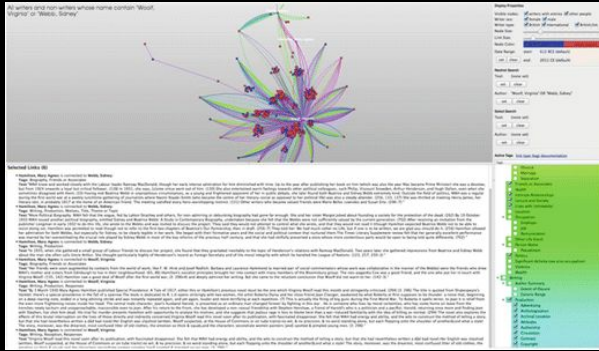


Humanities-Centered Design Features: Emergent Serendipity with HuViz

Kim Martin, Susan Brown, Chelsea Miya, and Shawn Murphy

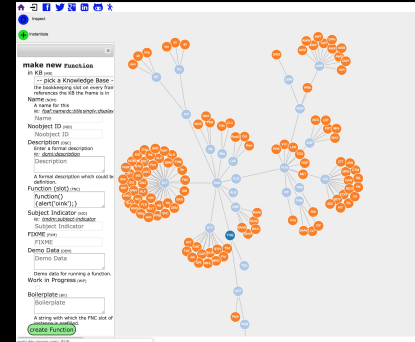


HuViz: prehistory



https://link.springer.com/chapter/10.1057/978-1-137-59569-0_5

- OrlandoVision aka OViz (2010)
- Based on Orlando text-base (XML)
- Could visualize very large dataset
- Must install desktop app and data
- Not semantic



http://noobj.dev.nooron.com/_/THG

- Nooron Noobj (2012)
- Javascript, web-based
- Self-hosting knowledge system
- Introspective, Self-visualizing
- OKBC semantics,, DARPA 80s/90s

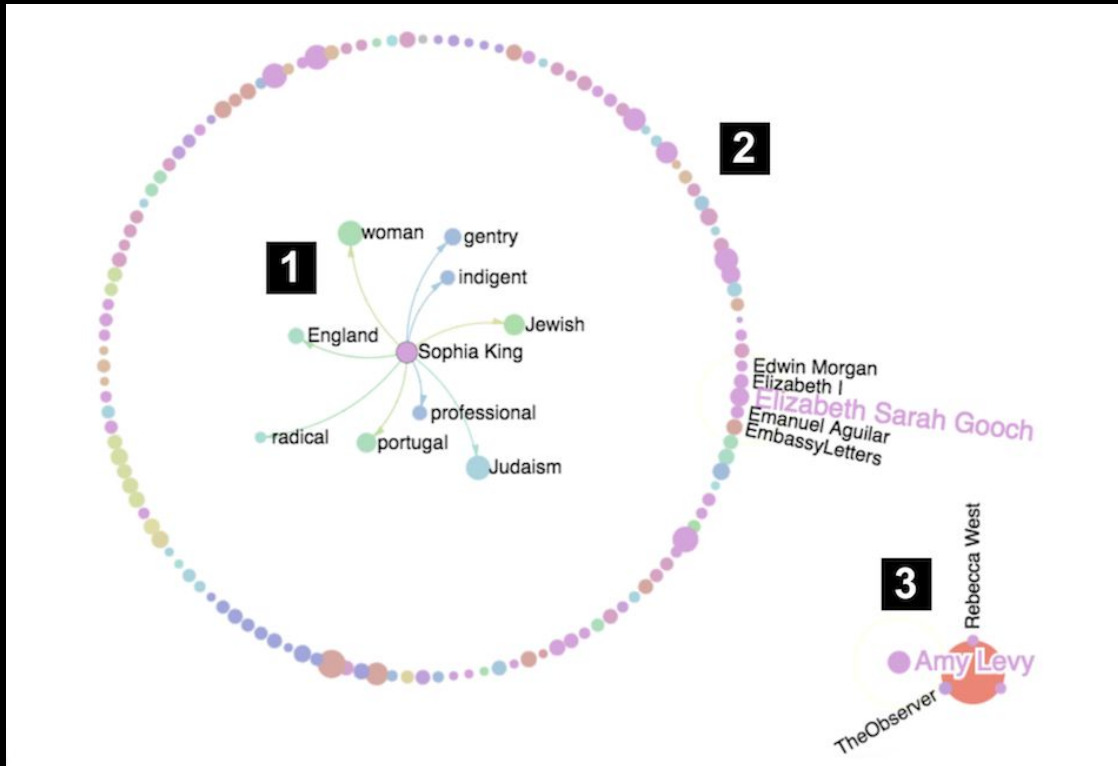
HuViz: 2012 – Present

SemWeb LOD Standards:

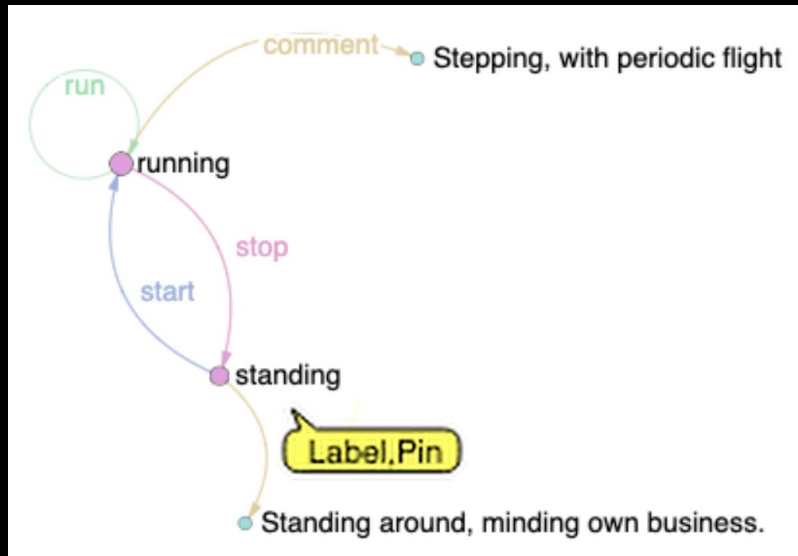
- RDF/OWL
- ttl, jsonld, trig, rdf ...
- SPARQL

The Visualization:

1. The Graph
2. The Shelf
3. The Discards



HuViz commands: <verb phrase> <noun phrase>



Current Command
Label and Pin standing .

Verbs

Activate	Select	Label	Shelve	Discard
Deactivate	Unselect	Unlabel	Hide	Retrieve
Wander	Pin			
Walk	Unpin			

Sets

All (4)

- Activated (4)
- Discarded (0)
- Graphed (4)
- Hidden (0)
- Labelled (4)
- Nameless (0)
- Pinned (4)
- Selected (4)
- Shelved (0)
- Walked (0)

Class Selector

Thing ▼ (0/0)

Literal ▼ (0/0)

rdf__PlainLiteral (2/2)

State (2/2)

Edges of the Selected Nodes

anything ▼ (0/0)

comment (2/2)

run (1/1)

start (1/1)

stop (1/1)

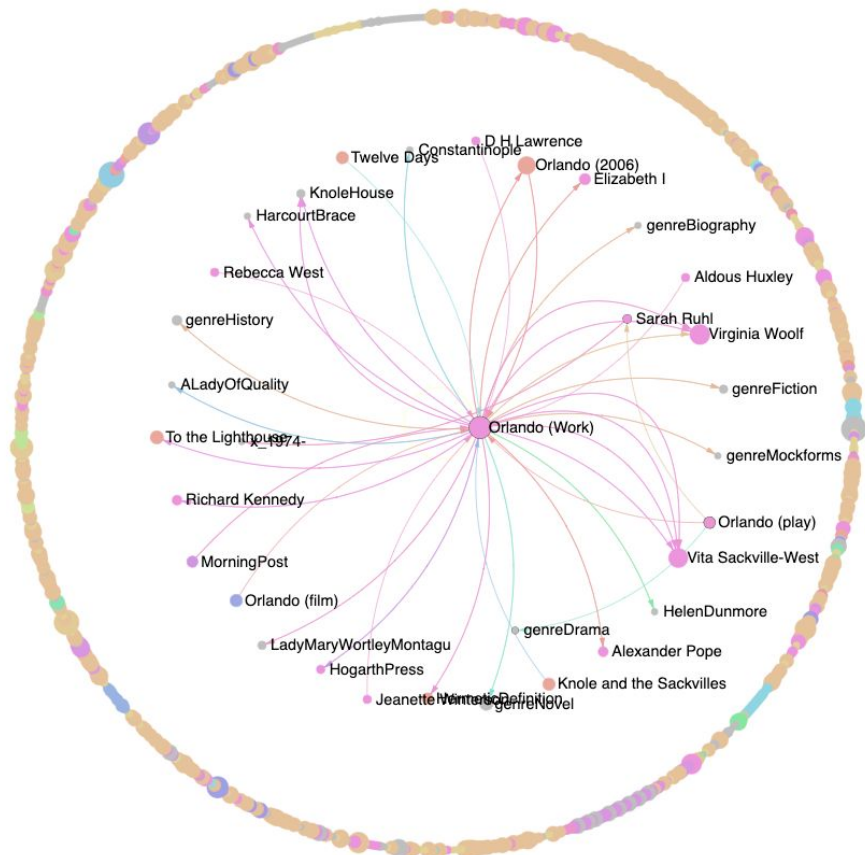
HuViz: multiple methods of interaction, all writing to a script

- Drag and drop from the shelf
- Engage Verb(s) then click nodes
- <verb phrase> <object phrase>
- Select nodes, toggle predicates

Command History

⏪ ⏩ ⏴ ⏵ ⬇️ ☰

- Activate the All set .
- Unselect the All set .
- Label the All set .
- Activate the All set . x
- Pin running at 359 degrees and range 0.44 . x



03r1:002
 ARCScholarTest.ttl
 http://sparql.cwrc.ca/ontology/cwrc.ttl



Intro Commands Settings History Credit Q

Dataset: ARCScholarTest.ttl Ontology: CWRC Ontology

Current Command
 Select Anglicanism .

Verbs
 Activate Select Label Shelve Discard Pin
 Deactivate Unselect Unlabel Hide Retrieve Unpin
 Wander
 Walk

Sets
 All (1824)
 Activated (4)
 Discarded (653)
 Graphed (33)
 Hidden (0)
 Labelled (33)
 Nameless (0)
 Pinned (0)
 Selected (0)
 Shelved (705)
 Walked (4)

Class Selector
 Thing (0/131)
 Annotation (0/1)
 Book (0/11)
 Class
 ClassIssueContext (0/1)
 Concept (0/280)
 ConceptScheme (0/4)
 context (0/209)
 biography context (0/0)
 cultural form context (0/0)
 nationality context (0/2)
 race or ethnicity context (0/1)
 religious context (0/9)
 sexuality context (0/2)
 coreExpression
 coreWork
 cultural form (0/0)
 ethnicity (0/2)
 gender (0/2)
 geographic heritage (0/6)
 national heritage (0/6)
 national identity (0/1)
 political affiliation (0/1)
 race or colour (0/3)
 religion (0/2)
 sexuality (0/1)
 social class (0/1)
 CulturalFormationContext (0/19)
 Dataset (0/1)
 DeprecatedClass
 DeprecatedProperty (0/1)
 Document (0/9)
 Film (0/1)
 Group (0/1)
 Label (0/10)
 Literal (0/0)
 rdf_PlanLiteral (0/983)
 xsd_boolean (0/1)
 xsd_date (0/1)
 Newspaper (0/3)
 ObjectProperty (0/37)
 Ontology (0/1)
 organization (0/10)
 person (0/54)
 Play (0/1)
 Sentence (0/18)
 SocialRankContext (0/1)



User-Testing

Qualtrics Survey-Tutorial

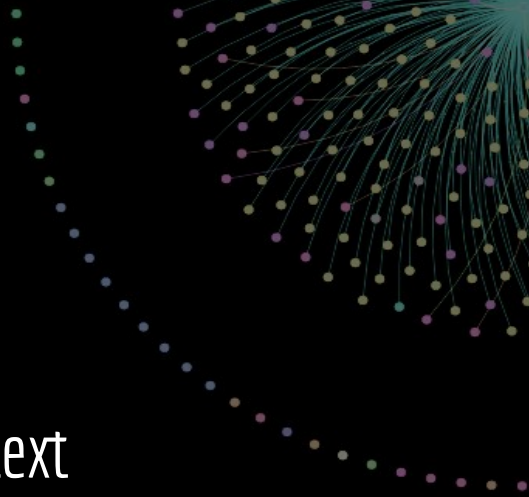
23 user tests

Students, faculty, members of
CWRC team

Datasets included Ada Byron,
cookbooks, and Shakespeare

Findings:

- Valued context
- Customized datasets to their own expertise
- Followed their own pathways through the data



User Testimonials

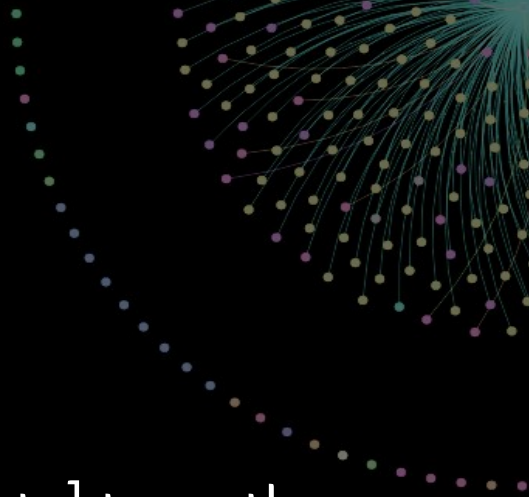
“structures information in a way that we are not used to seeing which can allow us to come to different conclusions.”

(P6)

“I think it would be cool for coming up with research questions, if you had a dataset and wanted to think about what to ask of it” (P2)

“[allows users to] trace the **pathways of discovery**”

(P12)





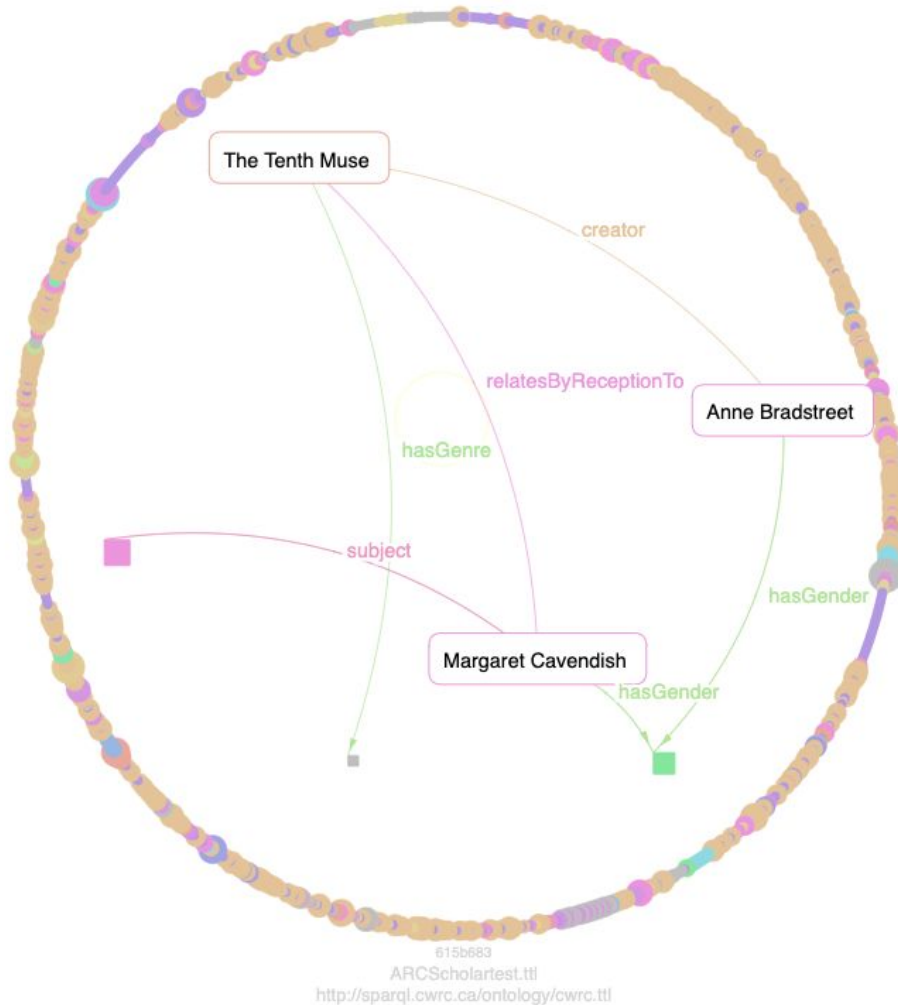
Serendipity

Definitions of Serendipity

“[t]he faculty of making happy and unexpected discoveries by accident. Also, the fact or an instance of such a discovery” - OED 2015

“occurs when unexpected circumstances and an insightful “aha” moment result in a valuable, unanticipated outcome” - Makri et al. 2014

“[a]n unexpected experience prompted by an individual’s valuable interaction with ideas, information, objects, or phenomena” - McCay-Peet & Toms 2015



615b683
 ARCScholarstest.ttl
<http://sparql.cwrc.ca/ontology/cwrc.ttl>

Dataset: ARCScholarstest.ttl Ontology: CWRC Ontology



Current Command

VERB SET/SELECTION .

Verbs

- Activate Select Label Shelfe Discard Pin
- Deactivate Unselect Unlabel Hide Retrieve Unpin
- Wander
- Walk

Sets


- All (1824)
- Activated (3)
- Discarded (0)
- Graphed (6)
- Hidden (0)
- Labelled (3)
- Nameless (0)
- Pinned (1)
- Selected (0)
- Shelved (1269)
- Walked (0)

Class Selector

- Thing ▼ (0/129)
 - Annotation (0/1)
 - Book (0/12)
 - Class
 - ClassIssueContext (0/1)
 - Concept (0/280)
 - ConceptScheme (0/4)
 - context ▼ (0/209)
 - cultural form context ▼ (0/0)
 - nationality context (0/2)
 - race or ethnicity context (0/1)
 - religious context (0/9)
 - sexuality context (0/2)

- coreExpression
- coreWork
- cultural form ▼ (0/0)
 - ethnicity (0/2)
 - gender (0/2)
 - geographic heritage
 - national heritage (0/6)
 - national identity (0/1)
 - political affiliation (0/2)
 - race or colour (0/3)
 - religion (0/2)
 - sexuality (0/1)
 - social class (0/1)


- CulturalFormationContext (0/19)
- Dataset (0/1)
- DeprecatedClass
- DeprecatedProperty (0/1)
- Document (0/9)
- Film (0/1)
- Group (0/1)

 **Digital Cavendish Project** @DigiCavendish
Yesterday's #ARC linked data from @susanirenebr... connection betw... The Tenth Muse
12:56 PM · Feb 23, 2018
2 Retweets 9 Likes

 **Digital Cavendish Project** @DigiCavendish · Feb 23, 2018
Replying to @DigiCavendish
We looked at Orlando and found that the connection is based on an observation that Patricia Caldwell makes in the Women Writers Project's contextual article on Bradstreet (www.northeastern.edu) 2/

 **Digital Cavendish Project** @DigiCavendish
(For a brief mo... Cavendish's re... have been a gr...

 **Digital Cavendish Project** @DigiCavendish · Feb 23, 2018
In William London's A Catalogue of the Most Vendible Books in England (1657) <quod.lib.umich.edu/e/eebo2/A48970...>, Bradstreet's "Tenth Muse" and Cavendish's "Poems, and Fancies" are listed in the poetry section. 5/

 **Digital Cavendish Project** @DigiCavendish
Caldwell notes, bookseller's ca...

 **Digital Cavendish Project** @DigiCavendish · Feb 23, 2018
It's notable that Cavendish's philosophical works... both Philosophical...

 **Digital Cavendish Project** @DigiCavendish · Feb 23, 2018
Overall, this was an interesting thread of research inspired by linked open data #ARCScholar #depubcoops 7/7



Serendipitous Elements of Design

1. Playful Interaction (Ridge et al., 2014)
2. Convergent information seeking (Khalili et al., 2018)
3. Highlighting Adjacencies (Thudt et al., 2012)
4. Contextualization of information (Martin & Quan-Haase, 2016)

SUBJECT
● <http://www.cwrc.ca/cwrcdata/Orlando>

PREDICATE
➔ <http://sparql.cwrc.ca/ontologies/cwrc#relatesByCirculationTo>

OBJECT
● <http://www.cwrc.ca/cwrcdata/ToTheLighthouse>

SOURCE <ARCScholar.ttl>

ID: <http://www.cwrc.ca/cwrcdata/VirginiaWoolf>

NAME: Virginia Woolf

TYPE(S): Person

LINKS TO: 11

LINKS FROM: 12

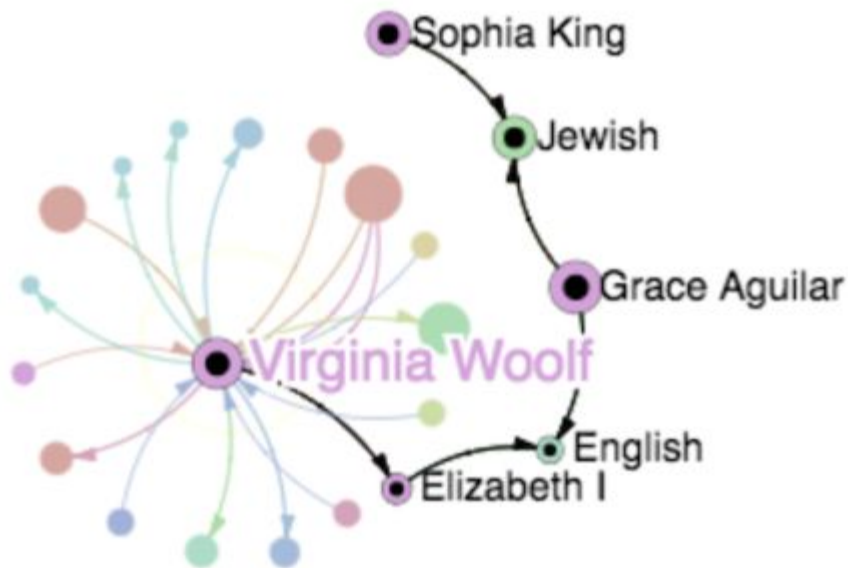
- [alludesExplicitlyTo](#) → <http://www.cwrc.ca/cwrcdata/ElizabethI>
- [hasGender](#) → <http://sparql.cwrc.ca/ontologies/cwrc#woman>
- [hasNationalHeritage](#) → <http://sparql.cwrc.ca/ontologies/cwrc#english>
- [hasNationality](#) → <http://sparql.cwrc.ca/ontologies/cwrc#englishNationality>
- [hasReligion](#) → <http://sparql.cwrc.ca/ontologies/cwrc#agnosticism>
- [hasReligion](#) → <http://sparql.cwrc.ca/ontologies/cwrc#quakers>
- [hasReligion](#) → <http://sparql.cwrc.ca/ontologies/cwrc#societyOfFriends>
- [hasSexualitySelfReported](#) → <http://sparql.cwrc.ca/ontologies/cwrc#bisexual>
- [hasSocialClassSelfDefined](#) → <http://sparql.cwrc.ca/ontologies/cwrc#gentry>
- [hasSocialRankSelfReported](#) → <http://sparql.cwrc.ca/ontologies/cwrc#professional>
- [respondsTo](#) → <http://www.cwrc.ca/cwrcdata/EmbassyLetters>
- [subject](#) → <http://www.cwrc.ca/cwrcdata/MargaretCavendish>



Designing for Serendipity in HuViz

Walking

- Illuminates user's "pathway"
- Previously clicked nodes turn black and remain in the graph; peripheral nodes are reshuffled





03f1d02
 ARCScholarstest.ttl
<http://sparql.cwrc.ca/ontology/cwrc.ttl>

Intro Commands Settings History Credit Q

Dataset: ARCScholarstest.ttl Ontology: CWRC Ontology

Current Command
 Label and Walk SET/SELECTION .

Verbs
 Activate Select Label **Shelve** Discard Pin
 Deactivate Unselect Unlabel Hide Retrieve Unpin

Wander
Walk

Class Selector

All (1824)
 Activated (0)
 Discarded (653)
 Graphed (0)
 Hidden (0)
 Labelled (0)
 Nameless (0)
 Pinned (0)
 Selected (0)
 Shelved (732)
 Walked (0)

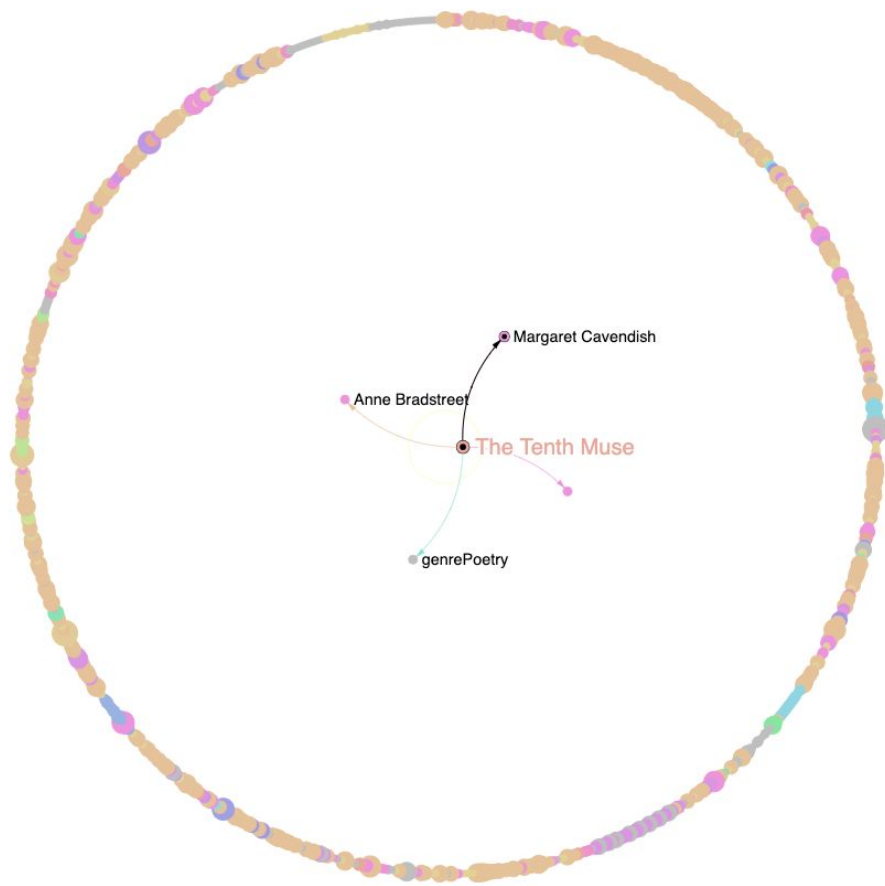
Thing (0/131)
 Annotation (0/1)
 Book (0/11)
 Class
 ClassIssueContext (0/1)
 Concept (0/280)
 ConceptScheme (0/4)
 context (0/209)
 biography context (0/0)
 cultural form context (0/0)
 nationality context (0/2)
 race or ethnicity context (0/1)
 religious context (0/0)
 sexuality context (0/2)

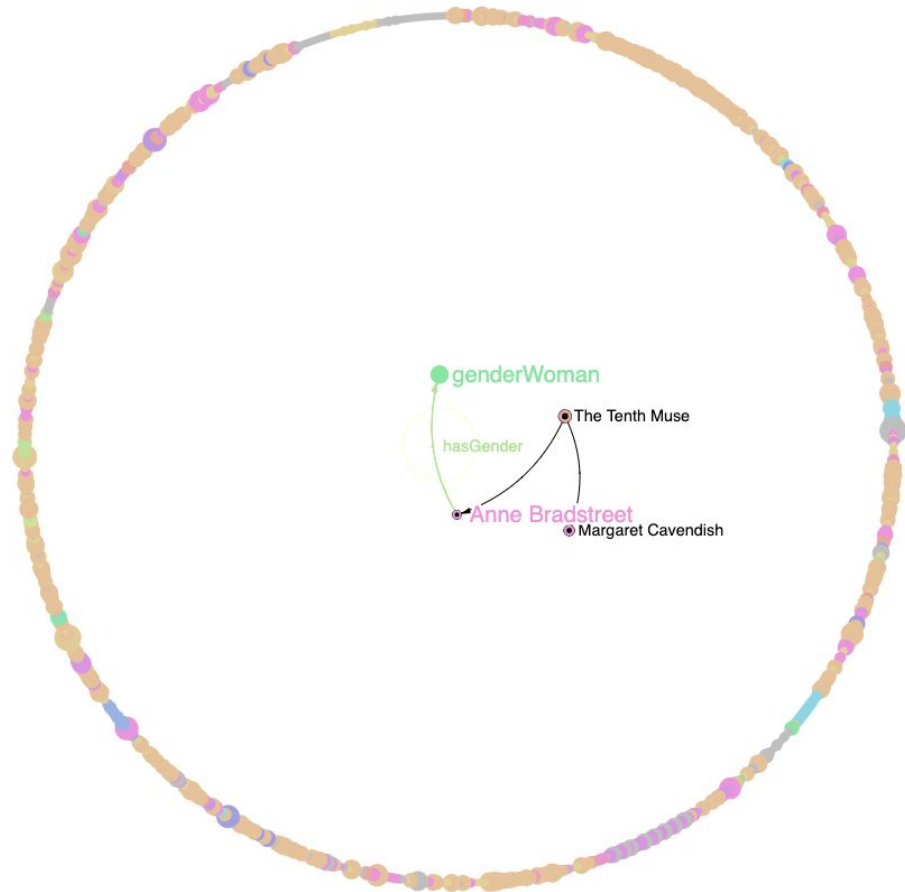
coreExpression
 coreWork
 cultural form (0/0)
 ethnicity (0/2)
 gender (0/2)
 geographic heritage
 national heritage (0/6)
 national identity (0/1)
 political affiliation
 race or colour (0/3)
 religion (0/2)
 sexuality (0/1)
 social class (0/1)

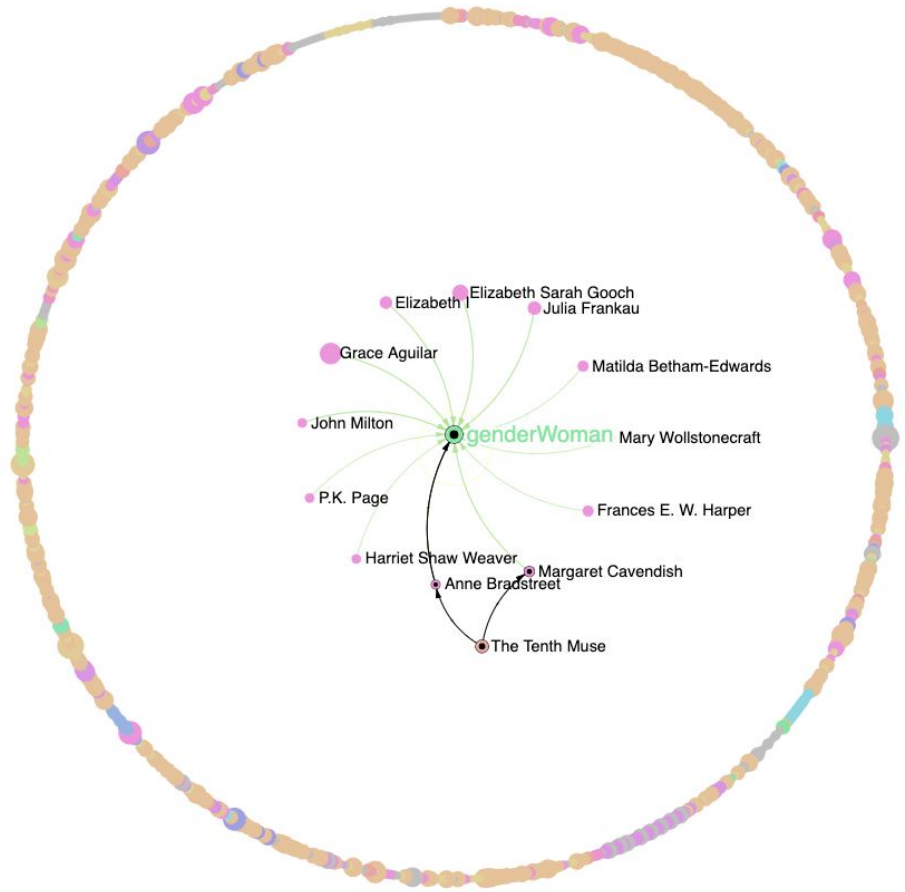
CulturalFormationContext (0/19)
 Dataset (0/1)
 DeprecatedClass
 DeprecatedProperty (0/1)
 Document (0/9)
 Film (0/1)
 Group (0/1)
 Label (0/10)
 Literal (0/0)
 rdf__PlainLiteral (0/983)
 xsd__boolean (0/1)
 xsd__date (0/1)

Newspaper (0/3)
 ObjectProperty (0/37)
 Ontology (0/1)
 organization (0/10)
 Person (0/54)
 Play (0/1)
 Sentence (0/18)
 SocialRankContext (0/1)



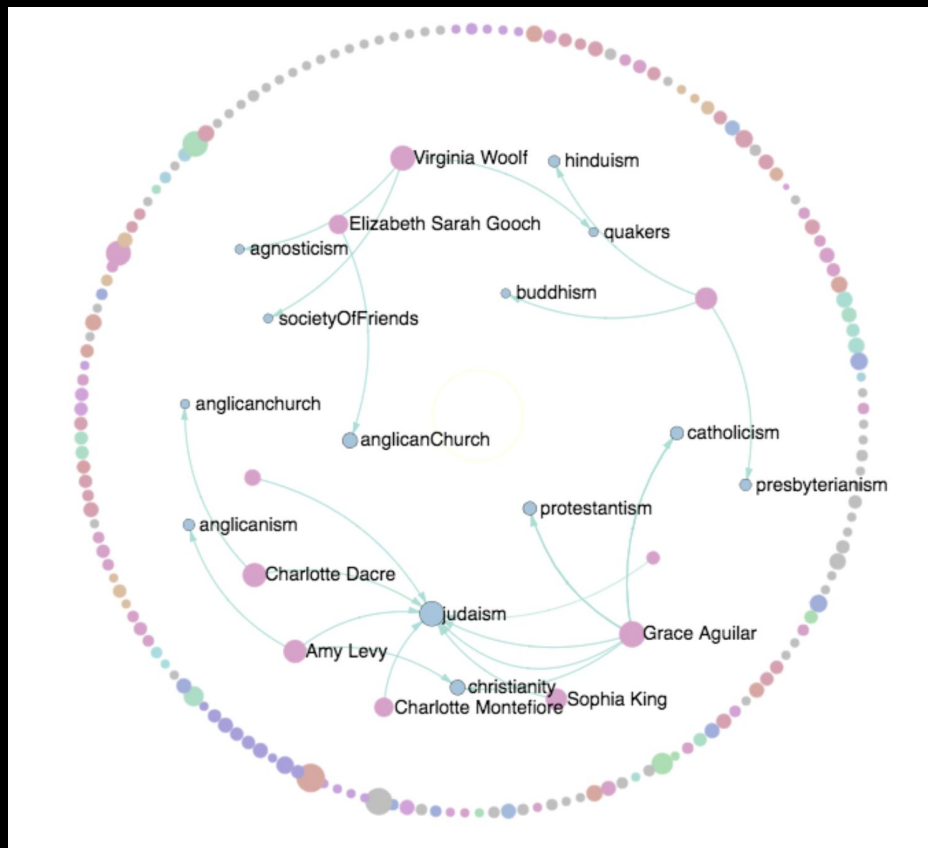






Wandering

- Clicking a node pulls connections into graph
- Can “wander” entire sets or classes of nodes (eg. social status, occupation)





0311d02
 ARCScholarTest.ttl
<http://sparql.cwrc.ca/ontology/cwrc.ttl>

Intro Commands Settings History Credit Q

Dataset: ARCScholarTest.ttl Ontology: CWRC Ontology

Current Command
 Wander and Label SET/SELECTION .

Verbs
 Activate Select **Label** Hide Discard Pin
 Unselect Unselect Hide Retrieve Unpin

Wander
 Walk

Sets
 All (1824)
 Activated (0)
 Discarded (653)
 Graphed (0)
 Hidden (0)
 Labelled (0)
 Nameless (0)
 Pinned (0)
 Selected (0)
 Shelved (732)
 Walked (0)

Class Selector

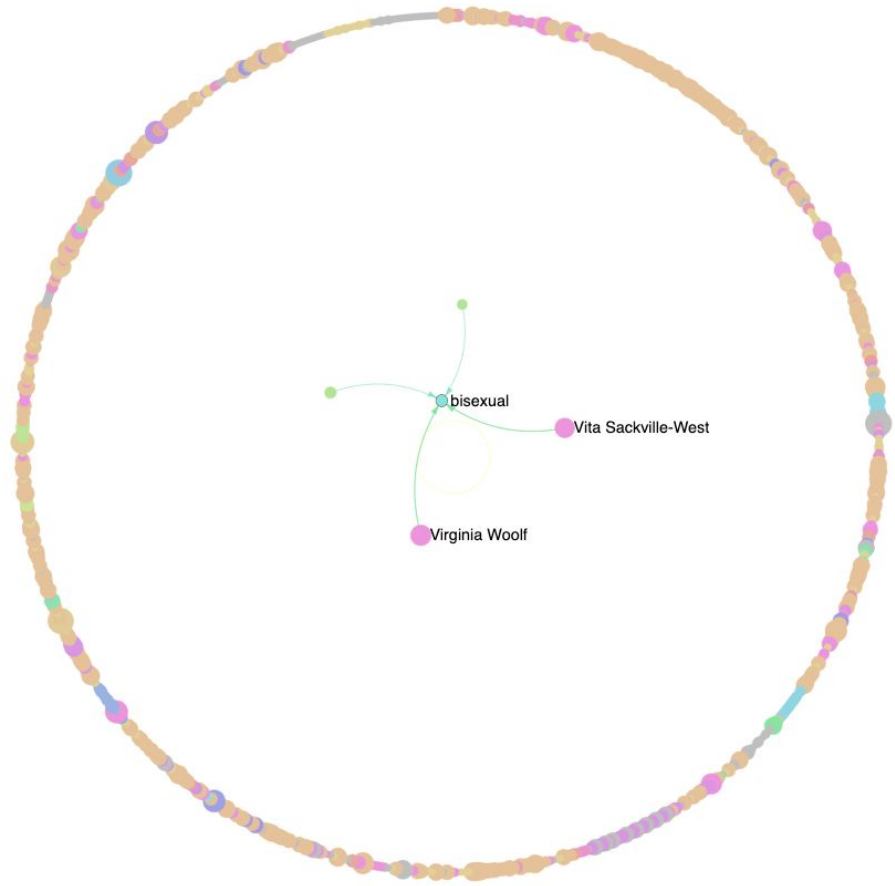
Thing (0/131)
 Annotation (0/1)
 Book (0/11)
 Class
 ClassIssueContext (0/1)
 Concept (0/280)
 ConceptScheme (0/4)
 context (0/209)
 biography context (0/0)
 cultural form context (0/0)
 nationality context (0/2)
 race or ethnicity context (0/1)
 religious context (0/0)
 sexuality context (0/2)

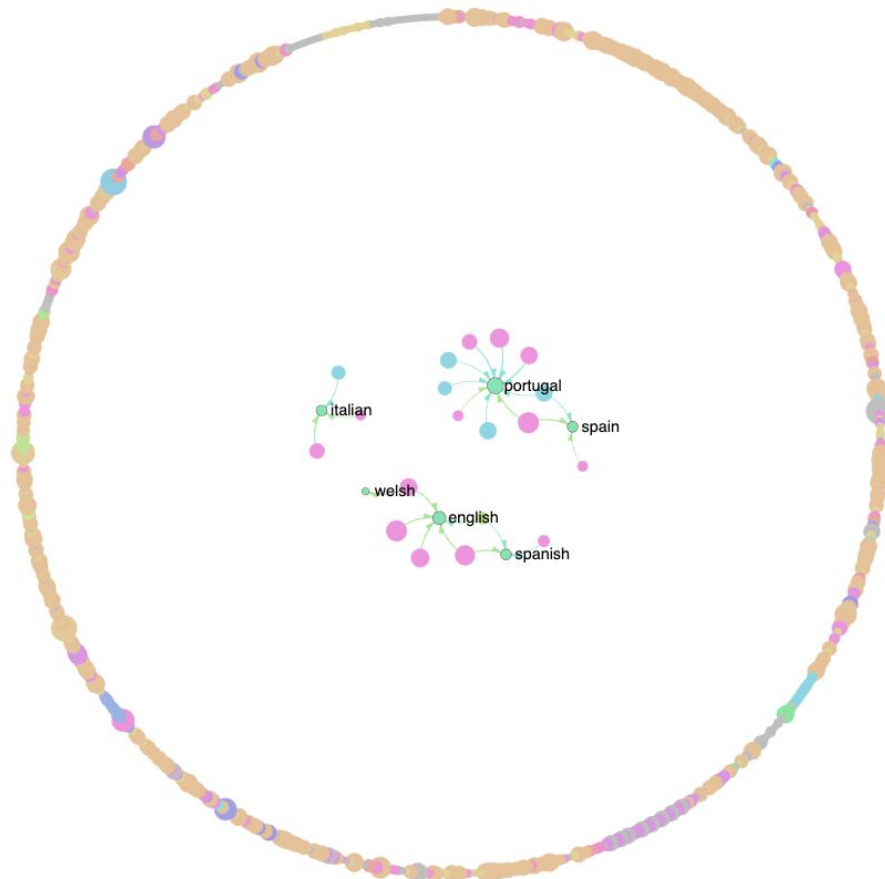
coreExpression
 coreWork
 cultural form (0/0)
 ethnicity (0/2)
 gender (0/2)
 geographic heritage
 national heritage (0/0)
 national identity (0/1)
 political affiliation
 race or colour (0/3)
 religion (0/2)
 sexuality (0/1)
 social class (0/1)

CulturalFormationContext (0/10)
 Dataset (0/1)
 DeprecatedClass
 DeprecatedProperty (0/1)
 Document (0/9)
 Film (0/1)
 Group (0/1)
 Label (0/10)
 Literal (0/0)
 rdf__PlainLiteral (0/983)
 xsd__boolean (0/1)
 xsd__date (0/1)

Newspaper (0/3)
 ObjectProperty (0/37)
 Ontology (0/1)
 organization (0/10)
 Person (0/54)
 Play (0/1)
 Sentence (0/18)
 SocialRankContext (0/1)







03f1d02
 ARCScholarTest.ttl
<http://sparql.cwrc.ca/ontology/cwrc.ttl>

Class Selector

Thing ▼ (0/131)

Annotation (0/1)

Book (0/11)

Class

ClassIssueContext (0/1)

Concept (0/280)

ConceptScheme (0/4)

context ▼ (0/209)

biography context ▼ (0/0)

cultural form context ▼ (0/0)

nationality context (0/2)

race or ethnicity context (0/1)

religious context (0/9)

sexuality context (0/2)

coreExpression

coreWork

cultural form ▼ (0/0)

- ethnicity (0/2)
- gender (0/0)
- geographic heritage (0/6)**
- national identity (0/1)
- political affiliation (0/1)
- race or colour (0/3)
- religion (0/2)
- sexuality (0/1)
- social class (0/1)

CulturalFormationContext (0/19)

Dataset (0/1)

DeprecatedClass

DeprecatedProperty (0/1)

Document (0/9)

Film (0/1)

Group (0/1)

Label (0/10)

Literal ▼ (0/0)

- rdf__PlainLiteral (0/983)
- xsd__boolean (0/1)
- xsd__date (0/1)

Newspaper (0/3)

ObjectProperty (0/37)

Ontology (0/1)

organization (0/10)

Person (0/54)

Play (0/1)

Sentence (0/18)

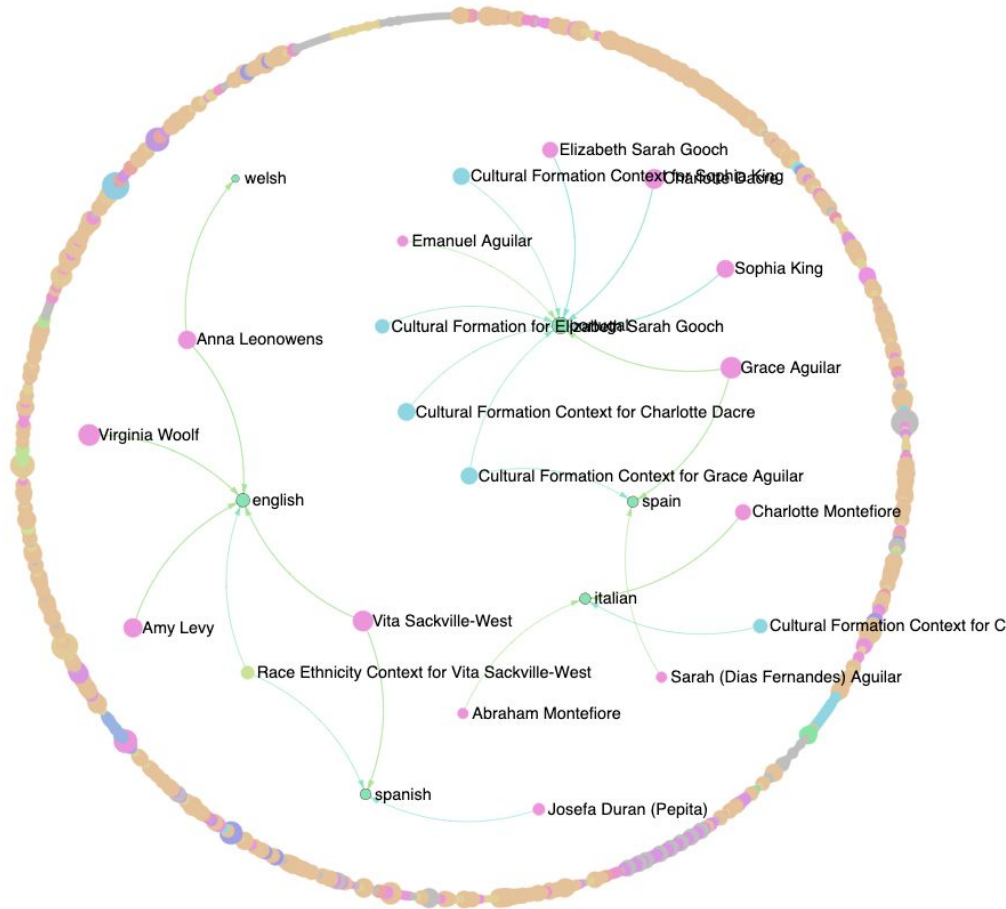
SocialRankContext (0/1)

SpatialThing ▼ (0/0)

- place (0/2)

TemporalEntity (0/1)

Vocabulary



Class Selector

Thing (0/131)

- Annotation (0/1)
- Book (0/11)
- Class
- ClassIssueContext (0/1)
- Concept (0/280)
- ConceptScheme (0/4)
- context (0/209)
- biography context (0/0)
- cultural form context (0/0)
- nationality context (0/2)
- race or ethnicity context (0/1)
- religious context (0/9)
- sexuality context (0/2)

coreExpression

coreWork

cultural form (0/0)

- ethnicity (0/2)
- geographic heritage (0/6)
- national heritage (0/6)
- national identity (0/1)
- political affiliation (0/1)
- race or colour (0/3)
- religion (0/2)
- sexuality (0/1)
- social class (0/1)

CulturalFormationContext (0/19)

Dataset (0/1)

DeprecatedClass

DeprecatedProperty (0/1)

Document (0/9)

Film (0/1)

Group (0/1)

Label (0/10)

Literal (0/0)

- rdf__PlainLiteral (0/983)
- xsd__boolean (0/1)
- xsd__date (0/1)

Newspaper (0/3)

ObjectProperty (0/37)

Ontology (0/1)

organization (0/10)

Person (0/54)

Play (0/1)

Sentence (0/18)

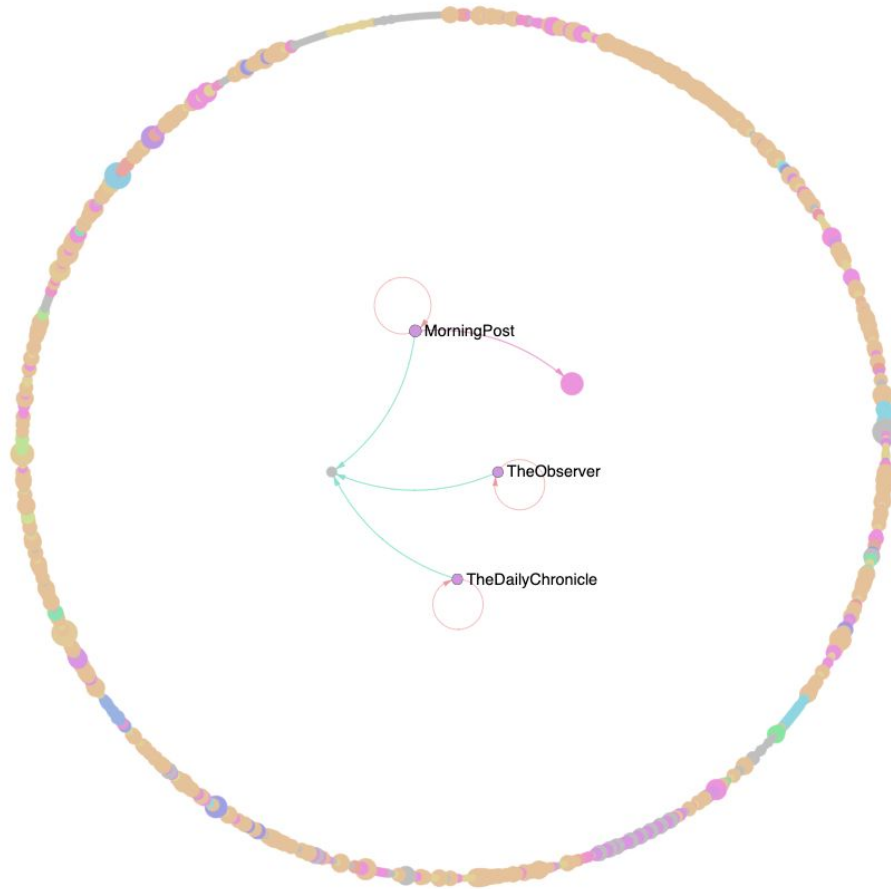
SocialRankContext (0/1)

SpatialThing (0/0)

- place (0/2)

TemporalEntity (0/1)

Vocabulary



03r1:002
 ARCScholarTest.ttl
<http://sparql.cwrc.ca/ontology/cwrc.ttl>

Class Selector

- Thing ▼ (0/131)
- Annotation (0/1)
- Book (0/11)
- Class
- ClassIssueContext (0/1)
- Concept (0/280)
- ConceptScheme (0/4)
- context ▼ (0/209)
- biography context ▼ (0/0)
- cultural form context ▼ (0/0)
 - nationality context (0/2)
 - race or ethnicity context (0/1)
 - religious context (0/9)
 - sexuality context (0/2)
- coreExpression
- coreWork
- cultural form ▼ (0/0)
 - ethnicity (0/2)
 - gender (0/2)
 - geographic heritage
 - national heritage (0/6)
 - national identity (0/1)
 - political affiliation
 - race or colour (0/3)
 - religion (0/2)
 - sexuality (0/1)
 - social class (0/1)
- CulturalFormationContext (0/19)
- Dataset (0/1)
- DeprecatedClass
- DeprecatedProperty (0/1)
- Document (0/9)
- Film (0/1)
- Group (0/1)
- Label (0/10)
- Literal ▼ (0/0)
 - rdf__PlainLiteral (0/983)
 - xsd__boolean (0/1)
 - xsd__date (0/1)
- Newspaper (0/3)**
- ObjectProperty (0/37)
- Ontology (0/1)
- organization (0/10)
- Person (0/54)
- Play (0/1)
- Sentence (0/18)
- SocialRankContext (0/1)
- SpatialThing ▼ (0/0)
 - place (0/2)
- TemporalEntity (0/1)
- Vocabulary



0311402
 ARCScholarTest.ttl
<http://sparql.cwrc.ca/ontology/cwrc.ttl>

Class Selector

- Thing (0/131)
- Annotation (0/0)
- Book (0/11)**
- Class
- ClassIssueContext (0/1)
- Concept (0/280)
- ConceptScheme (0/4)
- context (0/209)
- biography context (0/0)
- cultural form context (0/0)
- nationality context (0/2)
- race or ethnicity context (0/1)
- religious context (0/9)
- sexuality context (0/2)

coreExpression

coreWork

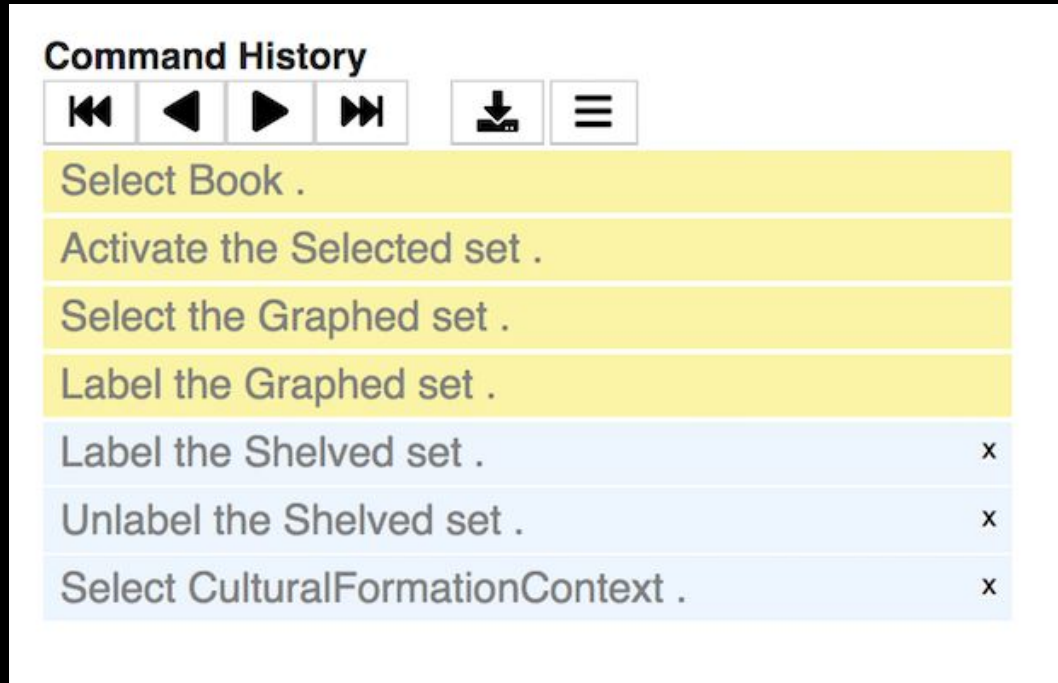
- cultural form (0/0)
 - ethnicity (0/2)
 - gender (0/2)
 - geographic heritage (0/2)
 - national heritage (0/6)
 - national identity (0/1)
 - political affiliation (0/1)
 - race or colour (0/3)
 - religion (0/2)
 - sexuality (0/1)
 - social class (0/1)

CulturalFormationContext (0/19)

- Dataset (0/1)
- DeprecatedClass
- DeprecatedProperty (0/1)
- Document (0/9)
- Film (0/1)
- Group (0/1)
- Label (0/10)
- Literal (0/0)
 - rdf__PlainLiteral (0/983)
 - xsd__boolean (0/1)
 - xsd__date (0/1)
- Newspaper (0/3)
- ObjectProperty (0/37)
- Ontology (0/1)
- organization (0/10)
- Person (0/54)
- Play (0/1)
- Sentence (0/18)
- SocialRankContext (0/1)
- SpatialThing (0/0)
 - place (0/2)
- TemporalEntity (0/1)
- Vocabulary

Command History

“Seeing a list of the moves that the students made [would be] like being with them while doing a close reading.”



The screenshot shows a 'Command History' window with a toolbar at the top containing navigation icons (back, forward, search, etc.) and a list of commands below. The first four commands are highlighted in yellow, and the last three are highlighted in light blue. The last three commands have an 'x' icon on the right side.

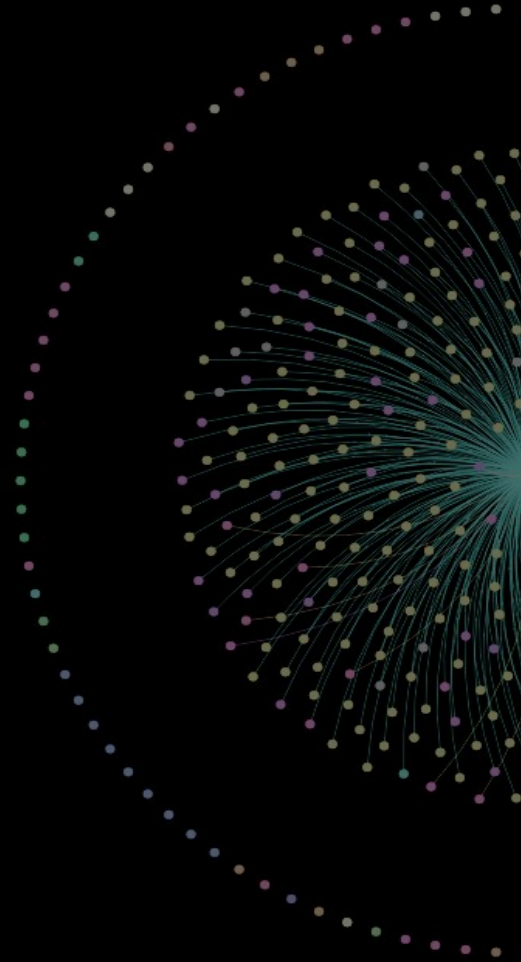
Command	Action
Select Book .	
Activate the Selected set .	
Select the Graphed set .	
Label the Graphed set .	
Label the Shelved set .	x
Unlabel the Shelved set .	x
Select CulturalFormationContext .	x



Next Steps

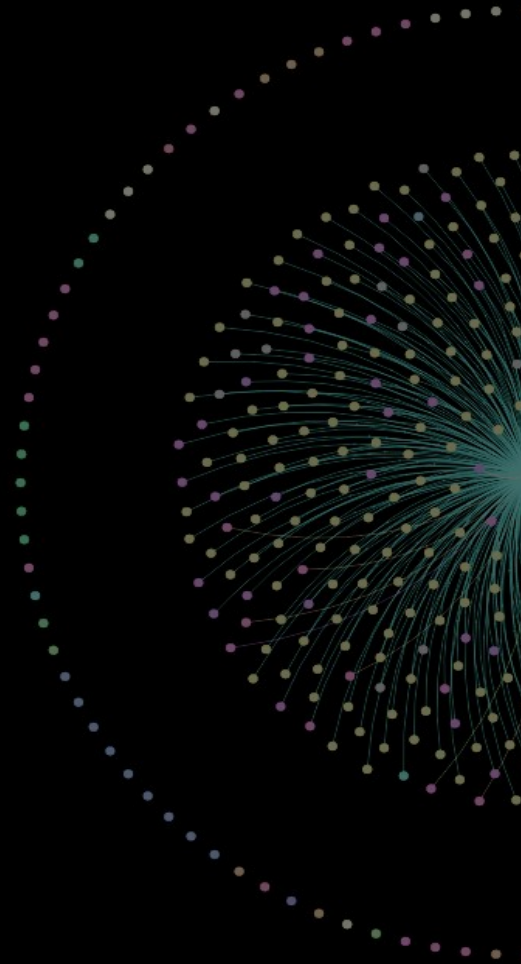
HuViz: features under development

- Scripting language
- **Semantic Authoring Tool**
- "Web Annotation" Inspector
- Support for **Pelagios** use-cases
- **Improving SPARQL support**
- Icons and media in nodes (eg per-class)
- Plug-in for Nooron "collective cognition" tool



HuViz: future features

- Multi-user support
- Plug-in to CWRC
- Embedding (like YouTube)
- Plug-in SDK
- Dynamic sync with external systems



The background is a dark teal color with a decorative pattern of small, multi-colored dots (yellow, purple, blue, green) connected by thin white lines, resembling a network or data visualization. The pattern is concentrated in the corners and along the edges, with a denser cluster in the top right and bottom left.

<https://tinyurl.com/testHuViz>

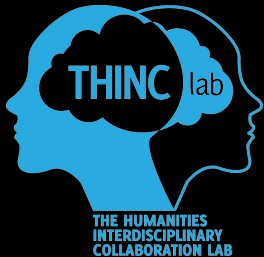
Thank you!

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