



How to Build a QA Application with Haystack in 30 Minutes



Julian Risch
Senior Machine Learning Engineer
deepset



Searching through large amounts of documents is slow

clinical practice guidelines

Annals of Oncology 27 (Supplement 5): v69-v82, 2016 doi:10.1000/senonc/mde/025 Published online 7 April 2018

Acute lymphoblastic leukaemia in adult patients: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up[†]



SPECIAL ARTICLE

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

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Management of infusion reactions to systemic anticancer therapy: ESMO Clinical Practice Guidelines[†]

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SPECIAL ARTICLE

Management of toxicities from immunotherapy: ESMO Clinical Practice Guideline for diagnosis, treatment and follow-up

ESMO :::::

CLINICAL PRACTICE GUIDELINES

J. Haanen¹, M. Obeld^{2,3,4}, L. Spain^{5,6,2}, F. Carbonnel^{5,0}, Y. Wang¹⁰, C. Robert^{13,12}, A. R. Lyon^{13,14}, W. Wick^{15,16}, M. Kostine²⁷, S. Peters², K. Jordan^{18,19} & J. Larkin¹⁹, on behalf of the ESMO Guidelines Committee

Key words: ESMO Clinical Practice Guideline, immunotherapy, side-effects, treatment, toxicity

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Available online 18 October 2022

MANAGEMENT

Adverse events (AFs) related to the use of immune check point inhibitor (ICI) therapy are defined as immune-related (IR) AEs (irAEs), irAEs are graded according to the Common Terminology Criteria for Adverse Events (CTCAE) version 5.0 (Supplementary Table S1, available at https://doi.org/10. 1016/j annone 2022 10 001) 1 The aim of this European Society for Medical Oncology (ESMO) Clinical Practice Guideline (CPG) is to provide specific guidance on irAE management. Recommendations provided are based on

GENERAL ASPECTS OF IMMUNE-RELATED ADVERSE EVENT versus inpatients and that of corticosteroid (CS)-refractor patients and patients with specific conditions can be found in Section 1 of the Supplementary Material, available at

General guidance for immunosuppression

irAE management generally consists of four sequential steps: (i) diagnosis and grading of irAEs, (ii) ruling out differential diagnoses and pre-immunosuppression work-up. (iii) selecting the appropriate immunosuppression strategy for grade ≥2 events and (iv) active evaluation at 72 h to adapt treatment. See Supplementary Table S2 and Section 1

he ESMO Guidelines

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- "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





SPECIAL ARTICLE

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

A. Fabi¹, R. Bhargava², S. Fatigoni³, M. Guglielmo⁴, M. Horneber⁵, F. Roila³, J. Weis⁶, K. Jordan⁷ & C. I. Ripamonti⁴, on behalf of the ESMO Guidelines Committee

¹Division of Medical Oncology, IRCCS Regina Elena National Cancer Institute, Rome, Italy, ²William Osler Health System, Corporate Department of Research, Department of Oncology and Division of Palliative Care, Brampton, Canada; ³Division of Medical Oncology, Ospedale Santa Maria della Misericordia, Perugia; ⁴Oncology-Supportive Care Unit, Department Onco-Haematology, Fondacione IRCCS Istituto Nazionale Tumori, Milan, Italy, ⁵Department of Internal Medicine, Division of Oncology and Hematology & Division of Pneumology, Paracelsus Medical University, Klinikum, Nuremberg; ⁶Department of Self Help Research in Oncology, Comprehensive Cancer Center, University Medical Center, Freiburg; ⁷Department of Medicine V, Hematology, Oncology and Rheumatology, University Hospital Heidelberg, Germany

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Key words: ca

stence and the inability to alleviate it through rest CRF affects almost 65% of patients with cancer; thirds of these patients describe CRF as severe for

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 11 C C .: CDF 1 . 1 . .

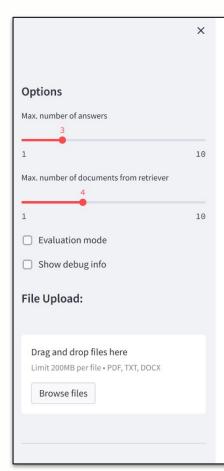
the type of tumour, stage of disease and treatment. 1,3,8

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-





Healthcare Demo

Ask a question and see if Haystack can find the correct answer to your query!

Note: do not use keywords, but full-fledged questions. The demo is not optimized to deal with keyword queries and might misunderstand you.

Run	Random question
now can we prevent a central nervous system retap:	52/10

Results:

...nts with aggressive B-cell lymphoma. Blood (ASH Annual Meeting Abstracts) 2014; 124: 394. 54. Tilly H, Lepage E, Coiffier B et al. Intensive conventional chemotherapy (ACVBP regimen) compared with standard CHOP for poor-prognosis aggressive non- Hodgkin lymphoma. Blood 2003; 102: 4284–4289. 55. Abramson JS, Hellmann M, Barnes JA et al. Intravenous methotrexate ANSWER as central nervous system (CNS) prophylaxis is associated with a low risk of CNS recurrence in high-risk patients with diffuse large B-cell lymphoma. Cancer 2010; 116: 4283–4290. 56. Cheah CY, Herbert KE, O'Rourke K et al. A multicentre retrospective comparison of central nervous system prophylaxis strategies among patients with high-r...

Relevance: 80.74 - Source: Diffuse Large B-Cell Lymphoma.pdf



• Three docker images are all you need!







4

- Install Docker
 - https://docs.docker.com/get-docker/



- Clone GitHub repository
 - o git clone https://github.com/deepset-ai/haystack-demos.git
- Build and start containers
 - o docker-compose up



















What is <u>Haystack</u>?

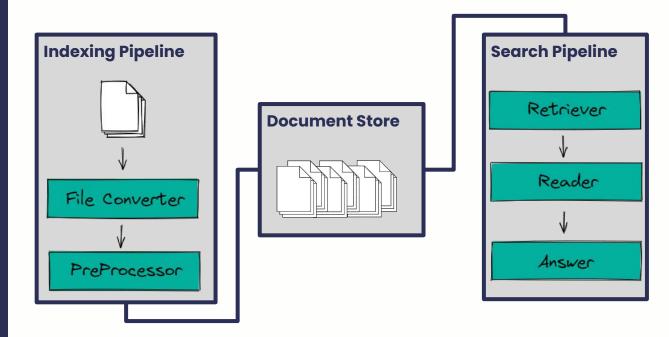
- Fully open source NLP framework
- The core NLP tasks covered
- Production focused

Integration with HF model hub

Easy to download latest models

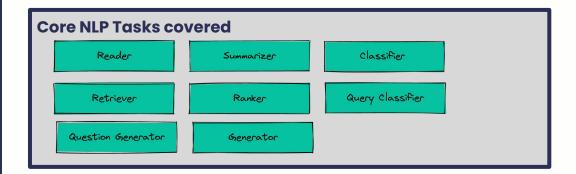
It's end-to-end, not just models

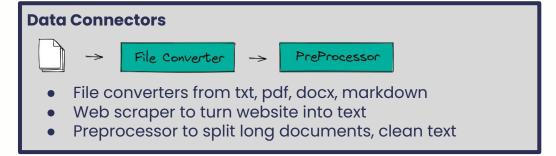
- Connector between components
- Efficient storage options

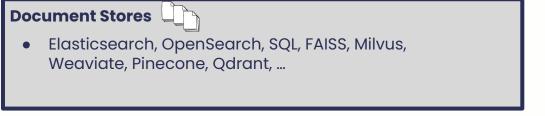




Features of Haystack



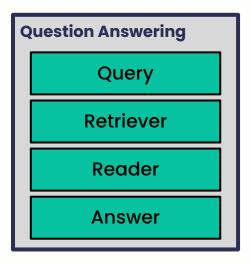






Document Store

• Clinical practice guidelines about oncology as .pdf files



- Retrieve the most relevant documents
- Extract answers from documents



Document Store



Question Answering

Query

Retriever

Reader

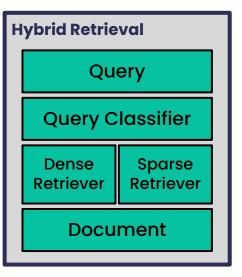
Answer

Query

Retriever

Summarizer

Document





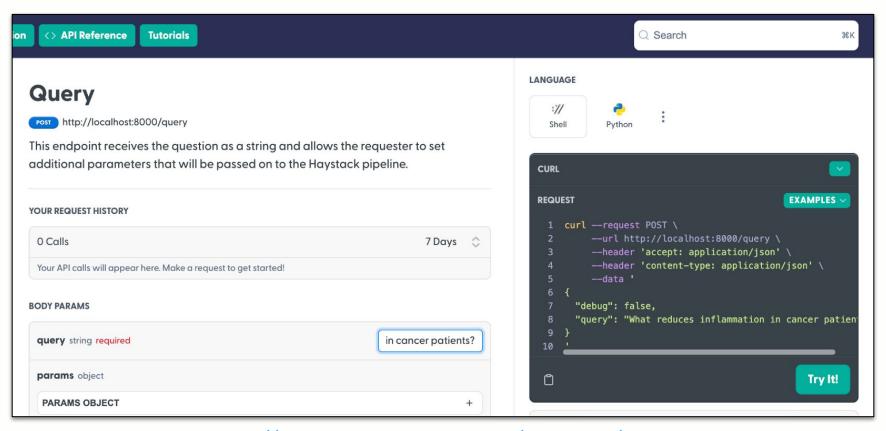
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. . .
components:
  - name: DocumentStore
    type: ElasticsearchDocumentStore
    params:
      host: localhost
  - name: Retriever
    type: EmbeddingRetriever
    params:
      document_store: DocumentStore
      embedding_model: sentence-transformers/multi-qa-mpnet-base-dot-v1
      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
      colit longth. 250
```

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4
```

```
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

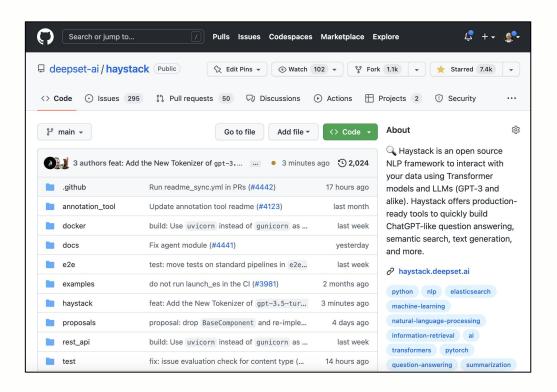




What's Next?

4

- 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





Thank you!



www.deepset.ai

https://github.com/deepset-ai

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