

# Using Data Visualisation to tell Stories about Cultural Collections

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## Abstract

The work presented here is concerned with visualisation of digitised museum collections and archives, focusing on the relationship between data, visualisation and narrative. A contrast is presented between visualisations that show “just the data” and those that present the information in such a way as to tell a story using visual rhetorical devices such as trees and streams. The role of interaction in negotiating the tension between communicators'/researchers' desire to tell stories about their discoveries and the need for users to interact freely is explored. Novel visualisations of data from the Wellcome Library are used to outline key research questions.

## Author Keywords

Design; HCI; Time; Visualisation; Museums; Narrative.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## Introduction

Cultural institutions have become swamped with digital data. Digitising the objects, images and texts in their collections has resulted in millions of electronic records. The British Museum has over 900,000 images in its digital collection and at present is adding 2,000 new

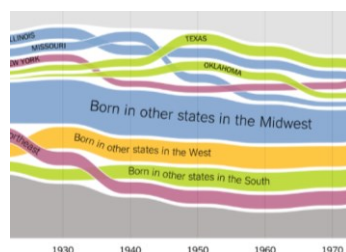


Figure 1: Detail from *Where We Came From and Where We Went, State by State*, from the New York Times, 2014.

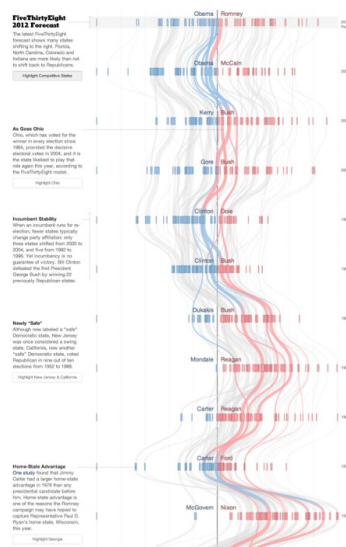


Figure 2: Detail from *Over the Decades, How States Have Shifted*, from the New York Times, 2012.

ones each week. How can museums, archives and libraries make sense of it all? My research explores how data visualisation, and particularly timeline tools, may be used to reveal patterns and insights, and to present stories about collection data. I explore the role of interaction in achieving a balance between the narrative flow intended by a museum and story discovery on the part of the user.

## Background

My colleagues at the Royal College of Art and I are interested in time as a graphic organising principle. We aim to develop interactive visualisations that are sufficiently sophisticated for use in investigating research questions, not just in presenting history to the general public [1, 2]. We also propose that some sophistication in representing history is called for even when designing for wider audiences [6].

Where I intend to break new ground is in researching how to represent narrative and narrative rhetoric in visualisation. Visualisations can show either “just the data” or deliberately present the information in such a way as to tell a story using visual rhetorical devices such as trees, streams or other geometric shapes. It is my intention to explore the use of these devices in contemporary interactive digital media.

Digital storytelling is currently a popular term in museum practice [8]; however it is rarely used to refer to storytelling through data visualisation. Typical “digital stories” from the museum sector resemble

long-form articles with digital media built in and around the text.

I’m particularly interested in applying the sorts of techniques currently used in data journalism to combine narratives with interactive graphics (see figures 1 & 2) [7, 3, 4]. Typically in data journalism, visualisation is used for quantitative data and the presented narrative often heavily relies on accompanying text. How might a designer build similar visualisations using collection data? And how might a designer adopt this type of interactive graphics to visualise qualitative trends over time?

This project will both aid researchers to capture meaningful connections between data-points and present them to others, and enable stories about historical data to be presented to the wider public. While the balance between author-driven and reader-driven narrative has been explored in data journalism [7], I am interested in exploring the role of interactivity in telling stories about historical data.

## Research Approach and Methods

My research approach is to make a number of prototype visualisations/visualisation tools with digital collections across a range of conceptual domains. I’m currently working with external partners at the British Library, where I am a researcher under the BLLabs program, at the Science Museum and at the Wellcome Library.



Figure 3: Visualisation of Medical Office of Health Reports data at Wellcome Library: 'typhoid carrier'.

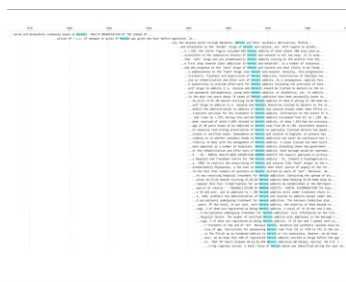


Figure 4: Visualisation of Medical Office of Health Reports data at Wellcome Library: 'heroin'.

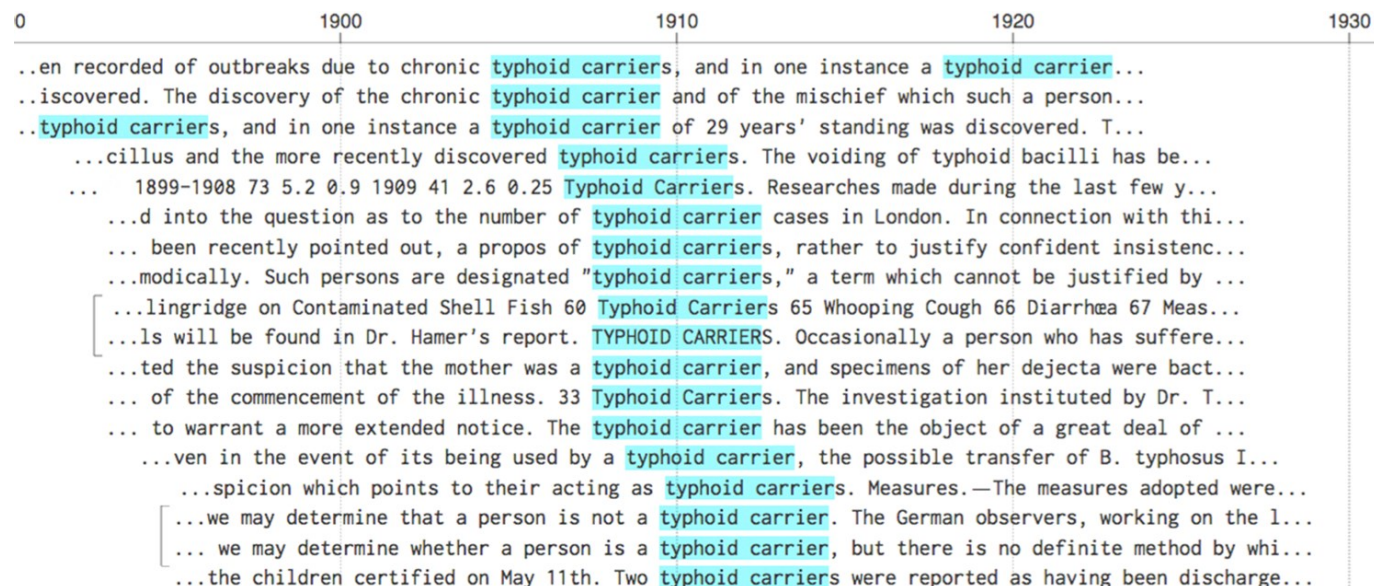


Figure 5: Detail from visualisation of Medical Office of Health Reports data at Wellcome Library: 'typhoid carrier'.

Kräutli showed that prototyping in this context is most productive in dialogue with curators/collection experts rather than general users [5]. I will be adopting this approach to testing my visualisations.

My most recent work has been with a collection of historic public health reports from the Wellcome Library: the Medical Officer of Health Reports. This collection consists of around 6,000 volumes between 1848-1972. Optical Character Recognition has been applied to the reports with high accuracy.

Rather than visualising quantitative data, I am interested in tracing commentary and attitudes around particular themes through time, and in digging into the text content, over exploring the shape of the collection as a whole.

The visualisations I have built with this data (see figures 3, 4 & 5), using JavaScript and D3.js, show every instance in all 6,000 reports of a particular search term with a snippet of surrounding text. Each snippet is horizontally centred on its date.

In this way it is possible to see every instance of a search term in these reports with the context of what is being said, and to compare those contexts over time.

Stacking the snippets in order of ascending date results in a slope stretching from order to newer. Additional meaning can be gained from the overall resulting shape. For instance, the strong column on the right of the visualisation for 'heroin' (figure 4) indicates an increase in frequency of use of the term in these reports 1960 onwards.

And to explore other terms connected with the original search term, a user can further filter and highlight the snippets using an input box.

Conducting conversations/interviews with collection experts around these visualisations will be the next step with this work. These dialogues will explore the degree of users' agency in interacting with the visualisations and setting the theme for their own investigations.

### Research Questions

As I investigate narrative form in relation to data, several questions arise:

- What role can interaction and animation play? And what form(s) should be adopted – what is the 'vocabulary' of graphics best suited to the task?
- To what degree can a story be brought out using computation? Do narrative visualisations always require a high level of authoring?
- Who narrates? Can there be a balance between museums encouraging users to construct their own

narratives and explore, and offering stories about the collection?

- What forms of inquiry are best framed in narrative terms?
- What literary narrative devices can be translated into visual terms, and what does narrative theory have to offer?
- How can rapid apprehension be supported from uncluttered displays, but still provide depth of information where it is needed?

### Anticipated Contributions

My PhD will likely contribute knowledge around the following questions:

- What kind of knowledge can be gained from using the visualisation tools/interfaces I propose to investigate the content of cultural collections and reveal connections across time?
- What role can interaction and visual rhetoric in visualisation play in exploring and/or presenting connections across time in cultural collections?
- Can knowledge be generated by visualising qualitative data from cultural collections across time, such as commentary found in text, that couldn't be generated using other means?

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