CREMMALab Project: Handwritten Text Recognition for medieval manuscripts

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CREMMALAB Project

Handwritten Text Recognition (HTR) for medieval manuscripts

Within the infrastructure of the CREMMA project (Consortium for Handwriting Recognition of Ancient Materials) supported by the DIM (research funded by the Île-de-France Region) MAP (Ancient and Heritage Materials), the CREMMALab project (2021-2022) combines research questions, creation and release of data from French medieval literary manuscripts for HTR.

Project Manager:
Ariane PINCHE (postdoctoral researcher)

EVENTS

Conference *Ancient documents and automatic recognition of handwriting*, 23-24 June 2022

WEBSITES

https://cremmalab.hypotheses.org

https://github.com/HTR-United/cremma-medieval

CREMMA MEDIEVAL DATASET

Medieval manuscripts corpus for training HTR models from the 12th to the 15th century, included in HTR-United catalog: https://htr-united.github.io

Dataset has been built with eScriptorium, an interface for HTR ground truth production, and Kraken, an HTR and layout segmentation engine. It is composed of forteen Old French manuscripts written between the 13th and 15th centuries.

Transcriptions have been standardized to strengthen HTR models. We chose a graphemic transcription method. Transcription guidelines avalaible here: https://hal.archives-ouvertes.fr/hal-03697382

MANUSCRIPT	DATE	TRANSCRIBED LINES
BnF, ms fr. 412	13th	6324
BnF, Arsenal 3516	13th	1991
Cologny, bodmer, 168	13th	1976
BnF, ms fr. 24428	13th	1328
BnF, ms fr. 25516	13th	717
BnF, ms fr. 844	13th	224
BnF, ms fr. 17229	13th	164
BnF, ms fr. 13496	13th	161
BnF, Arsenal 3516	13th	105
BnF, ms fr. 22549	14th	2682
Vaticane, Reg. Lat., 1616	14th	1772
Univ. of Pennsylvania, 660	14th	368
BnF, ms fr. 411	14th	179
Univ. of Pennsylvania, 909	15th	2513
All		21656

To ensure data quality, continuous integration workflow has been put in place:
- HTRVX: XML schema validator checking Alto files and segmentation vocabulary (segmOnto);
- Choco-Mufin: checking the homogeneity of the characters used in the dataset.

Abstract: https://hal.archives-ouvertes.fr/hal-03719504

HTR MODELS FOR MEDIEVAL MANUSCRIPTS TRAINED WITH KRAKEN

https://kraken.re

Test scores in-domain

1.0.1 Bicerin, accuracy 89.19%, model based on CREMMA Medieval first dataset, specialized on 13th and 14th c. manuscripts.

1.1.0 Bicerin, accuracy 95.30%, model based on CREMMA Medieval extended to 15th c. manuscripts.

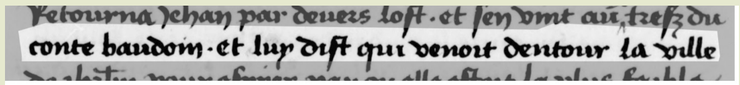
2.0.0 Cortado, accuracy 95.54%, model mixing CREMMA Medieval dataset with early prints (15th c.) from Gallic(orpor)a Project.

Models avalaible here: https://github.com/HTR-United/cremma-medieval/releases

Test scores out-of-domain

	BnF, ms, fr. 17229, 13th c.	BnF, ms, fr. 185, 14th c.	BnF, NAF 6213, 15th c.	ALL
Cortado	92.71%	92.07%	87.48%	90.95%
1.1.0 Bicerin	91.64%	91.34%	83.40%	89.23%
1.0.1 Bicerin	90.66%	88.45%	79.67%	86.50%

Example, Cortado model on BnF, NAF 6213



conte baudoi. et luy dist qui uenoit dentour la ville

Conclusion: a specialized model per script isn't always necessary, but the variety of the training set increases its robustness, even in our case with early prints.

See complete experience here: https://cremmalab.hypotheses.org/modeles-htr