Welcome! Before we get started ...

Tell us a little about yourself!

Short survey:

https://www.menti.com/al31ja5gtijw

Weaviate

Workshop:
An introduction to Weaviate

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Agenda

- **Weaviate Demo**
- **What Weaviate is**
  - What is a vector?
  - What is a vector database?
  - Searches.
- **Weaviate and LLMs**
  - Weaviate + LLMs (RAG).
  - Examples with real data.

Weaviate in action

What is a vector?

A vector is a set of numbers

Like

```
[1, 0]
```

or

```
[0.513, 0.155, 0.983, 0.001, 0.932]
```

or

```
[0.0009420722, 0.020158706, -0.03939992,
-0.025480185, 0.018441677, 0.0023035712,
-0.012281344, -0.025270471, -0.056622636, …]
```

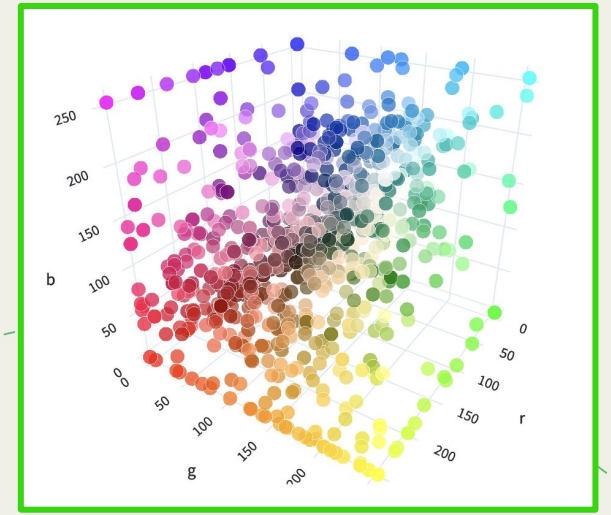
And they’re used to represent (some) meaning.

Numbers represent meaning?

Yes! Here's an example.

RGB *numbers* represent *colors*, like:
(255, 0, 0) = red
(80, 200, 120) = emerald.

Each number is a *dial*
for (red, green, blue) ness.



Now extend this concept...

To hundreds, or even thousands of these dials.

That's how vectors represent meaning.

Example

- "Three people rescued off Australian coast after yacht damaged by multiple shark attacks"

Vector

```
[-0.01670855, -0.02290458,
0.01024679, ..., -0.01840662,
-0.01677336,  0.00040852]
```

Examples

- "Three people rescued off Australian coast after yacht damaged by multiple shark attacks"
- "Tourists taking selfies and feeding dingoes blamed for rise in K’gari attacks"
- "Sam Kerr: Chelsea striker and Matildas captain named runner-up in Uefa’s player of the year awards"
- "‘She’s brilliant’: Mary Earps inspires girls to pick up goalkeeper gloves"

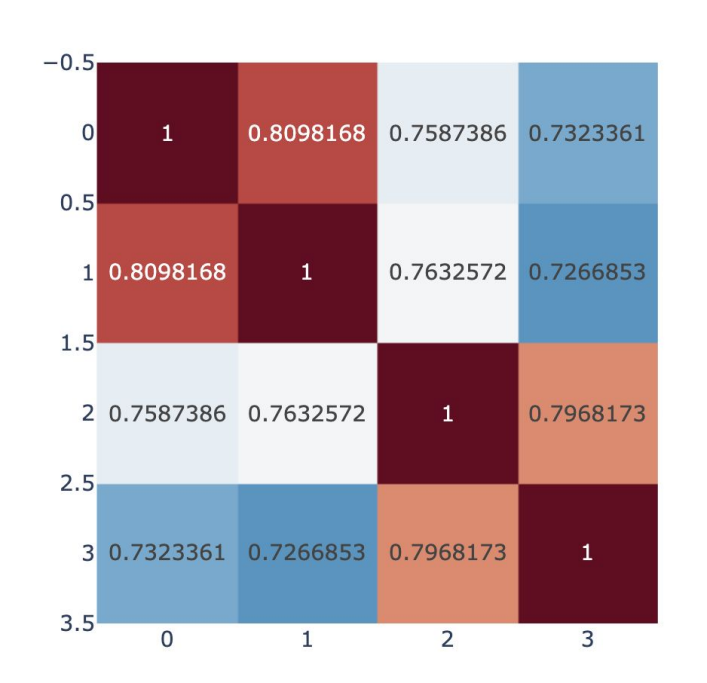
Vectors

```
[-0.01670855, -0.02290458,
0.01024679, ..., -0.01840662,
-0.01677336,  0.00040852]

[-0.01062017,  0.01388064,
0.02811302, ..., -0.01565292,
0.00282415, -0.01064047]

[-0.00067538, -0.00483041,
0.02590884, ..., -0.01845455,
-0.01025612, -0.00987435]

[-0.03254206,  0.00462641,
0.00465651, ...,  0.01225011,
-0.00032469, -0.01669922]
```

Examples

- "Three people rescued off Australian coast after yacht damaged by multiple shark attacks"
- "Tourists taking selfies and feeding dingoes blamed for rise in K’gari attacks"
- "Sam Kerr: Chelsea striker and Matildas captain named runner-up in Uefa’s player of the year awards"
- "‘She’s brilliant’: Mary Earps inspires girls to pick up goalkeeper gloves"

Similarity matrix



This the key to modern language models

Vector databases like Weaviate uses vectors to:

- Represent the meaning of objects
- Search for similar objects
- Transform objects

And the same core technology is used in LLMs

Why use a vector database?

Dealing with scale

Think about how many documents, paragraphs, or sentences exist.

Each vector represents some “meaning” – so we often need millions/billions of vectors!

This creates challenges

Dealing with scale

Vector comparisons are expensive operations.
And how to we manage the (source) data?

This is where vector databases come in.

What does a vector database enable?

Vector-first data operations

- Weaviate can deal with 100Ms of vectors!
- Still lightning-fast searches

What does a vector database enable?

Even better LLMs

- Tackles two problems:
  - Hallucination
    (Missing / incorrect information)
  - Cost of re-training / fine-tuning
- Retrieval augmented generation
  (generative search)

Key takeaways

- **Weaviate is a vector database**
  - It stores data based on meaning
  - All done through *vectors*
- **Weaviate can**
  - Perform vector / keyword / hybrid searches.
  - Complement LLMs.
  - Scale easily to production.

Thank you

What next?

- **Weaviate Documentation**: https://weaviate.io/developers/weaviate
  - Quickstart
  - Concepts
  - How-to guides
- **Weaviate Academy**: https://weaviate.io/developers/academy
  - Holistic, end-to-end guides on topics
- **Events & Webinars**: https://weaviate.io/community/events

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