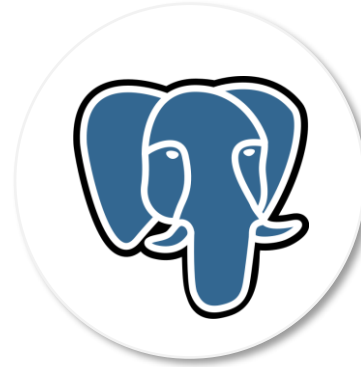# Set up

Pre-requisites

Python

PostgreSQL

Docker
for database building

2 ways of deploying Lettuce

Local

API

Local testing

Various options to allow users to specify which type of search to use

```
Start a Lettuce search pipeline

─ Arguments ─────────────────────────────────────────────────────────────────
  *    informal_names       INFORMAL_NAMES...   Source term to search for [default: None] [required]
─ Options ───────────────────────────────────────────────────────────────────
  --vector-search           --no-vector-search                      Whether to enable vector search in your pipeline
                                                                    [default: vector-search]
  --use-llm                 --no-use-llm                            Whether to enable the LLM step in your pipeline
                                                                    [default: use-llm]
  --vocabulary-id                               TEXT                Which vocabularies to return OMOP concepts from
                                                                    [default: None]
  --embed-vocab                                 TEXT                Which vocabularies to use for semantic search
                                                                    [default: None]
  --standard-concept        --no-standard-concept                   Whether to search through only standard concepts
                                                                    [default: standard-concept]
  --search-threshold                            INTEGER             What fuzzy matching threshold to limit responses to
                                                                    [default: 80]
  --verbose-llm             --no-verbose-llm                        Whether the LLM should report on its state while
                                                                    initializing
                                                                    [default: no-verbose-llm]

  --install-completion                                              Install completion for the current shell.
  --show-completion                                                 Show completion for the current shell, to copy it or
                                                                    customize the installation.
  --help                                                            Show this message and exit.
```

Results for OMOP matches of 'acetaminophen' source term:

```
lettuce]$ uv run lettuce-cli "acetaminophen" --no-vector-search --no-use-llm
INFO - Calculating best OMOP matches for ['acetaminophen'] - omop_match
INFO - Best OMOP matches for ['acetaminophen'] calculated - omop_match
INFO - OMOP Output: [{'search_term': 'acetaminophen', 'CONCEPT': [{'concept_name': 'acetaminophen', 'concept_id': 1125315, 'vocabulary_id': 'RxNorm', 'concept_code': '1
61', 'concept_name_similarity_score': 100.0, 'CONCEPT_SYNONYM': [], 'CONCEPT_ANCESTOR': [], 'CONCEPT_RELATIONSHIP': []}]}] - omop_match
[{'query': 'acetaminophen', 'OMOP fuzzy threshold': 80, 'OMOP matches': {'search_term': 'acetaminophen', 'CONCEPT': [{'concept_name': 'acetaminophen', 'concept_id': 112
5315, 'vocabulary_id': 'RxNorm', 'concept_code': '161', 'concept_name_similarity_score': 100.0, 'CONCEPT_SYNONYM': [], 'CONCEPT_ANCESTOR': [], 'CONCEPT_RELATIONSHIP': [
]}]}}]
```

API deployment

- Allows users to specify which type of search they want to perform (syntax differs from local client)

- Authorisation key needed (set in local environment variables)

Endpoints

The following endpoints will take HTTP `GET` requests:

- `/search/text-search/<source term>` : Runs full-text search for the source term
- `/search/vector-search/<source term>` : Runs semantic search for the source term
- `/search/ai-search/<source term>` : Runs retrieval-augmented generation search for the source term

Results

| GET ∨ | http:// | :8000/search/text-search/acetaminophen | Send ∨ |

Params   Authorization •   Headers (8)   Body   Pre-request Script   Tests   Settings   Cookies

Body   Cookies   Headers (7)   Test Results   🌐 200 OK   378 ms   975 B   Save Response ∨

Pretty   Raw   Preview   Visualize   JSON ∨

```json
1   {
2       "recommendations": [
3           {
4               "conceptName": "acetaminophen",
5               "conceptId": 1125315,
6               "conceptCode": "161",
7               "domain": "Drug",
8               "vocabulary": "RxNorm",
9               "conceptClass": "Ingredient",
10              "standard_concept": "S",
11              "invalid_reason": null,
12              "ranks": {
13                  "text_search": 1
14              },
15              "scores": {
16                  "text_search": 0.06079271
17              }
18          },
19          {
20              "conceptName": "Acetaminophen 0.0934 MG/MG / Ascorbic Acid 0.0333 MG/MG / Pheniramine 0.00333 MG/MG
                    Oral Granules [FERVEX RHUME PARACETAMOL/VITAMINE C] Box of 8",
21              "conceptId": 42715927,
22              "conceptCode": "OMOP2741590",
23              "domain": "Drug",
24              "vocabulary": "RxNorm Extension",
25              "conceptClass": "Branded Drug Box",
26              "standard_concept": "S",
27              "invalid_reason": null,
28              "ranks": {
29                  "text_search": 2
30              },
31              "scores": {
32                  "text_search": 0.06079271
33              }
34          }
35      ],
36      "metadata": {
37          "assistant": "Lettuce",
38          "version": "0.1.0",
39          "pipeline": "Full-text search",
40          "info": null
41      }
```
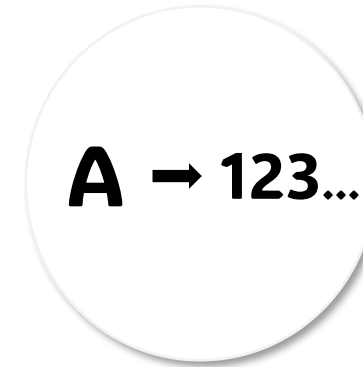
Default models

LLM search

llama-3.1-8b

Embedding

A → 123…

BGE small

Time taken: Comparison across search methods

	Local (mm:ss)	API (mm:ss)
Text search	00:08	00:03
Vector search	01:47	01:56
LLM search	00:32	04:29

Timings may vary depending on suitability of input, machine specifications, environmental factors, etc.

Comparison done based on search for term "acetaminophen", across all tests.

Key takeaways

Currently under development

Open-source

Potential to integrate with
other workflows
(via API deployment)

Further resources

Lettuce repository:

https://github.com/Health-Informatics-UoN/lettuce

Lettuce documentation:

https://health-informatics-uon.github.io/lettuce/quickstart

Building a database:

https://github.com/Health-Informatics-UoN/omop-lite

THANK YOU

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