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newspapers

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Large-scale refinement of digital historical newspapers with named entity recognition

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IFLA Newspaper Pre-Conference

14 August 2014, Geneva

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Overview

- Background
- NER Introduction
- Approach
- Challenges
- Scalability
- First results
- Outlook

This project is partially funded under the ICT Policy Support Programme (ICT PSP) as part of the Competitiveness and Innovation Framework Programme by the European Community
http://ec.europa.eu/ict_psp

Background

- Europeana Newspapers
  EU Best Practice Network

- **10** million newspaper pages with full-text from 12 libraries

- **36** million newspaper pages with metadata for Europeana

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Named entity recognition (I)

1. Detect names of persons, places, organisations

In 1917, Einstein applied the general theory of relativity to model the large-scale structure of the universe. He was visiting the United States when Adolf Hitler came to power in 1933 and did not go back to Germany, where he had been a professor at the Berlin Academy of Sciences. He settled in the U.S., becoming an American citizen in 1940. On the eve of World War II, he endorsed a letter to President Franklin D. Roosevelt alerting him to the potential development of "extremely powerful bombs of a new type" and recommending that the U.S. begin similar research. This eventually led to what would become the Manhattan Project. Einstein supported defending the Allied forces, but largely denounced using the new discovery of nuclear fission as a weapon. Later, with the British philosopher Bertrand Russell, Einstein signed the Russell–Einstein Manifesto, which highlighted the danger of nuclear weapons. Einstein was affiliated with the Institute for Advanced Study in Princeton, New Jersey, until his death in 1955.

Tag colours:
LOCATION TIME PERSON ORGANIZATION MONEY PERCENT DATE

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Named entity recognition (II)

2. Disambiguate entities

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Named entity recognition (III)

3. Link to online resources

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Approach (I)

- Tackle content in
  Dutch, German, French
  (about 50% of the 10m pages)

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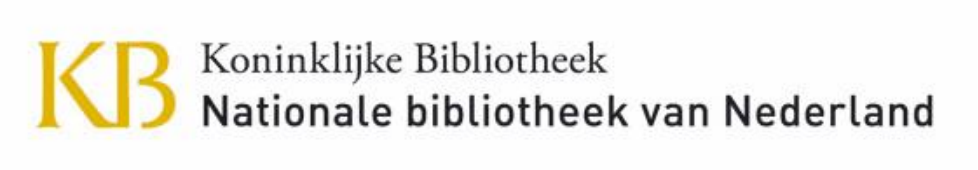
Approach (II)



- Use a machine learning tool (open source) developed by Stanford University, adapted for Europeana Newspapers by KBNL

https://github.com/KBNLresearch/europeananp-ner

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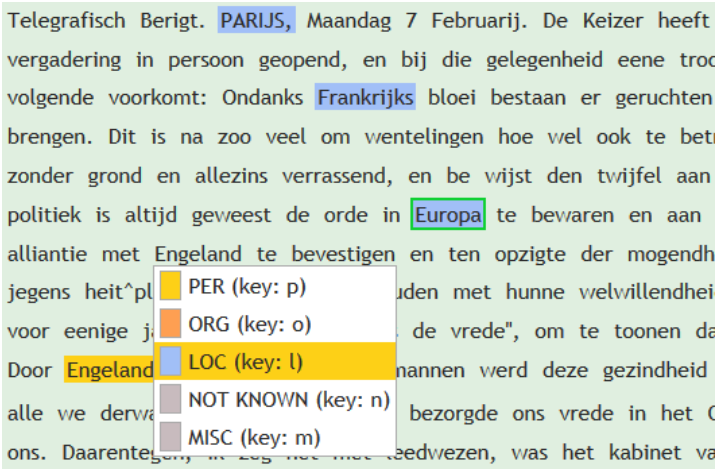
Approach (III)

- Create (and release) training material by manually annotating named entities on OCR‘d newspaper pages



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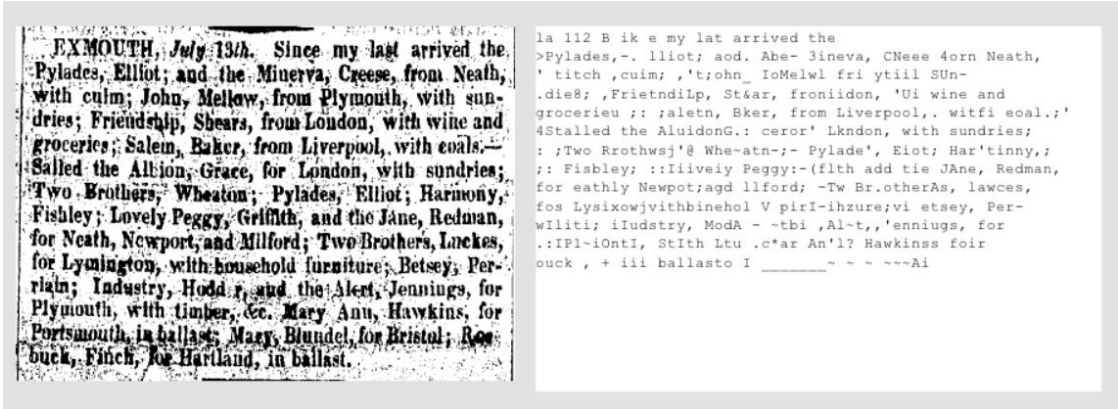
Challenges

- OCR quality
- Multiple (mixed) languages
- Historical spelling



EXMOUTH, *July 13th.* Since my last arrived the Pylades, Elliot; and the Minerva, Creese, from Neath, with culm; John, Mellow, from Plymouth, with sundries; Friendship, Shears, from London, with wine and groceries; Salem, Baker, from Liverpool, with coals.—Sailed the Albion, Grace, for London, with sundries; Two Brothers, Wheaton; Pylades, Elliot; Harmony, Fishley; Lovely Peggy, Griffith, and the Jane, Redman, for Neath, Newport, and Milford; Two Brothers, Luckes, for Lymington, with household furniture; Betsey, Perrian; Industry, Hodder, and the Alert, Jennings, for Plymouth, with timber, &c. Mary Ann, Hawkins, for Portsmouth, in ballast; Mary, Blundel, for Bristol; Roebuck, Finch, for Hartland, in ballast.

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Scalability

- Stanford NER software is multi-threaded e.g. 4 CPU cores – 4x throughput

- Optimise the NER classifier by filtering noise and sentences without NE‘s marked

- Robust proven Java technology

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First results (Dutch)

	Persons	Locations	Organizations
Precision	0.940	0.950	0.942
Recall	0.588	0.760	0.559
F-measure	0.689	0.838	0.671

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First results (French)

	Persons	Locations
Precision	0.529	0.548
Recall	0.834	0.216
F-measure	0.622	0.310

* Score for organisations omitted since not enough present in the source material

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Outlook

- Q3: Release of training data for Named Entity Recognition in Dutch, German, French
- Q3: First results for German (Austrian, Italian/South Tirol), final results for Dutch, French
- Q4: Release of software (open source) for disambiguating and linking of NER results to DBPedia

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www.theeuropeanlibrary.org/tel4/newspapers

https://github.com/KBNLresearch/europeananp-ner

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Thank you for your attention!

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