Research Article Summary

Paper Title: The Bohemian Bookshelf: Supporting Serendipitous Book Discoveries through Information Visualization

Author Names and Bio:

Alice Thudt

Alice is a PhD student in Computational Media Design under the supervision of Dr. Sheelagh Carpendale at the University of Calgary. She graduated from the University of Munich with a major in Mediainformatics in 2012. She is interested in how visualization can transform personal data collections into evocative mementos.

Uta Hinrichs

Dr. Hinrichs is a lecturer at the School of Computer Science at the University of St Andrews. She works with the Human Computer Interaction Group (SACHI). She received her PhD in Computer Science with a specialization in Computational Media Design from the University of Calgary where she worked with the Innovis group.She recently has been collaborating with literary scholars and historiansa, designing visualizations that can facilitate the exploration of large-scale, untapped cultural collections, such as science fiction stories, literature arounf city of Edinburgh, or 19th century commodity trading documents.

Sheelagh Carpendale

Dr. Carpendale is Canadian artist and computer scientist working in the field of Information Visualization and Human-Computer Interaction. She received her PhD from Simon Fraser University and currelty is a professor at the University of Calgary. She has received a BAFTA and leads the Innovations is Visualization (InnoVis) research group and has initiated graduate programs in Computational Media Design. Her research on information visualization, large interactive displays, and new media draws on her background in Computer Science, Art and Design.

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Likely Audiences:

HCI enthusiasts.
Librarians.
UI/UX designers.
Data Mining and Visualizations students and teachers.

Context/Background Work:

Information exploration has become a part of our everyday life. Often, a typical user is faced with a situation where s/he do not know what they are looking for. For instance, browsing through the large digital book collection at a local library, we are often confused about what the right 'keywords' would be, or what we would likely enjoy. Most search interfaces to digital data collections is targeting toward "minimizing the number of possibly *irrelevant* objects" rather than "maximizing the number of possibly *relevant* objects". This method, in the authors opinion does not facilitate '*serendipitous'* discoveries.

Structure/Main Ideas of the Paper:

The authors begin the paper by introducing the readers to the concept of serendipity. Oxford English dictionary's definition of the term is, "*the faculty of making happy and unexpected discoveries by accident".* This is followed by descriptions of five design goals in order to facilitate such '*serendipitous'* discoveries, namely:

1) Offering multiple visual access points by providing visualizations of different perspectives on the book collection.
2) Highlighting adjacencies between books.
3) Providing flexible visual pathways for exploring the book collection.
4) Enticing curiosity through abstract, metaphorical, and visually distinct representations of the collection.
5) Enabling a playful approach to information exploration.

The authors then move on to describe the 'Bohemian Bookshelf' as one possible implementation of the above listed five design goals. The paper then goes on to describe a brief implementation of the system in the University of Calgary library.

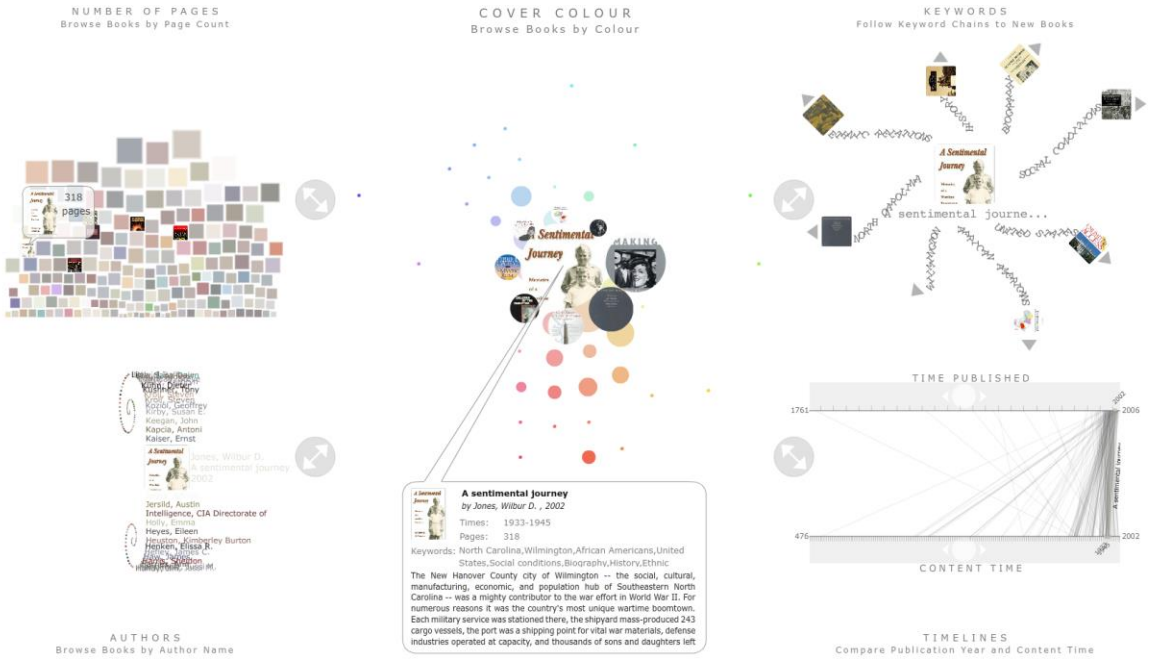
Contributions:

In terms of contribution, the authors have worked hard to describe the notion of 'serendipity'. Having gone through vast amounts of literature, they have enlisted factors that contribute to serendipity. The authors take extreme care to note that there are factors that contribute to serendipity that go well beyond its coincidental aspect. They are listed below in the same order as described in the paper.

1. Personality Traits
2. Observational Skills
3. Open-mindedness
4. Perseverance
5. Environmental Factors
6. Coincidence
7. Influence of People and systems

Methods:

This is how the Bohemian Bookshelf's dashboard looks like:

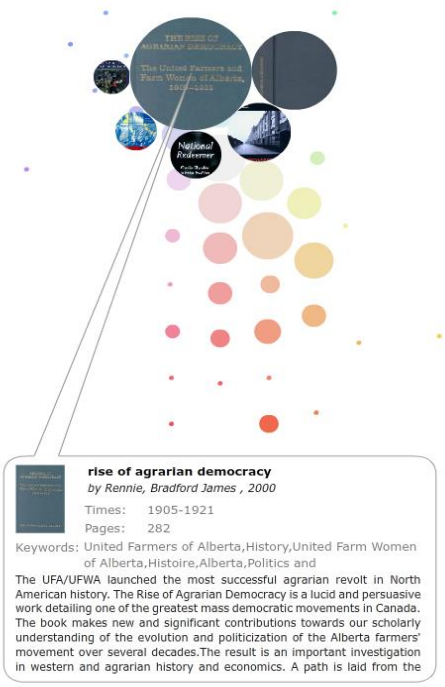


The Bohemian Bookshelf is based on a collection of 250 books retrived from the Open Library Project. The attributes the authors chose to focus on were, book title, author, keywords in the book, page count, (extracted) cover color, publication year and content era.

There are five different visualizations:

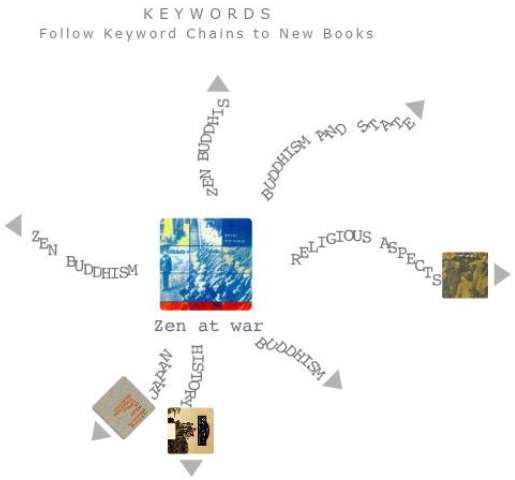
Cover Colour Circle

Covers are designed to attract attention. The cover colour circle highlights the aesthetic quality of the book by providing an overview on the palette of colors used while designing the cover. This is done by calculating the mean pixel colour from the books cover image. Books are grouped by color. It is partly inspired by etsy's 'shop by color'. Meets four out of five design goals (Visual access point, Enticing Curiosity, Playful exploration, Highlighting Adjacencies).



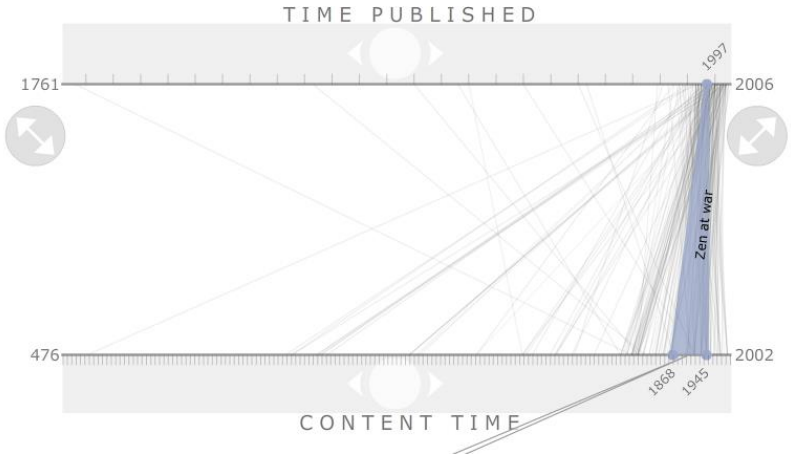
Keyword Chains

Shows a vignette of nine books connected through the central book via keywords. Meets the same four goals as Cover Colour Circle.



Timelines

Shows two parallel timelines. The top corresponds to the publication years, while the bottom corresponds to the time period the books covers. Each book is represented by a line and trends over years can be observed with just a glance. Zooming in and out is supported.



Book Pile

Physical characteristics such as thickness and weight play a role in the reading experience. A stacking algorithm is used to pile books. The thicker books get a spot on the top while thinner books move to the bottom of the pile. Selecting a book reveals the cover and the page count. Books with similar page counts are highlighted by showing their covers.

Author Spiral

The author spiral rolls up and down as we scroll through it. All the authors are arranged in alphabetical order. Selecting an author moves the book to the center and provides the preview of the cover, the author and the publication year. Author Spiral meets four out of five design goals (except providing flexible visual pathways for exploring book collection).

Design Goals	Design for serendipity through Visualization	Serendipity and the Bohemian Bookshelf
Offering **multiple visual access points** by providing visualizations of different perspectives on the book collection.	Supporting different access points to digital library catalogues encourages serendipity. Unlike physical libraries, where a book can be only at one place, digital libraries offer the chance at grouping the same book in multiple categories which users liked.	The Bohemian Bookshelf provides a variety of different perspectives on the same book collection, each providing a different access point at exploration. Providing a variety of different overviews helps address individual preferences.
Highlighting adjacencies between books.	Items in close proximity draw user attention. Adjacency can be either in terms of genre, topic, or publication year.	Each visualization in the Bohemian Bookshelf highlights adjacencies in the sense that it provides books that are in close proximity to the one that is currently selected (by colour of the cover, by number of pages). Highlighting adjacencies gave way to more new discoveries.
Providing **flexible visual pathways** for exploring the book collection.	There is a call for open-ended navigation strategies, especially for search interfaces. It provides a flexible navigation as opposed to a predetermined one. Multiple interactive overviews with possible adjacencies can provide the user with a visual guide.	There are multiple flexible pathways to trigger exploration for a user who simply does not know what to look for. a. The interlinking of visualizations helped users to fluidly switch back and forth through visualizations. b. Users deliberately chose the outliers. Smaller/larger books in

	Enabling options for multiple pathways support fluid transitions between visualizations.	the book pile or lone lines on the timeline viz. c. Emphasizing adjacencies helped users explore.
Enticing curiosity through abstract, metaphorical, and visually distinct representations of the collection.	Information seeking can be a pleasurable and an inspiring experience. Visual aesthetics can promote curiosity and initiate interaction.	The touch interface combined with the UI helped evoke curiosity in a lot of users. Many visitors appreciated the Cover Colour Circle in particular for its clean design. Many users encountered new books simply by pressing their favorite colour bubble.
Enabling a **playful approach** to information exploration.	Play as a facilitator of creativity can induce serendipitous discoveries.	The Bohemian Bookshelf is strongly focused around playful interaction to evoke curiosity and initiate exploration.

Results:

The Bohemian Bookshelf was installed on a tilted, touch-interactive display for eight consecutive days at the University of Calgary library. 11 visitors between the age groups 20-60 who interacted with the display for more than 30 seconds were interviewed. Response was mostly positive with most responses saying "*It will help me discover more books*", "*Opens up different possibilities..", "Fairly intuitive and easy to get used to*". Six visitors made personal discoveries out of which three of them found books by choosing their favorite colour in the cover colour circle.

Technologies:

The prototype was implemented in Adobe Flash. The visualizations were designed keeping in mind a large interactive touch display. It could also be integrated in a web based interface.

Relevance/Conclusion:

Although initial interactions have been positive, the Bohemian Bookshelf does raise some concerns. One such is Scalability. The current set up was done using 250 books. Most libraries have many, many more books than this. There is also a possibility to get distracted and the purpose of finding books can be 'lost'. While some users like having a choice, some did not.

However, this type of visualization can be powerful in terms of reusing the idea into other digital data collections such as newsfeeds, photos, videos or music collections.