Chennai Meetup

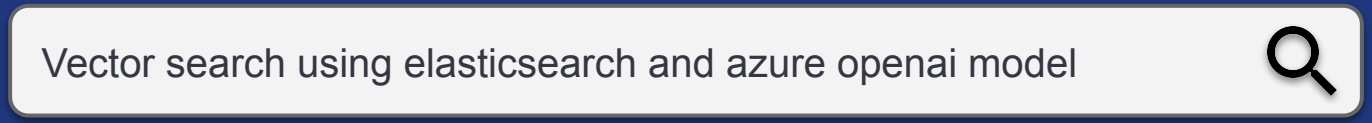
Someshwaran Mohankumar

@som2396, someshwaran.me

Elastic Support Engineer II

elastic

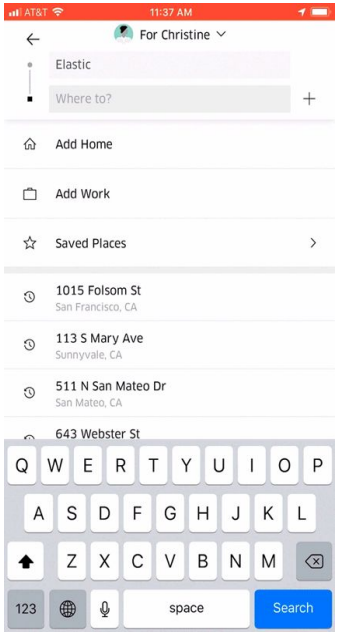
“Why” I’m here?

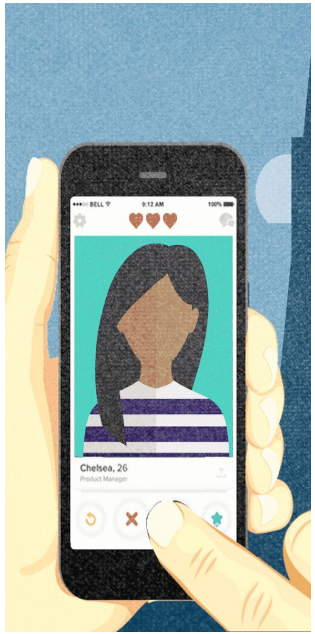


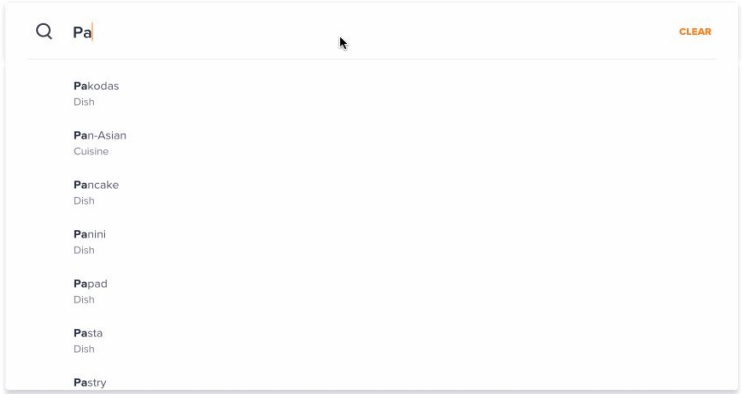
Let’s talk about, “What”?

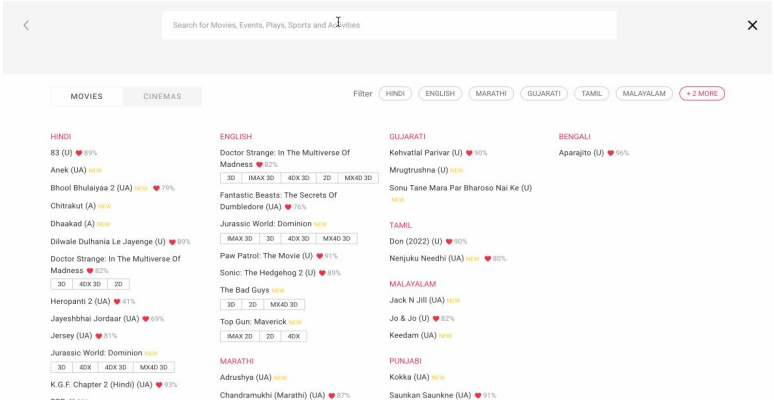
UBER

tinder


AT&T
11:37 AM
For Christine
Elastic
Where to?
Add Home
Add Work
Saved Places
1015 Folsom St
San Francisco, CA
113 S Mary Ave
Sunnyvale, CA
511 N San Mateo Dr
San Mateo, CA
643 Webster St
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
Search


Chelsea, 26
Product Manager


Pa
CLEAR
Pakodas
Dish
Pan-Asian
Cuisine
Pancake
Dish
Panini
Dish
Papad
Dish
Pasta
Dish
Pastry


Search for Movies, Events, Plays, Sports and Activities
MOVIES
CINEMAS
Filter
HINDI
ENGLISH
MARATHI
GUJARATI
TAMIL
MALAYALAM
+ 2 MORE
HINDI
83 (U)
Anek (UA)
Bhool Bhulaiyaa 2 (UA)
Chitrakut (A)
Dhaakad (A)
Dilwale Dulhania Le Jayenge (U)
Doctor Strange: In The Multiverse Of Madness
Heropanti 2 (UA)
Jayeshbhai Jordaar (UA)
Jersey (UA)
Jurassic World: Dominion
K.G.F: Chapter 2 (Hindi) (UA)
ENGLISH
Doctor Strange: In The Multiverse Of Madness
Fantastic Beasts: The Secrets Of Dumbledore (UA)
Jurassic World: Dominion
Paw Patrol: The Movie (U)
Sonic: The Hedgehog 2 (U)
The Bad Guys
Top Gun: Maverick
MARATHI
Adrushya (UA)
Chandramukhi (Marathi) (UA)
GUJARATI
Kehvatlal Parivar (U)
Mrugtrushna (U)
Sonu Tane Mara Par Bharoso Nai Ke (U)
TAMIL
Don (2022) (U)
Nenjuku Needhi (UA)
MALAYALAM
Jack N Jill (UA)
Jo & Jo (U)
Keedam (UA)
PUNJABI
Kokka (UA)
Saunkan Saunkne (UA)
BENGALI
Aparajito (U)

Lexical Search?

What is Lexical search?

1: Winter is coming.
2: Ours is the fury.
3: The choice is yours.

fury

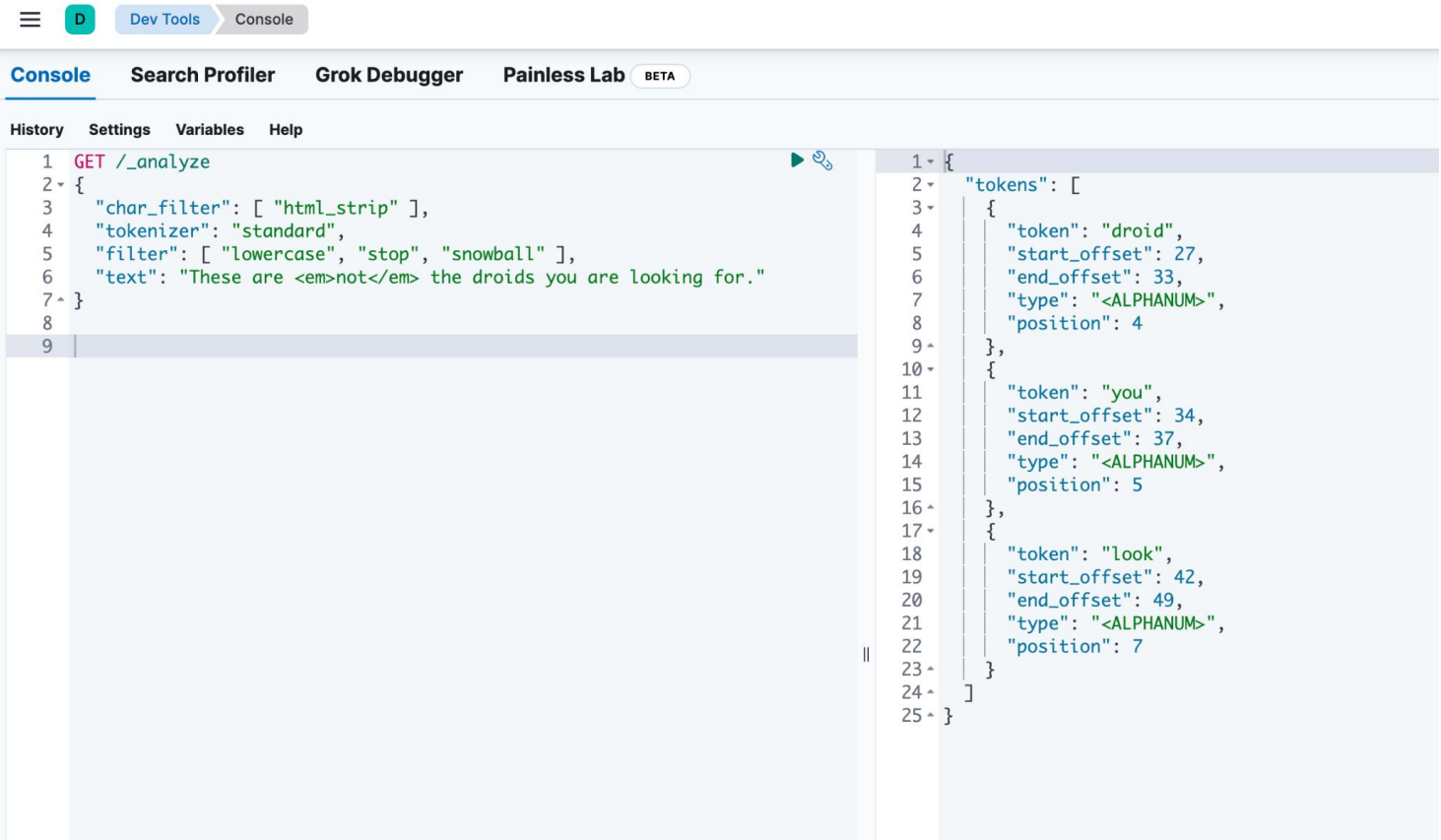
term	freq	documents
choice	1	3
coming	1	1
fury	1	2
is	3	1, 2, 3
ours	1	2
the	2	2, 3
winter	1	1
yours	1	3

Dictionary

Postings

Sample documents and resulting inverted index

How can we do Lexical search?



```
{ "tokens": [{
      "token": "droid",
      "start_offset": 27, "end_offset": 33,
      "type": "<ALPHANUM>",
      "position": 4
    },{
      "token": "you",
      "start_offset": 34, "end_offset": 37,
      "type": "<ALPHANUM>",
      "position": 5
    }, {
      "token": "look",
      "start_offset": 42, "end_offset": 49,
      "type": "<ALPHANUM>",
      "position": 7
    }
  ]
```


Remember this "Token" slide!

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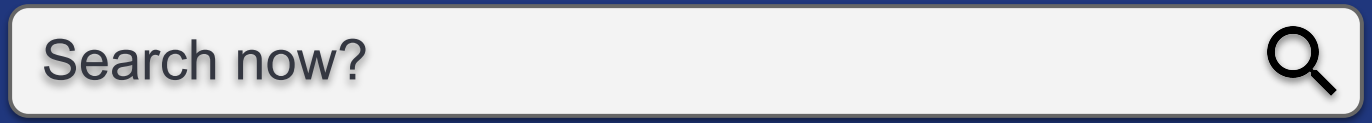
“Why” we’re talking about?



Elasticsearch:
You Know, for Search

Elasticsearch:
You Know, for Vector Search

What is Vector search?

Bag of Words

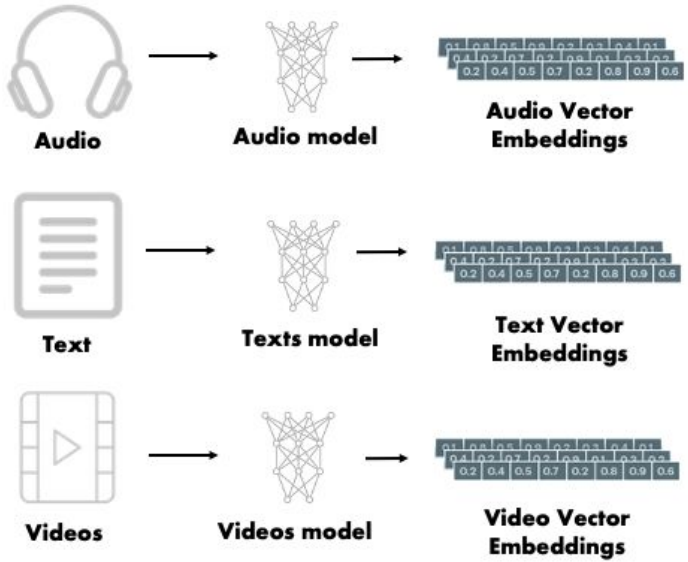
As a simplified illustration

These are not the droids you are looking for.
No. I am your father.

these: 1, are: 2, not: 1, the: 1, droid: 1, you: 1, look: 1, for: 1
no: 1, i: 1, am: 1, you: 1, father: 1

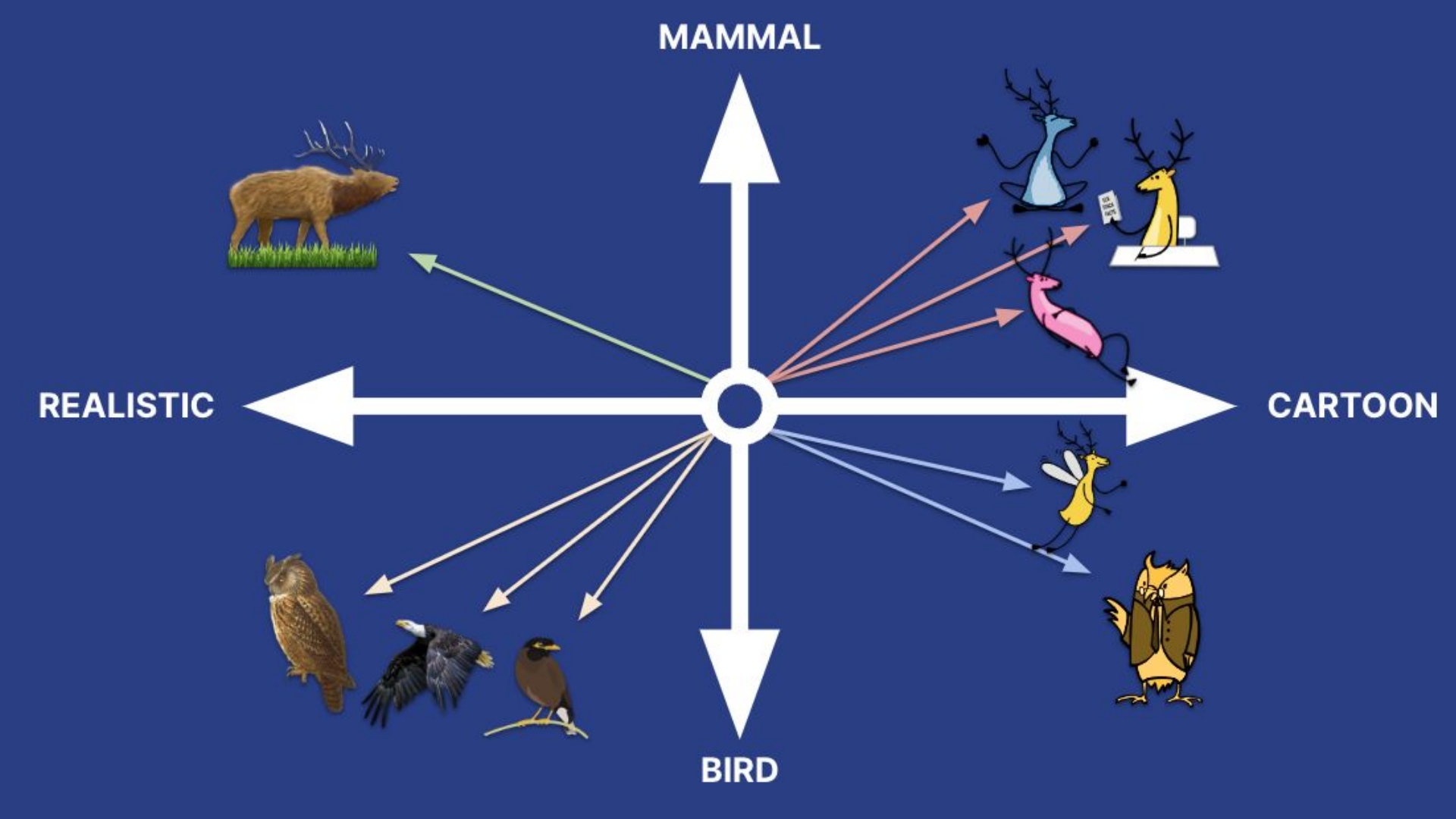
```
[these, are, not, the, droid, you, look, for, no, i, am, father]
[1,     2,   1,   1,   1,     1,   1,    1,   0,  0,  0,  0]
[0,     0,   0,   0,   0,     1,   0,    0,   1,  1,  1,  1]
```

elastic

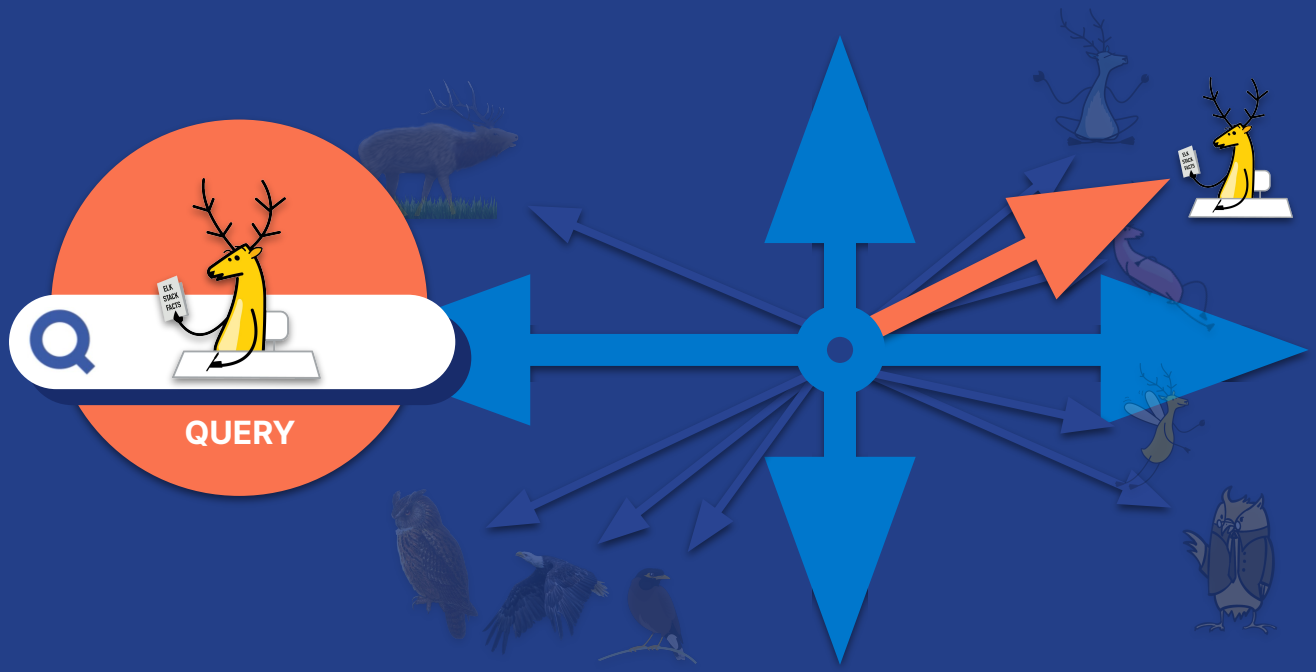


- "Change":
- Positive: "Change is the essence of progress."
- Negative: "I'm not comfortable with this sudden change."

- "Challenge":
- Positive: "Embrace the challenge and grow stronger."
- Negative: "Dealing with this challenge feels overwhelming."


MAMMAL
REALISTIC
CARTOON
BIRD

Vector search finds similar objects as those close to the query



Relevance	Result
Query	
1	
2	
3	
4	
5	

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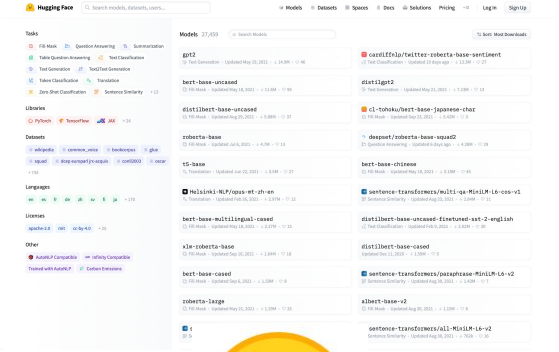
What is a Model?

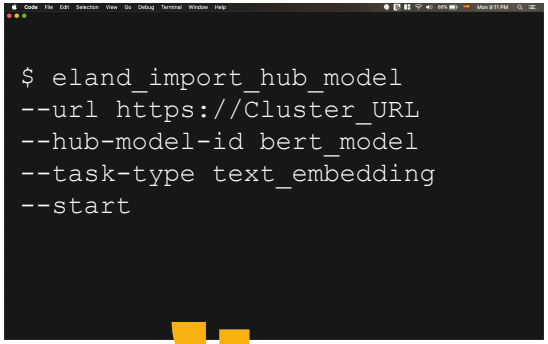
Hugging Face NLP Libraries

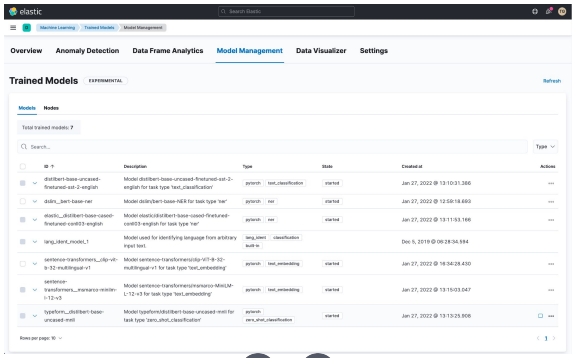
Hugging Face Model	`task-type`
Name-Entity recognition	`ner`
Text embedding	`text_embedding`
Text classification	`text_classification`
Zero shot classification	`zero_shot_classification`
Question & Answer	`question_answering`

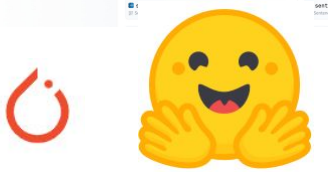
elastic

Eland Imports PyTorch Models









Huggingface.co

eland

Inference, not training

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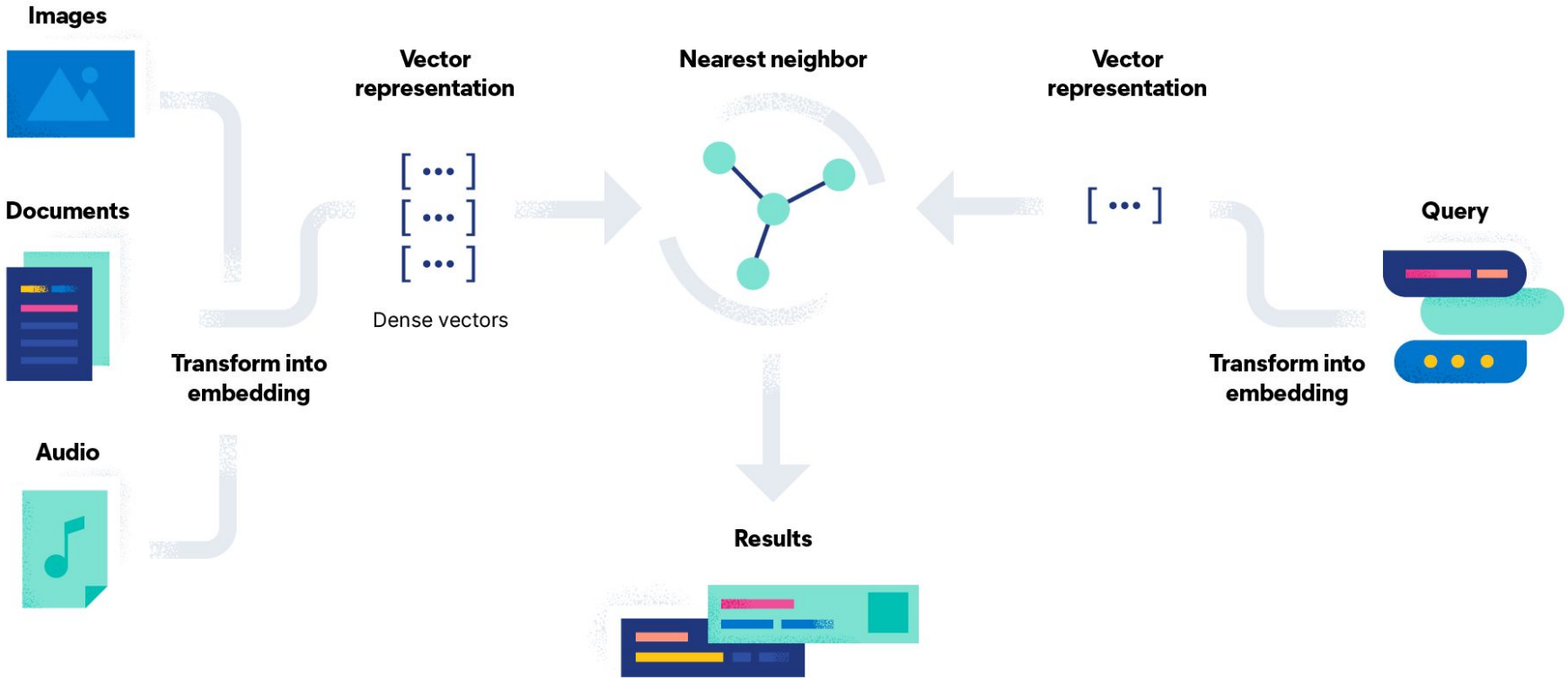
How Do You Search Vectors?

Vector Search



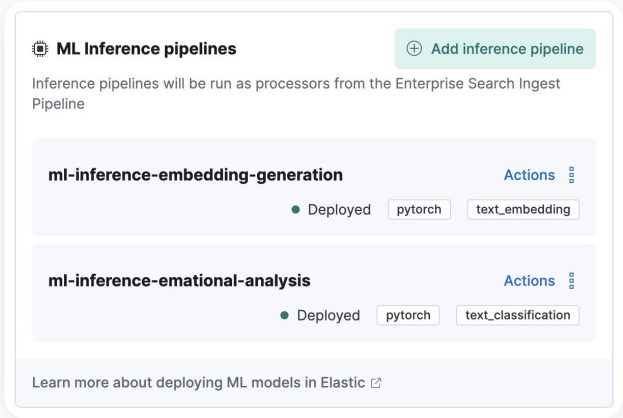
Data Ingestion and Embedding Generation

Source data

POST /_doc


```
{
  "_id":"product-1234",
  "product_name":"Summer Dress",
  "description":"Our best-selling…",
  "Price": 118,
  "color":"blue",
  "fabric":"cotton",
} "desc_embedding":[0.452,0.3242,…]
}
```


POST /_doc



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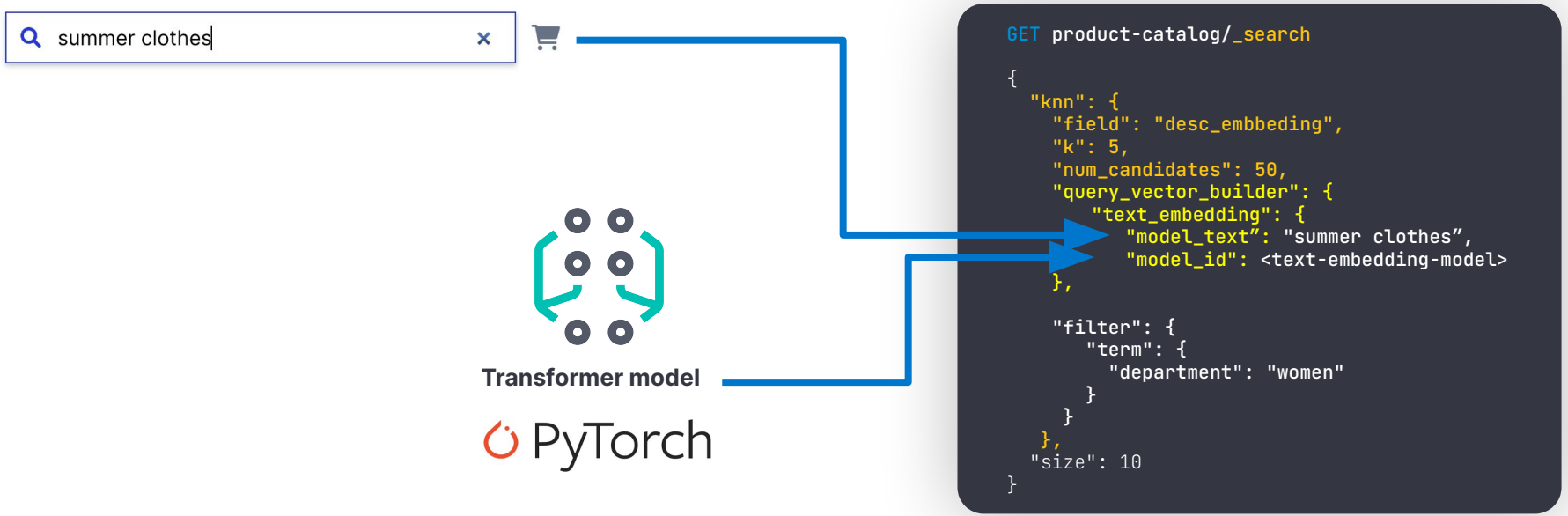
Vector Query



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But How Does It Really Work?

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Hierarchical Navigable Small Worlds (HNSW)

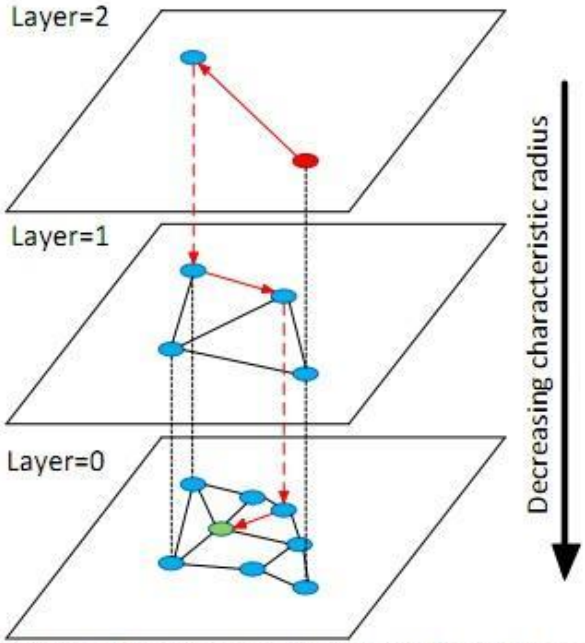

Fig. 1. Illustration of the Hierarchical NSW idea. The search starts from an element from the top layer (shown red). Red arrows show direction of the greedy algorithm from the entry point to the query (shown green).

https://zhuanlan.zhihu.com/p/98028479

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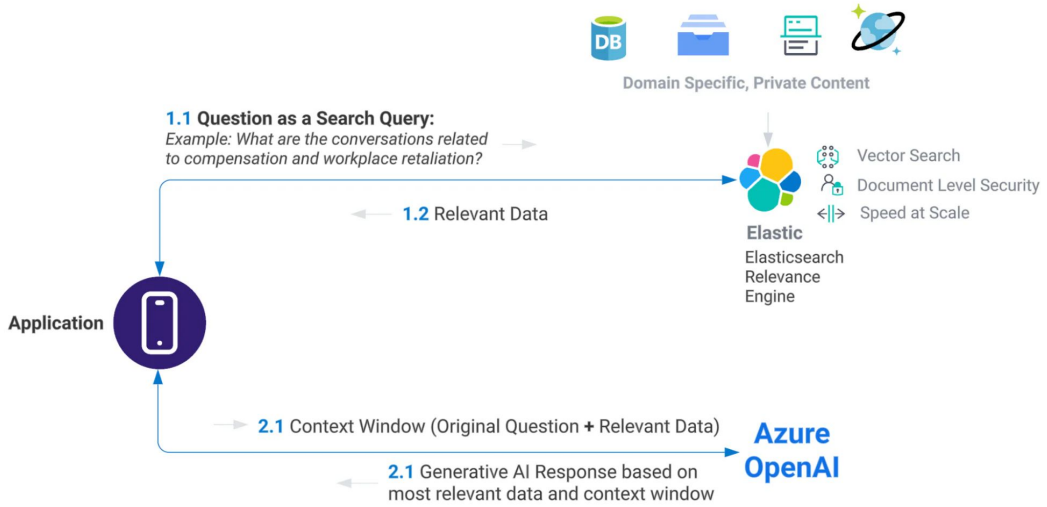
Demo Time!



Source: https://www.elastic.co/search-labs/blog/relativity-elasticsearch-azure-openai
Colab: https://colab.research.google.com/drive/190jXVIAY2ruFYEHXLfxqHxl7sRlp3XlY#scrollTo=VHReMu2357Ss

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The Elastic search platform is for everyone

TECHNOLOGY | FINANCE | TELCO | CONSUMER | HEALTHCARE | PUBLIC SECTOR | AUTOMOTIVE / TRANSPORTATION | RETAIL

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THANK YOU

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someshwaran.me