**Scoping Search Entity Relationship Diagram**

The following instructions show how to make a Neo4J relationship diagram from research papers referenced in Zotero and the references they cite. The aim of the network is to clarify if papers found by a researcher are based on a common body of knowledge. This is achieved by using Neo4J to visualize relationships between researchers, papers, journals, and a time period in order to answer questions about a field.

The entity metadata for my example is as follows:

│"startLabels" │"relationshipType"│"endLabels" │"relationshipCount"│

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│["Researcher"] │"CONTRIBUTED\_TO" │["Referenced Paper"]│775 │

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│["Referenced Paper"]│"PUBLISHED\_IN" │["Year"] │297 │

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│["Survey Paper"] │"PUBLISHED\_IN" │["Year"] │5 │

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│["Survey Paper"] │"PUBLISHED\_BY" │["Journal"] │5 │

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│["Survey Paper"] │"REFERENCES" │["Referenced Paper"]│383 │

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│["Survey Paper"] │"SUGGESTS" │["Future Work"] │24 │

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│["Researcher"] │"CONTRIBUTED\_TO" │["Survey Paper"] │17 │

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│["topic"] │"INVESTIGATES" │["Survey Paper"] │24 │

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│["Referenced Paper"]│"PUBLISHED\_BY" │["Journal"] │22

The relationships to one survey paper then look like this and can be queried with the cypher language:

Background pattern

Description automatically generated

Eg to show future avenues for research suggested by survey papers:

Chart, diagram

Description automatically generated

**Pre-requisites**

A python installation is required with the “pyzotero” module installed:

pip install pyzotero

pip install bibtexparserpip install html2text

(<https://github.com/urschrei/pyzotero>)

(<https://pyzotero.readthedocs.io/en/latest/>)

Neo4j desktop edition can be used to run the resulting .cypher script and visualize the reference list. Neo4j is available at:

<https://neo4j.com/download/>

Zotero account with sync enabled. A Zotero account can be created here:

<https://www.zotero.org/>

and sync can be set up from the desktop client here:

<https://research.library.gsu.edu/c.php?g=115275&p=751288>

**Parameters**

Please replace the parameters in Configuration.py with values appropriate for your environment.

library\_id: Can be found here [**https://www.zotero.org/settings/keys**](https://www.zotero.org/settings/keys)**:**

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api\_key: Can be generated here <https://www.zotero.org/settings/keys/new> as per the following settings. **Graphical user interface, text, application, email

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The script depends on a collection containing sub collections for the survey papers and primary papers used as part of the systematic review so the names of the parent collection and sub collection are required as parameters

**Graphical user interface, text, application, Word

Description automatically generated**

parent\_collection: “CN8002 - Research Methodology for Technologists”

subcollection: “Secondary”

**Organizing References, Future Work Suggestions and Topics**

**Topics/Keywords**

Tags are used as nodes for the topic of a paper (aka key words) and can be modified in the Zotero UI:

Graphical user interface, text, application

Description automatically generated

One of the use cases of the network is to triangulate and highlight recommendations for future works in an area. So Zotero notes are used to describe the future works although it could be a future work for the script to parse the research papers text bodies!

**References**

Please append references to a Zotero note with a “Reference |” using bibtex formatting eg:

Text

Description automatically generated with medium confidence

Bibtex references can be exported from survey papers using scopos.com

**Future Work**

Unfortunately bibtex citations don’t include tags for future work so they need appending as a note to a survey paper in Zotero manually.

The first line of the note should be:

Future Work Recommendations |

Followed by a line break delimited list of recommendations for future work eg:

Graphical user interface, text, application

Description automatically generated