Assembling Legacy Data for AI: the Case of the Paris Bible Project

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BnF Latin 10422
115x90 cm

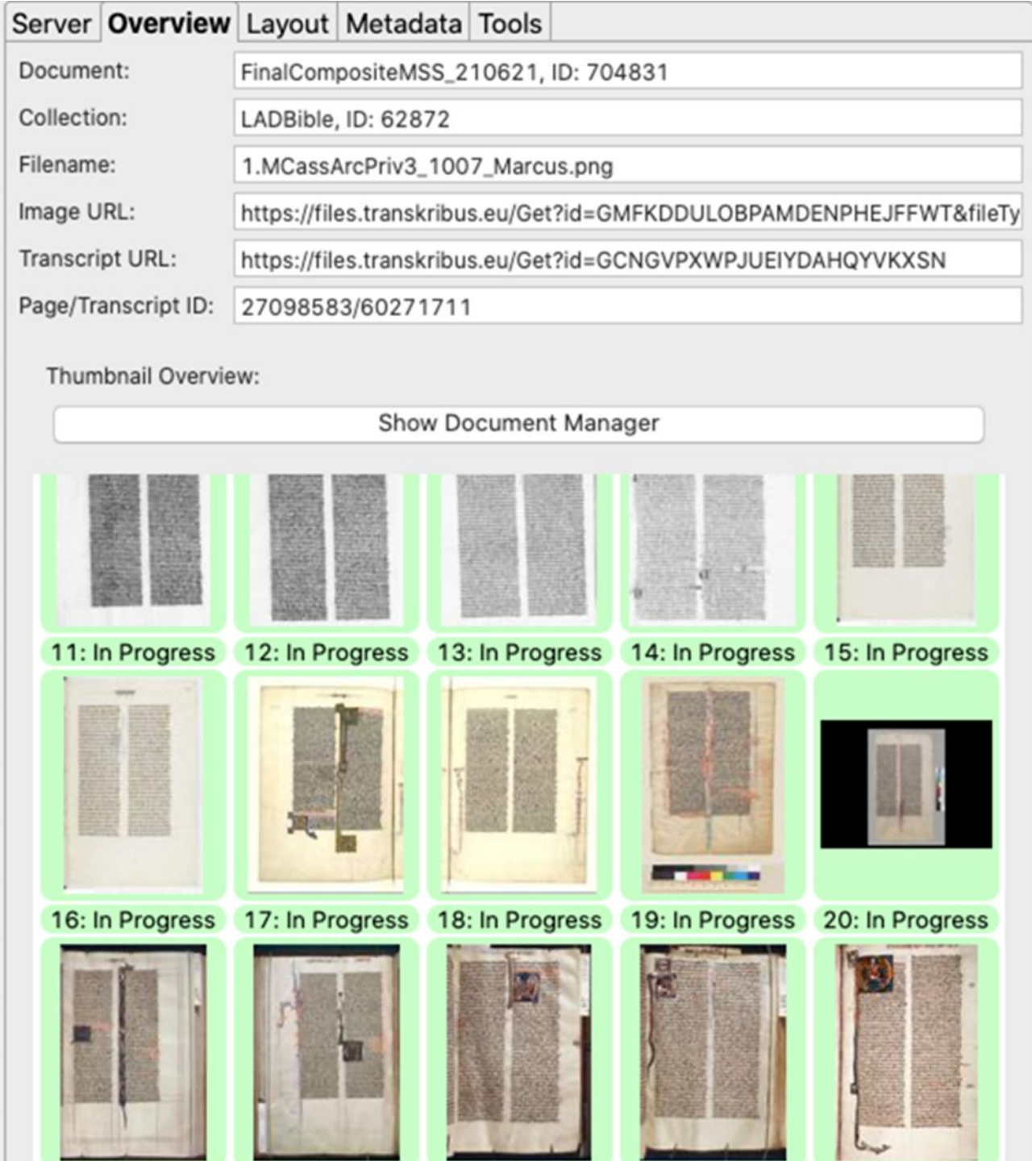
BnF Latin 40
255x180 cm

BnF Latin 11
425x300 cm

Source gallica.bnf.fr / Bibliothèque nationale de France, Département des Manuscrits, Latin 11

A Museum-University Collaboration for Studying Paris Bibles…

- One of the first mass-produced objects.
- Emerged in the 13th century, following the foundation of European Universities, specifically Paris.
- Spread in Europe during two centuries, with thousands n institutions worldwide.
- Books usually not signed, often portrayed as uniform:
    - Shared layout
    - New division of biblical books, following scrupulously the same order.
    - Increased number of abbreviations added to a smaller font size and more lines on the pages with a division in two text columns.
- Script somewhat specific to regions/workshops.
- This diversity in "uniformity" plus the scale of the archive makes it a perfect test case for machine learning
- BUT… we are not working with existing structured data, but creating unstructured textual data from HTR



Paris Bibles as Collection

- **Evolution in book history. Paris Bibles…**
  - were objects for individuals, for studying, teaching or preaching purposes.
  - have not traditionally been a particular medieval collection, or created to be part of a collection. To our knowledge, there have not been collections of fully digitized ones.
  - became a "must-have": today most modern cultural institutions possess at least one, and some historical libraries, many.
  - are not digitised and found in one place..
- **Digital Collections**
  - We are creating a **curated digital collection.**
  - We are **not** building a digital collection in our institution-s, but collecting from across institutions.
  - Our curation principles have machine learning in mind.

Getty

BRITISH LIBRARY

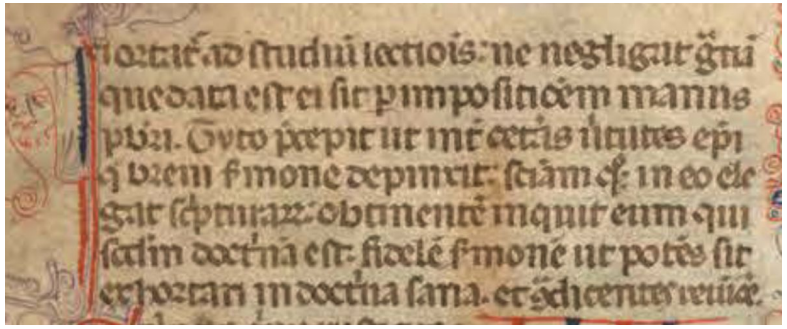
Vatican Apostolic Library

INTERNET ARCHIVE 25

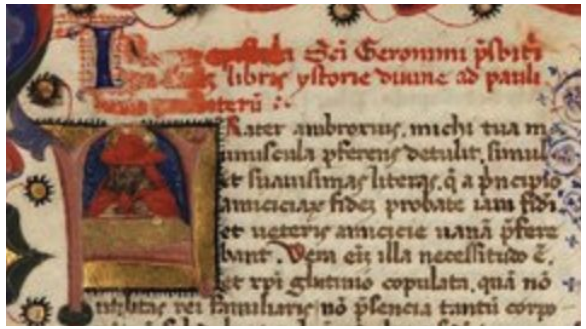
BnF Gallica

Gathering Data and Images

- Understanding where the Paris Bibles are
- Identifying metadata and denominations:
    - Biblia sacra
    - Pariser Normbibel
    - Bibbia dell' università
    - Universitetsbibel
    - Or even general denomination "Bible"
- Choosing sections of Bibles, if fully digitized.
- Isolating text from fragments or partial digitization.
- Challenge: document management and conflicting metadata



Biblioteca digital hispanica: Madrid, BNE 12906, 2r



Biblioteca nazionale centrale di Roma, Ms.Vitt.Em.825, 1r

e-codices: Aargau Cantonal Library, MsWettF 11, 1r

Challenges of Legacy Data

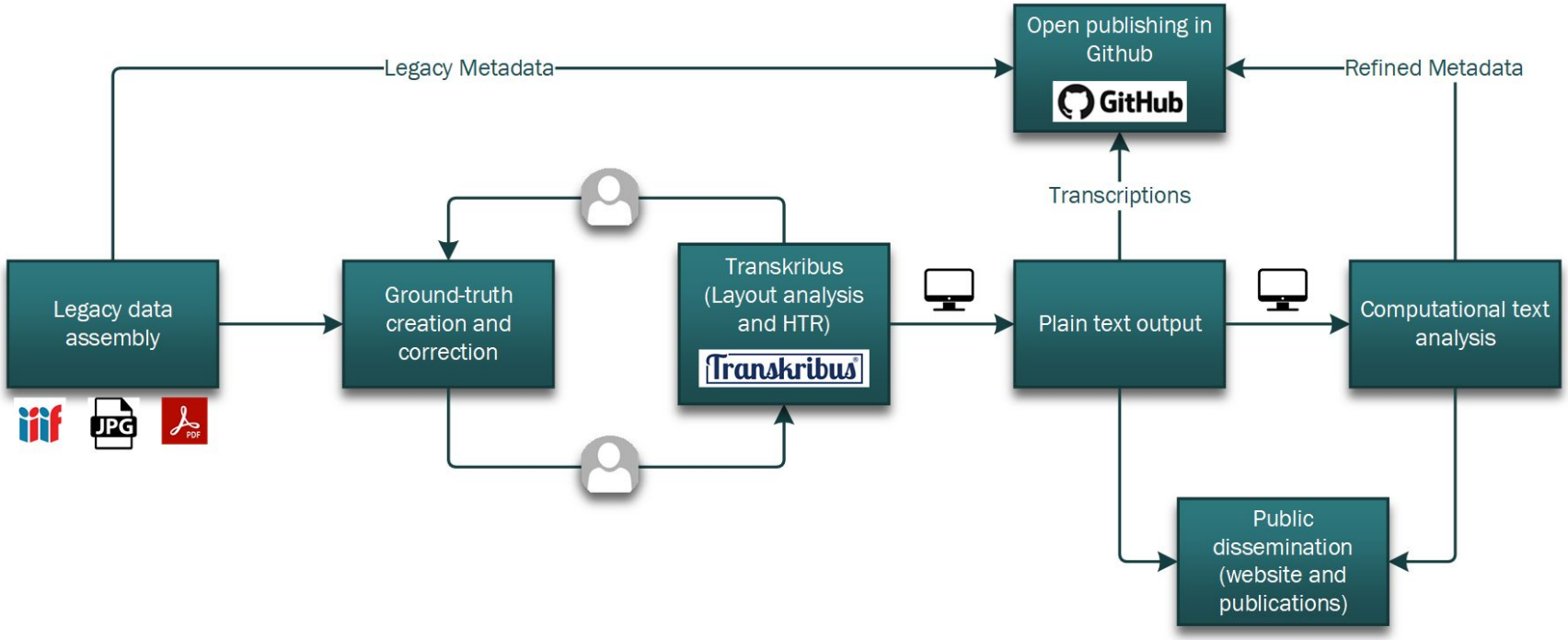
- creating ground truth is a time consuming process (there is little or none with all the features of interest to us)
- with high quality ground truth created based on one or two manuscripts, applying the models to new scenarios led to overfitting
- Ideal of creating a generic model that works across all possible manuscripts is a complex endeavor.
    - is more data the answer?
    - are sub-models the answer?
- On top of these question of the creation of ground truth, many issues are encountered with medieval manuscripts owing to layered histories of digitization:
    - Quality unequal from copy to copy (not so much a machine problem as a human one)
    - Metadata: Can we trust it? Need to start with well known documented mss
    - what is difficult for a machine might not be the same for humans
    - Making the objects comparable, finding a middle ground

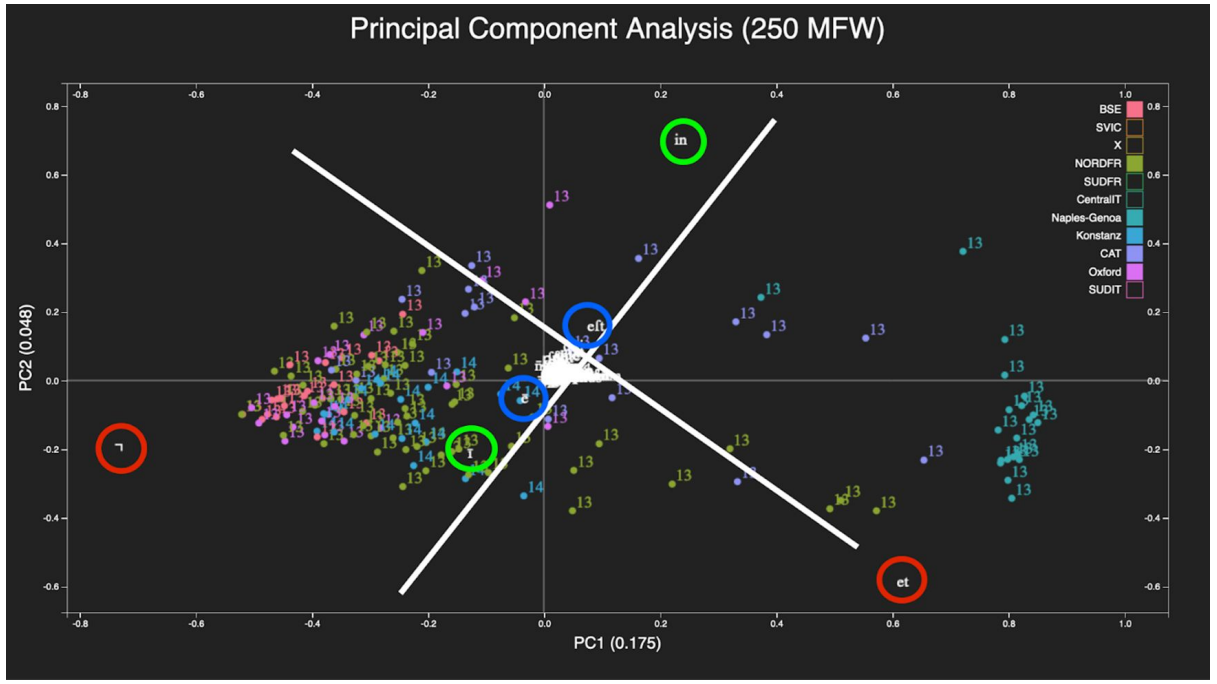
HTR-centered Workflow

- HTR - we have such a controlled corpus (uniformity of layout, of base text, narrow possibilities for paleographic) that we can aim for very low consistent CER.

- Other medieval and non medieval textual examples → higher paleographic difference will mean need for more HTR training and more keyword spotting approach.

- Such work is of a scale that is prohibitive for researchers -- need HTR

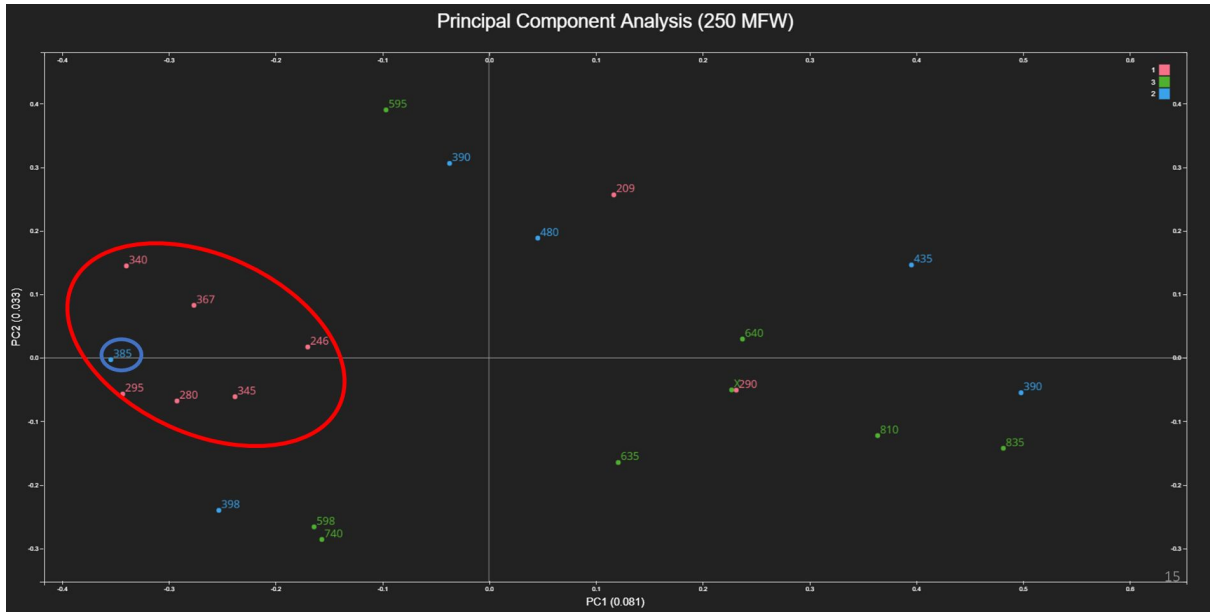


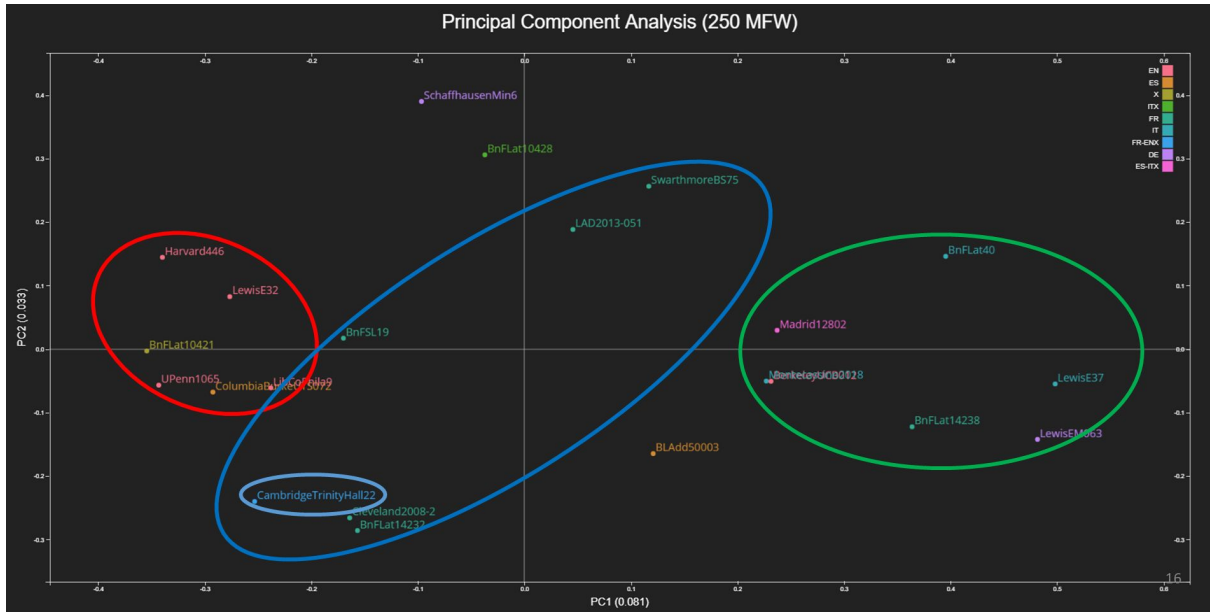


Some High Level Results

- Expectations: The use of abbreviations and special letter forms is specific to every scribe.

- Exciting findings :
  - Size of manuscripts seems to matter
  - regional patterns of abbreviation exist
  - Abbreviation patterns are highly localizable -- to scribe or a workshop





Collaboration and AI Research for Culture

- Timelines for research between university and museum are not the same.
- Funding in different institutions is not balanced.
- Project management for remote work was particularly important.
- Happy consequence of a tricultural project team, for understanding better the ways in which such collections are organized and described.
- *Interlocking question of diversity*: diversity of cultural knowledge about collections and how that diversity can benefit the models we train.
- But having members from those different environments did not assure us that we found everything, including GT from different manuscripts did not assure better output. .

Conclusion: What is the Promise of HTR for Other Archival Situations?

- HTR has great promise for medieval archives, or for any other voluminous handwritten collections
- However, remember that our scenario works relatively well since we are working with a corpus in which the domain is stable and the form is somewhat uniform
- There are plenty of medieval textual traditions with large numbers of manuscripts (*De consolatio philosophiae, Legenda aurea, Roman de la Rose*, etc.)
- BUT these have a very large spatio-temporal imprint, are found in many hands, many layouts, etc.
- You need to have a clear question in mind so that you design your research instrument clearly to know how AI/HTR will give you results which are useful to you, at the level of desired granularity..

Thank you for your attention!

Merci de votre attention!

شكراً لإتبهكم!

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