






Superlinked


One **Mixture of encoders** retrieval vs
many rerankers: A modern approach
to search and recommendations




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 Superlinked

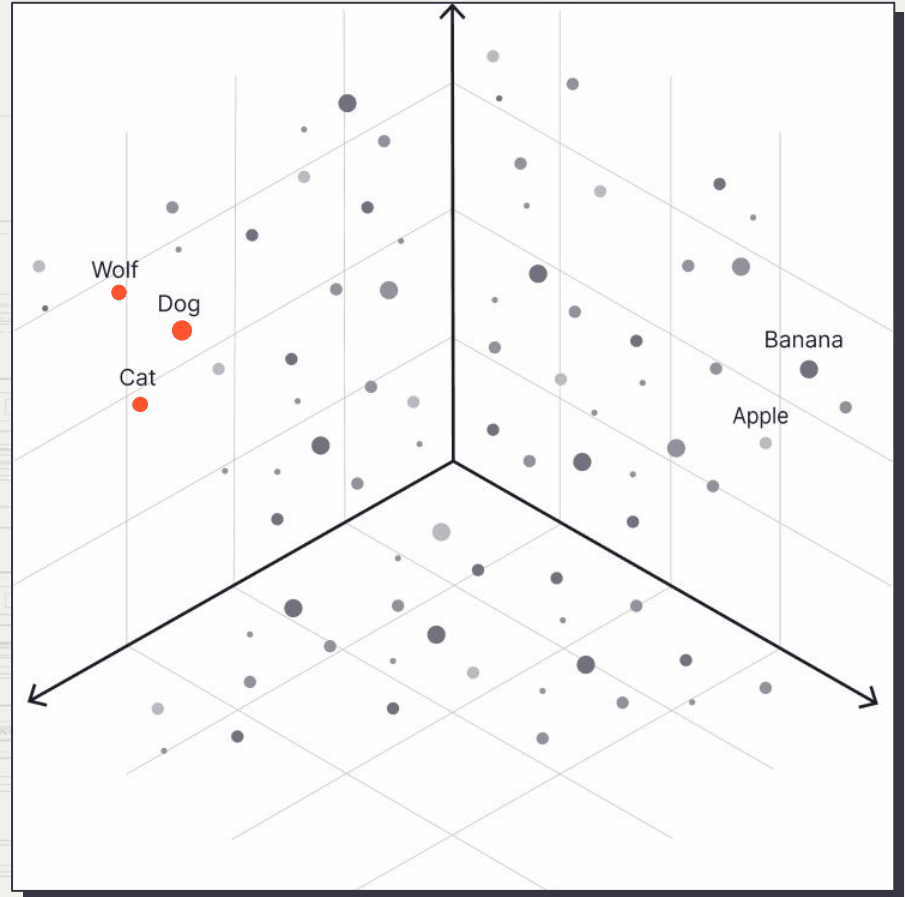
 Imperial College London

Vector based search

If the data was just text

wolf
cat
dog
banana
apple

Text
Embedding
Model





Superlinked

**Well ... there are
problems**

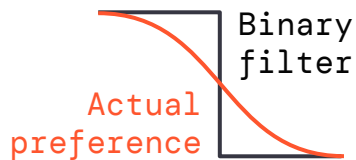
Real world data is not just text!

```
{  
  rating: 3.7,  
  description: "toothbrush with small head for hard-to-reach areas"  
  category_id: 47  
  price: $29.99  
  total_availability : 10  
  locations: "399 Geary St.", "1059 Hyde St."  
  image: s3://path/to/image.png  
  .. 50 other properties ..  
}
```

With **text-only embeddings**, you have to handle text separately from your other data and/or use **slow**, **low quality** & **high cost** workarounds*

:(Metadata filters

When you convert a fuzzy preference like "recent", "near" or "popular" into a filter, you model a sigmoid with a binary step function = not enough resolution.

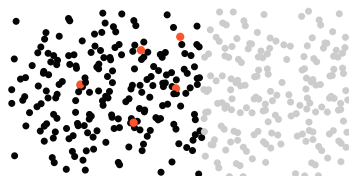


:(Candidate re-ranking

Semantic ranking & ColBERT only use text, learn2rank models need ML Engineers.

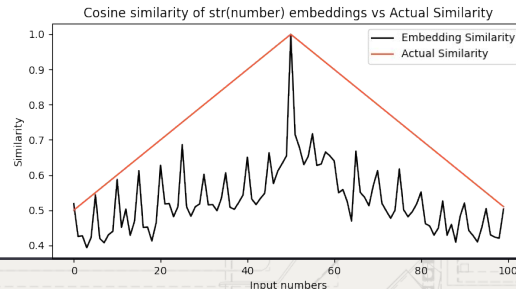
Broad queries eg "popular pants" can't be handled by re-ranking at all, due to poor candidate recall.

Other
products
Pants
Popular
pants



:(Stringify & vectorize

It's extremely noisy to stringify & text-embed whole objects like users, SKUs or content+metadata. See below for cosine(
textembed(str(50)),
textembed(str(1..100))):



* additionally making more advanced topics like feedback loops, personalization, explainability and control inaccessible




"Sparkly dress for a Christmas party under 100"

Without Superlinked


Search results for sparkly dress for a christmas party under 100

Brand ▾ Colour ▾ Size ▾ Product Type ▾ Categories ▾ [All Filters](#)


1 - 48 of 433 items Relevance ▾




£45
AUTOGRAPH
Pure Extra Fine Merino Wool Half Zip Jumper
4.5★★★★★ 508 reviews




£20
AUTOGRAPH
Pure Supima® Cotton Crew Neck T-shirt
4.5★★★★★ 703 reviews




£20
AUTOGRAPH
Pure Supima® Cotton Crew Neck T-shirt
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£20
AUTOGRAPH
Pure Supima® Cotton Crew Neck T-shirt
4.5★★★★★ 703 reviews



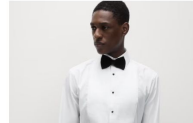
£15
AUTOGRAPH
Pure Extra Fine Merino Wool Half Zip Jumper
4.5★★★★★ 508 reviews



£150
AUTOGRAPH
Pure Extra Fine Merino Wool Half Zip Jumper
4.5★★★★★ 508 reviews



£150
AUTOGRAPH
Pure Extra Fine Merino Wool Half Zip Jumper
4.5★★★★★ 508 reviews



£150
AUTOGRAPH
Pure Extra Fine Merino Wool Half Zip Jumper
4.5★★★★★ 508 reviews

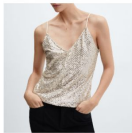
With Superlinked

Superlinked Store sparkly dress for a christmas party under 100 [Search](#) [Reset Session](#)


[Women](#) [Men](#) [Sports & Leisure](#) [Home](#) [Beauty](#) [Kids](#) [Christmas](#) [Outdoor](#)

Search Results for "sparkly dress for a christmas party under 100"


► Superlinked parameters
Showing 100 most relevant products for your query




Rose Gold Sequin Strap Top
Mango
\$29




Purple Velvet Crossed Dress
Mango
\$35




Khaki Velvet Knot Dress
Mango
\$45




Ivory Sequin Shoulder Pad Dress
Mango
\$49




Black Asymmetric Sequin Dress
Mango
\$49




Black Asymmetric Sequin Dress
Mango
\$49




Black Asymmetric Sequin Dress
Mango
\$49



Black Asymmetric Sequin Dress
Mango
\$49

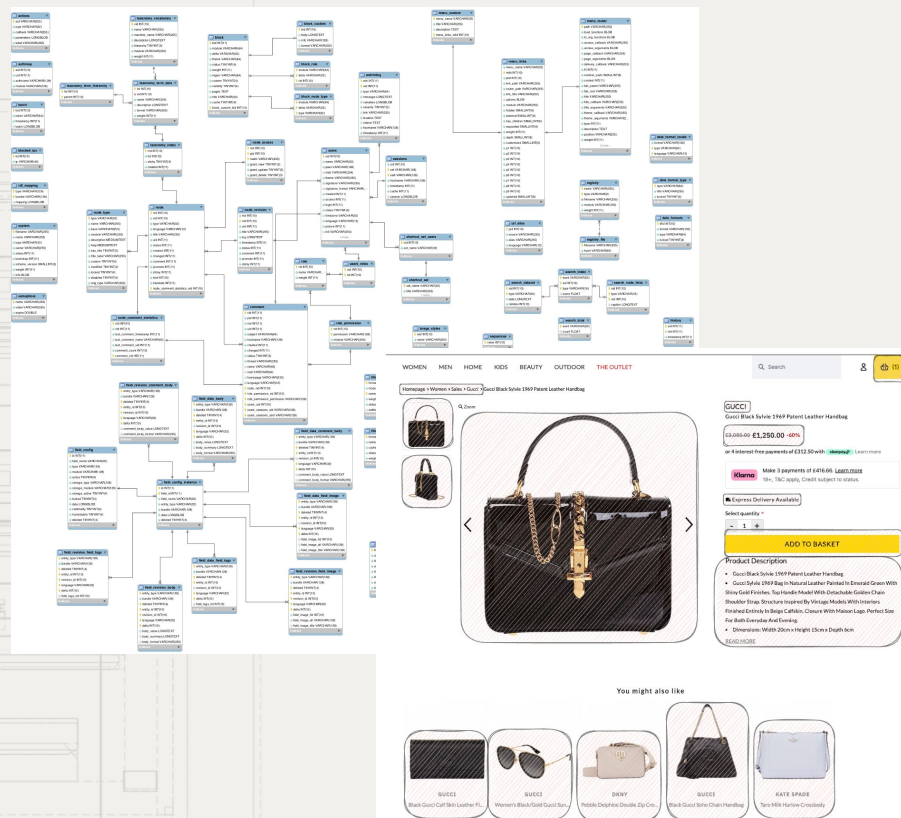
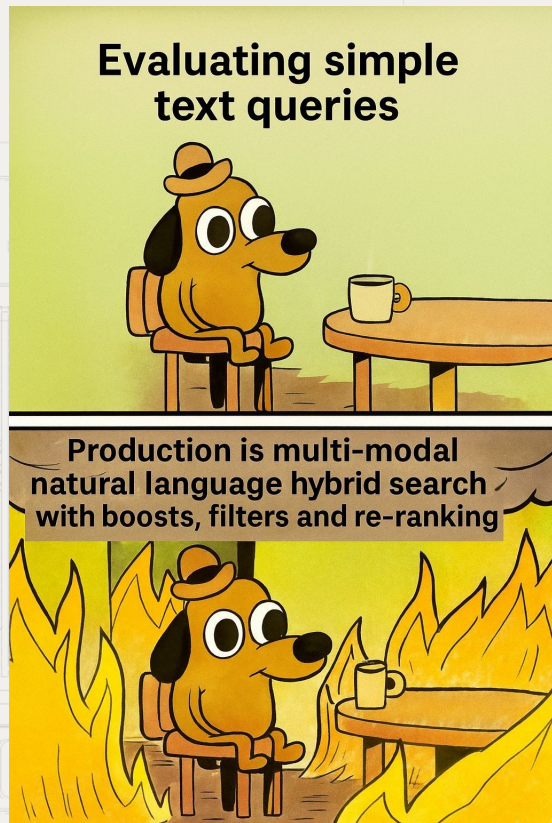


Black Asymmetric Sequin Dress
Mango
\$49



Black Asymmetric Sequin Dress
Mango
\$49

Production data is complex - not just a simple text query !





Superlinked

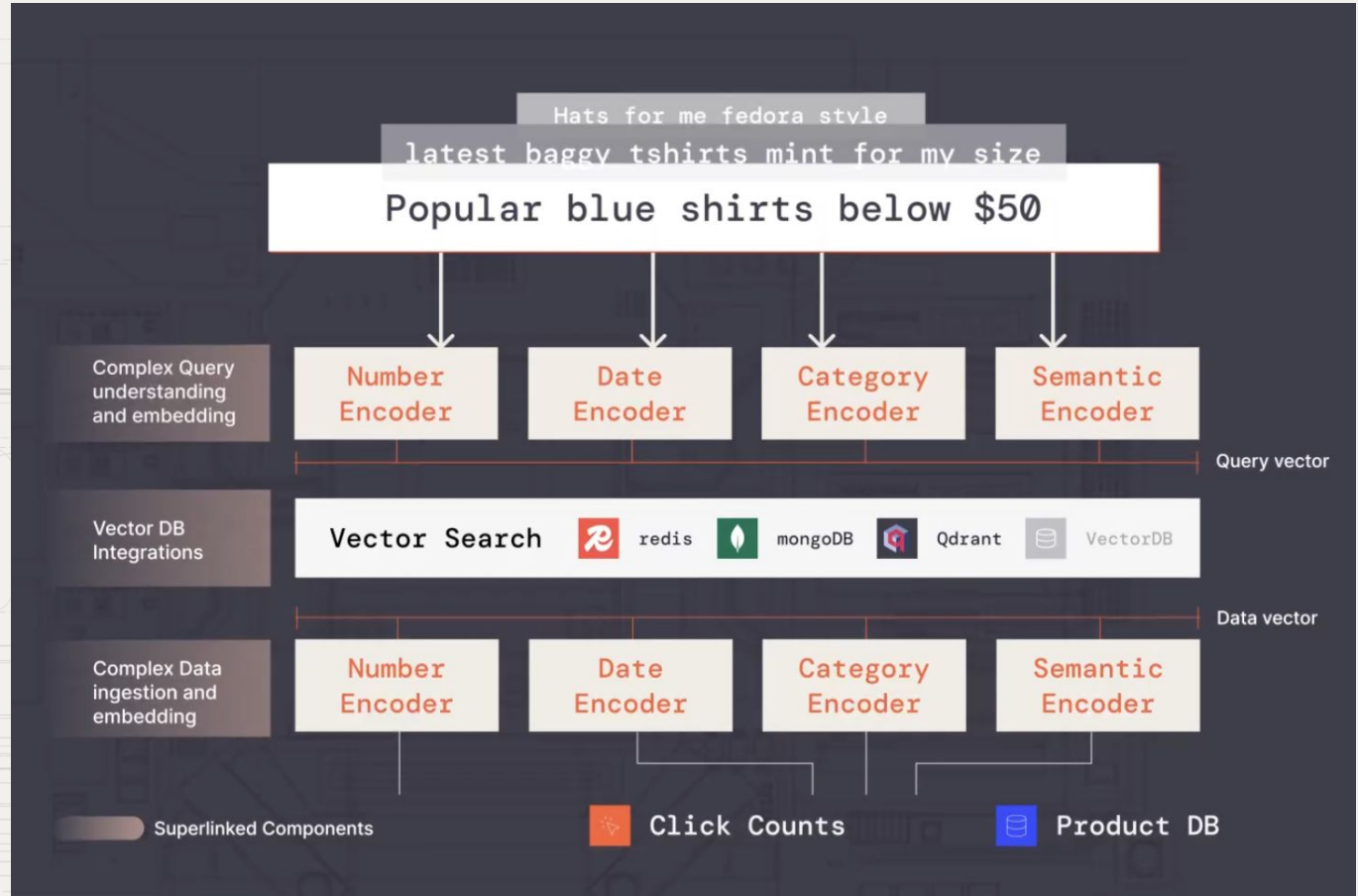
Introducing mixture of encoders

Mixture of encoders - a whole lifecycle product

Superlinked's solution

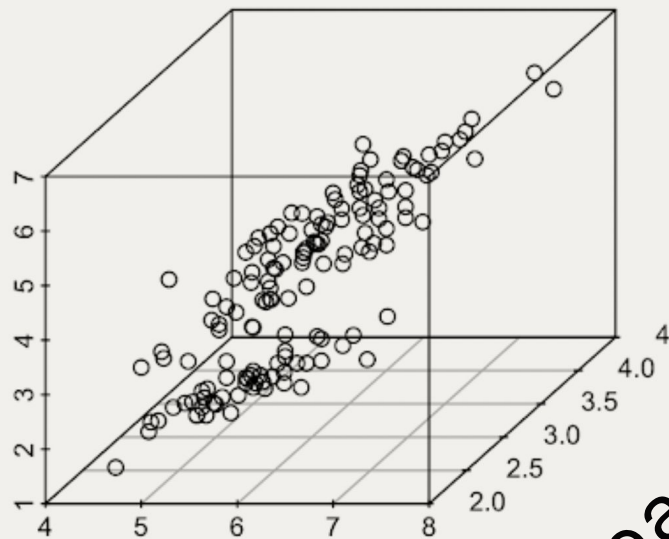
Benefits:

- Weights
- Explainability
- Business logic



Map data to a multi dimensional space

Recent



Popular

Near to Berlin





Superlinked

Superlinked in Production

77% Increase in Conversion Rate

Production Case Study

Customer

BRANDALLEY
THE NON-STOP DESIGNER SALE

\$150M+ in annual sales **5M+** monthly users

Results

+77%

Conversion
rate

+68%

Average order
value (AOV)

200ms

95th percentile
latency



Before

vs

After

- Algolia + manual curation
- Disjoin recommendations (from CRM, for you page, collections, bundles, checkouts, out of stock models etc.
- No real time streams but updates and interaction data took 24h

- Superlinked mixture of encoders framework





Superlinked

Open source Repo + evals

Test our claims, maybe
you will help us find
gaps !

Information Retrieval benchmarks - How close are they to your business problem ?

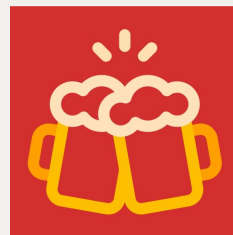
Massive Text Embedding Benchmark (MTEB)

- Text; Image is a recent addition
- A blended score of various metrics
- Retrieval: tops out at ≈ 0.6
- **NO METADATA**



Benchmarking-IR (BEIR)

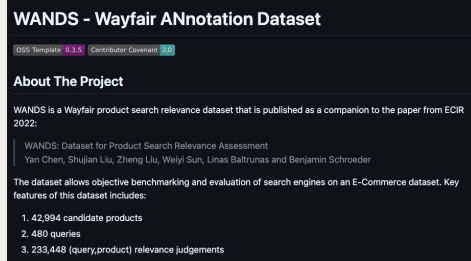
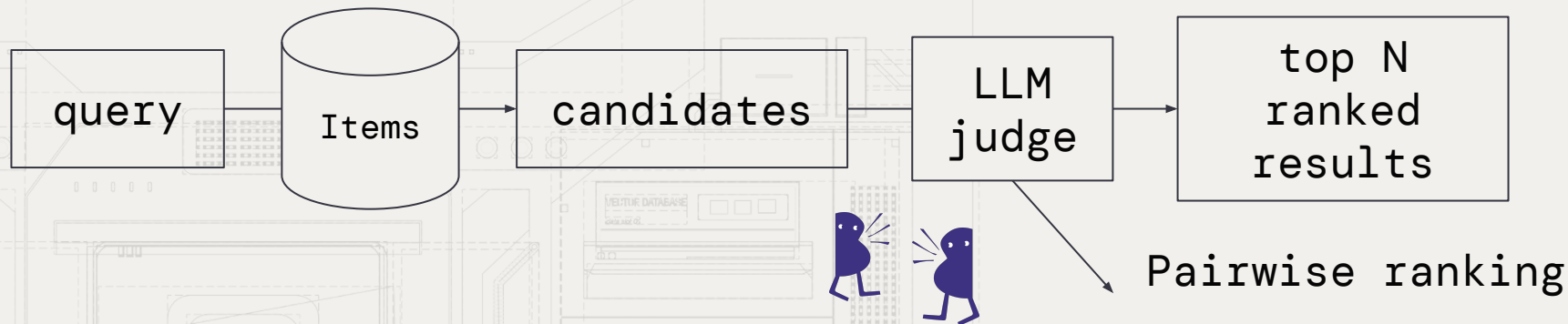
- Text (short- a few ¶!); no images
- Relies heavily on synthetic queries
- No negative examples to teach model what irrelevant results look like
- **NO METADATA**



Beir
Benchmarking IR

A Superlinked benchmark (coming soon!)

Based on the Wayfair Annotation Dataset



Articles / Airbnb search benchmarking

Publication Date: June 15, 2025 | #Personalized Search #Superlinked

Airbnb Search Benchmarking -
Comparison of retrieval
techniques

Superlinked
Vs
BM25, ColBERT,
cross encoders

Open source repo

For AI engineers



Open source

Github repo



README Apache-2.0 license

Superlinked

CHAT WITH OUR AI DOCS

Docs Ask DeepWiki pypi v28.3.1 Stars 1.2k last commit last friday license Apache-2.0

Superlinked is a Python framework for AI Engineers building *high-performance search & recommendation applications* that combine *structured and unstructured data*.

Quickstart

```
%pip install superlinked
```

```
from superlinked import framework as sl

# Define schema for movie reviews
class Review(sl.Schema):
    id: sl.IdField
    text: sl.String

review = Review()
space = sl.TextSimilaritySpace(text=review.text, model="all-MiniLM-L6-v2")
index = sl.Index(space)
query = sl.Query(index).find(review).similar(space, sl.Param("search")).select_all()
```

Even more open source resources

Lots of support in [docs](#) and
in-depth tech [articles](#)

Vector DB [comparison table](#)

The screenshot shows the VectorHub website with a navigation bar including 'BUILDING BLOCKS', 'ARTICLES', 'CONTRIBUTING', and 'VDB COMPARISON'. A search bar is present with the text 'Search topic...'. Below the navigation bar, there's a section titled 'Build with vectors' with a subtitle 'Free open-source platform teaching you how to build vector-powered applications, from prototype to production.' Below this, there's a list of featured articles: 'Semantic search in business news - a notebook article' (dated November 6, 2024), 'Improving RAG with RAPTOR' (dated October 30, 2024), and 'Semantic Chunking' (dated October 23, 2024). Each article has a thumbnail image and a 'Read all articles' button at the bottom.

Vendor	About				Search	
	OSS	License	Dev Lang	VSS Launch	Filters	Hybrid Search
Activeloo...	✓	MPL 2.0	python c+	2023	✓	✓
Aerospike	✗	Proprietary	kotlin	2024	✗	✗
Anari AI	✗	Proprietary	-	2023	-	✗
Apache C...	✓	Apache-2.0	java	2023	✓	✓
Apache S...	✓	Apache-2.0	java	2022	✓	✓
ApertureDB	✓	Apache-2.0	c++	2021	✓	-
Azure AI S...	✗	Proprietary	c++	2023	✓	✓
Chroma	✓	Apache-2.0	rust python	2022	✓	✗











Create your own real time recs store - demo

Superlinked Store

Women Men Sports & Leisure Home Beauty Kids Christmas Outdoor

Search Results for "Teddy bear under 69.99 dollars"

► Superlinked parameters
Showing 100 most relevant products for your query

 <p>Petsy Teddy Bear, Blond Steiff \$64</p>	 <p>My Bearly Teddy Bear, Light Brown Steiff \$47</p>	 <p>Max Teddy Bear, Beige Steiff \$54</p>	 <p>Lotta Teddy Bear, Beige Steiff \$54</p>	 <p>My First Steiff Teddy Bear, Beige Steiff \$29</p>
				

Check it out:

<https://recsys-nlq-demo.superlinked.io/>

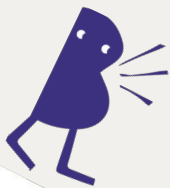
Learn how to build this yourself:

<https://links.superlinked.com/docs-tutorial>





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Thank You

Questions?