Introduction to Digital Humanities

Day 1

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Outline

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- Currently a postdoctoral researcher at the MSH in digital humanities;
- Mostly working on:
  - Stylistic analysis of New Testament text/manuscripts;
  - The application of philogeny algorithms to build the genealogical trees of manuscripts.

What are digital humanities ?

Definitions

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DH brings together experts from a wide range of disciplines:

- **humanities**
- **mathematicians**
- **computer scientists**

to try to provide new answers and new angles to existing problems.

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- **Engage**

with data.

The integration of computer science with humanities disciplines promises an in-depth transformation **in research, analysis, and understanding of existing data**.

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- A **paradigm shift** (*computational turn*) in research methodologies and outcomes, both for the humanities researcher and the computer scientists;
- Mark a new era of **interdisciplinary collaboration** to tackle research questions from different angles.
- **Widen research perspectives** through Open data initiatives and collaborative platforms.

A brief history of DH

The first wave

First wave: Emergence of Digital Humanities:

- **1940s-1950s**: Early use of computers for text analysis and birth of quantitative linguistics (stylometry, lexicometry ...).
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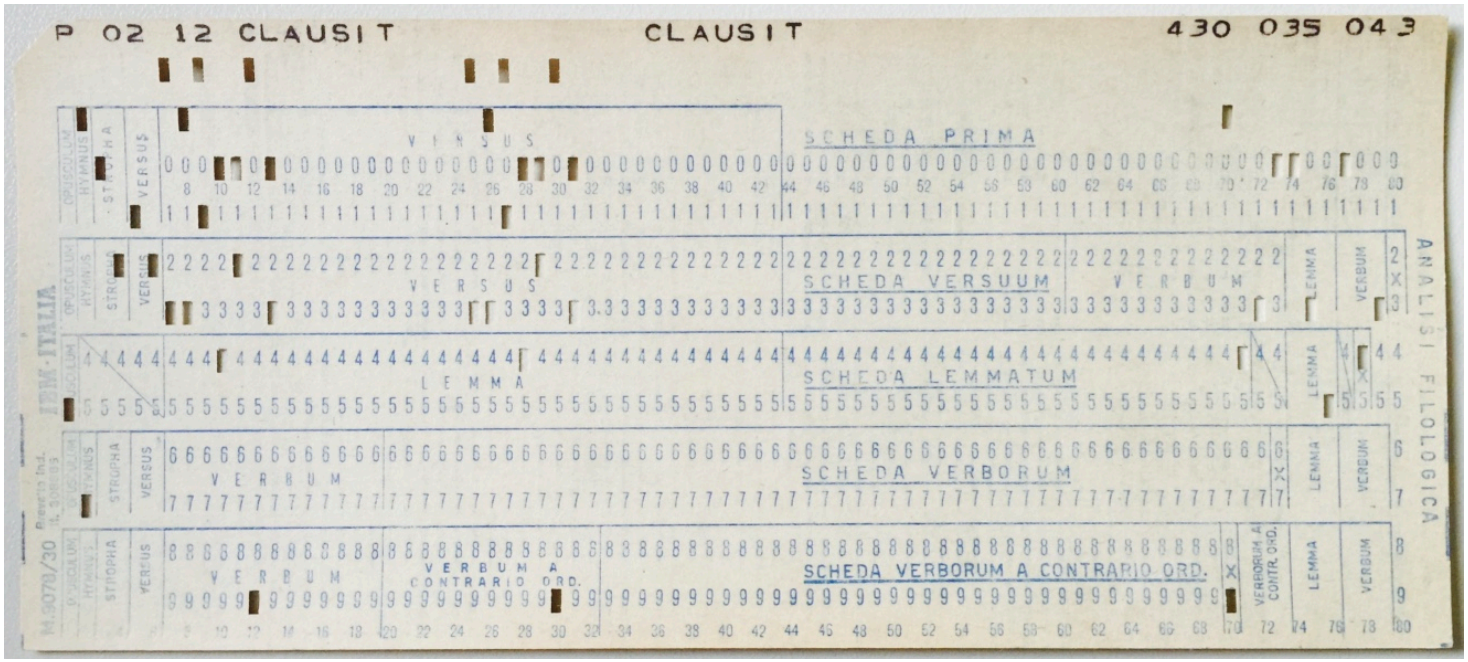
The first wave of digital humanities mostly dealt with **the application of quantitative models to textual data**.

Punch card of Index Thomisticus

Roberto Busa's Index Thomisticus (1949-1970s) project aimed at building a concordance and a term frequency of words in the *Opera Omnia* of Thomas Aquinas.



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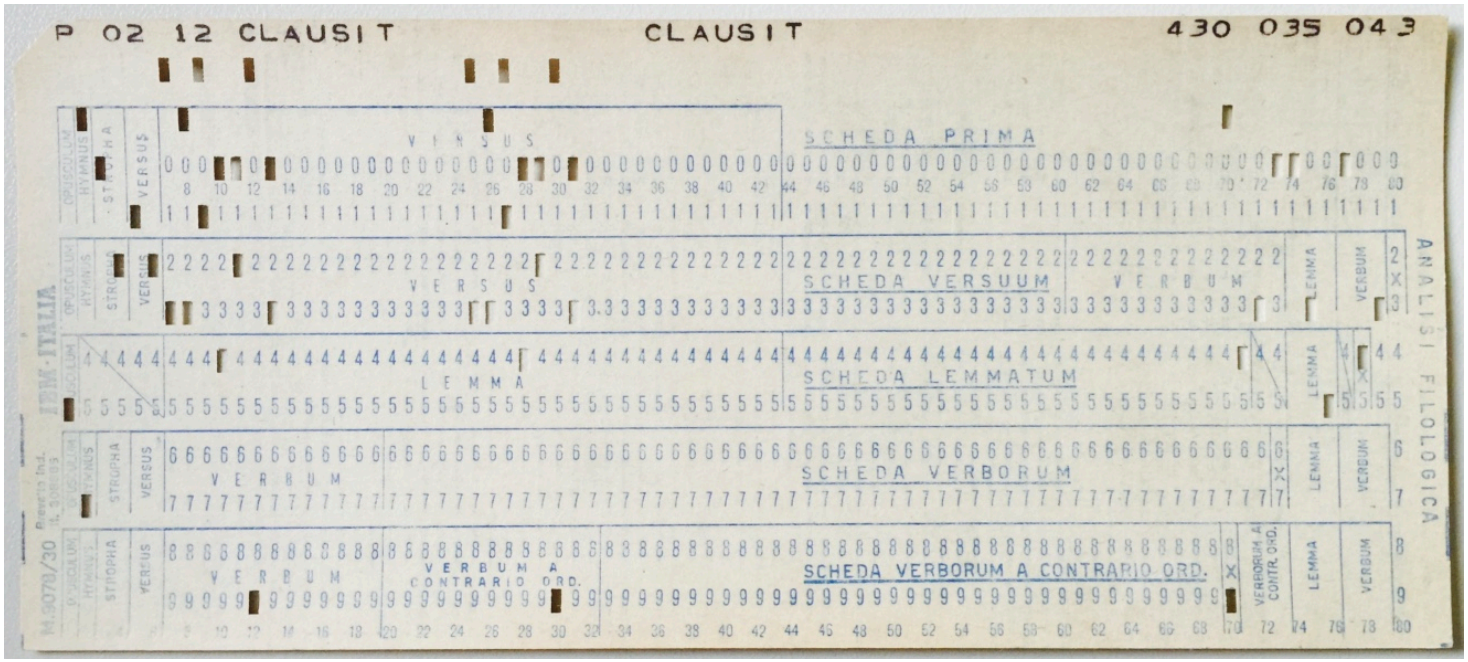

Each of us are going to do on Wednesday afternoon what took hundreds of people several years using punch cards ...

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Going further than the application of quantitative models to linguistic data, the second wave **focused on the storage and the distribution of textual data**.

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The emergence of the World Wide Web catalyzed the on-going momentum of DH, by adding the possibility to **communicate the results of digital scholarship**.

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- Easier to deploy collaborative tools.

Digital humanities is one of the **fastest growing research trend** and promises to **bring new insights to a wide variety of problems**.

Taxonomy of digital humanities project

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- **Application of Data Engineering**:
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- **Application of Software Engineering**:
  - develop software to facilitate the access and the manipulation of data;
  - design new way to engage with data to derive knowledge.

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... so you can generalize these methods on your own datasets and your own projects !

During labs, do not hesitate to use your own data or ask questions regarding how you can transpose methods to your own projects !

Example of digital humanities project

OCR and paleography for manuscript analysis

Example of breakthrough: how many scribes hands in the Qumran Great Isaiah Scrolls?

Example of breakthrough: Analysis of Isaiah scrolls

- Groningen University showed that the handwriting of the scribe on the Isaiah scroll **changed enough to indicate another scribe**;
- **which was barely perceptible visually**;
- using Machine Learning algorithms;

Popović M, Dhali MA, Schomaker L (2021) Artificial intelligence based writer identification generates new evidence for the unknown scribes of the Dead Sea Scrolls exemplified by the Great Isaiah Scroll (1QIsaa). PLoS ONE 16(4)

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- **Digitizing documents**: MiDRASH @ EPHE ...
- **Providing easier standards and tools to improve the efficiency of OCR**: Alto XML standard `https://www.loc.gov/standards/alto/`, Transkriptus, e-Scriptorium `https://msia.escriptorium.fr/` ...

NLP/Text Mining projects

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  - **Collation tools**: the collatex project;
  - **Text analysis tools for ancient languages**: Dikta project;
  - **Various online dictionaries** of common and rare languages.
  - **Tagged datasets** made available.

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  - **Various online dictionaries** of common and rare languages.
  - **Tagged datasets** made available.
- Applications of computer science models to **better understand the texts**:
  - Analysis of vocabulary;
  - Analysis of stylometric features;
  - Analysis of relationships between texts;
  - ...

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- *Si deux et deux sont quatre, Molière n'a pas écrit Dom Juan*, Dominique Labbé, 2009.
- Florian Cafiero et Jean-Baptiste Camps, « Why Molière most likely did write his plays », Science Advances, vol. 5, no 11, 1er novembre 2019

Example of NLP project: How many textual sources in Genesis and Exodus?

Source detection in ancient texts

Many ancient texts are composed of several sources, and stylometry has hinted towards:

- **Several sources in Genesis and Exodus** (*A Statistical Exploration of Text Partition Into Constituents: The Case of the Priestly Source in the Books of Genesis and Exodus*, Gideon Yoffe and Axel Bühler and Nachum Dershowitz and Israel Finkelstein and Eli Piasetzky and Thomas Römer and Barak Sober, 2023.)

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- **Several sources in the synoptic Gospels** (*Unraveling the Synoptic puzzle: stylometric insights into Luke's potential use of Matthew*, Sophie Robert-Hayek, Jacques Istas, Frédérique Rey, 2023.)

Stemmatology

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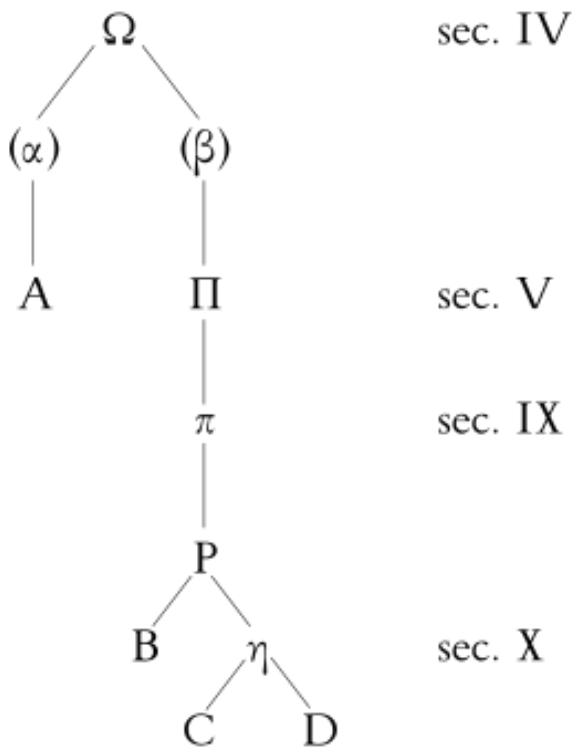
Stemmatology consists in finding the relationship between manuscripts to organize them as a genealogical tree.



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I am a post-doctoral researcher on the SHERBET project, aiming at using **philogeny based automatic methods** to construct stemmatology trees of the Hebrew manuscripts.

Data initiatives

Archiving initiatives

- Gallica @ the BNF.
- Project Gutenberg.
- Brown Corpus.
- ...

Collaborative research projects

Example of virtual tools enabling crowd sourcing for manuscript transcription:

- New Testament Virtual Manuscript Room, @ the Institut für neutestamentliche Textforschung
- Scripta Qumranica Electronica, @ the Göttingen and Haifa Universities

Bibliography and questions

Bibliography

- *A Companion to Digital Humanities*, Susan Schreibman, Ray Siemens and John Unsworth, *Wiley–Blackwell*, 2004.
- *A New Companion to Digital Humanities*, Susan Schreibman, Ray Siemens and John Unsworth, *Wiley–Blackwell*, 2016.

Questions

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Let's dive in after a short break !