Deep Networks in the Digital Republic of Letters

2013 Historical Network Research Conference
Hamburg 13-15 September 2013
Charles van den Heuvel

CIRCULATION OF KNOWLEDGE AND LEARNED PRACTICES

http://ckcc.huygens.knaw.nl/

CIRCULATION OF KNOWLEDGE AND LEARNED PRACTICES IN THE 17TH CENTURY DUTCH REPUBLIC
A Web Based Humanities Collaboratory on Correspondences

Isaac Beeckman	28
René Descartes	727
Hugo de Groot (Grotius)	8034
Christiaan Huygens	3090
Constantijn Huygens	7297
Antoni van Leeuwenhoek	282
Dirck Rembrantsz van Nierop	80
Jan Swammerdam	172
Total	20215
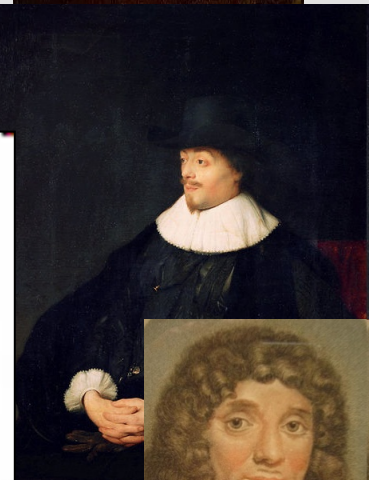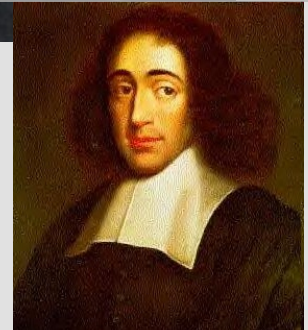
How can we combine and structure various sets of letters of 17th-century scholars and their correspondents in such a way that we can **analyze** and **visualize** the **circulation and appropriation of knowledge** production in a wider international context and recognize the development of themes of interest and scholarly **debates in space and time?**

Method: **topic modeling** and **natural language techniques**

The problem of the structure of the letters: multiple languages and mixed content

Metadata	1618-07-14	Dutch
	Huygens, Constantijn (1596-1687) London (GB)	Huygens, Maurits (1595-1642) [Den Haag (NL)]

Text	Ik schrijf u maar niet dikwijls, want gij hoort toch alles uit de brieven aan onze ouders. Gij moet mij wat meer van dat duel vertellen. Ik kan nog niet goed eene laars aantrekken en ben dus nog niet naar Cambridge en Oxford geweest. Den 20sten van deze maand gaan wij naar Bagshot, waar de Koning ook zal zijn.
	'Hier je menay de Gheyn veoir la galerie a peintures du feu prince par l'adresse de certains gentilshommes anglois qui m'ont grandement obligé. Celle du conte d'Arondel avec les antiquitez etc. de Gheyn m'avoit fait veoir par cy devant. Choses admirables en verité. Au reste nous voicy au païs le plus gentil du monde ou journellement nous voyons des palais et païsages *om op clavecingel-dexels te schilderen*'. Mijn knecht bevalt mij erg goed; wij spreken samen niets dan Engelsch.
	Ce 4e de Juillet 1618. De Lambeth.

The problem of spelling variation

```
-- Huygens, Christiaan (1629-1695) -- 2261 0638 0344
0157 Hugens
0146 Christiano Hugenio
0145 Christian Hugens de Zulichem
0103 Hugens de Zulichem
0101 Huygens
0097 Huguens
0082 Hugenius
0078 Christianus Hugenius
0071 Chr. Hugenius
0051 Hugeni
0050 Zulichem
0047 Hugenio
0046 Chr. Hugens de Zulichem
0040 Hugenii
0038 Christiano Hugenio de Zulichem
0031 Hugenium
0026 Vgenio
0026 Archimede
0025 Huijgens
```

344 x Christiaan Huygens and

151 x The Hague

0001 Hag. Comit.	0113 Hagae Com.
0001 's Gravenhaghe	0105 den Hage
0001 Hagae Comit.	0094 Hagae Comitis
0001 Den Haag	0072 Hag. Com.
0001 'S graven-hage	0040 la Haije
0001 Haye	0029 Hagae
0001 la Hayee	0016 den Haege
0001 's Graven Haghe	0014 la Hay
0001 den Haeg	0010 Hagae-Com.
0001 Dne Hage	0008 Hage
0001 Hagaecomit.	0005 's Gravenhage
0001 Hagae Com	0004 Hagam
0001 Haage	0004 Hagae Comitatem
0001 Haghe	0004 Den Haghe
0001 s' Gravenhage	0003 la Haya
0001 Hagae comitis	0002 Den Haech
0001 s'Graven-hage	0002 la haye
0001 Hagae com.	0002 La Haije
0001 den Haag	0002 Den Hagh
	0002 La Haye

1508 la Haye
0113 Hagae Com.
0105 den Hage
0094 Hagae Comitis

en het werck te reguleren nae het <PERSON>Erftractaet van Spiers</PERSON>

- classifier learns that "het" (DET) never precedes a PER

<PERSON>de Sweedse</PERSON> comm [issai] ren

- classifier learns that only a noun can be a PER

Named Entity Recognition

```
-- Huygens, Christiaan (1629-1695) -- 2261 0638 0344
0157 Hugens
0146 Christiano Hugenio
0145 Christian Hugens de Zulichem
0103 Hugens de Zulichem
0101 Huygens
0097 Huguens
0082 Hugenius
0078 Christianus Hugenius
0071 Chr. Hugenius
0051 Hugeni
0050 Zulichem
0047 Hugenio
0046 Chr. Hugens de Zulichem
0040 Hugenii
0038 Christiano Hugenio de Zulichem
0031 Hugenium
0026 Vgenio
0026 Archimede
0025 Huijgens
```

0004 Hagam
0004 Hagae Comitatensi
0004 Den Haghe
0003 la Haya
0002 Den Haech
0002 la haye
0002 La Haije
0002 Den Hagh
0002 La Haye
0001 Den Haeghe

http://ckcc.huygens.knaw.nl/epistolarium/

New Search Save Search Open Search   Back to results   Share this letter | Previous letter | Next letter

Metadata

1639-04-03   desc004/3197

Beaune, Florimond de (1601-1652)   Mersenne, Marin (1588-1648)
Blois (fr)   [Paris (fr)]

Appendix of: -

Appendices: -

Text

Monsieur et Révérend Père,

J'ai reçu les trois lettres et le paquet que vous m'avez envoyés cette semaine, et j'ai reçu un particulier contentement de la démonstration de Mr Descartes touchant la règle de Mr Fermat.

Pour ce qui est du développement du galand, il n'était point besoin que vous prissiez la peine de m'envoyer celui de Mr Descartes; je vous en ai toutefois obligation. Il n'y a autre différence entre le sien et le mien, sinon que, selon sa façon ordinaire, il est bref, et j'ai expliqué le calcul et la façon au long. En relisant toutefois la copie semblable à celle que je vous ai envoyée extraite du brouillard où j'avais fait le calcul (car j'en ai voulu retenir un exemplaire), j'ai remarqué une faute de transcription d'un signe *plus* au lieu du signe *moins,* que je crains qu'il se trouve en la vôtre, et quoique la pensée le corrige assez, néanmoins, si elle s'y trouve, je serai bien aise que vous la corrigiez. C'est dans le premier feuillet, dans la seconde face, après ces mots: «*Et si nous*

$$+\frac{1}{9}n^2$$
$$2$$

http://ckcc.huygens.knaw.nl/epistolarium/

vellem exactius, utrùm simile quid non sit inventum; et si scias, ad me scribe: excolerem enim confusam adhuc in cerebro meo speculationem illam, si aeque novam suspicarer atque certa est.

Interim me ama, vive feliciter et vale. Adhuc à me litteras accipies ante discessum.

Bredae Brab., 7⁰ Kal. Aprilis.

Tuus si suus
Du Perron.

Keywords

solvi quàm cubos utrùm quaestiones instrumentis absolutum discedam tantùm ideoque unaquaeque imaginari aequationum redii numerum repperi existimo minuta radices aliae

---

Similar letters

1646-02 (Descartes, René - ?) 85%

1687-03-10 (Huygens, Christiaan - Tschirnhaus, Ehrenfried Walther von) 84%

1673-03-25 (Huygens, Christiaan - Louis XIV, king of France) 84%

1657-10-19 (Sluse, René François de - Huygens, Christiaan) 84%

1656-06-28 (Huygens, Christiaan - Schooten, Frans van) 84%

1657-12-18 (Sluse, René François de - Huygens, Christiaan) 84%

1658-06-07 (Sluse, René François de - Huygens, Christiaan) 84%

1655-06-13 (Huygens, Christiaan - Wallis, John) 84%

1640-02-08 (Descartes, René - Hogelande, Cornelis van) 84%

Back to top

http://ckcc.huygens.knaw.nl/epistolarium/

New Search

Faceted search | Similarity search

Similar text search

```
veel boecken gelesen
behalven Vitruvium nu
onlanx ende Stevyn Huysbouw
```

Search

☑ Use paragraph topic model

5 results   Order By: Date ▾

1621-03-26 | Groot, Hugo de (1583-1645)
Antwerpen (be) | Nassau, Maurits van (1567-1625)
[Den Haag (nl)]

1639-12-03 | Groot, Hugo de (1583-1645)
Paris (fr) | Uytenbogaert, Johannes (1557-1644)
[Den Haag (nl)]

1636-09-09 | Huygens, Constantijn (1596-1687)
Sprang (nl) | Liere, Willem van (1588-1649)
?

1694-03-02 | Leeuwenhoek, Antoni van (1632-1723)
Delft (nl) | Royal Society (London)
London (gb)

1637-05-07 | Groot, Hugo de (1583-1645)
Paris (fr) | Reigersberch, Nicolaas van (1584-1654)
Den Haag (nl)

http://ckcc.huygens.knaw.nl/epistolarium/

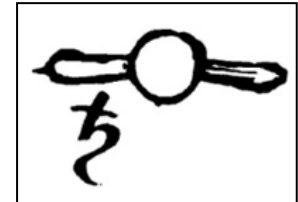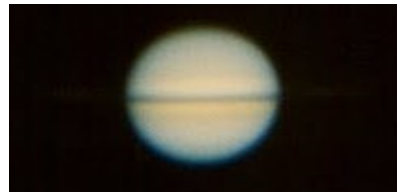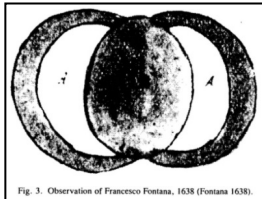http://ckcc.huygens.knaw.nl/epistolarium/

Experiment 1

Questions:

1) Who are the key players in the debate around the discoveries of the ringstructure and moons of Saturn in the seventeenth century. (long history in seven stages from 1616 - 1685)

2) Is the theory of Van Helden valid?

Conclusion:

Yes, but found app.   30% additional names

Source: Huib Zuidervaart (Huygens ING)

Experiment 2

Question

Are expressions of confidentiality in letters of Hugo Grotius representative for other 17th century correspondences as well?

Conclusion:

we found some extra references in the work of Grotius, but hardly in other correspondences

Problems:

implicit language and small data sets

source: Henk Nellen and Charles van den Heuvel

Future of Project

- Implementation of collaboratory for data enrichment and annotation and new user interfaces in a virtual research environment

- Linking letters to other: documents such as

  - Notes, working papers of scholars:

    Grotius Information Master

  - Early periodicals to study the impact of the letter format on the development of the periodical

- International cooperation for adding more letters and metadata of letters to create the critical mass necessary to test/falsify existing theories of the Republic of Letters and to develop new questions

Reassembling the Republic of Letters

A framework for radically multi-lateral collaboration on Europe's intellectual history

COST action – aim to create Europees netwerk to prepare an application to bring as many European scholarly correspondences together and to create a research infrastructure for analysis and annotation of these letters

Inititative: Howard Hotson and Thomas Wallnig (Vienna) combines collections of around 15 European countries

Intellectual Geographies of the Digital Republic of Letters

Digging into Data application

Stanford University (content of metadata), Oxford University CofK, (EMLO), Indiana University (Katy Borner/Scott Weingart topic modeling and visualization of scientific networks), Lancaster University (Spatial Humanities and Natural Language Processing, Ian Gregory and Paul Rayson) and Huygens ING (NER of geographical names and research of formal/and informal networks of knowledge

intellectual geographies

Geo maps

Mental maps

Topical maps

Source: Andre Skupin, 2005

intellectual geographies

Aim to create maps that represent knowledge distribution geographically in relation to (in-)formal networks of scholars and in relation to the development of debates over time

Source: Andre Skupin, 2005

Deep mapping

"But what we can do is inform the present more fully with the artifacts of social memory, the evidence of recall from various times and various perspectives. One means to this end is through deep mapping […]

"Each artifact […] would constitute a separate record anchored in time and space, thus allowing us to keep them in relationship, and each layer would contain the unique view over time – the dynamic memory – of an individual or a social unit."

David Bodenhamer, The Spatial Humanities. GIS and the Future of Humanities Scholarship, Bloomingtom/Indianapolis 2010, pp. 26 -27

Deep Historical Networks
in the Digital Republic of Letters

- **Enhancing understanding of the nature and topology of networks** (formal networks, informal networks of confidentiality etc.) by **combining (meta-)data of people/ topics**

- **Enhancing quality of networks as sources of historical evidence 1:** **improving topic modeling and NLS techniques** to make concepts more explicit

- **Enhancing quality of networks as sources of historical evidence 2** (**contexualization by creating multilayered networks** of notes, working papers, early periodicals, publications etc.)

- **Enhancing quality of networks as sources of historical evidence 3**(**creating interfaces for overlaying and annotating networks to express uncertainty**)

Thank You

http://ckcc.huygens.knaw.nl/