

Vector Stores in LangChain

20 May 2025 22:15

Why Vector Stores?

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Movie id	Movie name	Director	Actor	Genre	Release Date	Outcome
M001	3 Idiots	Raju Hirani	Aamir Khan	Drama, Romance	2009	Super Hit
M002	Chennai Express	Rohit Shetty	Shah Rukh Khan	Romance, Comedy	2014	Super Hit
M003	Inception	C Nolan	L Di Caprio	Thriller, Sci-Fi	2009	Blockbuster
M004	Stree	Amar Kaushik	Rajkumar Rao	Horror, Comedy	2019	Hit

What are Vector Stores

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A vector store is a system designed to store and retrieve data represented as numerical vectors.

Key Features

1. **Storage** – Ensures that vectors and their associated metadata are retained, whether **in-memory** for quick lookups or **on-disk** for durability and large-scale use.
2. **Similarity Search** - Helps retrieve the vectors most similar to a query vector.
3. **Indexing** - Provide a data structure or method that enables fast similarity searches on high-dimensional vectors (e.g., approximate nearest neighbor lookups).
4. **CRUD Operations** - Manage the lifecycle of data—adding new vectors, reading them, updating existing entries, removing outdated vectors.

Use-cases

1. Semantic Search
2. RAG
3. Recommender Systems
4. Image/Multimedia search

Vector Store Vs Vector Database

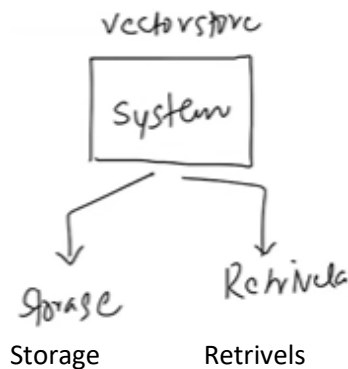
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- Vector Store

- Typically refers to a lightweight library or service that focuses on storing vectors (embeddings) and performing similarity search.
- May not include many traditional database features like transactions, rich query languages, or role-based access control.
- Ideal for prototyping, smaller-scale applications
- Examples: FAISS (where you store vectors and can query them by similarity, but you handle persistence and scaling separately).

- Vector Database

- A full-fledged database system designed to store and query vectors.
- Offers additional "database-like" features:
 - Distributed architecture for horizontal scaling
 - Durability and persistence (replication, backup/restore)
 - Metadata handling (schemas, filters)
 - Potential for ACID or near-ACID guarantees
 - Authentication/authorization and more advanced security
- Geared for production environments with significant scaling, large datasets



Vector Stores in LangChain

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- **Supported Stores:** LangChain integrates with multiple vector stores ([FAISS](#), [Pinecone](#), [Chroma](#), [Qdrant](#), [Weaviate](#), etc.), giving you flexibility in scale, features, and deployment.
- **Common Interface:** A uniform Vector Store API lets you swap out one backend (e.g., FAISS) for another (e.g., Pinecone) with minimal code changes.
- **Metadata Handling:** Most vector stores in LangChain allow you to attach metadata (e.g., timestamps, authors) to each document, enabling filter-based retrieval.

```
from_documents(...) or from_texts(...)
```

```
add_documents(...) or add_texts(...)
```

```
similarity_search(query, k=...)
```

Metadata-Based Filtering

Chroma Vector Store

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Chroma is a lightweight, open-source vector database that is especially friendly for local development and small- to medium-scale production needs.

