ChartEx: Discovering spatial descriptions and relationships in medieval charters

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1. Project overview

• DIGGING INTO DATA CHALLENGE

• “As the world becomes increasingly digital, new techniques will be needed to search, analyze, and understand these everyday materials. Digging into Data challenges the research community to help create the new research infrastructure for 21st century scholarship.”

• UK: AHRC, ESRC, JISC
• US: NEH, IMLS, NSF
• CAN: SSHRC
• Netherlands Organisation for Scientific Research
ChartEx Project Team

- **University of York.** History, Human Computer Interaction
- **University of Brighton.** Natural Language Processing
- **University of Leiden.** Data Mining
- **University of Washington.** History, Web Services
- **University of Toronto.** History and Digital Archives
- **Columbia University.** History and Digital Libraries

- **Data Repositories:** The National Archives (UK), Borthwick, DEEDS Project Uo Toronto, Columbia Digital Humanities

- **Advisory Panel:** various cognate projects
Why Charters?
Stories about people and places

• 408. Grant by Thomas son of Josce goldsmith and citizen of York to his younger son Jeremy of half his land lying in length from Petergate at the churchyard of St. Peter to houses of the prebend of Ampleford and in breadth from Steyngate to land which mag. Simon de Evesham inhabited; paying Thomas and his heirs 1d. or [a pair of] white gloves worth 1 d. at Christmas. Warranty. Seal.

• Witnesses: Geoffrey Gunwar, William de Gerford[b]y,' chaplains, Robert de Farnham, Robert le Spicer, John le plaster, Walter de Alna goldsmith, Nicholas Page, Thomas talliator, Hugh le bedel, John de Glouc', clerks, and others.

• January 1252 [1252/3].

• SOURCE: VC 3/Vi 326 (161 mm. x 137 mm.)

• ENDORSEMENT: Petergat', Donacio facta vicariis de domo que fuit Thome aurifabri; Simonis Evesham.

• SEAL: Slit.' Hole in MS.

• NOTE: See 403.
Why Charters?

History: the analysis of social, cultural and economic networks

- First establish the locations in which people lived
- Then map other data (here about poverty) onto those patterns.
- ChartEx – going beyond the manual capture of data.
Why Charters?
Heritage: going beyond buildings to people and lived environments.
ChartEx: Digging with Technology

- Automatically identify key parts of documents and extract them using natural language
- Automatically identify new relationships and knowledge through data mining
- Allow users to explore and understand the information available with user interfaces that support the types of complex tasks professional researchers do
ChartEx architecture

Charter Documents

Language processing

Analysed documents

Data Mining

Analysed integrated documents

Researchers workbench
2. Manual markup

Training data for NLP and DM
Step 1a: Identify Entities

• Initial examination charters for entities about actors, sites and events..........

• 408. Grant by **Thomas** son of **Josce goldsmith** and citizen of York to his younger son **Jeremy** of half his **land** lying in length from **Petergate** at the churchyard of St. Peter to houses of the **prebend of Ampleford** and in breadth from **Steyngate** to **land** which **mag. Simon de Evesham** inhabited; paying **Thomas** and his heirs 1d. or [a pair of] white gloves worth 1 d. at **Christmas**. Warranty. Seal.
Step 1b: Identify Relationships between Entities

- Initial examination of charters for relationships between entities ...

- 408. **Grant by** Thomas *son of* Josce goldsmith and citizen of York *to* his *younger son* Jeremy of half his land lying *in length from* Petergate at the churchyard of St. Peter *to* houses of the prebend of Ampleford and *in breadth from* Steyngate *to* land which mag. Simon de Evesham *inhabited*; paying Thomas and his heirs 1d. or [a pair of] white gloves worth 1 d. *at* Christmas. Warranty. Seal.
Representing relationships

1d every Christmas

rent

from

subject

to

length

breadth

from

to

father

father

occupation

goldsmith

GRANT

Thomas

from

to

Jeremy

father

Josce

Dimension1

Dimension2

Petergate

Ampleford

Steyngate

Simon’s land
Step 1c: BRAT tool

NLP Training Methodology

50 documents

Unmarked Documents

Newly marked documents

Training documents

NLP
ChartEx NLP architecture (work in progress)
Data Mining
(work in progress)
3. Interaction
Virtual Workbench

• Contextual inquiry conducted with 8 historians
  – “Bring your own charters” sessions
  – Studied how historians work with documents, the ways they construct their mental models of a problem and the types of information they record
Virtual Workbench (2)

• Transcription and analysis identified three distinct stages of work:
  – Working with collections – finding documents of interest
  – Investigating relationships – exploring a small set of documents for particular entities
  – Building models – creating own view of data contained in documents, sometimes adding external knowledge

• Currently most systems only support the first step well, and occasionally the second step
4. Challenges
Markup challenges

• Designing a markup scheme – we used the KANGA methodology (originally from the OS)
• Annotating documents – we used BRAT
• Interdisciplinarity – we used our HCI team to elicit the markup language from our Historians and applied it using a tool designed for Bio-NLP markup!
• Maintaining focus on task in hand was sometimes difficult
• Establishing good markup practices (inter-annotator agreement tests etc.) required effort.

Issues with Charter data

• Medieval shorthand (especially of Latin)
• Status of ‘apparatus’ – editorial additions or corrections made over the years
• OCR errors (of course)
• Different markup conventions, or different interpretation of markup conventions such as EAD (Eg main transaction type – data or metadata?)
• Interesting relationships and mixing between Latin and English
• Information omitted during transcription – notably, locations. (TNA are putting them back for us!)
5. Conclusions
Conclusions

• Steady progress overall – markup phase completed successfully, technical work now coming into its own

• Interesting interdisciplinary challenges – methodologies, analytic approaches, vocabularies etc.

• Lots of positive engagement from all parties to keep us all sane!