Mapping Museums: Research challenges and approaches

www.mappingmuseums.org

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Joint work with Dr Andrea Ballatore, Dr Jamie Larkin, Nick Larsson
Challenges of developing specialised KBs to support Humanities research

- lack of existing ontologies or datasets on which to base the design of the KB, due to the specialisation of the domain
- the development of conceptualisations and knowledge models is part of the research itself
- incremental collection and collation of data from diverse sources; additional data sources become known/available during the course of the research project
- incremental development of the conceptual model in tandem with the incremental collection of the data
- sometimes uncertainty, controversy and multiple viewpoints from the range of domain stakeholders, that need to be discussed and resolved
Challenges of developing specialised KBs to support Humanities research

• incompleteness, imprecision and contradictions in the data
  – data quality typically improves during the course of the research
• difficulty in specifying researchers’ requirements for facilities to Search, Visualise and Analyse the data while the conceptual model development and data collection are still in progress
• these requirements continue to evolve as the conceptual model and data continue to evolve
Mapping Museums: the history and geography of the UK independent sector 1960-2020 (AHRC, 2016-2020)

- This project is providing the first evidence-based history of the development of the UK’s independent museums sector and the links to wider cultural, social, and political concerns
- As such, it aims to contribute to scholarly understanding of British culture, be useful for policy makers and arts funders, and also be of interest to the general public
Mapping Museums

• During the first 18 months of the project, the research team gathered and codified data on some 4000 UK museums.

• A major part of the project has been the modelling and representation of the knowledge about the museums sector in the form of an RDFS ontology.

• Combined with, in parallel, the design and development of a suite of Browse, Search and Visualisation facilities to be supported by the KB.
Mapping Museums

• The project is the first to produce an authoritative database of museums opening and closing during a period of rapid expansion and change in the sector

• Ongoing research using the database is seeking to identify trends in the development of independent museums:
  – when museums opened
  – if there is a link between where/when they opened and their subject matter
  – if there are areas where few museums opened or survived
  – and if these patterns correlate to other broader cultural or social factors
Data Collection

- There were no directly usable digital datasets, and all of the data had to be entered manually into an evolving "master" spreadsheet, plus additional auxiliary s/sheets.
- The Digest of Museum Statistics (DOMUS), 1994-1999, was used as the starting point (around 1,800 museums).
- OCR techniques were also used to process photographs from the Association of Independent Museums archive (housed at the University of Leicester).
- Additional contemporary and historical datasets from various organisations (e.g., Arts Council England, Museums and Galleries Scotland, Association for Independent Museums) were then incorporated.
- Use of online resources such as museums' websites and Wikipedia resulted in a wider spread of entities that are considered as being "museums" by the public.
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Problems with the data

• Lost e.g. the Museums.UK Database (1987)
• Poorly archived e.g. lack of explanation of the coding in the Digest of Museum Statistics (DOMUS) (1994-9)
• Inaccessible e.g. commercial collections behind paywalls
• Dispersed, collected by different organisations and stored separately
• Inconsistent e.g. definition of museums, visitor numbers
Data Collection

• To mitigate these problems, the project team used online search engines, digital resources (BBC 1986 Domesday project, TripAdvisor), physical resources (Hudson and Nicholls 1985 Museum Directory), historic guidebooks, consulted subject specialists (Museums Development Network), made hundreds of telephone calls, conducted email and twitter correspondence.

• The outcome of the first phase of data collection (at 15 Months) was a main excel s/sheet comprising over 50 items of data relating to around 4000 museums
  – also two additional s/sheets of historical data relating to changes in Governance Status and Visitor Numbers over time.
Research Approach

- Evident from the outset that the gradual collection of diverse data and gradual development of understanding about the required functionality of the KB would require an **iterative, agile** methodology to be adopted.

- Also pointed to the need to adopt **semantic technologies** in order to develop the KB and search facilities:
  - the different relationships between entities can be described in fine detail
  - both the conceptual model and the data can be extended with new triples as new knowledge/data accrue
  - possible to integrate the evolving MM ontology with other existing taxonomies, e.g. for UK geographical regions (ONS) and the DOMUS subject classification
Research Approach

• Co-developing **graphical conceptual models** from the outset of the project has allowed us to gradually develop a common understanding across the whole team of the information that the KB will contain

• These were initially hand-drawn diagrams on paper, whiteboards, powerpoint

• And were subsequently modelled using the yED tool:
  – the format of the main Museums data spreadsheet was kept “in synch” with this evolving conceptual model
  – most of the graphical specification was automatically extracted from the metadata header of the Museums data spreadsheet (using Python)
  – additional modelling was added manually as required, e.g. for historical attributes (changes in Governance status, visitor numbers data) and the ONS administrative area hierarchy
Zooming in on: Governance
Data sources
Museums that opened in 1980
Museums that opened in 1980

1980 [69]

- 10 STAFFORD TERRACE
  Subject: Unknown

- AIRLEY HALL
  Subject: Unknown

- AUTOMOBIA MOTOR MUSEUM
  Subject: Unknown

- AUTOMOBIA TRANSPORT MUSEUM
  Subject: Transport: Cars and motorcycles

- AYCLIFFE AND DISTRICT BUS PRESERVATION SOCIETY
  Subject: Transport: Buses and trams

- BANCROFT ENGINE MILL TRUST
  Subject: Industry and manufacture: Textiles

- BANWELL MUSEUM
  Subject: Archaeology: Mixed

- BODELIO WEAVING CENTRE
  Subject: Arts: Costume and textiles

- BONNIES & KINNEIL RAILWAY
  Subject: Transport: Trains and railways

- BROADFIELD HOUSE GLASS MUSEUM
  Subject: Unknown

- BUXTON MOTOR MUSEUM
  Subject: Unknown

- CLYDEBANK MUSEUM
  Subject: Unknown

- COLDSTREAM MUSEUM
  Subject: Unknown

- CORRIGALL FARM MUSEUM
  Subject: Unknown

- COULTERSHAW HERITAGE SITE AND BEAM PUMP
  Subject: Utilities: Water and waste
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Museums that opened in 1980

- **Accreditation**: Unaccredited
- **Governance**: Government Local Authority
- **Governance Change**: Government Local Authority from 1989 to 1989
- **Governance Change**: Independent/Not for profit from 1989 to 1989
- **Subject Matter**: Personality/Other
Search

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<td>1984</td>
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Year open = 1980
Year open = 1980
Visualise

Number of museums by Subject Classification

Year: 2017
Visualise

Number of museums opening over time
Visualise Number of museums opening over time, by Governance type
Visualise Number of museums opening and closing over time

Opening and closing at location UK

- Year closed
- Year opened

Options:
- Visualisations
  - Number of museums
    - open at a given time
    - that opened up to given time
    - open over time
    - openings over time
    - closings over time
    - openings and closings over time
    - All
  - Plot
    - X
      - Governance
      - Classification 2018
      - MM size
      - Location
    - Y
      - Governance
      - Classification 2018
      - MM size

Graph showing the number of museums opening and closing over time.
After First Phase of Data Collection

Levels of completeness:

- opening dates: 88%
- closing dates: 6%
  - 13% known to have closed but year unknown
- governance: 92%
- visitor numbers: 67%
Managing Missing Data

**Option 1:** Exclude museums with missing data from any relevant visualisations or analyses
  - not adopted

**Option 2:** Create a sub-category of ‘Unknown’ under relevant categories
  - adopted for Governance and Visitor Numbers
  - new attribute Museum Size is inferred as Large, Medium, Small

**Option 3:** Record date *ranges* for opening/closing dates
Using date ranges

**Browse**: the date is taken to be the mid-point of the interval

**Search**: modal logic operators for comparing dates
(Definitely/Possibly)

**Visualisations**: opening/closing event occurrence is spread equally across the whole date interval
Search

Year open possibly equals 1980
**Results (363)**

<table>
<thead>
<tr>
<th>Name of museum</th>
<th>County</th>
<th>Town or City</th>
<th>Subject Matter</th>
<th>Year opened</th>
<th>Year closed</th>
<th>Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 Stafford Terrace</td>
<td>London</td>
<td></td>
<td>Personality: Other</td>
<td>1980</td>
<td>Still open</td>
<td>Government: Local Authority</td>
</tr>
<tr>
<td>19 Princelet Street</td>
<td>London</td>
<td></td>
<td>Other</td>
<td>1975-2000</td>
<td>Still open</td>
<td>Independent: Not for profit</td>
</tr>
<tr>
<td>Ash Museum</td>
<td>Surrey</td>
<td>Ash</td>
<td>Local Histories</td>
<td>1960-2017</td>
<td>Still open</td>
<td>Independent: Not for profit</td>
</tr>
</tbody>
</table>

Year open possibly equals 1980
Ongoing work

• Finalising the Web Application, autumn 2018
• Development of full project Website, 2019
• Support of humanities scholars’ ongoing research, 2018-2020; e.g. for a first analysis of Museum Closures 1960-2017 see http://blogs.bbk.ac.uk/mapping-museums/2018/02/23/museum-closure-pre-findings/
Publication

- KB and Web Application freely accessible on a dedicated website
- Dataset will be published and freely available as Linked Open Data
- Project software is open-source and GPL licenced
- Hard copies of the dataset will be archived in the Micromuseums Archive at the Bishopsgate Institute
- Translated versions of historic surveys will be published online