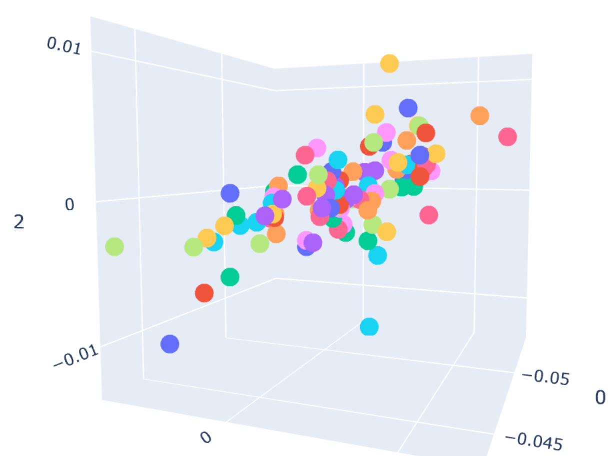
In [26]:
```
X
```

Out[26]:
```
array([[-1.4590222e-02, -2.1133895e-01, -4.7438904e-03],
       [-2.7601445e-02, -1.6377506e-01, -9.5280139e-03],
       [-5.2432995e-02,  2.0638121e-02,  1.0925694e-04],
       ...,
       [ 1.5823811e-01,  2.3719370e-02,  1.5382897e-02],
       [-2.7450187e-02, -6.2797256e-02, -1.9610928e-02],
       [ 3.5188053e-02,  1.1956904e-01, -2.4944900e-03]], dtype=float32)
```

In [27]:
```
X.shape
```

Out[27]:
```
(3840, 3)
```

In [28]:
```
import plotly.express as px
fig = px.scatter_3d(X[200:300],x=0,y=1,z=2, color=y[200:300])
fig.show()
```



In [ ]: