Using the LOD service via SPARQL and Notebooks, data analysis, network analysis, and visualizations

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Overview

- SPARQL Protocol and RDF Query Language
  - online in Yasgui editor
  - Queries and Visualizations
- Python
  - Data Analysis
  - Network Analysis

SPARQL in Yasgui

- SPARQL query editor *Yasgui*   https://yasgui.triply.cc/
  - Perform queries to any publicly open LD service
  - Visualize the results
- *ParliamentSampo* endpoint   https://ldf.fi/semparl/sparql
  - LOD publication about MPs and Speeches in the Parliament of Finland
  - … more about ParliamentSampo later today!

SPARQL in Yasgui, simple example

- Example query for Finnish MPs and their parties
  https://api.triplydb.com/s/uncoScdi4

```
SELECT DISTINCT *
WHERE {
  # Instance of the class Person
  ?person a biocrm:Person ;
    :party ?party ;
    skos:prefLabel ?person_label .

  # Full name of the Party
  ?party skos:prefLabel ?party_label .
  FILTER (LANG(?party_label) = 'en')
}
```

SPARQL in Yasgui, simple example

SPARQL in Yasgui

- The parties by the number of members

  COUNT, GROUP BY, ORDER BY, DESC

  https://api.triplydb.com/s/aT-p42xqf

```
SELECT DISTINCT
    ?party ?party_label
    (COUNT(DISTINCT ?person) AS ?number_of_mps)
WHERE {
  ?person a biocrm:Person ;
    :party ?party ;
    skos:prefLabel ?person_label .

  ?party skos:prefLabel ?party_label .
  FILTER (LANG(?party_label) = 'fi')
}
GROUPBY ?party ?party_label
ORDER BY DESC(?number_of_mps)
```

SPARQL in Yasgui, GROUPBY

- https://api.triplydb.com/s/MPGqgyVIn

Visualization in Yasgui

- https://api.triplydb.com/s/31n0EgQVr

Yasgui, another simple example

- Places of birth: https://api.triplydb.com/s/Y0inSmRw0

Yasgui, combining earlier examples

- https://api.triplydb.com/s/WfIG4jti-
- Number of MPs by their party at each geographic location

```
13  SELECT DISTINCT ?place ?place_label ?party ?party_label
14     (COUNT(DISTINCT ?mp) AS ?number_of_MPs)
15     (CONCAT("Point("+STR(?long)+" "+STR(?lat)+")") AS ?location)
16     (MIN(?party_color) AS ?locationColor)
17     (CONCAT(?place_label, ' - ', ?party_label) AS ?locationLabel)
18  WHERE {
19     ?mp a biocrm:Person ;
20       crm:P98i_was_born/crm:P7_took_place_at ?place ;
21       :party ?party .
22     ?party skos:prefLabel ?party_label ;
23           :hexcolor ?party_color .
24     FILTER (LANG(?party_label) = 'fi')
25
26     ?place wgs:lat ?lat ;
27           wgs:long ?long ;
28           skos:prefLabel ?place_label .
29  } GROUP BY ?place ?party ?party_label ?place_label
30  ?locationLabel ?long ?lat # HAVING (?number_of_MPs > 1)
31  ORDER BY (?number_of_MPs)
```
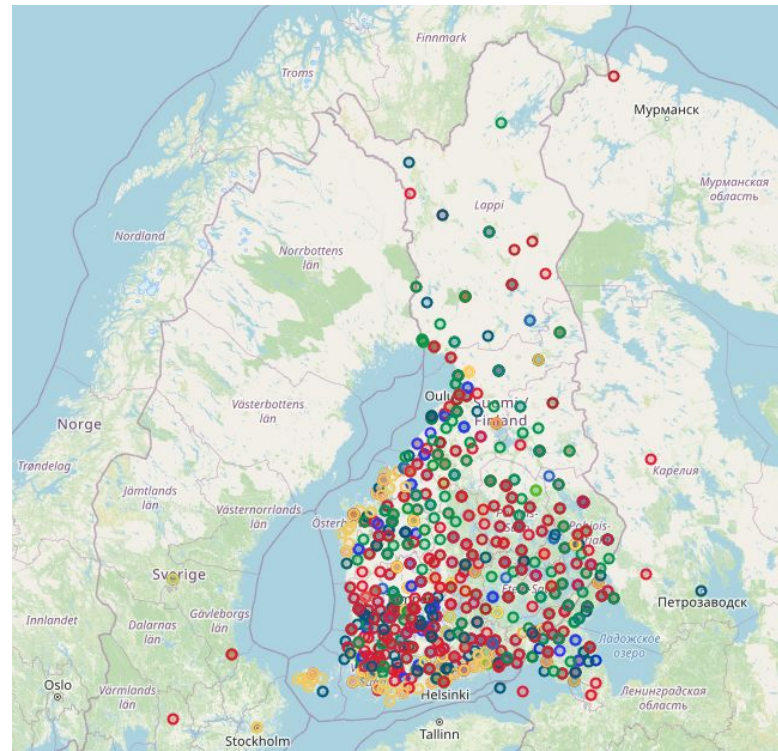
Press CTRL - <spacebar> to autocomplete

Table | Response | Gallery | Chart | Geo | Geo-3D | Geo events | Markup | Network | Pivot | Timeline | 1279 results in 0.4 seconds

Simple view ☑   Ellipse ☑

place	place_label	party	party_label	number_of_MPs	location	locationColc
http://sws.geonames.org/658225/	Helsinki	group:Q499029	Suomen Sosialidemokraattinen Puolue	55	Point(2.493545e+01 6.016952e+01)	#E11931
http://sws.geonames.org/658225/	Helsinki	group:Q304191	Kansallinen Kokoomus	54	Point(2.493545e+01 6.016952e+01)	#00587C
http://sws.geonames.org/658225/	Helsinki	group:Q845537	Suomen ruotsalainen kansanpuolue	41	Point(2.493545e+01 6.016952e+01)	#EFCB65
http://sws.geonames.org/634963/	Tampere	group:Q499029	Suomen Sosialidemokraattinen Puolue	21	Point(2.378712e+01 6.149911e+01)	#E11931
http://sws.geonames.org/658225/	Helsinki	group:Q196695	Vihreä liitto	21	Point(2.493545e+01 6.016952e+01)	#61BF1A

Places of birth on map

- https://api.triplydb.com/s/WfIG4jti-
- Place markers colored by the party
  - Swedish People's Party of Finland
  - Centre Party
  - Social Democratic Party of Finland

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Data Analysis with Python

- Yasgui allows a lot of simple data analysis and visualization
  - Data tables, Time Series, Pie and Column Charts, Maps
- For more complex and custom analysis
  - Jupyter notebooks or Google Colaboratory
 - Gephi for network analysis

Programming with Python

- Commonly used modules
  - Data acquisition: *RDFLib, SPARQLWrapper*
  - Data processing and analysis: *Pandas, NumPy, SciPy, scikit-learn*
  - Visualization: *Matplotlib, Seaborn*
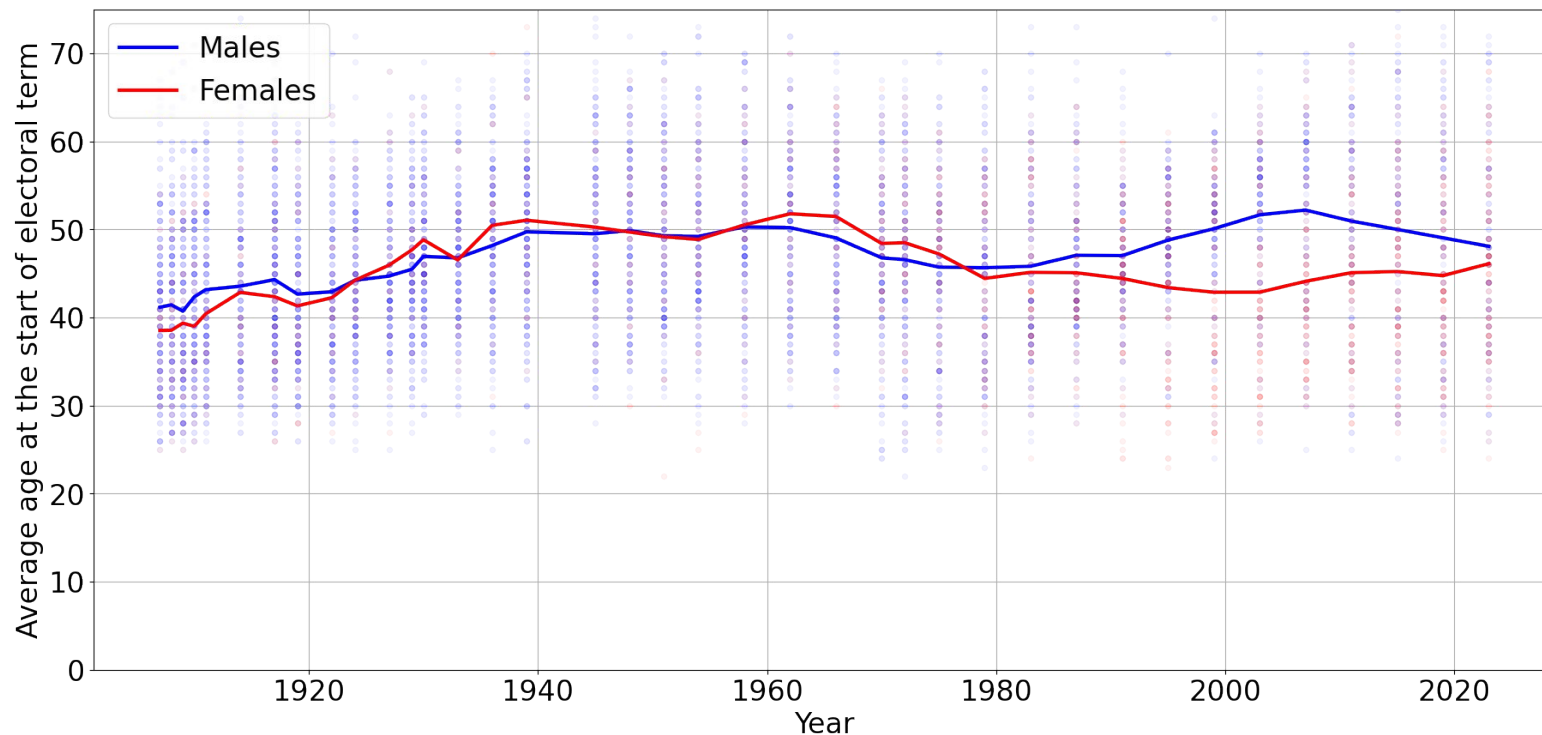 - Networks: *NetworkX, Graph-tool*

Google Colaboratory Example

- [Google Colaboratory Notebook](#) example using ParliamentSampo data
- Workflow
  - *Install Libraries and import modules*
  - *Query the database*
  - *Process the data*
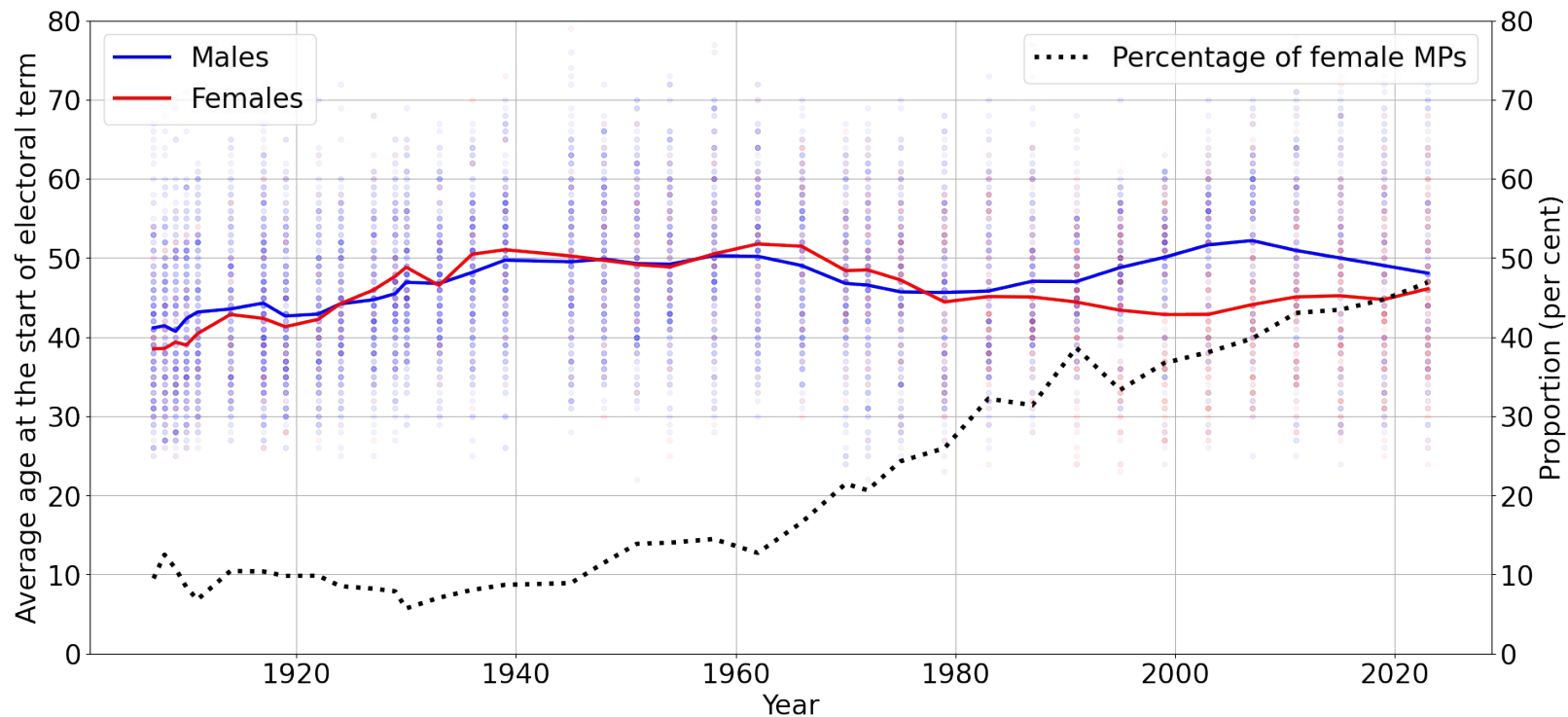 - *Output the tables or visualizations*

Google Colaboratory Example
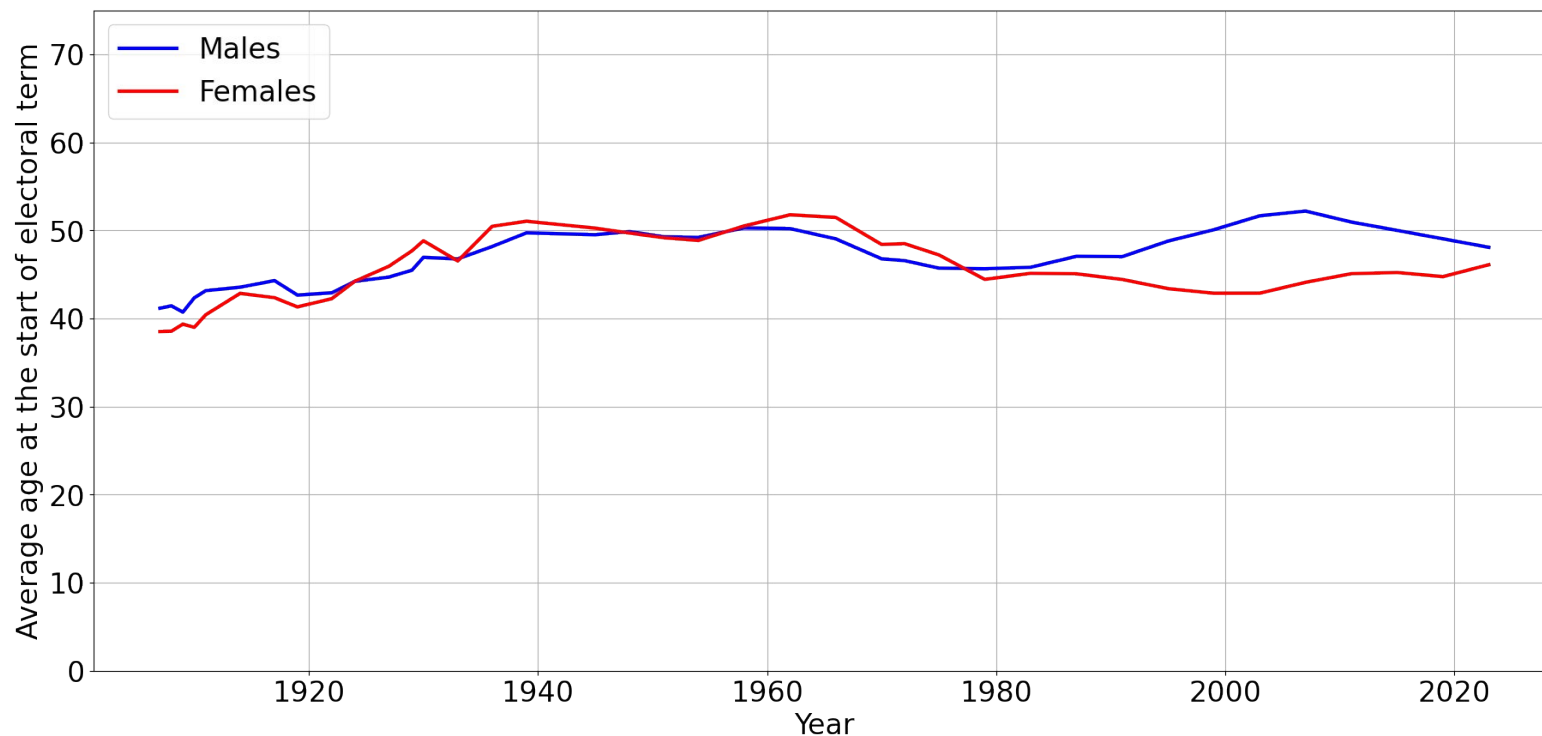
Google Colaboratory Example

Google Colaboratory Example

Network Analysis

- Biographical datasets provide networks by multiple criteria
  - Interactions between people
    - *Epistolary data*
  - Reference networks
    - *BiographySampo, ParliamentSampo*
  - Common characteristics
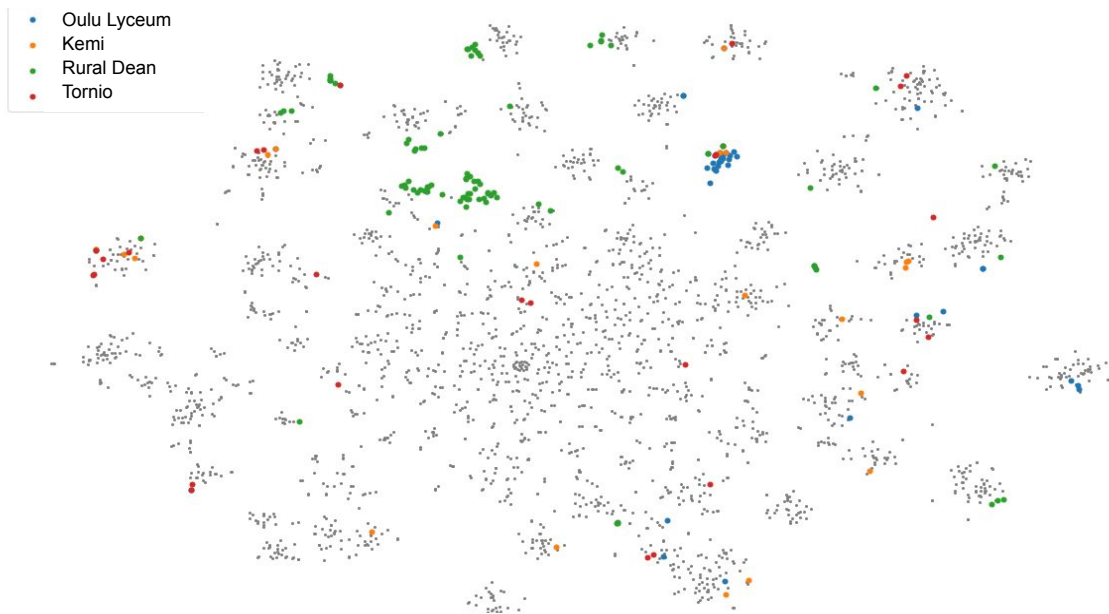   - *AcademySampo, ParliamentSampo*

Network Analysis

Based on mentioning other people in parliamentary speeches:
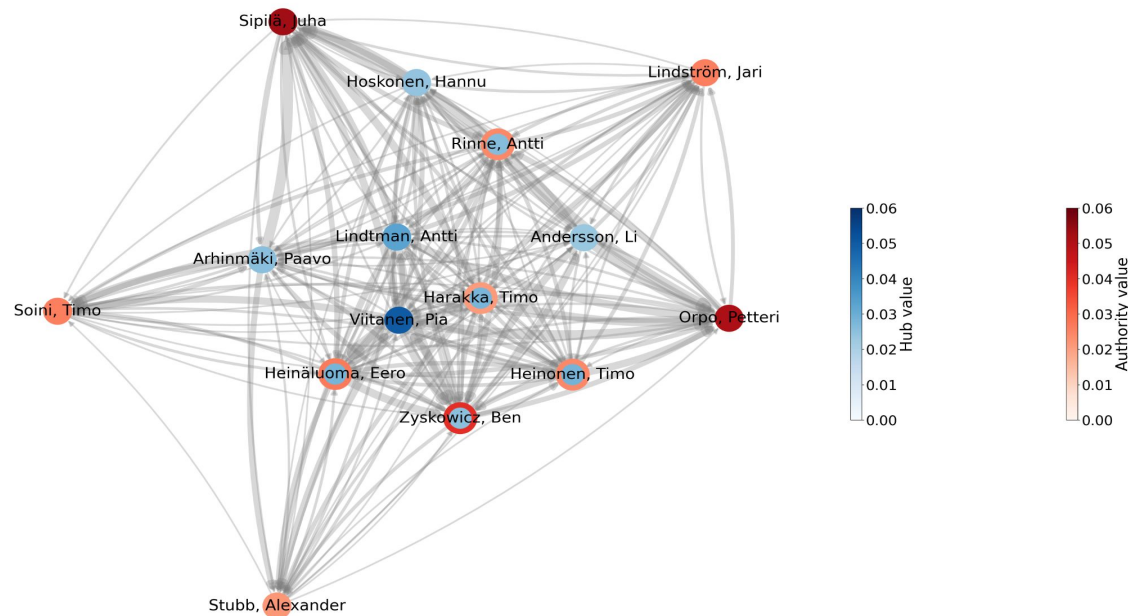
Poikkimäki et al.: Applying Network and Bibliometric Analyses to Mentions of Politicians in Plenary Speeches …

Network and Cluster Analysis

AcademySampo: Embeddings based on lifetime activities, e.g., common vocations, memberships, locations, …

Recommender System

AcademySampo: Embedding based on lifetime activities, e.g., common vocations, memberships, locations, …

Recommending actors with similar characteristics in their walks of life on the portal page:

1. Lund, Karl Arne (1878-1919): [Tornion pormestari; Tornio]
2. Grandell, Isak (1691-1732): [Tornion pormestari; Tornio]
3. Ekholm, Nils Gabriel (1758-1809): [Tornion pormestari; Tornio]
4. Lindström, Kaarlo Aleksanteri (1872-1929): [ylempi hallintotutkinto; Yo Oulun lys.; 6.6.1892; Oulun lyseo]
5. Helander (→ Helanen), Olavi Leonard (1869-1931): [kunnallispormestari; Kemi]
6. Caselius, Ano Eemil (1867-1929): [tuomari; kunnallispormestari]

Thank You!