




IEG

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# The Digital Humanities—the “Computational Linguistics” for the Rest of the Humanities?

Dr.-Ing. Michael Piotrowski  
Leibniz Institute of European History  
<piotrowski@ieg-mainz.de>

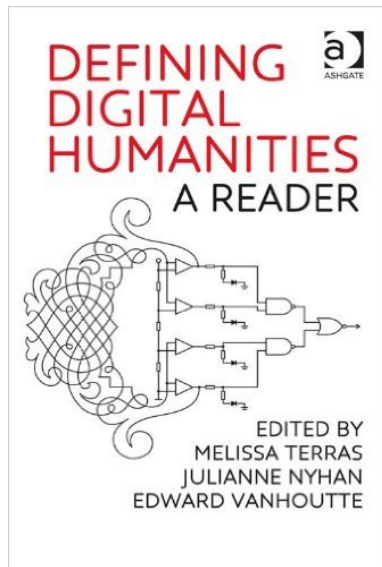
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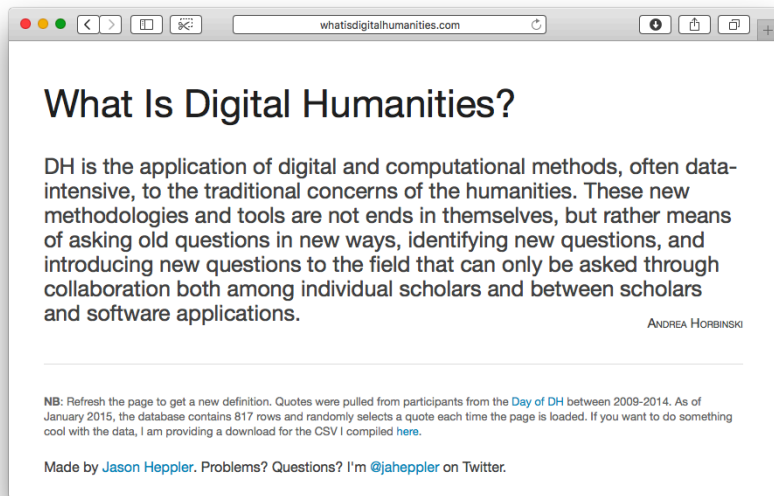
Fred Jelinek Seminar, Prague, April 4, 2016



# Introduction

# Defining Digital Humanities





# Do we really need a definition?

Yes, we do.

If you want to create a program of studies or devise a research agenda, you *must* commit yourself to *some* definition.

- ▶ However, most definitions focus on *methods* and say very little about *goals*.
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## What Do We Mean by “Digital Humanities”?

# Consensus

Relatively broad consensus, that the digital humanities bring together humanities and computer science; thus we have two aspects:

- Ⓐ Work on *humanities* research question using methods and tools from computer science
  - Ⓑ Work on *computer science* methods und tools for tackling research questions in the humanities
- ➔ Term is inherently ambiguous

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# Piotrowski 2012

*The emerging field of digital humanities aims to exploit the possibilities offered by digital data for humanities research. The digital humanities combine traditional qualitative methods with quantitative, computer-based methods and tools, such as information retrieval, text analytics, data mining, visualization, and geographic information systems [GIS].*

*[Piotrowski 2012, p. 6]*

Michael Piotrowski [2012]. Natural Language Processing for Historical Texts. San Rafael, CA: Morgan & Claypool.

***In a narrow sense**, “digital humanities” refers to the application of quantitative, computer-based methods for humanities research, usually complementing traditional qualitative methods [...]. The important point is that it is humanities research, i.e., you’re applying these methods to answer a humanities research question.*

***In a wider sense**, it may also refer to the application of computer-based tools in humanities research (note that this definition does not require the use of quantitative methods). For example, creating a digital edition is not digital humanities in the narrow sense (because it does not use quantitative methods), but it is in the wider sense.*

<http://nlphist.hypotheses.org/114>

# Discussion

- ▶ Actually only a description of *practices*
- ▶ Nothing is said about motivations or goals of the digital humanities
- ▶ Implies that there are two kinds of humanities—“digital” humanities and “non-digital” [analog?] humanities
- **This is not true.** All humanities disciplines have their specific objects of research and use whatever methods are needed—they are defined by their research objects, *not* by their methods!



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## Let's Look at Computational Linguistics

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Linguistics has a “vantage point” for observing the digital humanities, because it has essentially completed the transformation from “armchair linguistics” to an empirical science using formal models.

## Theoretical CL

[“mathematical linguistics”]

Formal language theory

Grammar theory

## Applied CL

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→ Actually math or CS

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→ Actually linguistics



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Digital history is concerned with the construction of formal models of historical circumstances and with the methodology of constructing such models.

→ digital history creates *concrete* formal models of its research objects.  
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# Example

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  - ▶ definition of tag set
  - ▶ annotation guidelines
  - Digital philology
- ▶ Technology used:
  - ▶ Inline vs. stand-off markup
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- ▶ DH = CS?
- ▶ Rather: DH = CS  $\cap$  specifics of humanities
  - ▶ Representation of vagueness
  - ▶ Handling incomplete data
  - ▶ Dealing with uncertainty
  - ▶ Specific requirements resulting from research questions
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# Formal Models in the Humanities

# Formal models

- ▶ A model is a representation of a selected part of the world.
- ▶ Model  $\approx$  description  $\approx$  theory
- ▶ Слово “формальный” не означает ничего, кроме как “логически последовательный + однозначный + абсолютно явный”.

[Gladkij & Mel'čuk 1969, p. 9]

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# Formal Models in the Humanities Research Process

Formal models are mathematical representations of complex systems or processes, often used in the natural sciences and engineering. They provide a structured way to analyze and predict the behavior of these systems.

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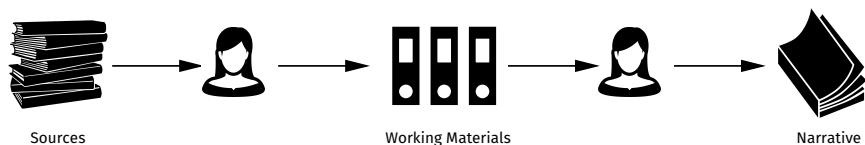
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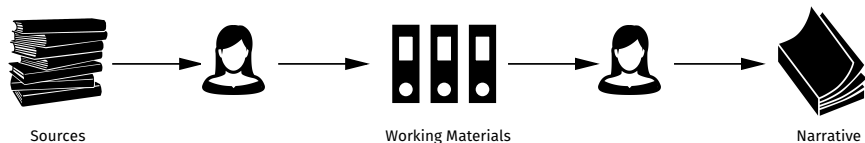
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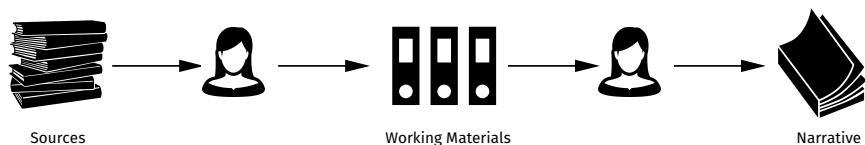
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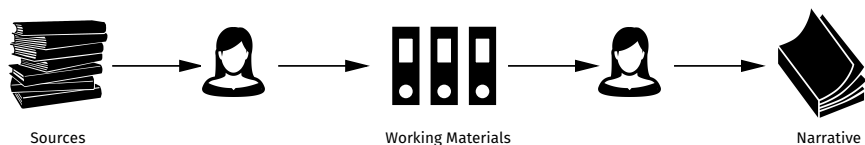
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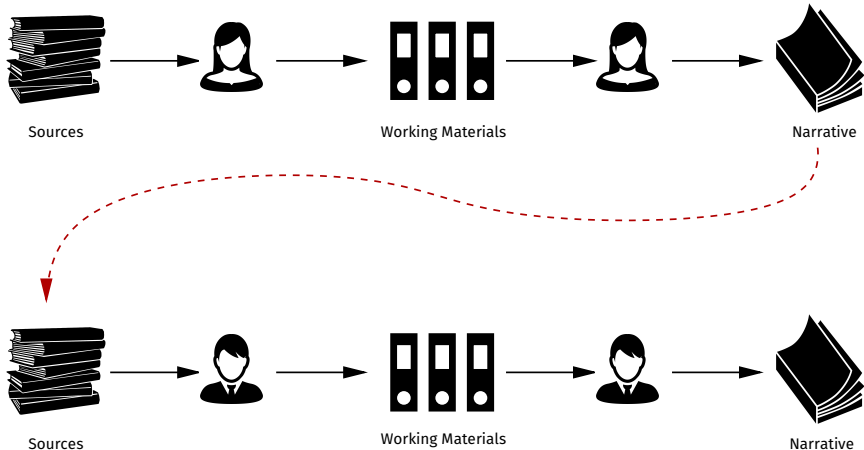
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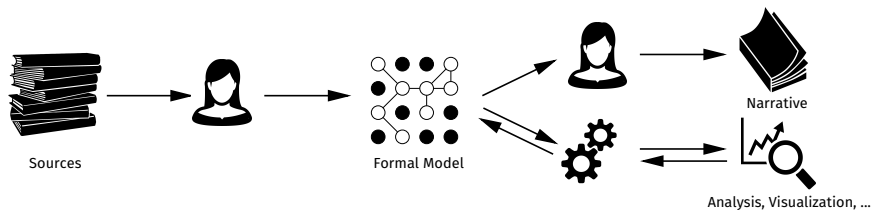


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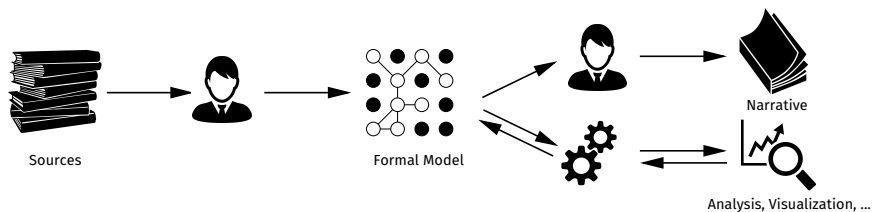
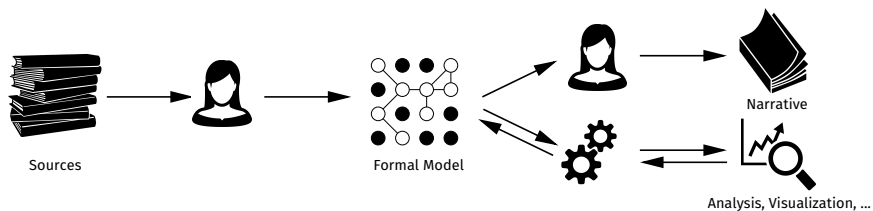
# Building on the work of others (traditional process)



# Where do formal models come into play?

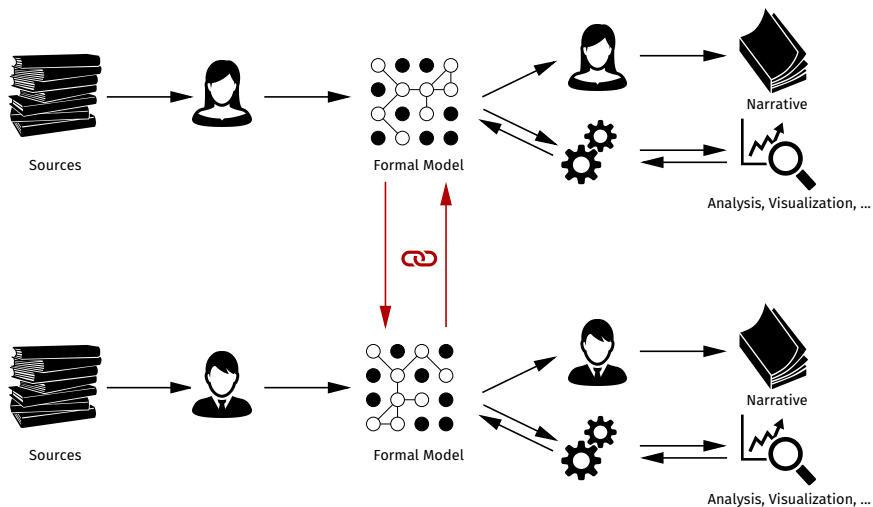


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# What Is the Role of NLP?

- ▶ If the humanities seriously want to base their research on large quantities of text (and quantitative methods), they will need NLP as basis for all higher-level analyses
- ▶ For digital historical scholarship, NLP must then be regarded as an *auxiliary science* of history, similar to diplomatics, codicology, paleography, numismatics, sigillography, etc., which are indispensable for evaluating and using historical sources

*Il n'est pas indispensable que le philologue établisse lui-même le programme, encore que ce soit infiniment souhaitable ; il devrait au moins connaître assez le langage de programmation pour contrôler le travail du technicien ; en effet, l'expérience m'a appris qu'il ne faut pas s'en remettre les yeux fermés aux électroniciens, mal préparés par leur formation mathématique à se faire une idée juste de problèmes concrets qui se posent dans la domaine de la philologie.*

*[Jacques Froger, 1970]*

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## Recent Work

# Example: Appenzeller Landbuch



Rechtsquellenstiftung  
Fondation des sources du droit  
Fondazione per le fonti giuridiche

des Schweizerischen Juristenvereins  
de la Société suisse des juristes  
della Società svizzera dei giuristi

www.ssrq-sds-fds.ch/teiviewer/

Digitalisierte Edition des ältesten Appenzeller Landbuchs (SSRQ AR/AI 1, Nr. 1)

Inhalte

- 1. Älteres Landbuch
- Von fräßen und büssen der selbigen
- In dem namenn der hailgenn dryfalltickait, amen.**
- 1) Was ain veltcher aid uff im trait
- Wie der aman unnd der walbel ach(w)eren
- 2) Von richter
- 3) Das ist ordinantz
- 4) So ain landtman gegem ander fräntet
- 5) Ain gast übenm landtman zuckt
- 6) Im überloffen
- 7) Vor frid halssenn lögnen
- 8) In schimpf zuckenn
- 9) Von frid upnemen
- 10) Onzichtig redenn
- 11) Dot schlag über frid
- 12) Über frid halssenn lögnen
- 13) Bussen über frid
- 14) In unglit schaidenn
- 15) Ainem an sin eer redenn
- 16) Wegenn machenn
- 17) Vom landt ni(c)hen
- 18) Aljchen mitwoch
- 19) Tod schlag büssen
- 20) Verboten ussem ratt sagenn

Text

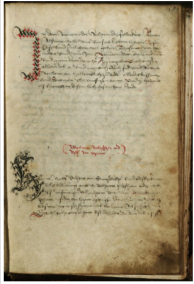
Auszeichnungen anzeigen/verbergen

[S. 47] In dem namenn der hailgenn dryfalltickait, amen.  
 Als man zalt vonn unßers liebenn herenn **Jeßu Cristi**  
 unnd sailgmachers geburt thesennt vier hundertt unnd  
 nün jar, wurdennt, wir, der landtman unnd gmain  
 landtliütt zü **Appenzell**, durch unnser allenn lob, er  
 unnd nutz,<sup>1</sup> ouch durch frid unnd rüwenn willenn  
 einhellennklich zü radt, alle die büssenn unnd stattutenn  
 über unnß zü nemenn unnd zü haltende, als hienach an  
 disem büch geschribenn stadt.<sup>2</sup>

1) Zum Verweis auf den Gemeinen Nutzen vgl. *Dubach*, S. 258; *HLS*  
 5, S. 201 f.  
 2) Vgl. die inhaltlich sehr ähnliche Einleitung in *LB 1585*, fol. 1r.

Faksimile

Seite: 47

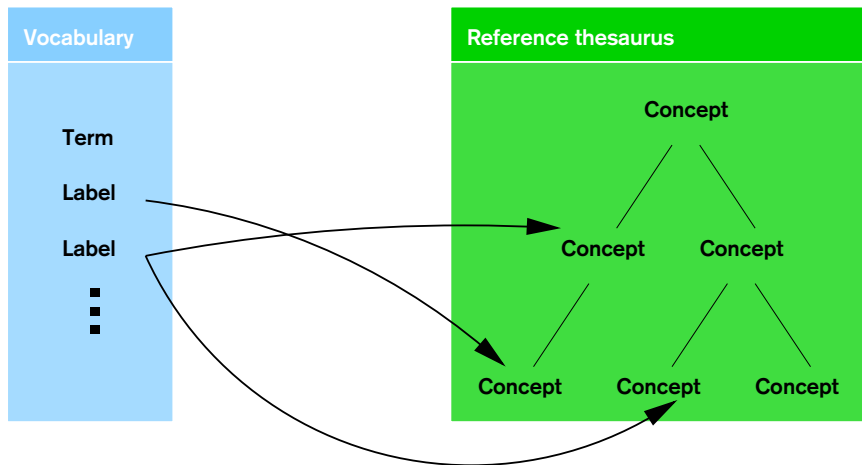


Suche in Editionstext Bibliographia Index locorum Index personarum Index rerum

ID	Name	Art des Eintrags	Land	Region	Gemeinde	ortsnamen.ch	HLS-DHS-DSS
IDX0027	Altkirch	P.PPL	FR	FR-A			D7355
IDX0031	<b>Appenzell</b>	A.ADM1	CH	CH-AR, CH-AI		1012154	D7389
IDX0035	Appenzell	P.PPLC	CH	CH-AI		1005493	D1313
IDX0037	Appenzell Kirchgemeinde St. Mauritius	A.PRSH	CH	CH-AI			
IDX0043	Arbon	P.PPL	CH	CH-TG		6000059	D1852
IDX0056	Ausserhoden, Auserre Rhoden	A.PCLIX	CH	CH-AR		1010803	D7476
IDX0073	Basel	P.PPLC	CH	CH-BS			D7478
IDX0078	Bellinzona	P.PPL	CH	CH-TI			D2031
IDX0087	Bern	P.PPLC	CH	CH-BE			D209



# Example: Labeling System



# Example: Peace Treaties as Linked Open Data

## Friedenspräliminarien von Breslau



URI of this Resource Map: <http://data.ieg-friedensvertraege.de/data/treaty/2213>

### Friedenspräliminarien von Breslau

URI: <http://data.ieg-friedensvertraege.de/data/treaty/2213>

Property	Value
Contributor	<ul style="list-style-type: none"><li>ieg-partner/12</li><li>ieg-partner/93</li></ul>
Date	<ul style="list-style-type: none"><li>1742-06-10T22:00:00Z (xsd:dateTime)</li></ul>
<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<ul style="list-style-type: none"><li>ieg:place/313</li></ul>
is Same As of	<ul style="list-style-type: none"><li>ieg:treaty/2213</li></ul>
Same As	<ul style="list-style-type: none"><li>ieg:treaty/2213</li></ul>
Title	<ul style="list-style-type: none"><li>Friedenspräliminarien von Breslau (de)</li></ul>
Type	<ul style="list-style-type: none"><li>Manuscript</li></ul>

URI: <http://data.ieg-friedensvertraege.de/data/rdf/treaty/2213>

Property	Value
is Same As of	<ul style="list-style-type: none"><li>ieg:rdf/treaty/2213</li></ul>
Same As	<ul style="list-style-type: none"><li>ieg:rdf/treaty/2213</li></ul>

This page shows information obtained from the SPARQL endpoint at <http://localhost:3032/ieg/sparql>.

As Turtle | As RDF/XML | Browse In Disco | Browse In Graphite Browser

# Example: Cosmotool

DARIAH-DE

Suche

Kategorien

Index



**Johann Wolfgang von Goethe**  
\* 28. August 1749  
† 22. März 1832

cosmotool / Biographische Daten / Johann Wolfgang von Goethe

## Biographische Daten

### Zeitleiste



Datum	Event	Source
1749-8-28	(1) Geburt Frankfurt am Main	
1749-8-28	(2) aus Textanalyse Goethe-Haus	
1749-8-28	(3) aus Textanalyse Frankfurter Großen Hirschgraben	
1785-1-1	(4) aus Textanalyse Leipzig	
1788-3-1	(5) aus Textanalyse Dresden	
1770-4-1	(6) aus Textanalyse Universität Straßburg	
	(7) Studium Universität Leipzig	
	(8) Studium Universität Straßburg	
1772-1-1	(9) aus Textanalyse	

### Ereignis-Details

**Ereignis 1**  
**Geburt: Frankfurt am Main**  
Direktes Ereignis in der Biographie der analysierten Person.  
Quelle: <http://www.wikidata.org/wiki/Q2679>

### Kartendarstellung



## Volltexte

### Quellen

Wikipedia.DE ▼

Erkennung Invaliden

# Summary

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- ▶ The digital humanities do not merely aim to accelerate research or to analyze larger amounts of data.
- ▶ The key is **formal modeling** of scholarly knowledge and insights in machine-processable form.
- ▶ Formal models increase coherence, precision, and explicitness, encourage cooperation and sharing, and help researchers to directly build upon each other's work.
- ▶ **Knowledge representation** techniques are thus the foremost tools for creating formal models in the humanities.
- ▶ The “digital humanities discussion” can benefit from studying the development of linguistics.
- ▶ Digital humanities subfields can learn from corpus linguistics.
- ▶ NLP should be considered an *auxiliary science*—as such, scholars have to get acquainted with its methods and tools.

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Leibniz-Institut für  
Europäische Geschichte

Mitglied der  
*Leibniz*  
Leibniz-Gemeinschaft

# The Digital Humanities—the “Computational Linguistics” for the Rest of the Humanities?

Dr.-Ing. Michael Piotrowski  
Leibniz Institute of European History  
<piotrowski@ieg-mainz.de>

 @true\_mxp

Fred Jelinek Seminar, Prague, April 4, 2016

