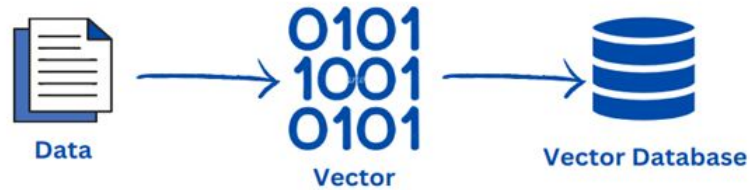


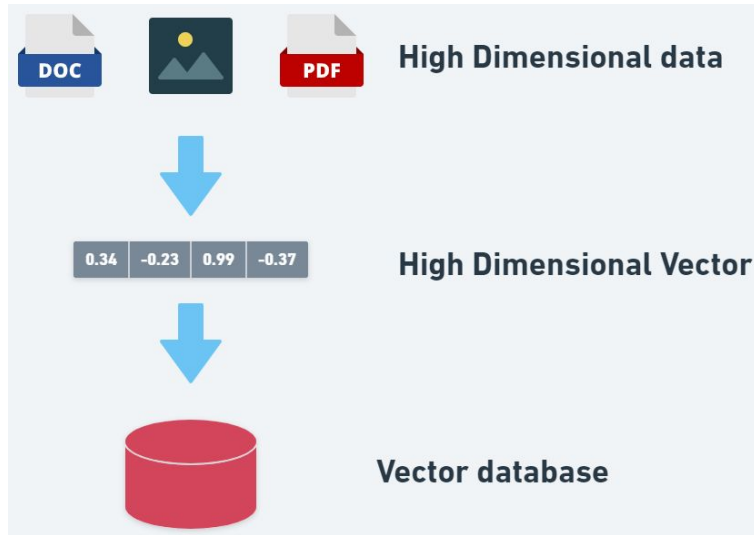
Vector Databases



What we will learn?

- What is Vector Database?
- Why we need Vector DB?
- How Vector DB work?
- Use cases of Vector DB
- Some widely used Vector DB
- Practical demo using Python & Langchain

What is Vector Database?



A vector database is a database used for storing high-dimensional vectors such as word embeddings or image embeddings.

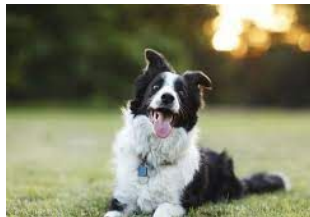
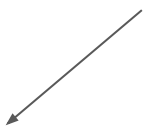
Why we need Vector DB?

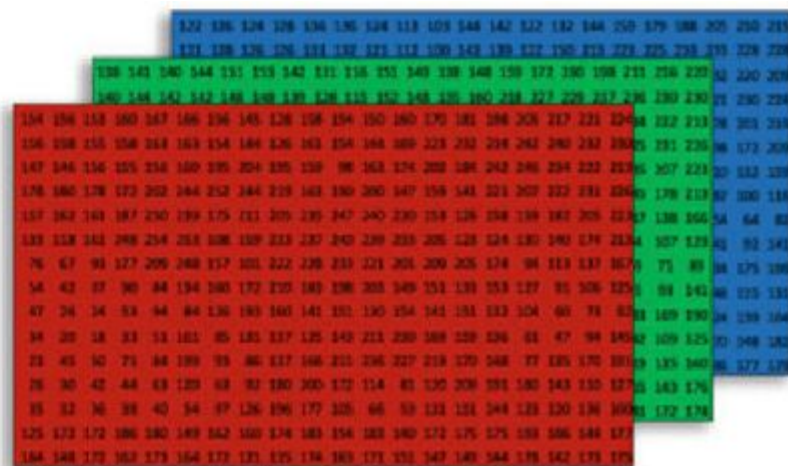
Over 80 - 85% data out there is unstructured data



We can't easily store them into a Relational/Traditional database !!







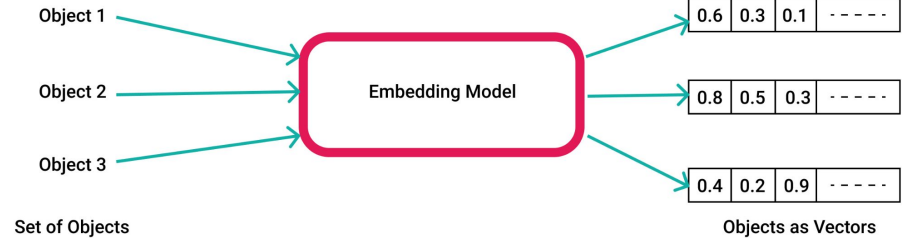
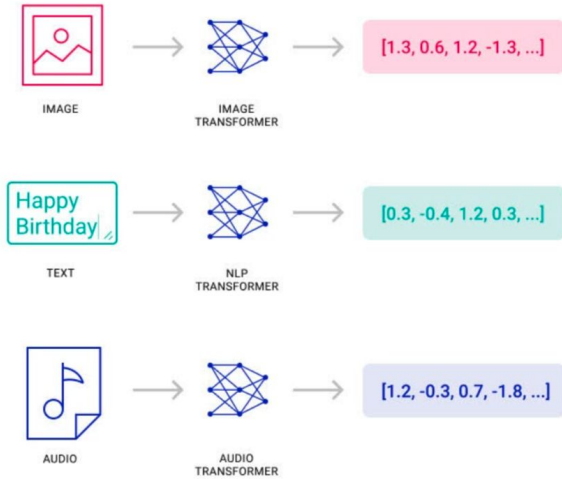
RGB Channels



Vector Embeddings

Object

Vector





Text

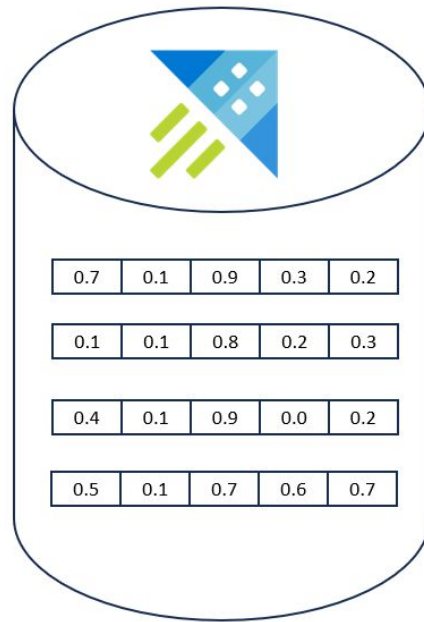


Embedding Model



0.7	0.1	0.9	0.3	0.2
0.1	0.1	0.8	0.2	0.3
0.4	0.1	0.9	0.0	0.2
0.5	0.1	0.7	0.6	0.7

Vector Embeddings



ADX for vector storage + similarity search

ADX as a Vector database

Embeddings Example

Lets go to whiteboard & understand :)

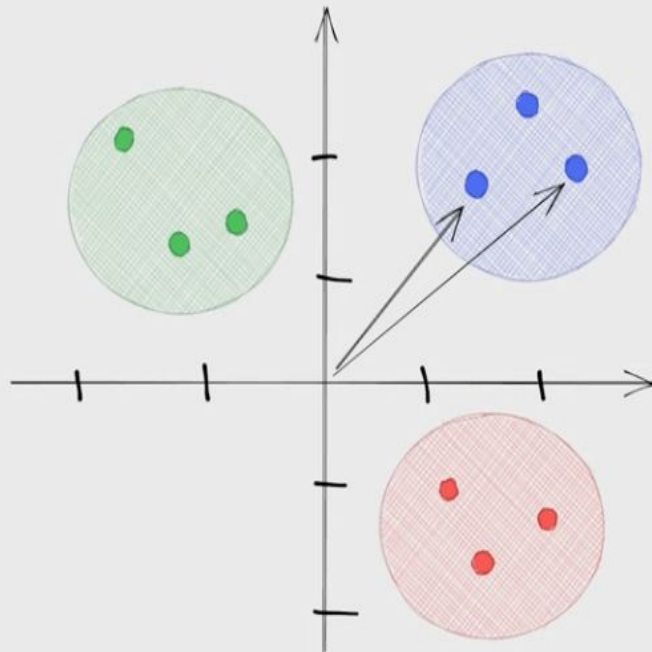
vector embeddings (2D example)

king
man
woman
apple
banana
orange

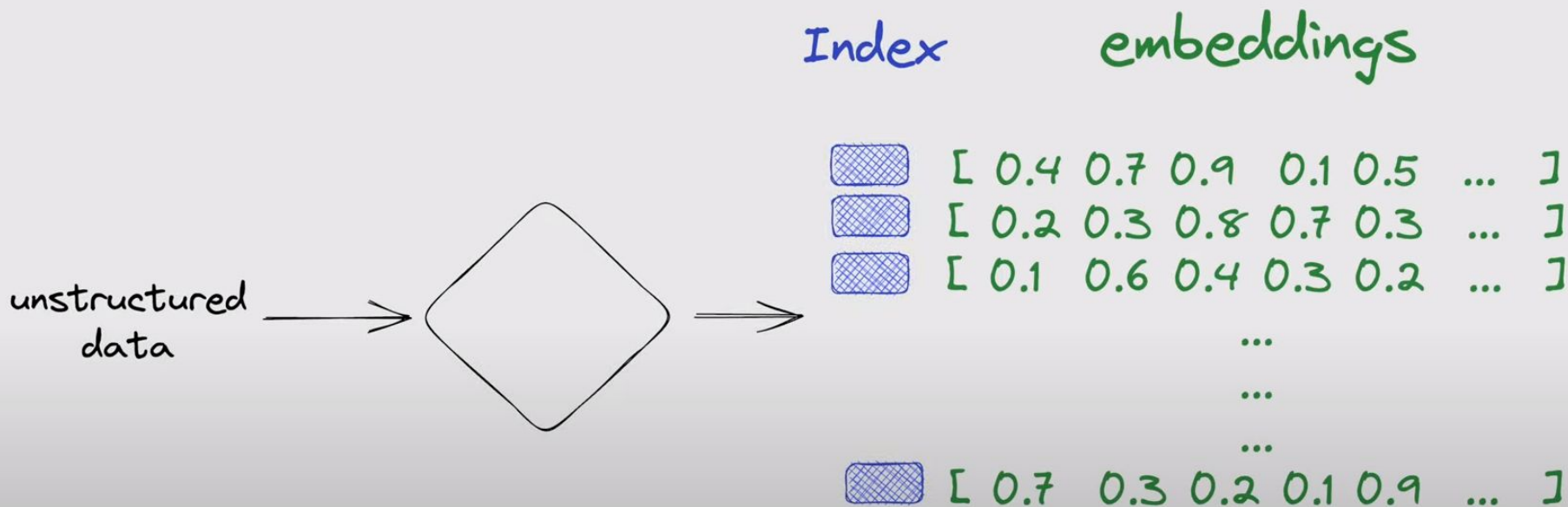
football
golf
tennis



$[4 \ 5 \]$
 $[3 \ 3.5 \]$
 $[5 \ 3 \]$
 $[2.5 \ -2 \]$
 $[2.5 \ -3 \]$
 $[4 \ -2.5 \]$
 $[-3 \ 4 \]$
 $[-1.5 \ 3 \]$
 $[-2 \ 2 \]$



Vector Indexes



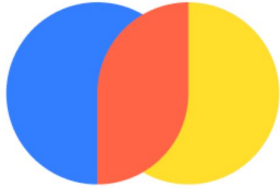


A vector database indexes and store vector embeddings for faster retrieval and similarity search.

Use cases of Vector DB

1. Long-Term memory for LLMs
2. Semantic Search: Search based on the meaning of context
3. Similarity Search: Text, Images, Videos, Audios
4. Recommendation engine as well

Some widely used Vector DB



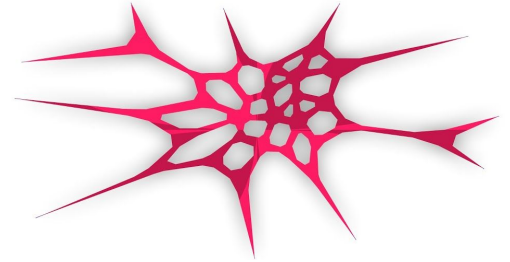
Chroma



Weaviate

FAISS

Scalable Search With Facebook AI



Pinecone



redis

Practical demo

