On the Trail of Spatial Humanities

Historical Materials and Geographic Information Systems for Digital Humanities Projects

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Merrick Lex Berman

Center for Geographical Analysis
Harvard University
Goals of Digital Humanities

- access to cultural / historical information
- tools to find, browse, mashup, query, map, and analyze this info
- communicate the resources, topics, and findings of digital scholarship
- utilize digital resources and methods for teaching and learning
- connect communities (across disciplines, across sectors, and the public)
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movement from

introverted projects by individual scholars ->

to collaborative cross-disciplinary projects ->

to exposing data and methods to wider academic communities & the public.
Challenges in Digital Humanities

how to bridge the gaps between

(a) primary sources
(b) scholars with domain expertise
(c) technical implementations

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large investment up front for organizing, digitizing, transcribing, annotating historical texts, images, facts and figures so they become accessible to the scholarly community.

further development is needed to make the digital resources useful for analysis, and to expose them, or at least their metadata, in machine readable formats, which enables integration and re-use across the broader community of potential users.
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*From raw data -> well organized information -> analysis -> knowledge*
History

(a) evidence
(b) “facts” (attestations)
(c) people, places, events
(d) narratives
(e) historiography

geographic & temporal scale
Historical Research ~ Spatial Humanities

**History**

(a) evidence  
(b) “facts” (attestations)  
(c) people, places, events  
(d) narratives  
(e) historiography  

geographic & temporal scale

**Geographic Information Systems**

(a) geodata (spatial objects)  
(b) “features” (attestations)  
(c) locations, areas, networks  
(d) spatial relations (adjacency)  
(e) networks, morphology  

geographic & temporal scale
<table>
<thead>
<tr>
<th><strong>History</strong></th>
<th><strong>Geographic Information Systems</strong></th>
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<tr>
<td>(a) evidence</td>
<td>(a) geodata (spatial objects)</td>
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<td>(b) “facts” (attestations)</td>
<td>(b) “features” (attestations)</td>
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<td>(d) narratives</td>
<td>(d) spatial relations (adjacency)</td>
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geographic & temporal scale

<table>
<thead>
<tr>
<th><strong>Spatial Humanities</strong></th>
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<tr>
<td>textual analysis</td>
<td>★ visualization</td>
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<tr>
<td>description</td>
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<td>world-building</td>
<td>★ synthesis</td>
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<td>delineation</td>
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<td>map-making</td>
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Vector and Raster (Grid) Formats

- **Point**
- **Line**
- **Polygon**
- **Grid**
Spatial Objects relate to Attributes
Symbolization of numerical classes

JapanG 1887 - Sample Map

Kokudaka
- 0
- 0 - 17559
- 17560 - 26851
- 26852 - 38972
- 38972 - 57261
- 57261 - 185420

Symbol

Color ramp: BuPu

Table:

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<th>Symbol</th>
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<td>57261.0000 - 185420</td>
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Lattices and grids

Reference Frame

2D Lattice

3D Lattice

3D Grid

Data Values

2D Grid

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<tr>
<td>9</td>
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</table>
Classified raster data with hillshading
What software is used for GIS?

**Desktop GIS**
- ArcMap
- QGIS
- GoogleEarth

**Webmaps**
- GoogleMaps API
- Worldmap
- Leaflet

**Statistical Packages**
- R
- Stata
- Spss
Desktop GIS compared to webmaps
Google Maps compared to desktop GIS
Proprietary basemaps vs. Public data
GIS + webmaps + collaboration = WorldMap
Creating a collaborative project on WorldMap
Rectifying a scanned map using Warper

http://warp.worldmap.harvard.edu/
Export as WMS using Warper
Warped map is added to WorldMap project
Mapping Objects from Digital Collections

[db0031] Celebration of the 30th Anniversary of the Russo-Japanese War
Collect Metadata, Create Feature

Item Details

<table>
<thead>
<tr>
<th>Title, English</th>
<th>[db0031] Celebration of the 30th Anniversary of the Russo-Japanese War</th>
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<td>211 MNEMONIC DEVICES</td>
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<td>520 RECREATION</td>
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<td>Description/Critical</td>
<td>Parade in Mukden/Shenyang to celebrate the 30th anniversary of the Japanese victory in the Russo-Japanese war of 1904/1905.</td>
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<td>Coverage/Location</td>
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<td>Shenyang</td>
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<td>Coverage/Location, Country</td>
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<td>Description/Ethnicity</td>
<td>Japanese</td>
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<td>Relation/IsPartOf</td>
<td>East Asia Image Collection</td>
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<td>Gerald &amp; Reita Warner Manchuria Negative Collection</td>
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<td>Format/Medium</td>
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<td>Date/Image, Upper</td>
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<td>Date/Image, Lower</td>
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<td>Item URL</td>
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</tr>
</tbody>
</table>

Object Metadata

- **Location**: Mukden (Shenyang)
- **Title**: Russo-Japanese War Parade
- **Date**: 1935-03-10
- **URL**: http://digital.lafayette.edu/collections/eastasia/warner-negs-manchuria/db0031

how to video
GIS Examples: CHGIS

(a) based on changing administrative divisions over time
(b) contains relationships between administrative units
(c) can be used to model change over time as a network
Buddhist Temples Index
### Geocoding Locations in Source Text

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<td>廣南府</td>
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### Temple Information

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<td>2220</td>
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<td>Site ID</td>
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<tr>
<td>Location</td>
<td>大和县苍山十六峰</td>
</tr>
<tr>
<td>Established</td>
<td>唐开元中</td>
</tr>
<tr>
<td>Notes</td>
<td>今名三塔寺，七楼八殿三塔</td>
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## Mapping the Geocoded Points

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Distribution of the Geocoded Buddhist Sites

Buddhist Temples in China

- 1 temple
- 45 temples

src: Da Qing Yitongzhi as listed in "Chugoku no Jiin" Yajima Genryo

map: Lex Berman (c) CHGIS, 2004
Revealing Bias in Sources
Time, price, and distance

A long-range route simulation from Carthago (in present-day Tunisia) to Londinium (London) highlights difference in outcomes depending on priority, mode, and season.
Ming Dynasty Courier Routes & Post Offices

http://maps.cga.harvard.edu/chinapostoffice
Japanese Historical GIS Examples

- Edo Nagoya GIS
  - Mizoguchi

- Meiji GIS
  - Murayama

- Skinner Meiji
  - Skinner

- Tokugawa GIS
  - Berman

- Tokyo Urban History
  - Loren Siebert

- Historical Maps
  - David Rumsey

- Agricultural History GIS
  - NIAES

- Castle Explorer
  - Dan O’Grady

- Kyoto Historical Photos
  - Kondo / Yano / et al

Hiroshi Kawaguchi  Progress in Historical GIS in Japan

links to various Japan HGIS resources
The Future of Spatial Humanities

*movement away from*

- Creation of large GIS databases
- Creation of “one-off” datasets for single projects
- Creation of custom site-specific or dataset-specific platforms
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*Moving toward*

- Open platforms with multiple access methods (UIs, APIs, RDF)
- Feeds and web-services that are easy to integrate or mash-up
- Queries based on spatial and temporal extents + space time visualizations
- Curation of selected data for analysis, annotations & markup by experts
Exemplars: Spatial History Project

The Spatial History Project

- A Data Model for Spatial History
- Machado de Assis: Memórias Póstumas
- Colorado Railroad Accidents, July 1884 - June 1895
- Neoliberalism, Civic Participation and the Salmon Industry in Southern Chile
- When the Loss of a Finger is Considered a "Minor" Injury
- Land Speculation in Fresno County: 1860-1891
- Building the New Order: 1938-1945
- Chasing an End to Perpetual Deforestation
- From Salt Ponds to Refuge in San Francisco Bay
- Prostitution in Philadelphia: Arrests 1912-1918
- Union Pacific Shipping from Nebraska: Forwarded/Received
- Union Pacific Shipping from Nebraska: East/West
Examplars: Addressing History
Examplars: VGI Volunteer Geo Information

http://whaling.oldweather.org/#/

http://buildinginspector.nypl.org/
Open Data is the new paradigm
Working demonstration projects

http://worldmap.harvard.edu/maps/manchukuo

http://maps.cga.harvard.edu/ncc/