How to Build a QA Application With Haystack in 30 Minutes

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Question Answering

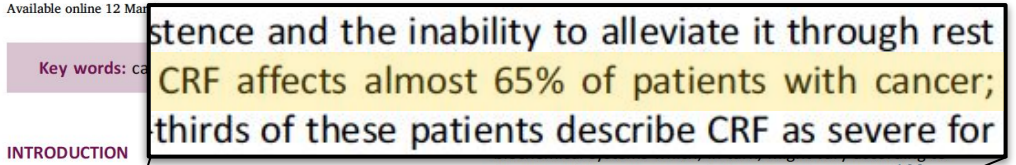
- Searching through large amounts of documents is slow

Question Answering

- Searching through large amounts of documents is slow
- Searching through one document is slow

Question Answering

- "How many people are affected by cancer-related fatigue?"
- Highlight the answer in the relevant document context
- Extractive QA, no hallucination
- Running on local machine



ESMO GOOD SCIENCE BETTER MEDICINE BEST PRACTICE

ANNALS OF ONCOLOGY driving innovation in oncology

SPECIAL ARTICLE

Cancer-related fatigue: ESMO Clinical Practice Guidelines for diagnosis and treatment†

A. Fabi[1], R. Bhargava[2], S. Fatigoni[3], M. Guglielmo[4], M. Horneber[5], F. Roila[3], J. Weis[6], K. Jordan[7] & C. I. Ripamonti[4], on behalf of the ESMO Guidelines Committee*

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Key words: ca

INTRODUCTION

Fatigue is the most common symptom experienced by patients during the cancer trajectory from diagnosis to the end of life and is defined as a distressing, persistent, subjective sense of physical, emotional and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent physical activity and that interferes with usual functioning.[1,2] Cancer-related fatigue (CRF) is different from other types of fatigue by its severity and persistence and the inability to alleviate it through rest or sleep. CRF affects almost 65% of patients with cancer; over two-thirds of these patients describe CRF as severe for at least 6 months and one-third reports this as persistent fatigue for a number of years after treatment.[3–5] Up to 40% of patients report fatigue at cancer diagnosis, 80%–90% during chemotherapy (ChT) and/or radiotherapy (RT), in particular 17%–21% during ChT alone and 33%–53% during association of ChT and RT.[2,3] Moreover, hormonal therapy, targeted therapy and also immunotherapy can be

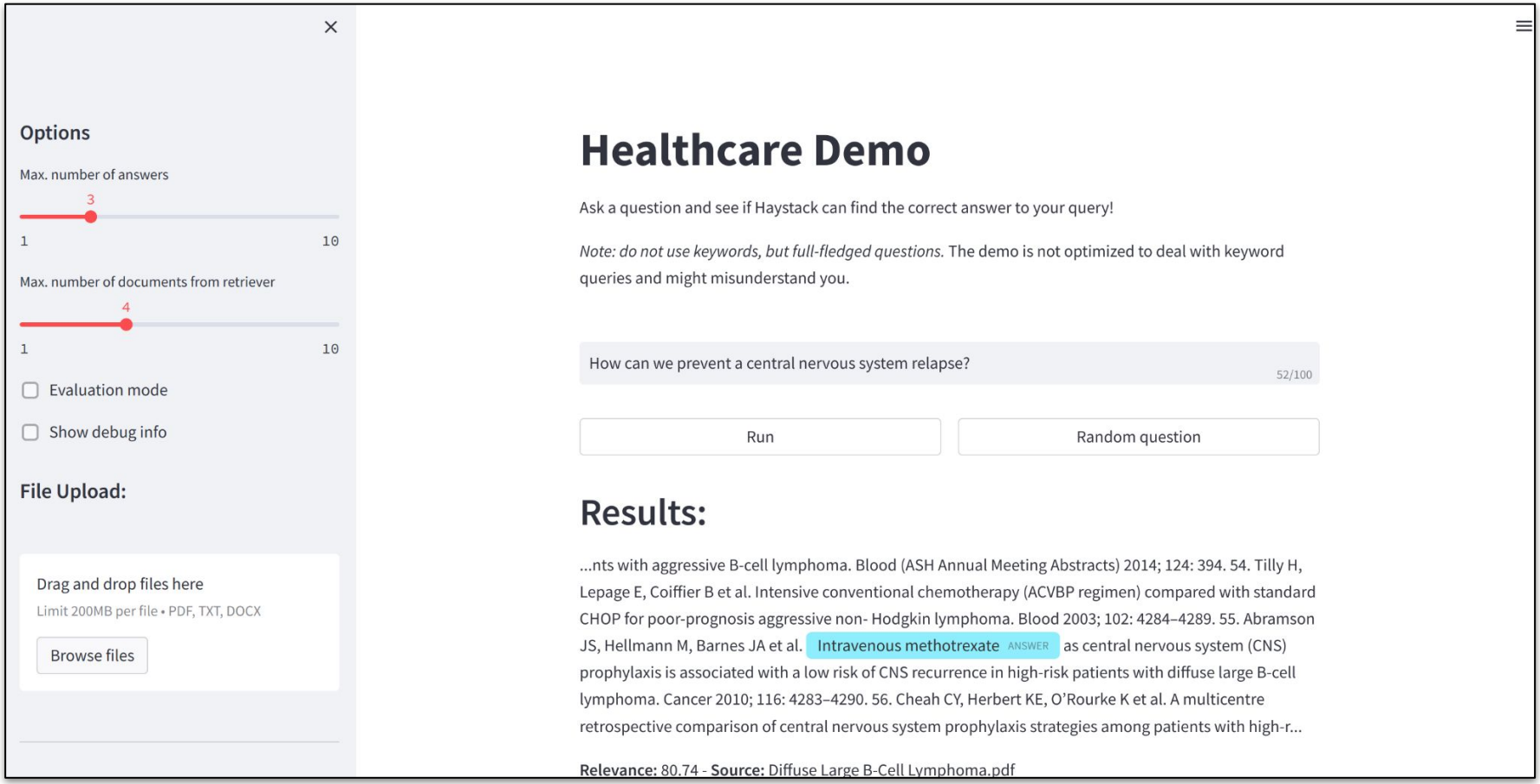
the type of tumour, stage of disease and treatment.[1,3,8]

CRF probably starts in the skeletal muscles due to a progressive reduction of physical activity (sometimes with physical interruption), but the brain is also critical as a central regulator of fatigue perception. Recently, tryptophan degradation and several cytokines and other pro-inflammatory mediators produced in response to cancer have been associated with fatigue; however, their direct role in pathogenesis of fatigue is controversial. Cytokines have been implicated in the pathophysiology of fatigue by possibly acting at multiple levels, including mood, muscle mass, strength and metabolic status. A recent review showed a positive correlation between fatigue and circulating levels of inflammatory markers; interleukin (IL)-6, IL-1 and neopterin values, in particular, were significantly associated with CRF.[1,3,8]

GENERAL PRINCIPLES OF CARE

Shared decision-making between the fatigued cancer pa-

Question Answering



Building a QA Application

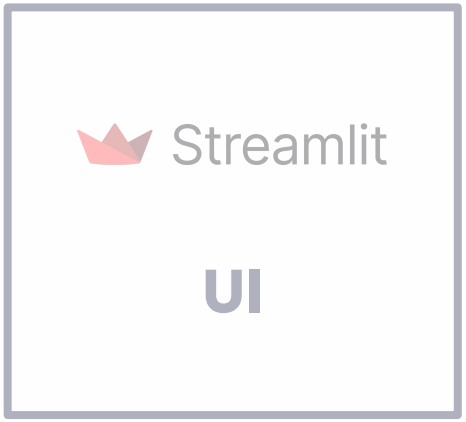
- Three docker images are all you need!

Building a QA Application

- Install Docker
  - https://docs.docker.com/get-docker/
- Clone GitHub repository
  - `git clone` https://github.com/deepset-ai/haystack-demos.git
- Build and start containers
  - `docker compose up`

Building a QA Application

Building a QA Application



haystack
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What is Haystack?

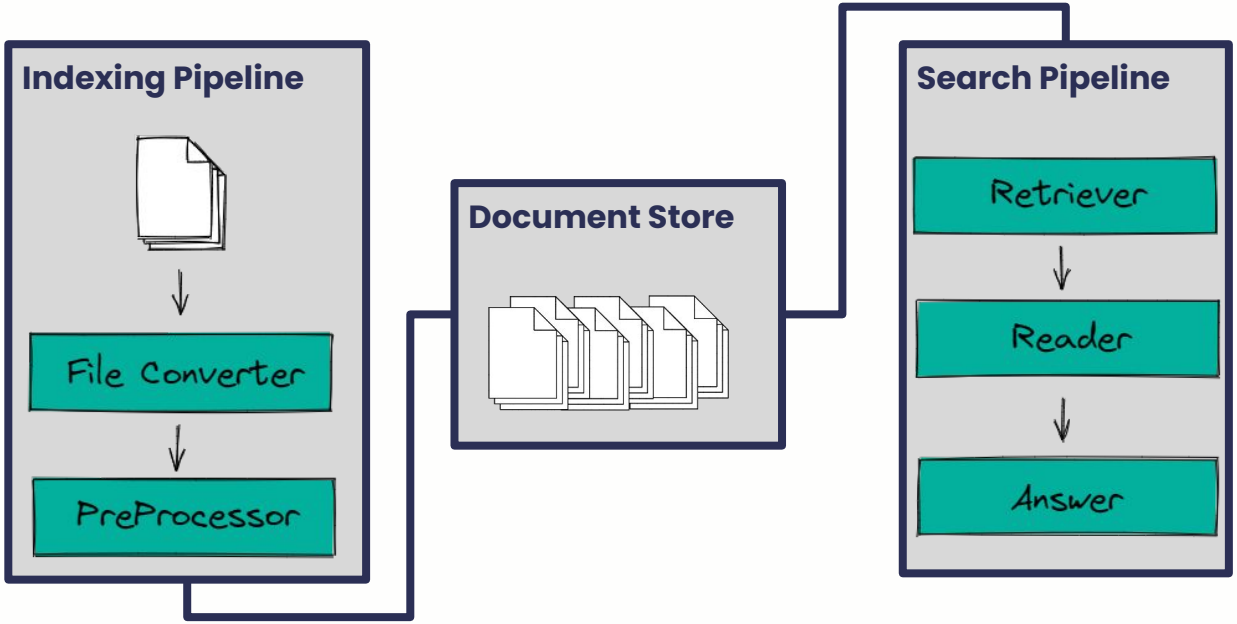
- Fully open source NLP framework
- The core NLP tasks covered
- Production focused

Integration with HF model hub

- Easy to download latest models

It's end-to-end, not just models

- Connector between components
- Efficient storage options



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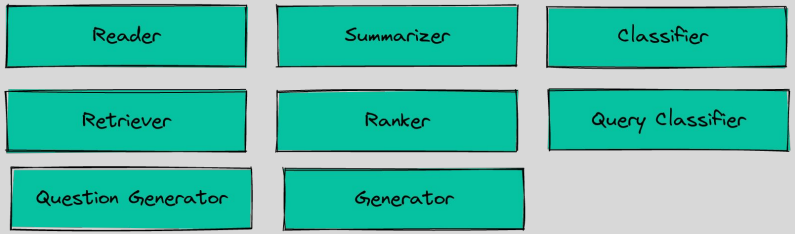
Features of Haystack

Core NLP Tasks covered



Data Connectors

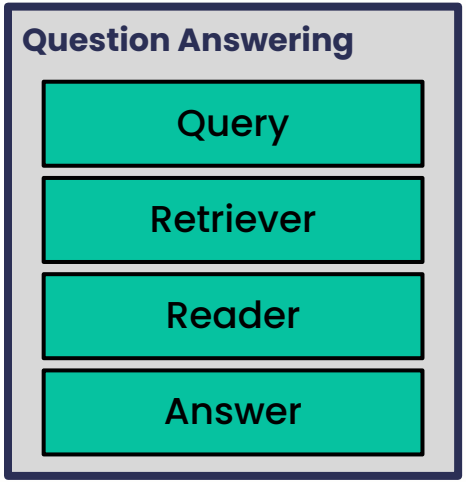
- File converters from txt, pdf, docx, markdown
- Web scraper to turn website into text
- Preprocessor to split long documents, clean text

Document Stores

- Elasticsearch, OpenSearch, SQL, FAISS, Milvus, Weaviate, Pinecone, Qdrant, ...

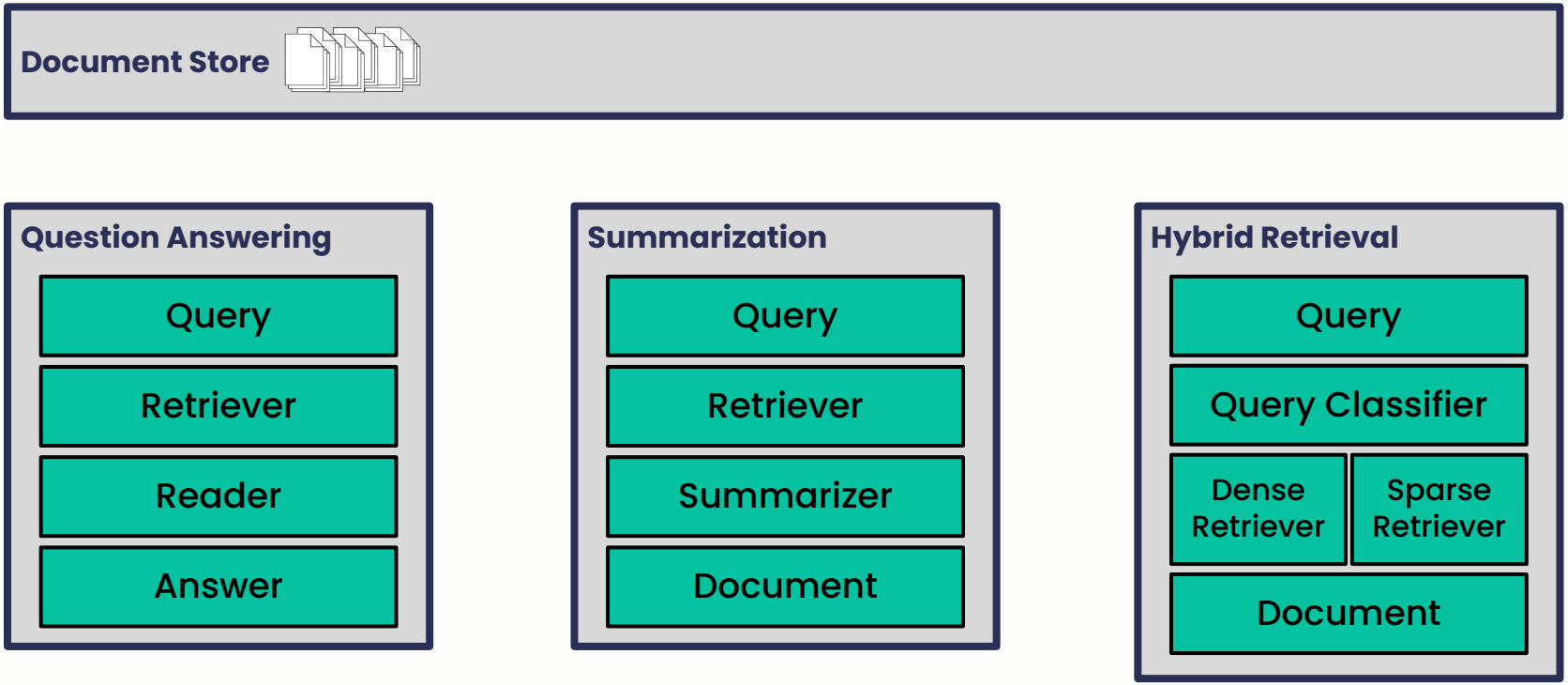
Haystack Pipelines

- Clinical practice guidelines about oncology as .pdf files



- Retrieve the most relevant documents
- Extract answers from documents

Haystack Pipelines



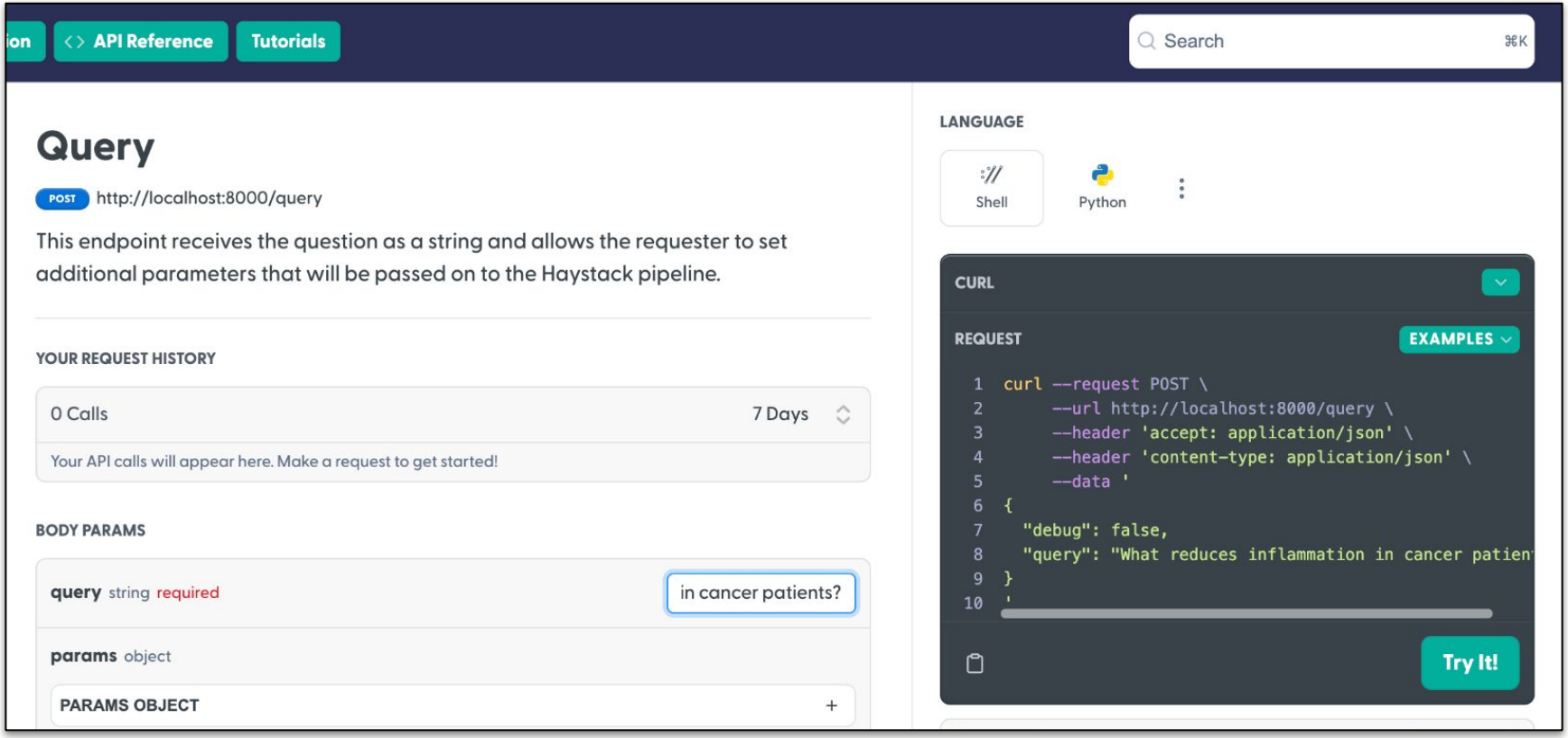
Haystack Pipelines

```yaml
components:
  - name: DocumentStore
    type: ElasticsearchDocumentStore
    params:
      host: localhost
  - name: Retriever
    type: EmbeddingRetriever
    params:
      document_store: DocumentStore
      embedding_model: sentence-transformers/multi-qa-mpnet-base-dot-v1
      top_k: 10
  - name: Reader
    type: FARMReader
    params:
      model_name_or_path: dmis-lab/biobert-large-cased-v1.1-squad
      context_window_size: 700
  - name: PDFConverter
    type: PDFToTextConverter
  - name: Preprocessor
    type: PreProcessor
    params:
      split_by: word
      split_length: 250
```

Haystack Pipelines

```yaml
pipelines:
  - name: query
    nodes:
      - name: Retriever
        inputs: [Query]
      - name: Reader
        inputs: [Retriever]
  - name: indexing
    nodes:
      - name: PDFConverter
        inputs: [File]
      - name: Preprocessor
        inputs: [PDFConverter]
      - name: Retriever
        inputs: [Preprocessor]
      - name: DocumentStore
        inputs: [Retriever]
```

Haystack API

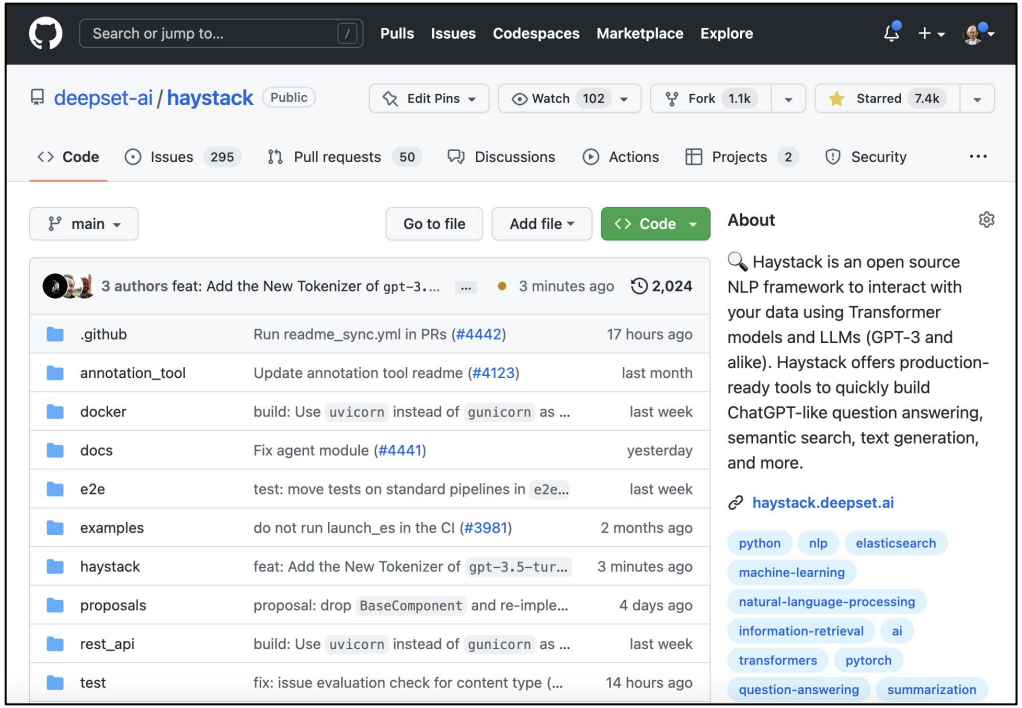


https://docs.haystack.deepset.ai/reference/query

What's Next?

- Try out different pipelines
- Collect user feedback
- Create evaluation data
- Tune pipeline parameters

- Fine-tune models
- Reduce model size
- Calibrate confidence scores
- Try QA on tabular data



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Thank you!

www.deepset.ai

https://github.com/deepset-ai

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