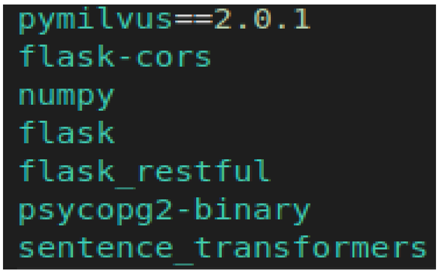
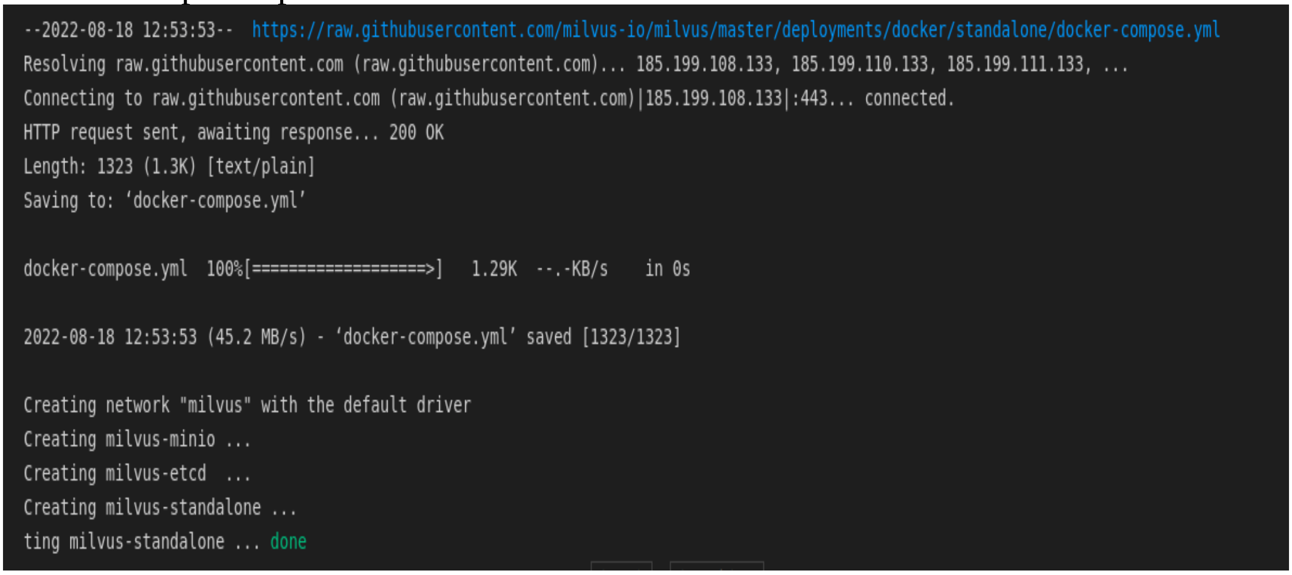
Step–1 :- Install the following libraries using pip install.



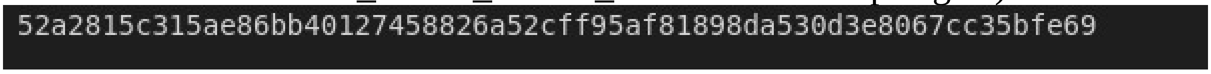
```
pymilvus==2.0.1
flask-cors
numpy
flask
flask_restful
psycopg2-binary
sentence_transformers
```

Step-2 :- Download the docker-compose(wget https://raw.githubusercontent.com/milvus-io/milvus/master/deployments/docker/standalone/docker-compose.yml -O docker-compose.yml) and run command sudo docker-compose up -d.



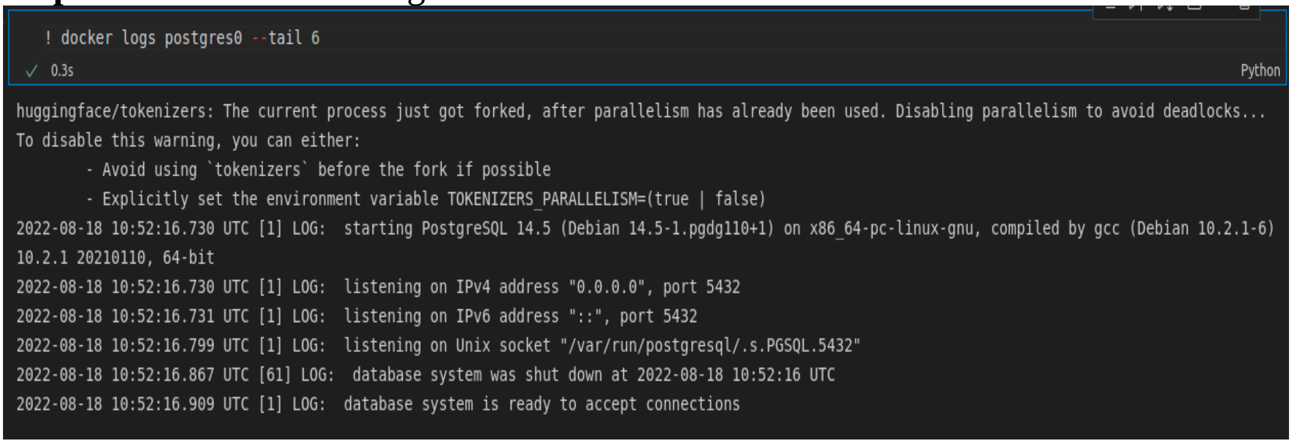
```
--2022-08-18 12:53:53--  https://raw.githubusercontent.com/milvus-io/milvus/master/deployments/docker/standalone/docker-compose.yml
Resolving raw.githubusercontent.com (raw.githubusercontent.com)... 185.199.108.133, 185.199.110.133, 185.199.111.133, ...
Connecting to raw.githubusercontent.com (raw.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1323 (1.3K) [text/plain]
Saving to: ‘docker-compose.yml’

docker-compose.yml  100%[===================>]   1.29K  --.-KB/s    in 0s

2022-08-18 12:53:53 (45.2 MB/s) - ‘docker-compose.yml’ saved [1323/1323]

Creating network "milvus" with the default driver
Creating milvus-minio ...
Creating milvus-etcd  ...
Creating milvus-standalone ...
ting milvus-standalone ... done
```

Step-3 :- Start the Postgres Server by command(!docker run --name postgres0 -d -p 5438:5432 -e POSTGRES_HOST_AUTH_METHOD=trust postgres)



```
52a2815c315ae86bb40127458826a52cff95af81898da530d3e8067cc35bfe69
```

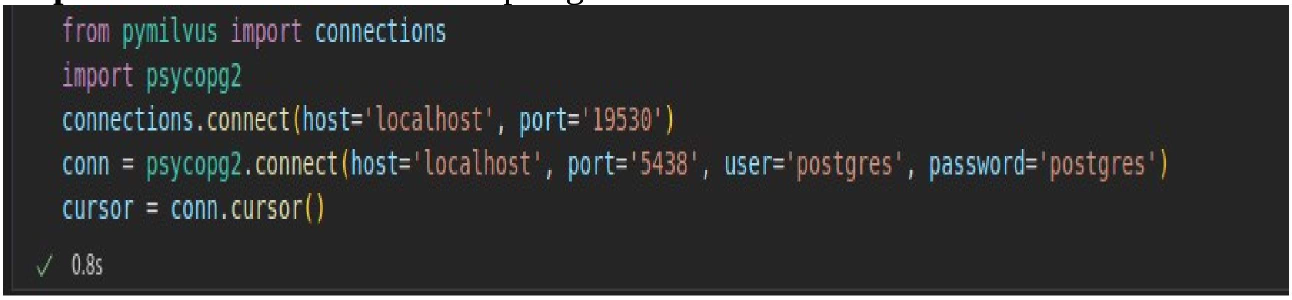
Step-4 :- See the docker logs.



```
! docker logs postgres0 --tail 6
```

```
huggingface/tokenizers: The current process just got forked, after parallelism has already been used. Disabling parallelism to avoid deadlocks...
To disable this warning, you can either:
        - Avoid using `tokenizers` before the fork if possible
        - Explicitly set the environment variable TOKENIZERS_PARALLELISM=(true | false)
2022-08-18 10:52:16.730 UTC [1] LOG:  starting PostgreSQL 14.5 (Debian 14.5-1.pgdg110+1) on x86_64-pc-linux-gnu, compiled by gcc (Debian 10.2.1-6)
10.2.1 20210110, 64-bit
2022-08-18 10:52:16.730 UTC [1] LOG:  listening on IPv4 address "0.0.0.0", port 5432
2022-08-18 10:52:16.731 UTC [1] LOG:  listening on IPv6 address "::", port 5432
2022-08-18 10:52:16.799 UTC [1] LOG:  listening on Unix socket "/var/run/postgresql/.s.PGSQL.5432"
2022-08-18 10:52:16.867 UTC [61] LOG:  database system was shut down at 2022-08-18 10:52:16 UTC
2022-08-18 10:52:16.909 UTC [1] LOG:  database system is ready to accept connections
```

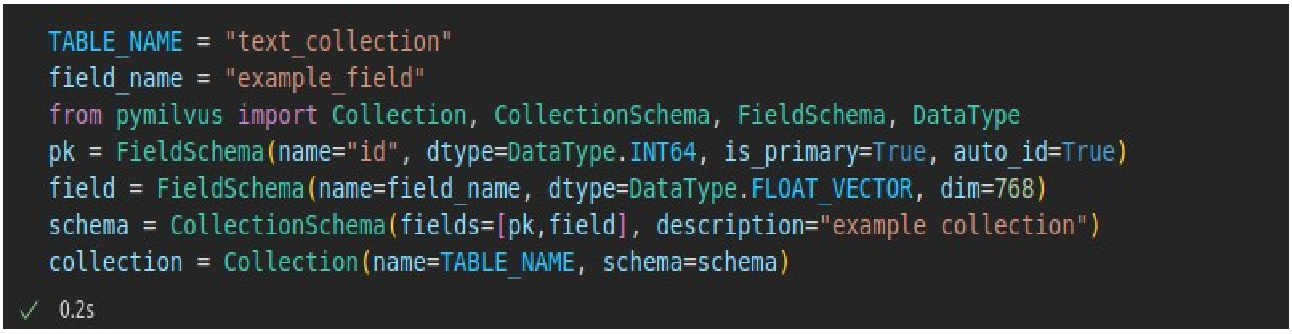
Step-5 :- Connect to Docker and postgres server.



```
from pymilvus import connections
import psycopg2
connections.connect(host='localhost', port='19530')
conn = psycopg2.connect(host='localhost', port='5438', user='postgres', password='postgres')
cursor = conn.cursor()
```

✓ 0.8s

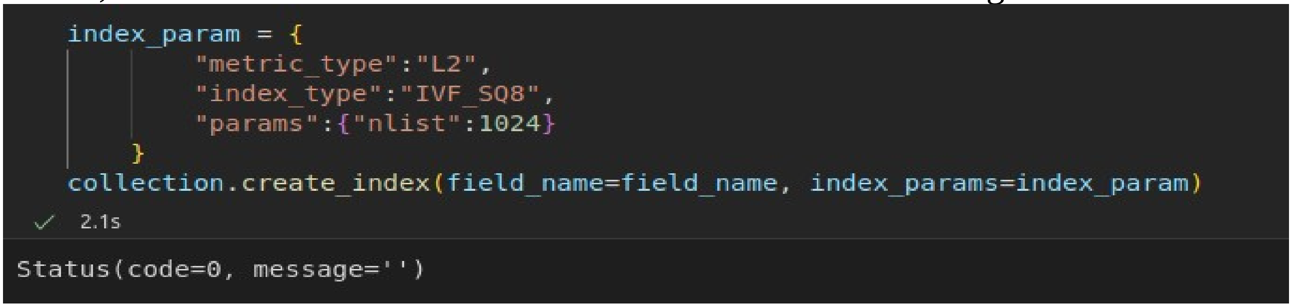
Step-6 :- Create the collection by giving the name of the collection and dimension of the vector.



```
TABLE_NAME = "text_collection"
field_name = "example_field"
from pymilvus import Collection, CollectionSchema, FieldSchema, DataType
pk = FieldSchema(name="id", dtype=DataType.INT64, is_primary=True, auto_id=True)
field = FieldSchema(name=field_name, dtype=DataType.FLOAT_VECTOR, dim=768)
schema = CollectionSchema(fields=[pk,field], description="example collection")
collection = Collection(name=TABLE_NAME, schema=schema)
```

✓ 0.2s

Step-7 :- Set the index. This can be done before or after inserting the data. If done before, indexes will be made as data comes in and fills the data segments.

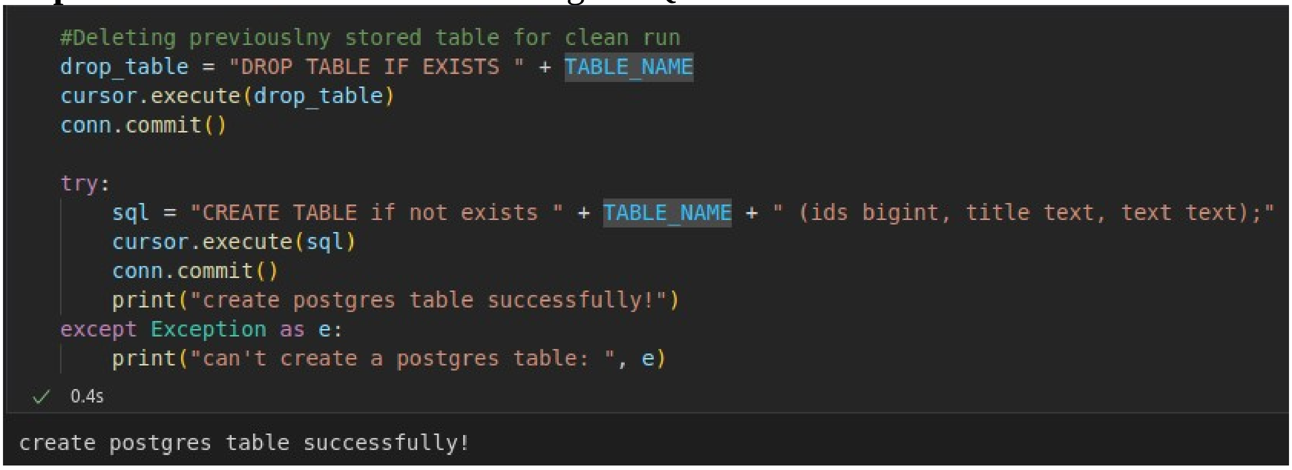


```
index_param = {
            "metric_type":"L2",
            "index_type":"IVF_SQ8",
            "params":{"nlist":1024}
        }
collection.create_index(field_name=field_name, index_params=index_param)
```

✓ 2.1s

```
Status(code=0, message='')
```

Step-8 :- Create the new table in PostgresSQL.

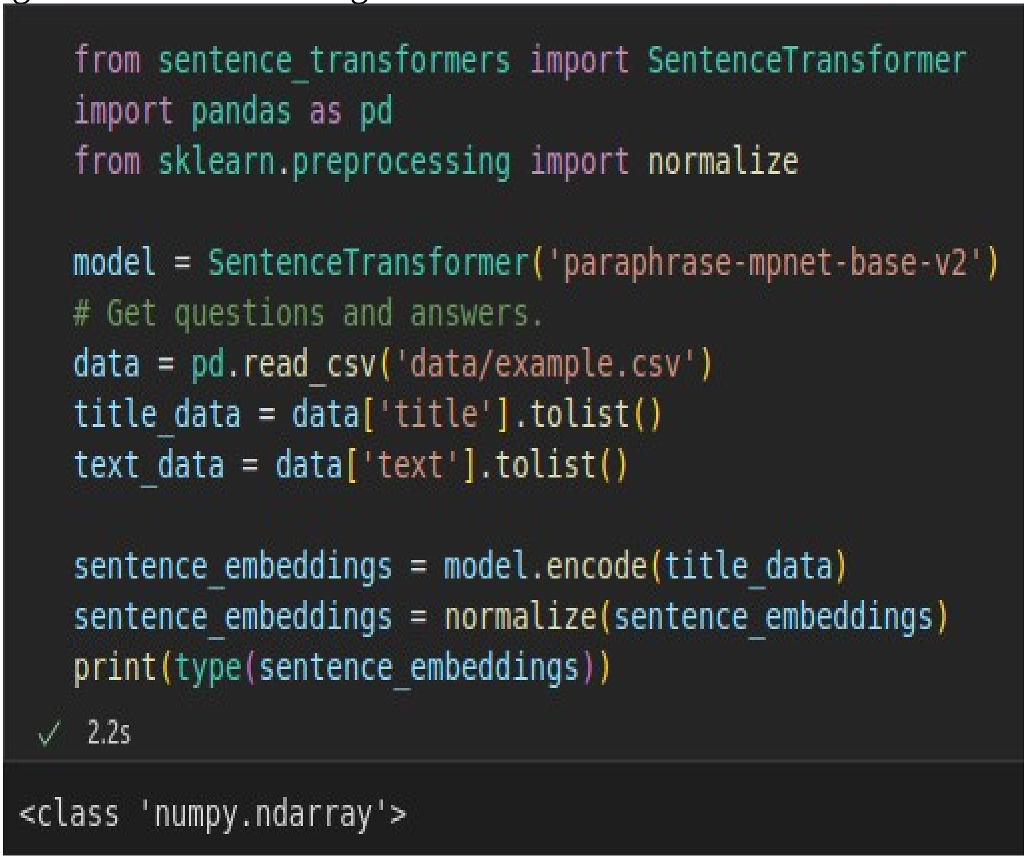


```
#Deleting previouslny stored table for clean run
drop_table = "DROP TABLE IF EXISTS " + TABLE_NAME
cursor.execute(drop_table)
conn.commit()

try:
    sql = "CREATE TABLE if not exists " + TABLE_NAME + " (ids bigint, title text, text text);"
    cursor.execute(sql)
    conn.commit()
    print("create postgres table successfully!")
except Exception as e:
    print("can't create a postgres table: ", e)
```

✓ 0.4s

```
create postgres table successfully!
```

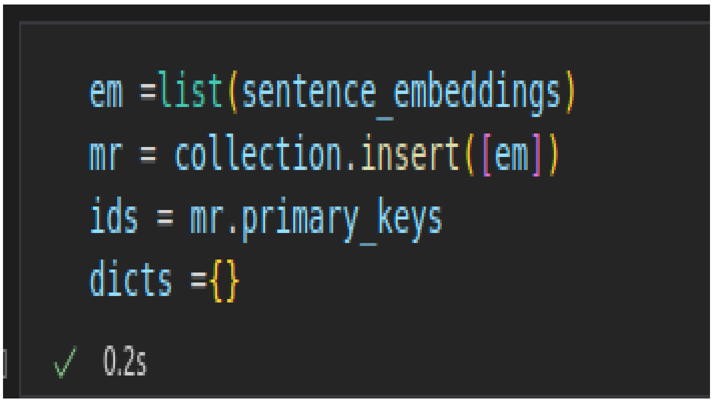
Step-9 :- Generate the embeddings, in this we are using the sentence_transformer library to encode the sentence into vectors. This library uses the modified BERT model to generate the embeddings.



```
from sentence_transformers import SentenceTransformer
import pandas as pd
from sklearn.preprocessing import normalize

model = SentenceTransformer('paraphrase-mpnet-base-v2')
# Get questions and answers.
data = pd.read_csv('data/example.csv')
title_data = data['title'].tolist()
text_data = data['text'].tolist()

sentence_embeddings = model.encode(title_data)
sentence_embeddings = normalize(sentence_embeddings)
print(type(sentence_embeddings))
```

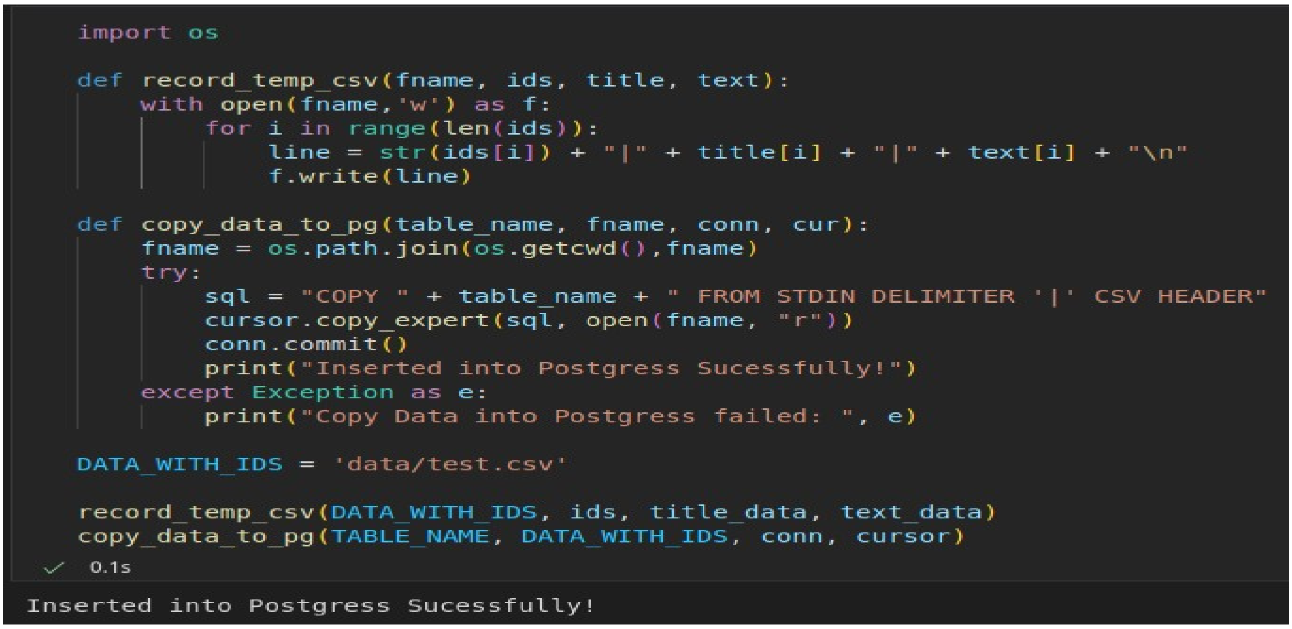
```
<class 'numpy.ndarray'>
```

Step-10 :- Insert the vectors into Milvus.



```
em =list(sentence_embeddings)
mr = collection.insert([em])
ids = mr.primary_keys
dicts ={}
```

Step-11 :- Insert the data(ID, Title and Text) into PostgreSQL.

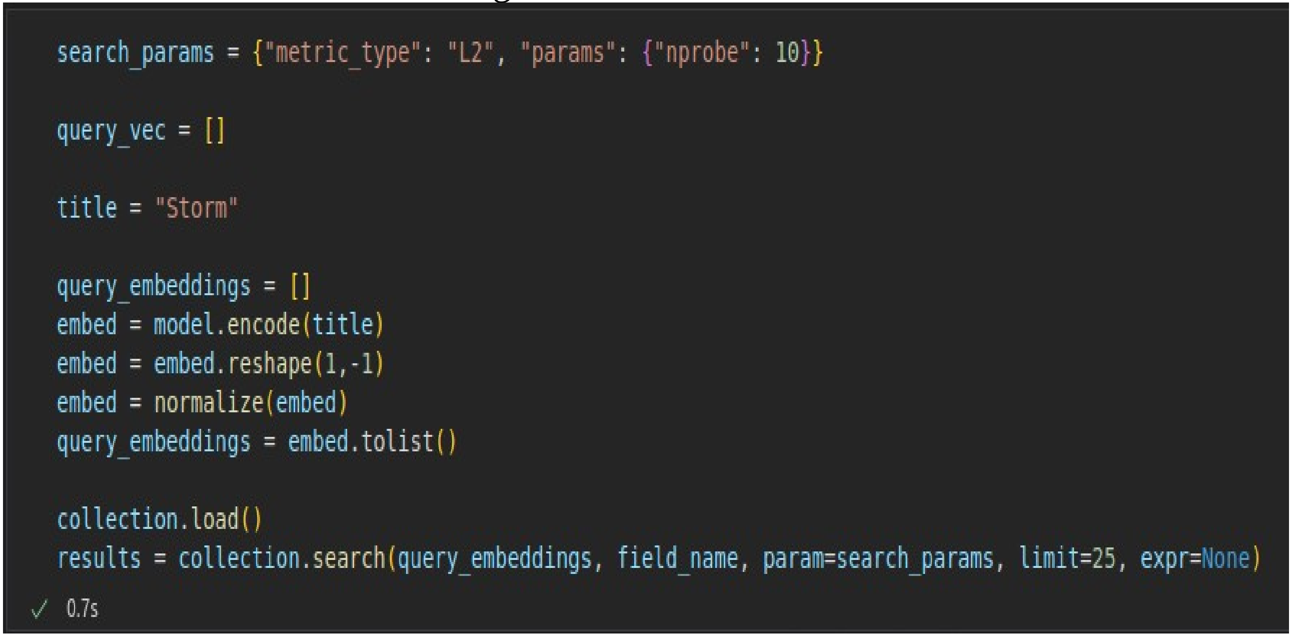


```
import os

def record_temp_csv(fname, ids, title, text):
    with open(fname,'w') as f:
        for i in range(len(ids)):
            line = str(ids[i]) + "|" + title[i] + "|" + text[i] + "\n"
            f.write(line)

def copy_data_to_pg(table_name, fname, conn, cur):
    fname = os.path.join(os.getcwd(),fname)
    try:
        sql = "COPY " + table_name + " FROM STDIN DELIMITER '|' CSV HEADER"
        cursor.copy_expert(sql, open(fname, "r"))
        conn.commit()
        print("Inserted into Postgress Sucessfully!")
    except Exception as e:
        print("Copy Data into Postgress failed: ", e)

DATA_WITH_IDS = 'data/test.csv'

record_temp_csv(DATA_WITH_IDS, ids, title_data, text_data)
copy_data_to_pg(TABLE_NAME, DATA_WITH_IDS, conn, cursor)
```

✓ 0.1s

```
Inserted into Postgress Sucessfully!
```

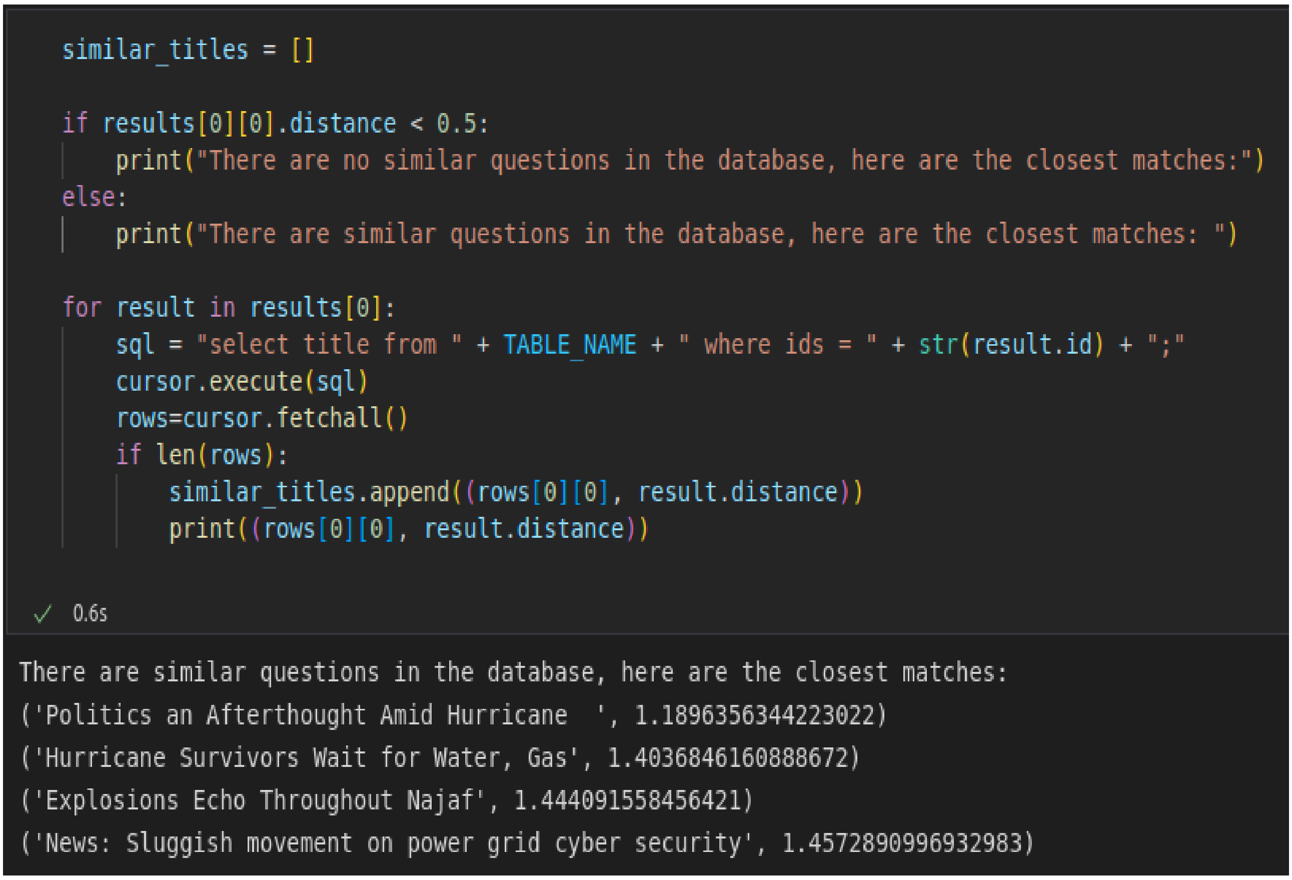
Step-12 :- Now, we will generate the embedding we want to search and then will search for the similiar Embeddings in the Milvus.



```
search_params = {"metric_type": "L2", "params": {"nprobe": 10}}

query_vec = []

title = "Storm"

query_embeddings = []
embed = model.encode(title)
embed = embed.reshape(1,-1)
embed = normalize(embed)
query_embeddings = embed.tolist()

collection.load()
results = collection.search(query_embeddings, field_name, param=search_params, limit=25, expr=None)
```

✓ 0.7s

Step-13 :- Now, get the similar Titles. There may not have titles that are similar to the given one, so we have used the threshold value 0.5, when the most similar distance retrieved is less than this value, a hint that the system does not include the relevent information.

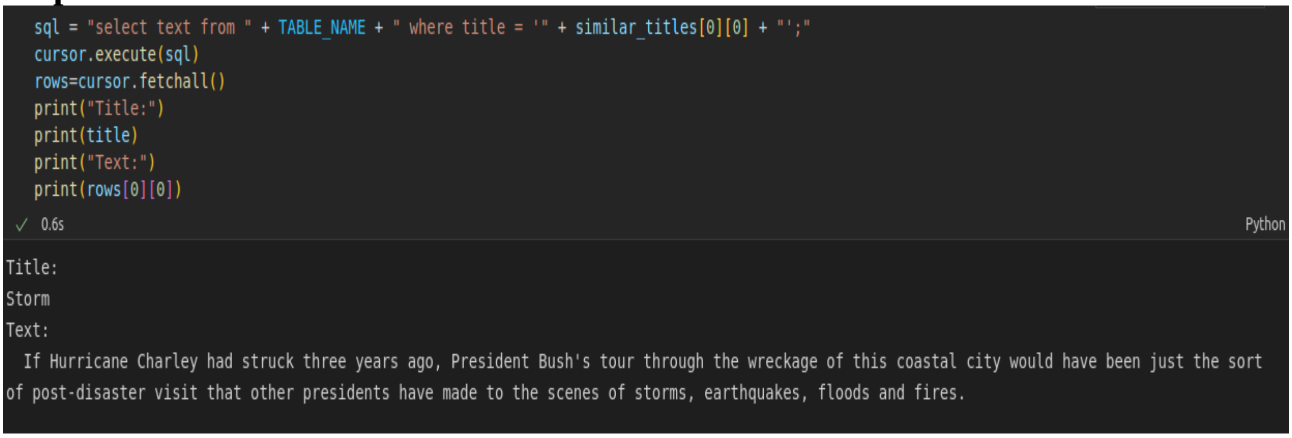


```python
similar_titles = []

if results[0][0].distance < 0.5:
    print("There are no similar questions in the database, here are the closest matches:")
else:
    print("There are similar questions in the database, here are the closest matches: ")

for result in results[0]:
    sql = "select title from " + TABLE_NAME + " where ids = " + str(result.id) + ";"
    cursor.execute(sql)
    rows=cursor.fetchall()
    if len(rows):
        similar_titles.append((rows[0][0], result.distance))
        print((rows[0][0], result.distance))
```

✓ 0.6s

```
There are similar questions in the database, here are the closest matches:
('Politics an Afterthought Amid Hurricane  ', 1.1896356344223022)
('Hurricane Survivors Wait for Water, Gas', 1.4036846160888672)
('Explosions Echo Throughout Najaf', 1.444091558456421)
('News: Sluggish movement on power grid cyber security', 1.4572890996932983)
```

Step-14 :- Get the most closest Title.



```python
sql = "select text from " + TABLE_NAME + " where title = '" + similar_titles[0][0] + "';"
cursor.execute(sql)
rows=cursor.fetchall()
print("Title:")
print(title)
print("Text:")
print(rows[0][0])
```

✓ 0.6s Python

```
Title:
Storm
Text:
 If Hurricane Charley had struck three years ago, President Bush's tour through the wreckage of this coastal city would have been just the sort
of post-disaster visit that other presidents have made to the scenes of storms, earthquakes, floods and fires.
```