Mapping spatial named entities from noisy OCR output: Epiméthée from OCR to map.

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DH2023, Collaboration as opportunity

July 2023

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Can NER perform well on noisy OCR transcripts ?

Question How to assess the quality of NER results on noisy OCR corpora ? [Koudoro-Parfait et al., 2021]

- Data : Eltec reference texts and OCR versions
- Manual evaluation : all misspellings are not of equal importance
- Intersections reference/OCR ➜ **contaminated NE issues**

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A search for appropriate solutions to make NER results on noisy data usable :

Correcting OCR transcriptions to improve NER quality ✗

Linking contaminated entities to knowledge bases entities ✗

Charting entities get an overview ✓ [Koudoro-Parfait and Lejeune, 2024]

Combining the results of **several NER models** ✓

Disambiguating using similarity metrics and clusters ✓ [Koudoro-Parfait et al., 2022], [Koudoro-Parfait, 2022]

Charting NE from low quality OCR (CER : 0.14)

(a) NER on reference version

(b) manual filtering on reference

(c) NER on Kraken version

(d) manual filtering on Kraken

Figure – *"La petite Jeanne"*, Carraud, 1853. Dark green / red : 3 NER tool, Middle green /orange : 2 NER tools, green-grey / yellow : 1 NER tool.

Charting NE from high quality OCR (CER : 0.05)

(a) NER on reference version

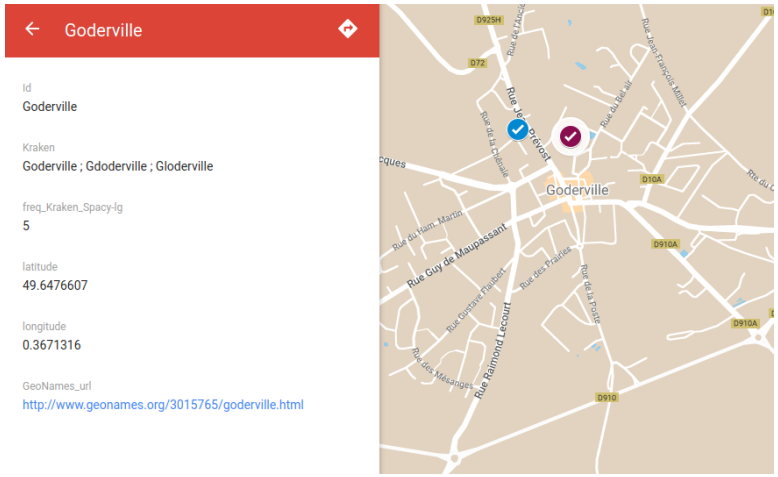
(b) manual filtering on reference

(c) NER on Kraken version

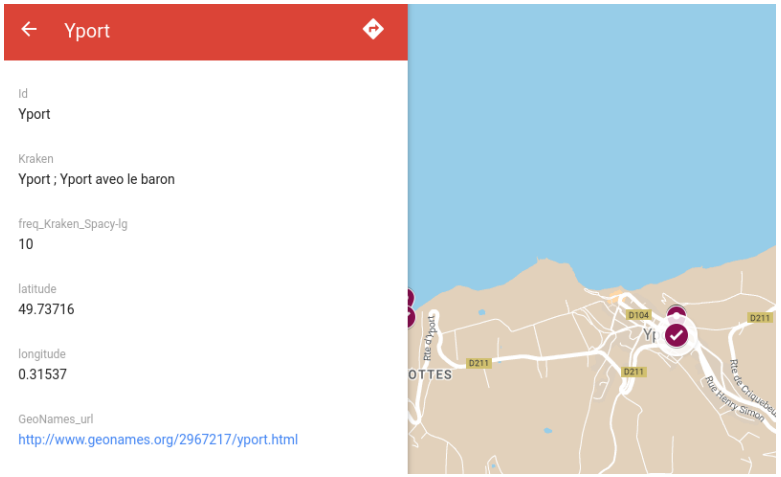
(d) manual filtering on Kraken

Figure – *"Le petit chose"*, Daudet,1868. Dark green / red : 3 NER tool, Middle green /orange : 2 NER tools, green-grey / yellow : 1 NER tool.

Aligning contaminated forms of named entities (NE)



(a) Contaminated forms of `Goderville`



(b) Contaminated forms of `Yport`

- Average text quality (CER : 0.12)
- Most forms of Frequent NE are extracted (Jaccard : 0.8, Cosine : 0.45)

"Une vie", Maupassant, 1883.

Clustering to help manual filtering

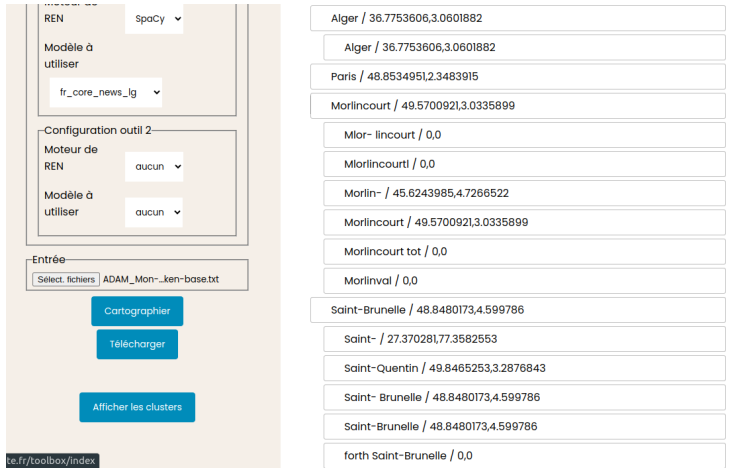
Version	Centroid	Cluster members
Réf.[1]	Montparnasse	Montparnasse, boulevard Montparnasse, théâtre Montparnasse, Montmartre, rue Bonaparte, Mont-, Saumon, Gymnase
Kraken	Montparnasse	Montparnasse, boulevard Montparnasse, theatre Montparnasse, Gymnase, Debarrassez, WWt3, rs5, ytP
Tess fr	Montparnasse	Montparnasse, boulevard Montparnasse, théâtre Montparnasse, Montmartre, rue Bonaparte, Mont-, Saumon, Gymnase
Kraken[1]	quartier Latin	Quartier Latin, quartier Latin, Quartier, ILatinl, Latin, Cachotier, Moustier, Orties, PARTIE=.
Tess fr	quartier Latin	Quartier Latin, quartier Latin, Quartier, Latin, Latin !., Moustier, Orties,
Kraken[2]	Goderville	Gdoderville, Gloderville, Goderville, Barville, Fourville, OD0

Table – Groups where centroid is a TP

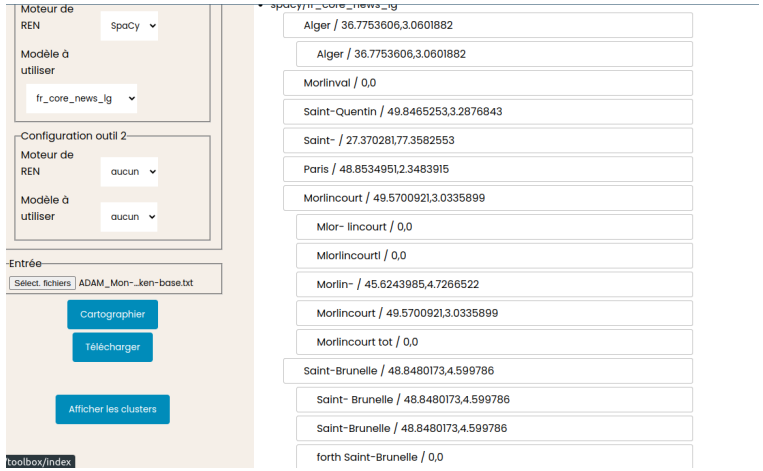
- These are the best results.
- Some results have as centroid a FP or an ambiguous entity.

[1] `spaCy_lg`, *"Le petit chose"*, Daudet, 1868. [2] *`spaCy_lg`*, *"Une vie"*, G. de Maupassant, 1883

Using maps to improve clusters and filter out FP



(a) Before user's action



(b) After user's action

Contributions

- Épiméthée an end-to-end workflow
  - OCR → NER → Map
  - Clustering
  - Interactive filtering assistance tools
  - Reusable outputs

    → Humans can deal with noise, but what if there is silence ?
- Clustering : helps decision making for **linking contaminated NE**
  - Manual evaluation
  - Observation of **borderline cases** : Centroid is FP or Ambiguous
  - Automated cluster improvement : **filtering out outliers**

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Perspectives :

➥ Improving automated geolocalization.

➥ Evaluation of tools in other languages

→ Difficulties in providing access to tools for Low-resource language

#additional# Clustering to help manual filtering

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(a) Groups where centroid is a TP

Version	Centroid	Cluster members
Réf.[1]	PION	Lyon, Odéon, Rio, PION
Kraken	Fougeroux	Luxembourg, Perou, Broum, Fougeroux, MY, Vaudoux, les Fougeroux
Tess fr	Viens	Vienne, Viens, Agen, ENLÈVEMENT, Fe, Providence, Tiens

(b) Groups where centroid is a FP

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[1] spaCy lg *"Le petit chose"* Daudet 1868 [2] *spaCy lg "Une vie"* G. de Maupassant 1883

References I

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