```
# Install gensim if not already installed
!pip install gensim

# For loading pre-trained embeddings
import gensim.downloader as api

# For numerical operations
import numpy as np

# For visualization
import matplotlib.pyplot as plt

# For dimensionality reduction
from sklearn.manifold import TSNE

# To suppress warnings
import warnings
warnings.filterwarnings("ignore")

print("Libraries imported successfully!")
```

```
Collecting gensim
  Downloading gensim-4.4.0-cp312-cp312-manylinux_2_24_x86_64.manylinux_2_28_x86_64.whl.metadata (8.4 kB)
Requirement already satisfied: numpy>=1.18.5 in /usr/local/lib/python3.12/dist-packages (from gensim) (2.0.2)
Requirement already satisfied: scipy>=1.7.0 in /usr/local/lib/python3.12/dist-packages (from gensim) (1.16.3)
Requirement already satisfied: smart_open>=1.8.1 in /usr/local/lib/python3.12/dist-packages (from gensim) (7.5.0)
Requirement already satisfied: wrapt in /usr/local/lib/python3.12/dist-packages (from smart_open>=1.8.1->gensim) (2.1.1)
Downloading gensim-4.4.0-cp312-cp312-manylinux_2_24_x86_64.manylinux_2_28_x86_64.whl (27.9 MB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 27.9/27.9 MB 36.4 MB/s eta 0:00:00
Installing collected packages: gensim
Successfully installed gensim-4.4.0
Libraries imported successfully!
```

```
print("Loading pre-trained model...")
model = api.load("glove-wiki-gigaword-100")  # 100-dimensional vectors
print("Model loaded successfully!")

# Print vocabulary size
print("Vocabulary Size:", len(model))

# Show one example vector
word = "king"
print(f"\nVector for '{word}':\n", model[word])
```

```
Loading pre-trained model...
[==================================================] 100.0% 128.1/128.1MB downloaded
Model loaded successfully!
Vocabulary Size: 400000

Vector for 'king':
 [-0.32307  -0.87616   0.21977   0.25268   0.22976   0.7388   -0.37954
 -0.35307  -0.84369  -1.1113   -0.30266   0.33178  -0.25113   0.30448
 -0.077491 -0.89815   0.092496 -1.1407   -0.58324   0.66869  -0.23122
 -0.95855   0.28262  -0.078848  0.75315   0.26584   0.3422   -0.33949
  0.95608   0.065641  0.45747   0.39835   0.57965   0.39267  -0.21851
  0.58795  -0.55999   0.63368  -0.043983 -0.68731  -0.37841   0.38026
  0.61641  -0.88269  -0.12346  -0.37928  -0.38318   0.23868   0.6685
 -0.43321  -0.11065   0.081723  1.1569    0.78958  -0.21223  -2.3211
 -0.67806   0.44561   0.65707   0.1045    0.46217   0.19912   0.25802
  0.057194  0.53443  -0.43133  -0.34311   0.59789  -0.58417   0.068995
  0.23944  -0.85181   0.30379  -0.34177  -0.25746  -0.031101 -0.16285
  0.45169  -0.91627   0.64521   0.73281  -0.22752   0.30226   0.044801
 -0.83741   0.55006  -0.52506  -1.7357    0.4751   -0.70487   0.056939
 -0.7132    0.089623  0.41394  -1.3363   -0.61915  -0.33089  -0.52881
  0.16483  -0.98878 ]
```

```
# Animals, Cities, Countries, Technology, Emotions
word_list = [
    # Animals
    "dog", "cat", "lion", "tiger", "elephant", "horse", "wolf", "monkey",

    # Cities
    "paris", "london", "tokyo", "delhi", "mumbai", "beijing", "new_york",

    # Countries
    "india", "china", "france", "germany", "japan", "america",

    # Technology
    "computer", "laptop", "keyboard", "mouse", "internet", "software",
    "hardware", "smartphone",
    # Emotions
    "happy", "sad", "angry", "joy", "fear", "love", "hate",

    # Royal / Family
    "king", "queen", "man", "woman", "boy", "girl"
]

# Extract vectors
vectors = []
valid_words = []

for word in word_list:
    if word in model:
        vectors.append(model[word])
        valid_words.append(word)

vectors = np.array(vectors)

print("Total words used:", len(valid_words))
```

```
Total words used: 41
```

```
print("Running t-SNE...")

tsne = TSNE(n_components=2, random_state=42, perplexity=10)
reduced_vectors = tsne.fit_transform(vectors)

print("t-SNE completed!")
```

```
Running t-SNE...
t-SNE completed!
```

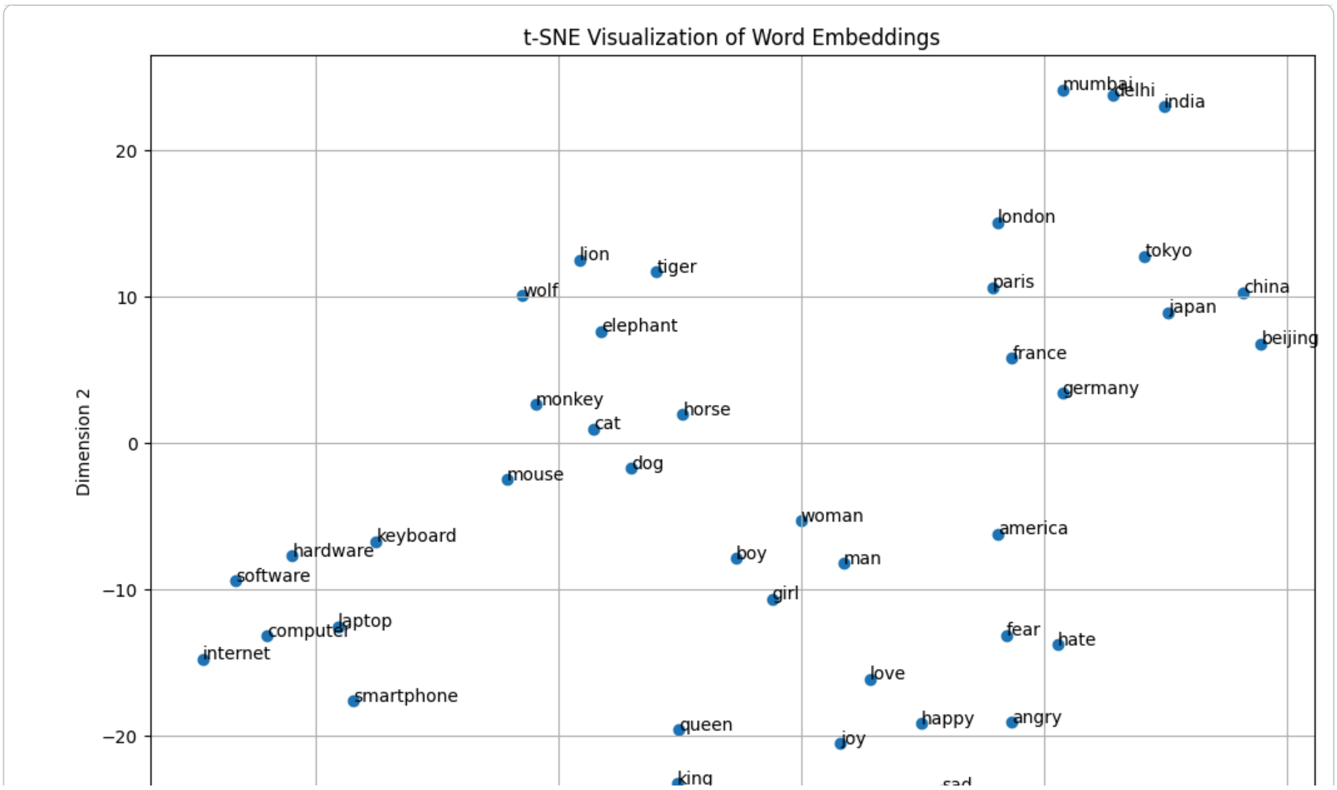
```
plt.figure(figsize=(12, 8))

x = reduced_vectors[:, 0]
y = reduced_vectors[:, 1]

plt.scatter(x, y)

for i, word in enumerate(valid_words):
    plt.annotate(word, (x[i], y[i]))

plt.title("t-SNE Visualization of Word Embeddings")
plt.xlabel("Dimension 1")
plt.ylabel("Dimension 2")
plt.grid(True)
plt.show()
```


t-SNE Visualization of Word Embeddings
Dimension 2
20
10
0
−10
−20
mumbai
delhi
india
london
tokyo
paris
china
japan
beijing
france
germany
lion
tiger
wolf
elephant
monkey
horse
cat
dog
mouse
woman
america
keyboard
hardware
boy
man
software
girl
laptop
computer
fear
hate
internet
love
smartphone
happy
angry
queen
joy
king
sad