Computational Archival Practice
Towards A Theory for Archival Engineering

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Value Proposition

The ultimate value of archival science is in its contribution to increasing and improving knowledge of the past.
“Science is about knowing. Engineering is about doing.”
Henry Petroski
Archival Engineering

Definitions

- **Archival engineering**
  the systematic application of archival science to deliver optimal value in the provision of archival goods and services.

- **Archival goods**
  the materials preserved by archives and information about them.

- **Archival services**
  actions that support the discovery and delivery of these goods and enable evaluation of qualities, such as relevance, adequacy, authenticity and reliability as related to the interests of consumers.
Questions

1. What is involved in knowing the past?

2. How can archival science be applied to maximize its value in the production and improvement of this knowledge?

3. How the contribution of archival science can be assessed?
Knowing the Past

- The past does not exist.
- The past is something that is constructed by thinking, writing or speaking about former times.
Structural Concepts

- **The Building**: **Target Past**: the intended or actual result of a construction of the past, consisting of information about an object, event, process, action, activity, person, agent or state of affairs, or some combination of these, that existed or occurred at a prior time.

- **Components**:
  - **Event**: something that happened.
    - **Process**: a set of related events that start from a beginning and lead towards an end.
  - **Action**: an event in which at least one agent is actively involved.
    - **Agent**: a person, system or device that is involved in the performance of an action.
    - **Activity**: a set of related actions; i.e. a process wherein all events are actions.
  - **Person**: a human or legal entity.
  - **State of affairs**: a set of one or more related objects or persons where one or more specified characteristics are invariant.
Construction Site: Context

- **Constructed Context**
- **Historical Context**
Context

• “The interrelated conditions in which something exists or occurs.”
• A set of coherent assertions that clarify something in a target past.
• **Contexted object** (aka contextually situated object): an object considered in relation to a set of circumstances that clarify its existence, occurrence or characteristics.
• **Contextual element**: a part of the circumstances that clarify a contexted object.
• Qualification of an object as contextual or contexted determined by its role in construction.
Building Design: Purview

- Scope
- Topics
- Intent
- Methods of investigation and processing the resultant data
**Constructed Context**

- Determined by the **purview**
  - Elements are limited to those relevant to the purview.

- Types of **constructed context**:
  - **Inferred** ("as built"): from information about the target past
  - **Imposed** (architectural): based on criteria derived from the purview
    - may be independent of **historical context**
Historical Context

- Evinced or discovered in construction materials
- Contemporaneous
  - The contextual and contexted objects and their relationships existed either at the same time or in immediate succession.
- Essentially independent of purview
Types of Historical Context

- **Coherent**: all contextual and contexted objects and their relationships were part of the same whole
  - e.g., records within an archival fonds

- **Coincident**: if not part of a single whole
  - e.g., authors of acquired records
Linguistic Context

- A subtype of coherent historic context comprising text and ‘context’ as defined in Systemic Functional Linguistics
  - “Text:” language that is used to accomplish something, to do some job.
  - “Context:” language that is with the text, relating it to the situation in which the text is used.
Construction Materials: Tokens

- **Token** (def.): a persistent representation of one or more elements of a Target Past.

- The representational function of a **token** may be fulfilled by its content, form, expression, context or a combination of these.
Tokens

• The referent of a token is determined by the purview of the target past.

• A document may be valued because of what it says about its subject(s)
• what it reveals about its author.
• what it reveals about a state of affairs in which it was used.
• what it reveals about how agents communicated.
Tokens

A surviving artifact is a token of its contextualized self.
Intent
From Archival Science to Archival Engineering

- Ultimate value: increasing and improving knowledge of the past.
- Archival engineering should aim to improve both the process and the results of the construction of target pasts and the evaluation of the results,
- Using insights offered by archival science,
  - expanded to a broader scope,
  - adapted to unprecedented aspects of digital information and
  - optimizing automation.
Record: Token

- Qualified not by inherent properties, such as content, form or organization, but based on relationships to actions, agents and other record:tokens

  Problems with the conceptualization of ‘record’

- Limited to be instruments or byproducts of an activity, excluding products

- Sets are defined on the basis of “records creators” and their retention in record keeping systems.

- “Original order,” or the organization of sets of records can express but may not be identical to the relationships arising from their use.
Archival Token

• A type of conceptual object
  • Capable of different instantiations,
  • With content, form and expression that are either invariant or predictable based on specified bounded variability.
• A historical token that represents an object or objects from a former time and has a rich historic contextual proximity to its referent;
  • Archival context:
    • An agent or agents who had or had access to the token
    • An action or activity in which the token was used or intended for use by the agent(s).
Archival Context

• A supergraph of the archival links among tokens used in an action or activity.

• The use of an archival token establishes an archival link between that object and other archival tokens used in the same action or activity.

• Archival link is derived from the concept of archival bond

• Archival link extends the concept of linguistic context to reveal and preserve contextual relationships among texts.
Archival Bond(Agent$_1$)

Needs Assessment

Initial Message

Response

Archival Fonds
Archival Bond($Agent_2$)

- Initial Message
- Response
- Policy
- Resource Data

Archival Fonds

Agent 2
Inferred Constructed Context

Coherent archival edge

Coherent organizational edge

Coincident edge

Linguistic edge
## Archival Token v. Record

<table>
<thead>
<tr>
<th>Record</th>
<th>Archival Token</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often defined as “affixed to a medium”</td>
<td>Conceptual</td>
</tr>
<tr>
<td>Qualified as record based on its production, acquisition and <strong>retention</strong></td>
<td>Qualified based on agents and actions in which the agents used the token</td>
</tr>
<tr>
<td>Archival bond encompasses all records used in an activity, and does not distinguish subgraphs.</td>
<td>Archival context differentiates binary relationships between archival tokens from the total graph of relationships among all archival tokens used in an activity by an agent or set of agents.</td>
</tr>
<tr>
<td>In practice assumes that the archival bond is completely represented in the arrangement of records</td>
<td>Record keeping may express relationships that arise in use, but adds context via selection for retention and organization</td>
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<tr>
<td>In principle, limited to a record collection.</td>
<td>Not limited by record keeping</td>
</tr>
<tr>
<td>All records are archival tokens</td>
<td>Not all archival tokens are records</td>
</tr>
</tbody>
</table>
Quantitative Evaluation

- Enabled by application of approaches such as graph theory or set theory

- Determined by criteria derived from the value proposition for archival engineering and definition of its basic terms.