```
!pip install openai
```

    Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wh
    Collecting openai
      Downloading openai-0.26.4.tar.gz (55 kB)
      ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 55.6/55.6 KB 2.1 MB/s eta
      Installing build dependencies ... done
      Getting requirements to build wheel ... done
      Installing backend dependencies ... done
      Preparing metadata (pyproject.toml) ... done
    Requirement already satisfied: tqdm in /usr/local/lib/python3.8/dist-packages (
    Requirement already satisfied: requests>=2.20 in /usr/local/lib/python3.8/dist-
    Requirement already satisfied: aiohttp in /usr/local/lib/python3.8/dist-package
    Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.
    Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.8/dist-pa
    Requirement already satisfied: chardet<5,>=3.0.2 in /usr/local/lib/python3.8/di
    Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.8/d
    Requirement already satisfied: multidict<7.0,>=4.5 in /usr/local/lib/python3.8/
    Requirement already satisfied: charset-normalizer<3.0,>=2.0 in /usr/local/lib/p
    Requirement already satisfied: yarl<2.0,>=1.0 in /usr/local/lib/python3.8/dist-
    Requirement already satisfied: async-timeout<5.0,>=4.0.0a3 in /usr/local/lib/py
    Requirement already satisfied: aiosignal>=1.1.2 in /usr/local/lib/python3.8/dis
    Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.8/dist-p
    Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.8/di
    Building wheels for collected packages: openai
      Building wheel for openai (pyproject.toml) ... done
      Created wheel for openai: filename=openai-0.26.4-py3-none-any.whl size=67744
      Stored in directory: /root/.cache/pip/wheels/2b/d8/4e/268f029bd3277c1dd9e8781
    Successfully built openai
    Installing collected packages: openai
    Successfully installed openai-0.26.4

The **embedding is an information dense representation of the semantic meaning of a piece of text.**

Each embedding is a vector of floating point numbers, such that the **distance between two embeddings in the vector space is correlated with semantic similarity between two inputs**

For example, if two texts are similar, then their vector representations should also be similar.

```
import pandas as pd
import openai, numpy as np
from openai.embeddings_utils import get_embedding,cosine_similarity
```

1. Similarity embeddings : These models are good at capturing semantic similarity between two or more pieces of text.

2. Text search embeddings: These models help measure whether long documents are relevant to a short search query. There are two types: one for embedding the documents to be

retrieved, and one for embedding the search query.

```python
api_key='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'
openai.api_key=api_key
```

▾ Text Similarity

```python
sentences=["Browsing the Product List",
    "Browsing the Catalog",
    "Searching the Catalog",
    "Browsing the items List",
    "Add  cart Items",
    "Update items in the Cart",
    "Remove items from cart",
    "View Cart Items",
    "Make payment",
    "List Order Items",
    "View Order Status",
    "Confirm Order",
    "Get Total amount",
    "Change Shipping Info ",
    "Signing Up",
    "Signing In",
    "Signout",
    "Manage Item",
    "Manage Account",
    "Manage Order",
    "Manage product/category"]


# resp=openai.Embedding.create(
#     input=[ "Browsing the Product List",
#     "Browsing the Catalog",
#     "Searching the Catalog",
#     "Browsing the items List",
#     "Add  cart Items",
#     "Update items in the Cart",
#     "Remove items from cart",
#     "View Cart Items",
#     "Make payment",
#     "List Order Items",
#     "View Order Status",
#     "Confirm Order",
#     "Get Total amount",
#     "Change Shipping Info ",
#     "Signing Up",
#     "Signing In",
#     "Signout",
#     "Manage Item",
#     "Manage Account",
#     "Manage Order",
#     "Manage product/category"],
#     engine="text-similarity-davinci-001")
```

```python
resp=openai.Embedding.create(
    input=sentences,
    engine="text-similarity-davinci-001")


type(resp['data'])


    list


len(resp['data'])


    21


type(resp['data'][0])


    openai.openai_object.OpenAIObject


resp['data'][0].keys()


    dict_keys(['object', 'index', 'embedding'])


resp['data'][0]['embedding']


for x in range(0, len(sentences)):
  embeddings=resp['data'][x]['embedding']


# embedding_a=resp['data'][0]['embedding']
# embedding_b=resp['data'][1]['embedding']
# embedding_c=resp['data'][2]['embedding']
# embedding_d=resp['data'][3]['embedding']
# embedding_e=resp['data'][4]['embedding']
# embedding_f=resp['data'][5]['embedding']
# embedding_g=resp['data'][6]['embedding']
# embedding_h=resp['data'][7]['embedding']
# embedding_i=resp['data'][8]['embedding']
# embedding_j=resp['data'][9]['embedding']
# embedding_k=resp['data'][10]['embedding']
# embedding_l=resp['data'][11]['embedding']
# embedding_m=resp['data'][12]['embedding']
# embedding_n=resp['data'][13]['embedding']
# embedding_o=resp['data'][14]['embedding']
# embedding_p=resp['data'][15]['embedding']
# embedding_q=resp['data'][16]['embedding']
# embedding_r=resp['data'][17]['embedding']
# embedding_s=resp['data'][18]['embedding']
# embedding_t=resp['data'][19]['embedding']
# embedding_u=resp['data'][20]['embedding']
```

```
Dic1={}
outer1={}

for x in range(0, len(sentences)):

  print("for the usecase : ",sentences[x])
  print()
  print("for this usecase these are the following similarities(in sorted order) with the o
  print()
  for j in range(0, len(sentences)):
    Dic1[sentences[j]]=np.dot(embeddings[x],embeddings[j])
  sorted_data1 = sorted(Dic1.items(), key = lambda kv: kv[1],reverse=True)
  outer1[sentences[x]]=sorted_data1
    # print(sentences[j]," : ",np.dot(embeddings[x],embeddings[j]))
  for z in range (0, len(sorted_data1)):
    print(sorted_data1[z])
  print()
```

for the usecase : Browsing the Product List

for this usecase these are the following similarities(in sorted order) with the

('Manage Account', 0.00018662122833927944)
('Searching the Catalog', 0.0001607755103364035)
('Signout', 0.00010331949188289308)
('Add cart Items', 0.00010186250123880077)
('Browsing the Product List', 9.945530092035724e-05)
('Manage product/category', 9.628793843512867e-05)
('List Order Items', 9.103010909363145e-05)
('Change Shipping Info ', 7.829729759975968e-05)
('Signing In', 5.4383679722064954e-05)
('Remove items from cart', 4.57367688991208e-05)
('View Order Status', 3.243383113624696e-05)
('View Cart Items', 2.0936291290249128e-05)
('Confirm Order', 9.106178174326195e-06)
('Browsing the items List', -4.580803381201232e-06)
('Get Total amount', -7.2374320557433945e-06)
('Manage Item', -8.765685871259732e-06)
('Signing Up', -5.169141743009871e-05)
('Browsing the Catalog', -6.271385243892093e-05)
('Update items in the Cart', -7.88674215468051e-05)
('Manage Order', -0.00011744594175572623)
('Make payment', -0.00014607893651652493)

for the usecase : Browsing the Catalog

for this usecase these are the following similarities(in sorted order) with the

('Make payment', 9.211346991416791e-05)
('Manage Order', 7.405826931957023e-05)
('Update items in the Cart', 4.973168640940795e-05)
('Browsing the Catalog', 3.9545677820433884e-05)
('Signing Up', 3.259522514205502e-05)
('Manage Item', 5.527407037824307e-06)
('Get Total amount', 4.563731060892124e-06)
('Browsing the items List', 2.888532080662194e-06)

('Confirm Order', -5.742112376338121e-06)
        ('View Cart Items', -1.3201865264541126e-05)
        ('View Order Status', -2.0451906344703713e-05)
        ('Remove items from cart', -2.8840383058811696e-05)
        ('Signing In', -3.429289372827195e-05)
        ('Change Shipping Info ', -4.9372181498598487e-05)
        ('List Order Items', -5.740115183773325e-05)
        ('Manage product/category', -6.071659837924778e-05)
        ('Browsing the Product List', -6.271385243892093e-05)
        ('Add cart Items', -6.423176856973313e-05)
        ('Signout', -6.515050789697788e-05)
        ('Searching the Catalog', -0.000101380736247569 73)
        ('Manage Account', -0.00011767835467525224)

        for the usecase : Searching the Catalog

        for this usecase these are the following similarities(in sorted order) with the

        ('Manage Account', 0.0003016845049805955)
        ('Searching the Catalog', 0.00025990332823116053)

```python
print("for sentence Browsing the Product List")
print()
print("Browsing the Product List",np.dot(embedding_a,embedding_a))
print("Browsing the Catalog",np.dot(embedding_a,embedding_b))
print("Searching the Catalog",np.dot(embedding_a,embedding_c))
print("Browsing the items List",np.dot(embedding_a,embedding_d))
print("Add  cart Items",np.dot(embedding_a,embedding_e))
print("Update items in the Cart",np.dot(embedding_a,embedding_f))
print("Remove items from cart",np.dot(embedding_a,embedding_g))
print("View Cart Items",np.dot(embedding_a,embedding_h))
print("Make payment",np.dot(embedding_a,embedding_i))
print("List Order Items",np.dot(embedding_a,embedding_j))
print("View Order Status",np.dot(embedding_a,embedding_k))
print("Confirm Order",np.dot(embedding_a,embedding_l))
print("Get Total amount",np.dot(embedding_a,embedding_m))
print("Change Shipping Info ",np.dot(embedding_a,embedding_n))
print("Signing Up",np.dot(embedding_a,embedding_o))
print("Signing In",np.dot(embedding_a,embedding_p))
print("Signout",np.dot(embedding_a,embedding_q))
print("Manage Item",np.dot(embedding_a,embedding_r))
print( "Manage Account",np.dot(embedding_a,embedding_s))
print( "Manage Order",np.dot(embedding_a,embedding_t))
print("Manage product/category",np.dot(embedding_a,embedding_u))
```

        for sentence Browsing the Product List

        Browsing the Product List 0.9999999570993006
        Browsing the Catalog 0.9216017383147661
        Searching the Catalog 0.8549261416724563
        Browsing the items List 0.9556667028892363
        Add cart Items 0.8070501319938329
        Update items in the Cart 0.8155241983817824
        Remove items from cart 0.7785711933768448
        View Cart Items 0.8333309509248801

Make payment 0.7203421320099781
List Order Items 0.82852621389915
View Order Status 0.8094752318833942
Confirm Order 0.779686684977721
Get Total amount 0.7388697045987466
Change Shipping Info 0.7517880524786467
Signing Up 0.7763148911666187
Signing In 0.7748712705718449
Signout 0.7371937107133659
Manage Item 0.788791162296564
Manage Account 0.7697043634744878
Manage Order 0.7818650327395404
Manage product/category 0.8269406966493253


```python
print("for sentence Browsing the Catalog")
print()
print("Browsing the Product List",np.dot(embedding_b,embedding_a))
print("Browsing the Catalog",np.dot(embedding_b,embedding_b))
print("Searching the Catalog",np.dot(embedding_b,embedding_c))
print("Browsing the items List",np.dot(embedding_b,embedding_d))
print("Add  cart Items",np.dot(embedding_b,embedding_e))
print("Update items in the Cart",np.dot(embedding_b,embedding_f))
print("Remove items from cart",np.dot(embedding_b,embedding_g))
print("View Cart Items",np.dot(embedding_b,embedding_h))
print("Make payment",np.dot(embedding_b,embedding_i))
print("List Order Items",np.dot(embedding_b,embedding_j))
print("View Order Status",np.dot(embedding_b,embedding_k))
print("Confirm Order",np.dot(embedding_b,embedding_l))
print("Get Total amount",np.dot(embedding_b,embedding_m))
print("Change Shipping Info ",np.dot(embedding_b,embedding_n))
print("Signing Up",np.dot(embedding_b,embedding_o))
print("Signing In",np.dot(embedding_b,embedding_p))
print("Signout",np.dot(embedding_b,embedding_q))
print("Manage Item",np.dot(embedding_b,embedding_r))
print( "Manage Account",np.dot(embedding_b,embedding_s))
print( "Manage Order",np.dot(embedding_b,embedding_t))
print("Manage product/category",np.dot(embedding_b,embedding_u))
```


for sentence Browsing the Catalog

Browsing the Product List 0.9216017383147661
Browsing the Catalog 0.999999924516948
Searching the Catalog 0.9235130441707522
Browsing the items List 0.9208707658633701
Add cart Items 0.790093221641655
Update items in the Cart 0.7904444435987001
Remove items from cart 0.7629721182283455
View Cart Items 0.8135642130409988
Make payment 0.7149807308190699
List Order Items 0.7878706643532671
View Order Status 0.7877246010142129
Confirm Order 0.7679076358874216
Get Total amount 0.7270139362319163
Change Shipping Info 0.7410249259246122
Signing Up 0.7742514226615949
Signing In 0.7806045175189963

```
        Signout 0.7407819456074971
        Manage Item 0.7745878514275449
        Manage Account 0.7638519132321184
        Manage Order 0.7730912694722059
        Manage product/category 0.7816645470842618


print("for sentence Searching the Catalog")
print()
print("Browsing the Product List",np.dot(embedding_c,embedding_a))
print("Browsing the Catalog",np.dot(embedding_c,embedding_b))
print("Searching the Catalog",np.dot(embedding_c,embedding_c))
print("Browsing the items List",np.dot(embedding_c,embedding_d))
print("Add  cart Items",np.dot(embedding_c,embedding_e))
print("Update items in the Cart",np.dot(embedding_c,embedding_f))
print("Remove items from cart",np.dot(embedding_c,embedding_g))
print("View Cart Items",np.dot(embedding_c,embedding_h))
print("Make payment",np.dot(embedding_c,embedding_i))
print("List Order Items",np.dot(embedding_c,embedding_j))
print("View Order Status",np.dot(embedding_c,embedding_k))
print("Confirm Order",np.dot(embedding_c,embedding_l))
print("Get Total amount",np.dot(embedding_c,embedding_m))
print("Change Shipping Info ",np.dot(embedding_c,embedding_n))
print("Signing Up",np.dot(embedding_c,embedding_o))
print("Signing In",np.dot(embedding_c,embedding_p))
print("Signout",np.dot(embedding_c,embedding_q))
print("Manage Item",np.dot(embedding_c,embedding_r))
print( "Manage Account",np.dot(embedding_c,embedding_s))
print( "Manage Order",np.dot(embedding_c,embedding_t))
print("Manage product/category",np.dot(embedding_c,embedding_u))


        for sentence Searching the Catalog

        Browsing the Product List 0.8549261416724563
        Browsing the Catalog 0.9235130441707522
        Searching the Catalog 1.0000000583509092
        Browsing the items List 0.8567562826846948
        Add  cart Items 0.8078271529977368
        Update items in the Cart 0.8011160579646921
        Remove items from cart 0.7773477453342857
        View Cart Items 0.8162560130916132
        Make payment 0.7335355154304025
        List Order Items 0.8128303553682947
        View Order Status 0.8049685973791825
        Confirm Order 0.7877432567022609
        Get Total amount 0.7555472978604731
        Change Shipping Info  0.7641149476671738
        Signing Up 0.8022329194252558
        Signing In 0.8058177596340704
        Signout 0.7657641127232249
        Manage Item 0.7958520519707997
        Manage Account 0.7778114608412758
        Manage Order 0.7895049308742208
        Manage product/category 0.7851576719437035
```

```
print("for sentence Browsing the items List")
print()
print("Browsing the Product List",np.dot(embedding_d,embedding_a))
print("Browsing the Catalog",np.dot(embedding_d,embedding_b))
print("Searching the Catalog",np.dot(embedding_d,embedding_c))
print("Browsing the items List",np.dot(embedding_d,embedding_d))
print("Add  cart Items",np.dot(embedding_d,embedding_e))
print("Update items in the Cart",np.dot(embedding_d,embedding_f))
print("Remove items from cart",np.dot(embedding_d,embedding_g))
print("View Cart Items",np.dot(embedding_d,embedding_h))
print("Make payment",np.dot(embedding_d,embedding_i))
print("List Order Items",np.dot(embedding_d,embedding_j))
print("View Order Status",np.dot(embedding_d,embedding_k))
print("Confirm Order",np.dot(embedding_d,embedding_l))
print("Get Total amount",np.dot(embedding_d,embedding_m))
print("Change Shipping Info ",np.dot(embedding_d,embedding_n))
print("Signing Up",np.dot(embedding_d,embedding_o))
print("Signing In",np.dot(embedding_d,embedding_p))
print("Signout",np.dot(embedding_d,embedding_q))
print("Manage Item",np.dot(embedding_d,embedding_r))
print( "Manage Account",np.dot(embedding_d,embedding_s))
print( "Manage Order",np.dot(embedding_d,embedding_t))
print("Manage product/category",np.dot(embedding_d,embedding_u))
```

for sentence Browsing the items List

Browsing the Product List 0.9556667028892363
Browsing the Catalog 0.9208707658633701
Searching the Catalog 0.8567562826846948
Browsing the items List 1.0000000718966642
Add cart Items 0.82673852696588
Update items in the Cart 0.8316673019630699
Remove items from cart 0.8053343853532027
View Cart Items 0.8480198346371435
Make payment 0.7309200156364719
List Order Items 0.8542964732683281
View Order Status 0.8052292927494356
Confirm Order 0.7808972737039832
Get Total amount 0.7521317313170882
Change Shipping Info 0.7473219452786715
Signing Up 0.7759689089686381
Signing In 0.784255128039488
Signout 0.7467681644244546
Manage Item 0.8137384343639777
Manage Account 0.7701643689141313
Manage Order 0.7842743681508275
Manage product/category 0.7954212941915222