Introduction to Digital Humanities
Day 1

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Outline

About me

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- PhD in computer science / artificial intelligence and its applications to complex systems;
- Currently a postdoctoral researcher at Ecritures / LORIA / LJK in digital humanities;
- Mostly working on the application of philogeny algorithms to build the genealogical trees of manuscripts.

What are digital humanities ?

Definitions

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Digital Humanities

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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.

What are digital humanities ?

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- **Generate**
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- **Engage**

with data.

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

What are digital humanities ?

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- 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

Introduction to Digital Humanities
What are digital humanities ?
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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 …).
- Limited by computational power and resources.

Introduction to Digital Humanities
  What are digital humanities ?
  A brief history of DH

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The first wave of digital humanities mostly dealt with **the application of quantitative models to textual data**.

Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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.

Introduction to Digital Humanities
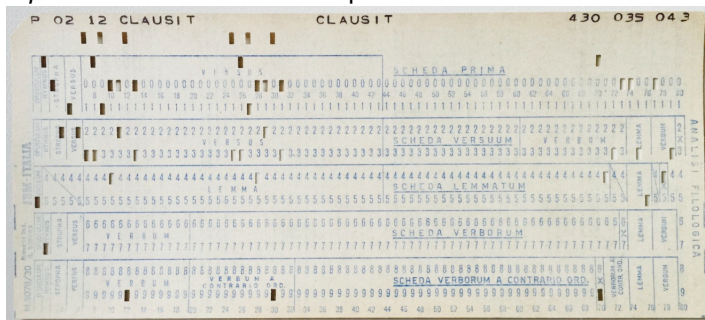What are digital humanities ?
A brief history of DH
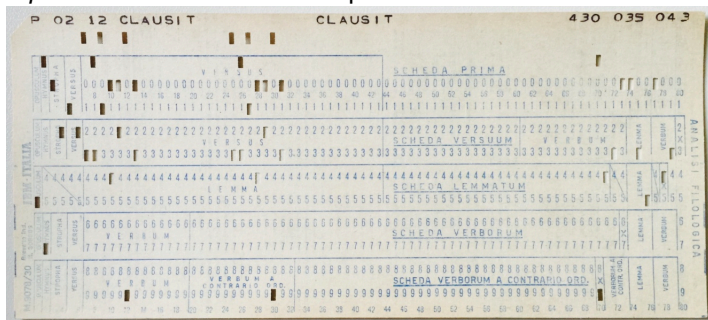
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Each of us are going to do on Wednesday afternoon what took hundreds of people several years using punch cards ...

Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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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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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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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**.

Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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Introduction to Digital Humanities
What are digital humanities ?
A brief history of DH

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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

Introduction to Digital Humanities
What are digital humanities ?
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Introduction to Digital Humanities
What are digital humanities ?
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Introduction to Digital Humanities
What are digital humanities ?
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Introduction to Digital Humanities
  What are digital humanities ?
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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.

Introduction to Digital Humanities
What are digital humanities ?
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Introduction to Digital Humanities
What are digital humanities ?
Taxonomy of digital humanities project

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Introduction to Digital Humanities
What are digital humanities ?
Taxonomy of digital humanities project

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Introduction to Digital Humanities
What are digital humanities ?
Taxonomy of digital humanities project

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Introduction to Digital Humanities
  What are digital humanities ?
    Taxonomy of digital humanities project

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Introduction to Digital Humanities
What are digital humanities ?
Taxonomy of digital humanities project

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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

With a new machine learning algorithm to analyze ancient handwriting digitally, Groningen University showed that the handwriting of the scribe on the Isaiah scroll **changed enough to indicate another scribe** took over roughly halfway through the text of the Isaiah scroll, which was **barely perceptible visually**.

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)

OCR for numerization of manuscripts

OCR (Optical Character Recognition) enables the transformation of manuscripts, archives, and historical texts into **digital formats**.

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- **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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- Applications of NLP models to better understand the texts:
  - Analysis of style
  - Analysis of vocabulary
  - …

Example of NLP project: Did Molière write his own play?

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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 shown:

- 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 (current project of mine !)

Stemmatology

Stemmatology

Stemmatology consists in finding the relationship between manuscripts to organize them as a genealogical tree.
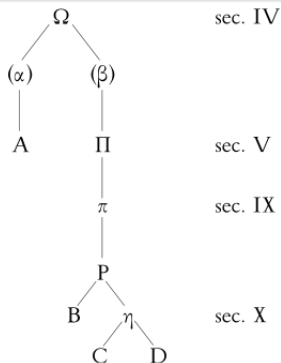
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I am a post-doctoral researcher on the SHERBET project, aiming at using **philogeny based automatic methods** to construct stemmatology trees of the Hebrew manuscripts.

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

- *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 !