

# PGVector

## Contents

- Similarity search with score

This notebook shows how to use functionality related to the Postgres vector database (PGVector).

```
## Loading Environment Variables
from typing import List, Tuple
from dotenv import load_dotenv
load_dotenv()
```

```
from langchain.embeddings.openai import OpenAIEmbeddings
from langchain.text_splitter import CharacterTextSplitter
from langchain.vectorstores.pgvector import PGVector
from langchain.document_loaders import TextLoader
from langchain.docstore.document import Document
```

```
loader = TextLoader('../.../state_of_the_union.txt')
documents = loader.load()
text_splitter = CharacterTextSplitter(chunk_size=1000, chunk_overlap=0)
docs = text_splitter.split_documents(documents)

embeddings = OpenAIEmbeddings()
```

```
## PGVector needs the connection string to the database.
## We will load it from the environment variables.
import os
CONNECTION_STRING = PGVector.connection_string_from_db_params(
    driver=os.environ.get("PGVECTOR_DRIVER", "psycopg2"),
    host=os.environ.get("PGVECTOR_HOST", "localhost"),
    port=int(os.environ.get("PGVECTOR_PORT", "5432")),
    database=os.environ.get("PGVECTOR_DATABASE", "postgres"),
    user=os.environ.get("PGVECTOR_USER", "postgres"),
    password=os.environ.get("PGVECTOR_PASSWORD", "postgres"),
)
```

[Skip to main content](#)

```
## Example
# postgresql+psycopg2://username:password@localhost:5432/database_name
```

# Similarity search with score

## Similarity Search with Euclidean Distance (Default)

```
# The PGVector Module will try to create a table with the name of the collection.
So, make sure that the collection name is unique and the user has the
# permission to create a table.
```

```
db = PGVector.from_documents(
    embedding=embeddings,
    documents=docs,
    collection_name="state_of_the_union",
    connection_string=CONNECTION_STRING,
)
```

```
query = "What did the president say about Ketanji Brown Jackson"
docs_with_score: List[Tuple[Document, float]] =
db.similarity_search_with_score(query)
```

```
for doc, score in docs_with_score:
    print("-" * 80)
    print("Score: ", score)
    print(doc.page_content)
    print("-" * 80)
```

-----  
Score: 0.6076628081132506

Tonight. I call on the Senate to: Pass the Freedom to Vote Act. Pass the John Lewis Voting Rights Act. And while you're at it, pass the Disclose Act so Americans can know who is funding our elections.

Tonight, I'd like to honor someone who has dedicated his life to serve this country: Justice Stephen Breyer—an Army veteran, Constitutional scholar, and retiring Justice of the United States Supreme Court. Justice Breyer, thank you for your service.

One of the most serious constitutional responsibilities a President has is nominating someone to serve on the United States Supreme Court.

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Breyer's legacy of excellence.

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And I did that 4 days ago, when I nominated Circuit Court of Appeals Judge Ketanji Brown Jackson. One of our nation's top legal minds, who will continue Justice Breyer's legacy of excellence.

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