# pa - w2v explore models

June 2, 2019

```
In [1]: # Turn on Auto-Complete
        %config IPCompleter.greedy=True

In [2]: # Start logging process at root level
        import logging
        logging.basicConfig(format='%(asctime)s : %(levelname)s : %(message)s', level=logging.I
        logging.root.setLevel(level=logging.INFO)

In [3]: # Load model and dictionary
        dictrionary_root_path = "dictionaries/"
        dictionary_unlem_path = dictrionary_root_path+"enwiki-20190409-dict-unlemmatized.txt.bz
        dictionary_lem_path = dictrionary_root_path+"enwiki-20190409-dict-lemmatized.txt.bz2"
        is_lemmatized = False

In [4]: import os
        model_root_path = "models/"
        models_list = [name for name in os.listdir(model_root_path) if os.path.isfile(os.path.j
        print(len(models_list))

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In [5]: from sklearn.manifold import TSNE
        tsne_model = TSNE(perplexity=40, n_components=2, init='pca', n_iter=2500, random_state=
        #fitted_values = tsne_model.fit_transform(tokens)

In [6]: from gensim.models import Word2Vec

        word_to_plot = "woman"
        top_similar = 100

        for model_name in models_list:
            if "-lem" in model_name:
                dictionary_path = dictionary_lem_path
            else:
                dictionary_path = dictionary_unlem_path

            #print("loading model", model)
            model = Word2Vec.load(os.path.join(model_root_path, model_name), mmap='r')
            print("model loaded")

            word_vector = model.wv.most_similar(positive=[word_to_plot], topn=top_similar)
            print("word_vector loaded")

            word_vocabulary = [word_to_plot]
            for element in word_vector:
                element_name = element[0]
                if element_name not in word_vocabulary:
                    word_vocabulary.append(element_name)
            #print(word_vocabulary)
            print("word_vocabulary loaded")

            labels = []
            tokens = []
            for word in word_vocabulary:
                tokens.append(model[word])
                labels.append(word)

            #print(tokens)
            #print(labels)

            fitted_values = tsne_model.fit_transform(tokens)

            break
```

```
2019-05-20 18:27:32,255 : INFO : 'pattern' package found; tag filters are available for Englis
2019-05-20 18:27:32,271 : INFO : loading Word2Vec object from models/wiki-en-190409-s300-w5-mc
2019-05-20 18:27:45,912 : INFO : loading wv recursively from models/wiki-en-190409-s300-w5-mc5
2019-05-20 18:27:45,914 : INFO : loading vectors from models/wiki-en-190409-s300-w5-mc5-bw1000
2019-05-20 18:27:45,919 : INFO : setting ignored attribute vectors_norm to None
2019-05-20 18:27:45,922 : INFO : loading vocabulary recursively from models/wiki-en-190409-s30
2019-05-20 18:27:45,924 : INFO : loading trainables recursively from models/wiki-en-190409-s30
2019-05-20 18:27:45,926 : INFO : loading syn1neg from models/wiki-en-190409-s300-w5-mc5-bw1000
2019-05-20 18:27:45,929 : INFO : setting ignored attribute cum_table to None
2019-05-20 18:27:45,930 : INFO : loaded models/wiki-en-190409-s300-w5-mc5-bw10000-cbow-i5-c1-u
2019-05-20 18:27:56,551 : INFO : precomputing L2-norms of word weight vectors


model loaded
word_vector loaded
word_vocabulary loaded


/home/rclaret/anaconda3/envs/py36/lib/python3.6/site-packages/ipykernel_launcher.py:30: Deprec
```

```
In [13]: from gensim.models import Word2Vec
```

```
word_to_plot = "man"
top_similar = 100

for model_name in models_list:
    if "-lem" in model_name:
        dictionary_path = dictionary_lem_path
    else:
        dictionary_path = dictionary_unlem_path

    #print("loading model", model)
    model = Word2Vec.load(os.path.join(model_root_path, model_name), mmap='r')
    print("model loaded")

    word_vector = model.wv.most_similar(positive=[word_to_plot], topn=top_similar)
    print("word_vector loaded")

    word_vocabulary = [word_to_plot]
    for element in word_vector:
        element_name = element[0]
        if element_name not in word_vocabulary:
            word_vocabulary.append(element_name)
    #print(word_vocabulary)
    print("word_vocabulary loaded")

    labels = []
    tokens = []
    banned_words = ["creature", "monster"]
    for word in word_vocabulary:
        if word not in banned_words:
            tokens.append(model[word])
            labels.append(word)

    #print(tokens)
    #print(labels)

    fitted_values = tsne_model.fit_transform(tokens)

    break
```

```
2019-05-20 19:58:23,469 : INFO : loading Word2Vec object from models/wiki-en-190409-s300-w5-mc5
2019-05-20 19:58:35,566 : INFO : loading wv recursively from models/wiki-en-190409-s300-w5-mc5-
2019-05-20 19:58:35,568 : INFO : loading vectors from models/wiki-en-190409-s300-w5-mc5-bw10000
2019-05-20 19:58:35,573 : INFO : setting ignored attribute vectors_norm to None
2019-05-20 19:58:35,575 : INFO : loading vocabulary recursively from models/wiki-en-190409-s300
2019-05-20 19:58:35,576 : INFO : loading trainables recursively from models/wiki-en-190409-s300
2019-05-20 19:58:35,578 : INFO : loading syn1neg from models/wiki-en-190409-s300-w5-mc5-bw10000
2019-05-20 19:58:35,582 : INFO : setting ignored attribute cum_table to None
2019-05-20 19:58:35,583 : INFO : loaded models/wiki-en-190409-s300-w5-mc5-bw10000-cbow-i5-c1-un
```

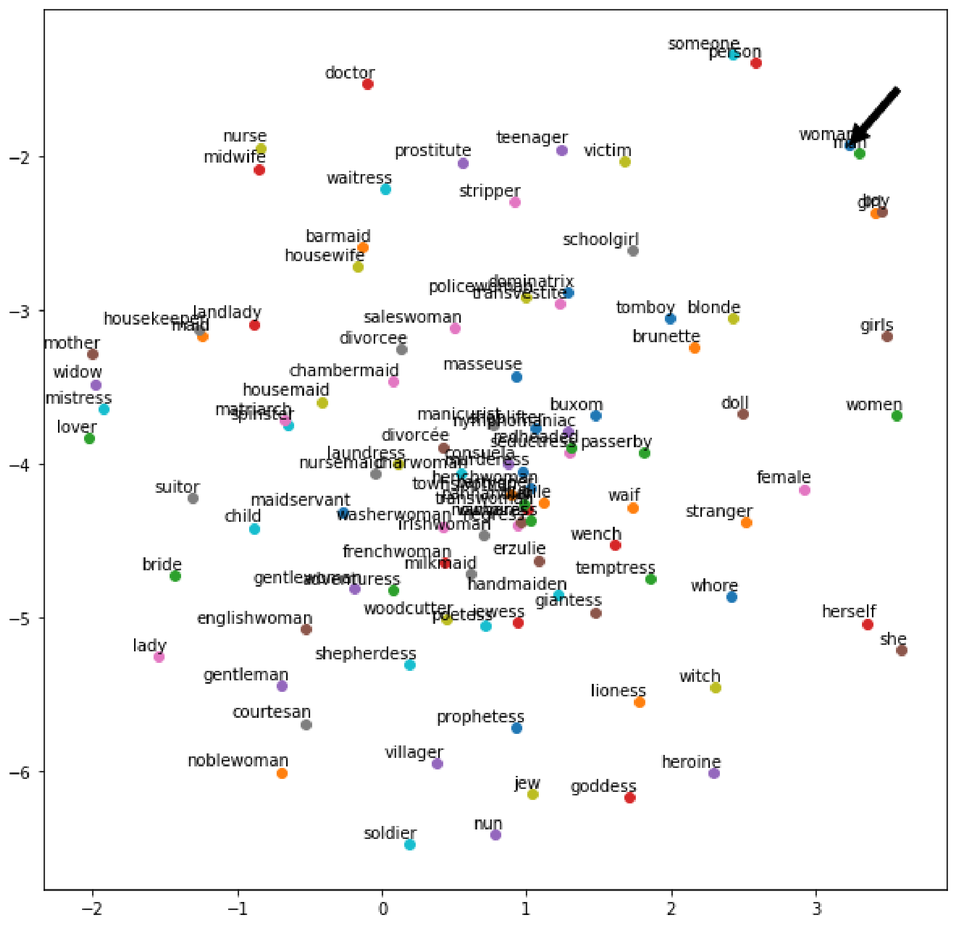
```
2019-05-20 19:58:50,790 : INFO : precomputing L2-norms of word weight vectors
```

```
model loaded
word_vector loaded
word_vocabulary loaded
```

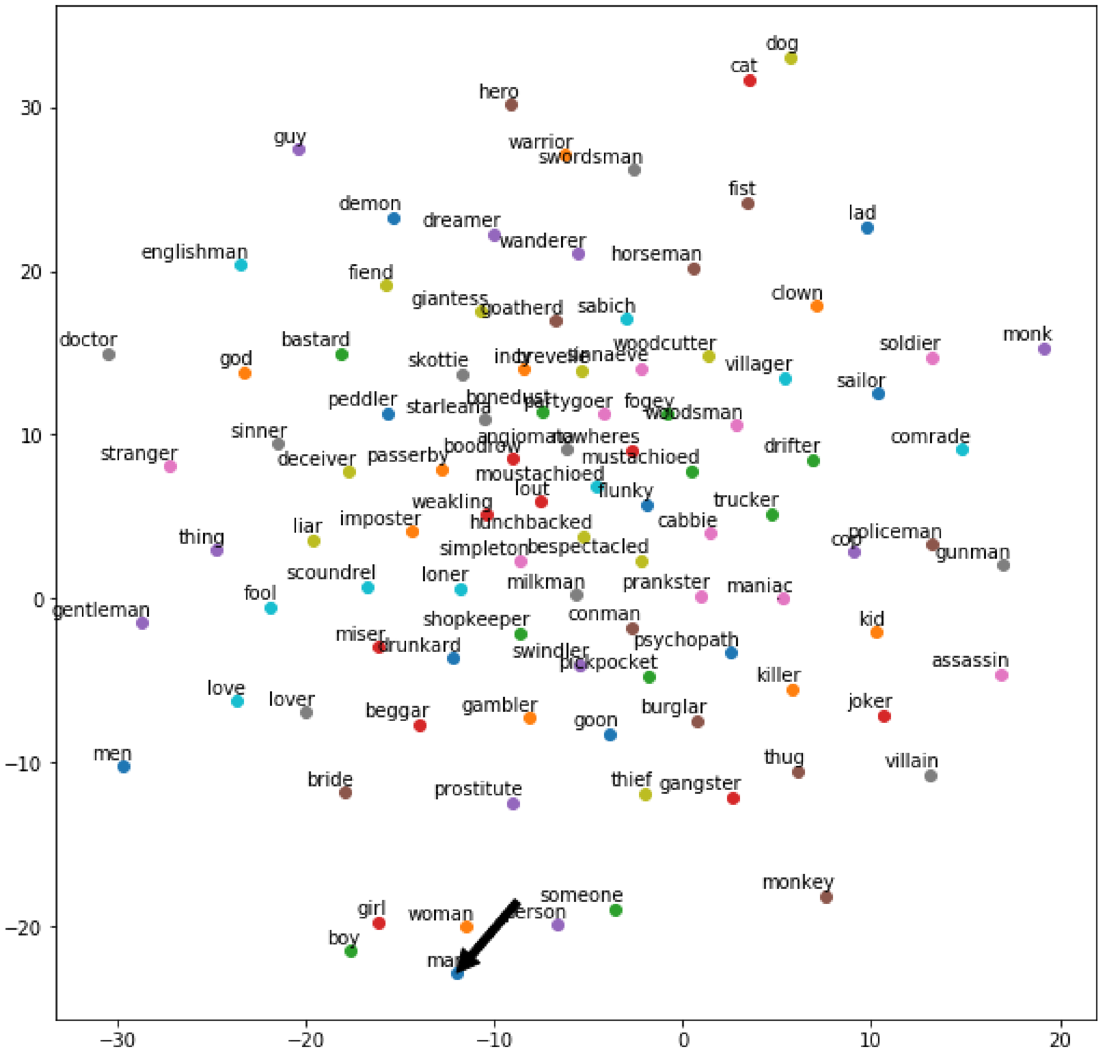
```
/home/rclaret/anaconda3/envs/py36/lib/python3.6/site-packages/ipykernel_launcher.py:32: Depreca
```

```
In [11]: import matplotlib.pyplot as plt
         #%matplotlib widget
         #%matplotlib notebook
         %matplotlib inline
```

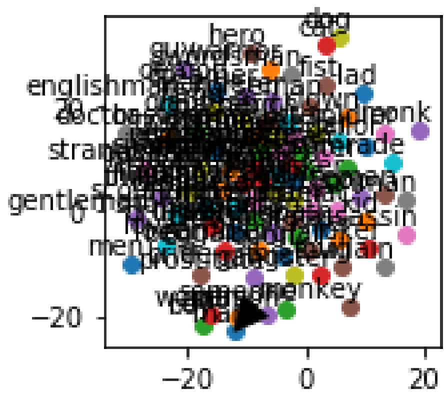
```
In [8]: plt.figure(figsize=(10, 10))
        def plot_word_vector(fitted_values):
            x = []
            y = []
            for value in fitted_values:
                x.append(value[0])
                y.append(value[1])


            for i in range(len(x)):
                plt.scatter(x[i],y[i])
                plt.annotate(labels[i],
                             xy=(x[i], y[i]),
                             xytext=(5, 2),
                             textcoords='offset points',
                             ha='right',
                             va='bottom')
                if labels[i]==word_to_plot:
                    plt.annotate(word_to_plot, xy=(x[i], y[i]), xytext=(5, 0),
                    arrowprops=dict(facecolor='black', shrink=0.8),fontsize = 1,
                    )
            plt.show()
        plot_word_vector(fitted_values)
```

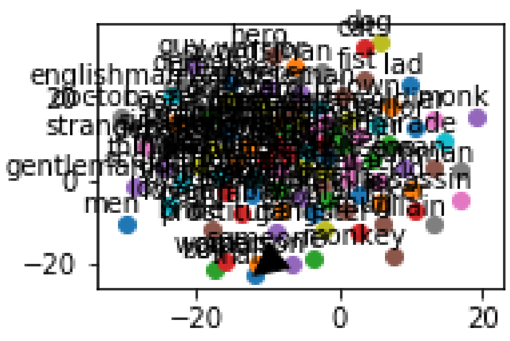


```
In [14]: plt.figure(figsize=(10, 10))
         def plot_word_vector(fitted_values):
             x = []
             y = []
             for value in fitted_values:
                 x.append(value[0])
                 y.append(value[1])


             for i in range(len(x)):
                 plt.scatter(x[i],y[i])
                 plt.annotate(labels[i],
                              xy=(x[i], y[i]),
                              xytext=(5, 2),
                              textcoords='offset points',
                              ha='right',
                              va='bottom')
                 if labels[i]==word_to_plot:
                     plt.annotate(word_to_plot, xy=(x[i], y[i]), xytext=(5, 0),
                     arrowprops=dict(facecolor='black', shrink=0.8),fontsize = 1,
                     )
             plt.show()
         plot_word_vector(fitted_values)
```



```
In [20]: from sklearn.manifold import TSNE

         plt.figure(figsize=(5, 5))
         tsne_model = TSNE(perplexity=40, n_components=2, init='pca', n_iter=2500, random_stat
         plt.subplot(2,2,1)
         plot_word_vector(tsne_model.fit_transform(tokens))

         tsne_model = TSNE(perplexity=40, n_components=2, init='pca', n_iter=2500, random_stat
         plt.subplot(2,2,2)
         plot_word_vector(tsne_model.fit_transform(tokens))
```





```
In [14]: from ipywidgets import *
         import numpy as np
         import matplotlib.pyplot as plt

In [15]: def update(w):
             line.set_ydata(np.sin(w * x))
             fig.canvas.draw()

         x = np.linspace(0, 2 * np.pi)
         fig = plt.figure()
         ax = fig.add_subplot(1, 1, 1)
```

```
        line, = ax.plot(x, np.sin(x))

        interact(update, w=widgets.IntSlider(min=-10,max=30,step=1,value=10,continuous_update=
```

```
<IPython.core.display.Javascript object>


<IPython.core.display.HTML object>


interactive(children=(IntSlider(value=10, continuous_update=False, description='w', max=30, mi
```

```
In [ ]:
```