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Graph-Based Visual Analytics Tools for Digital Humanities Research

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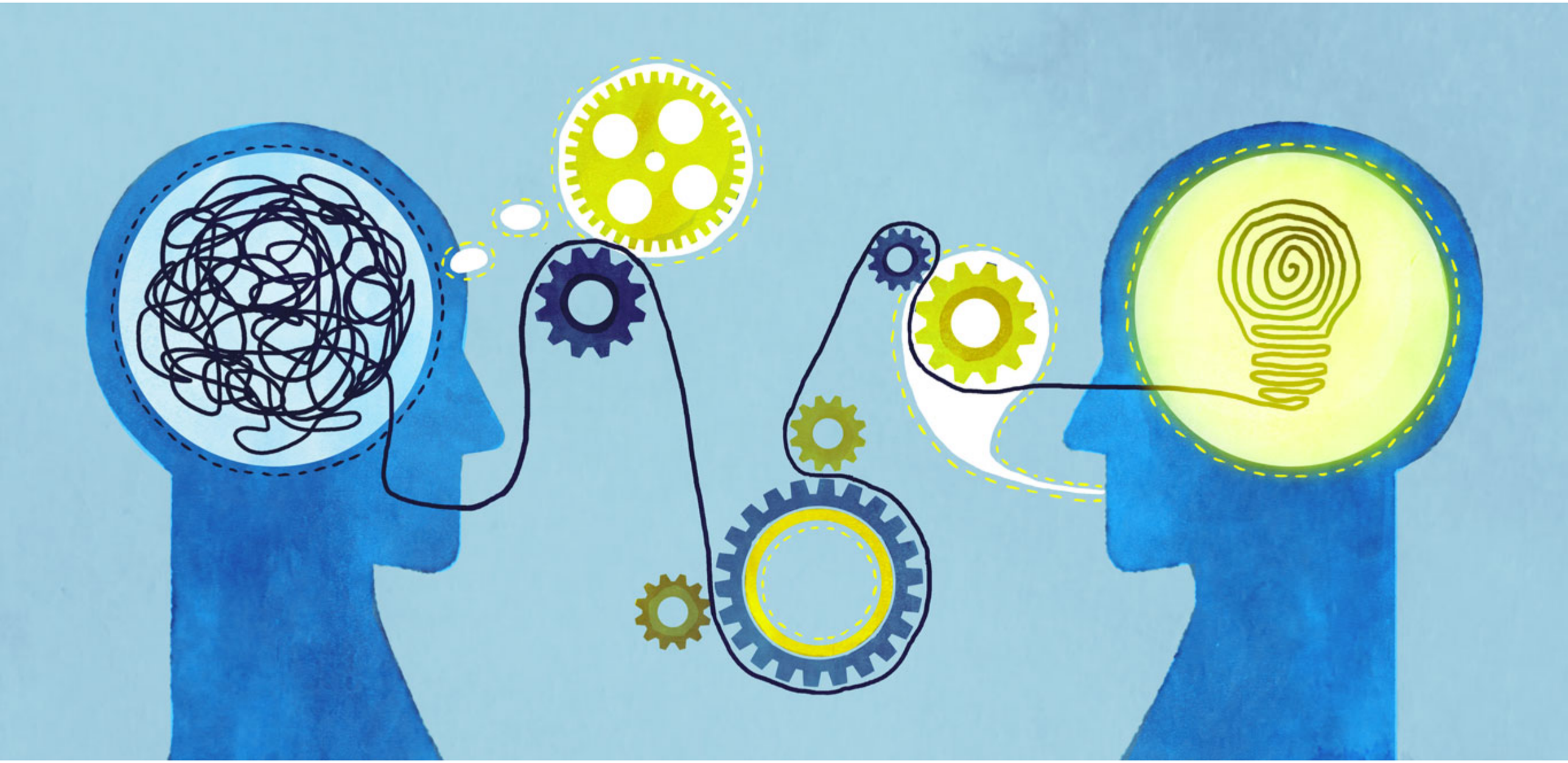
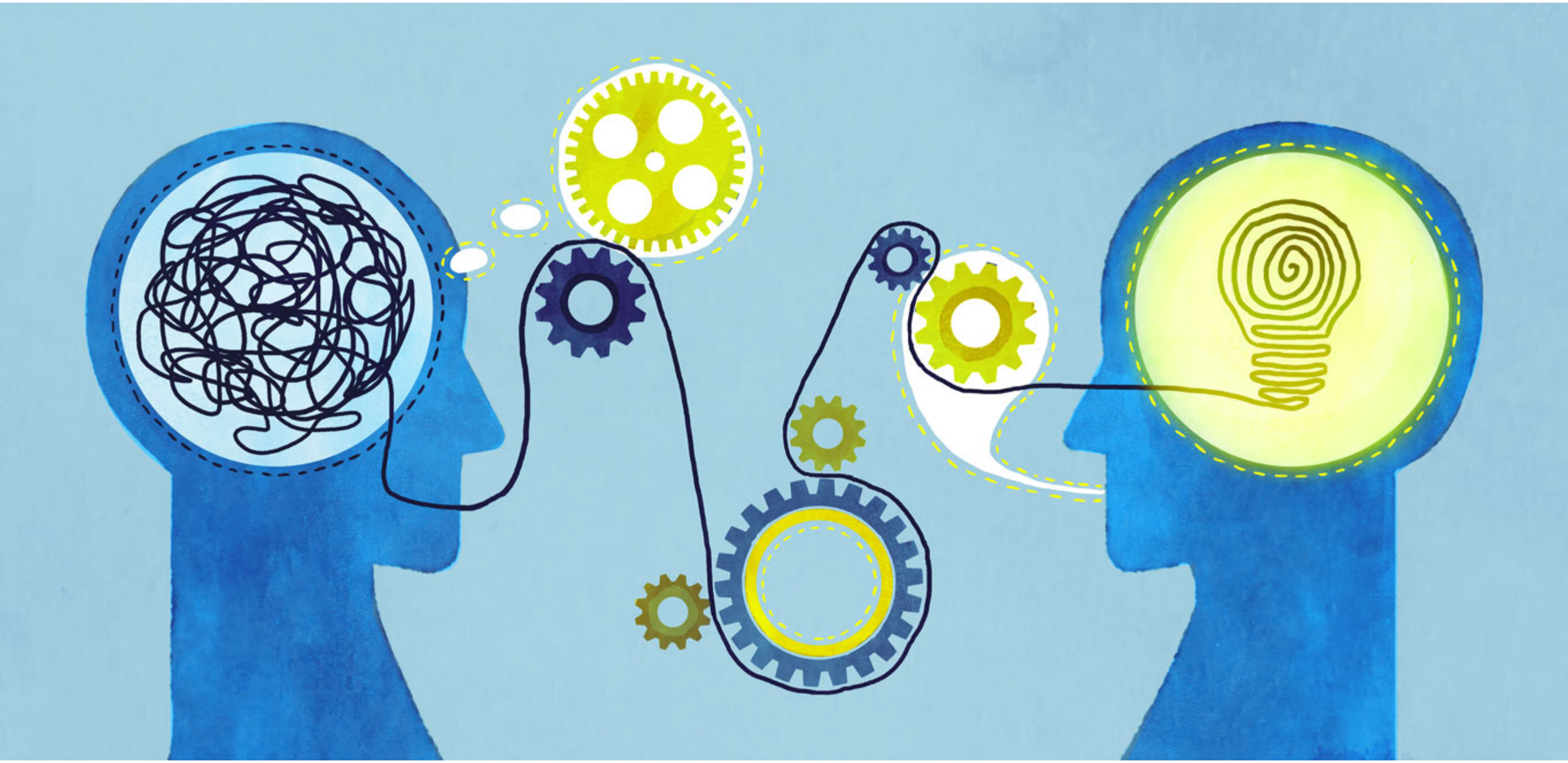


Digital Humanities is all about humans



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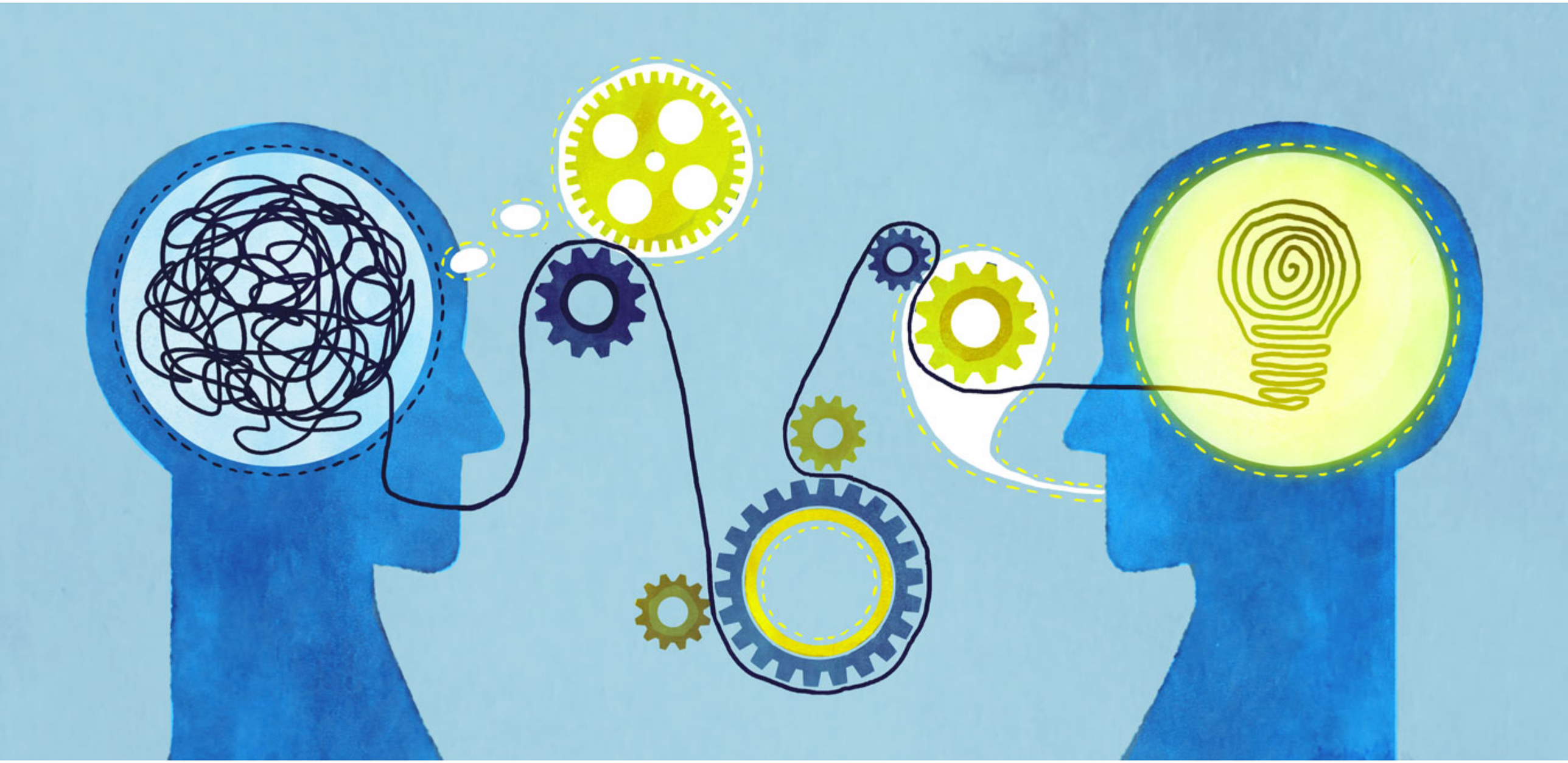
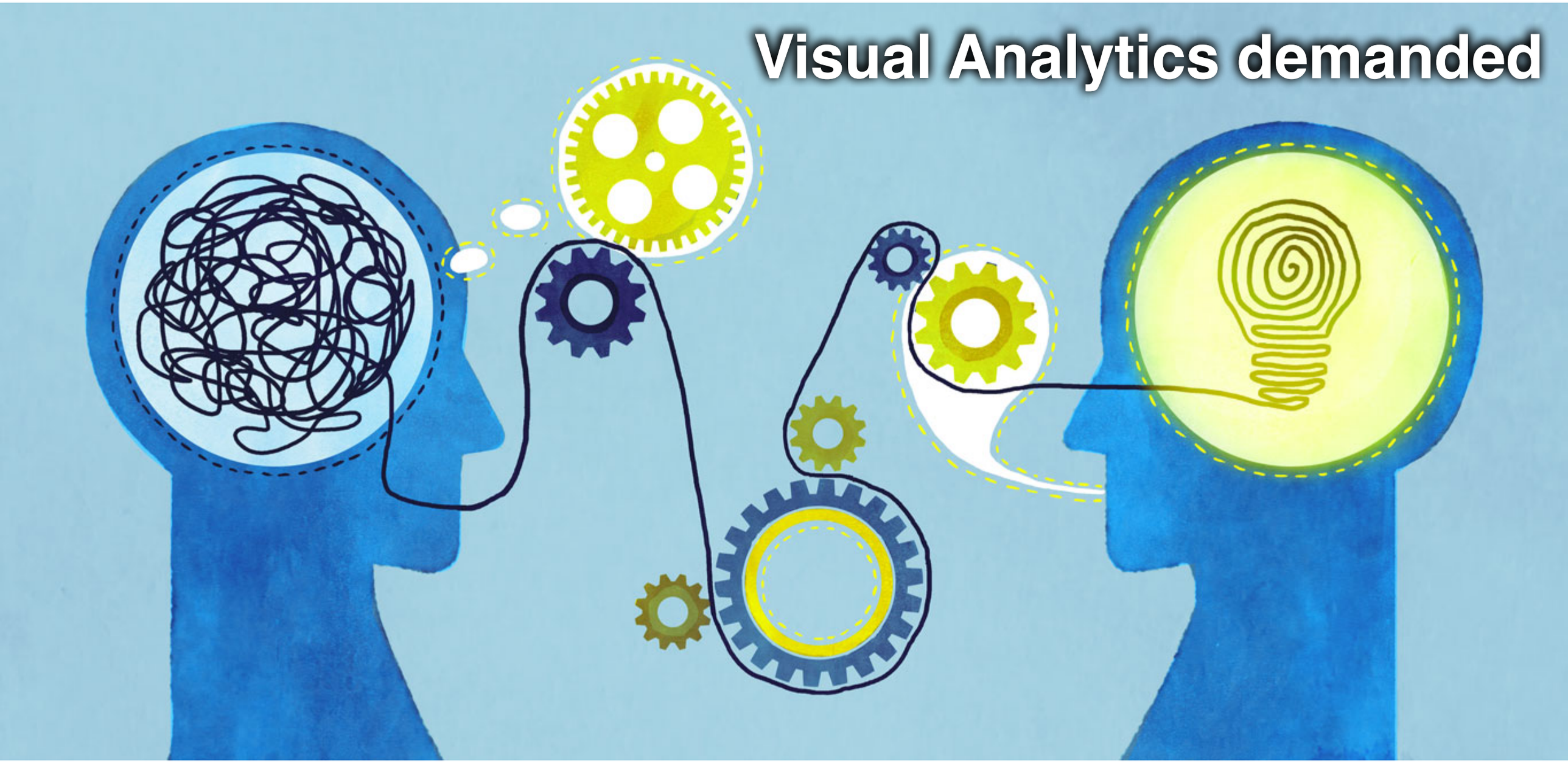


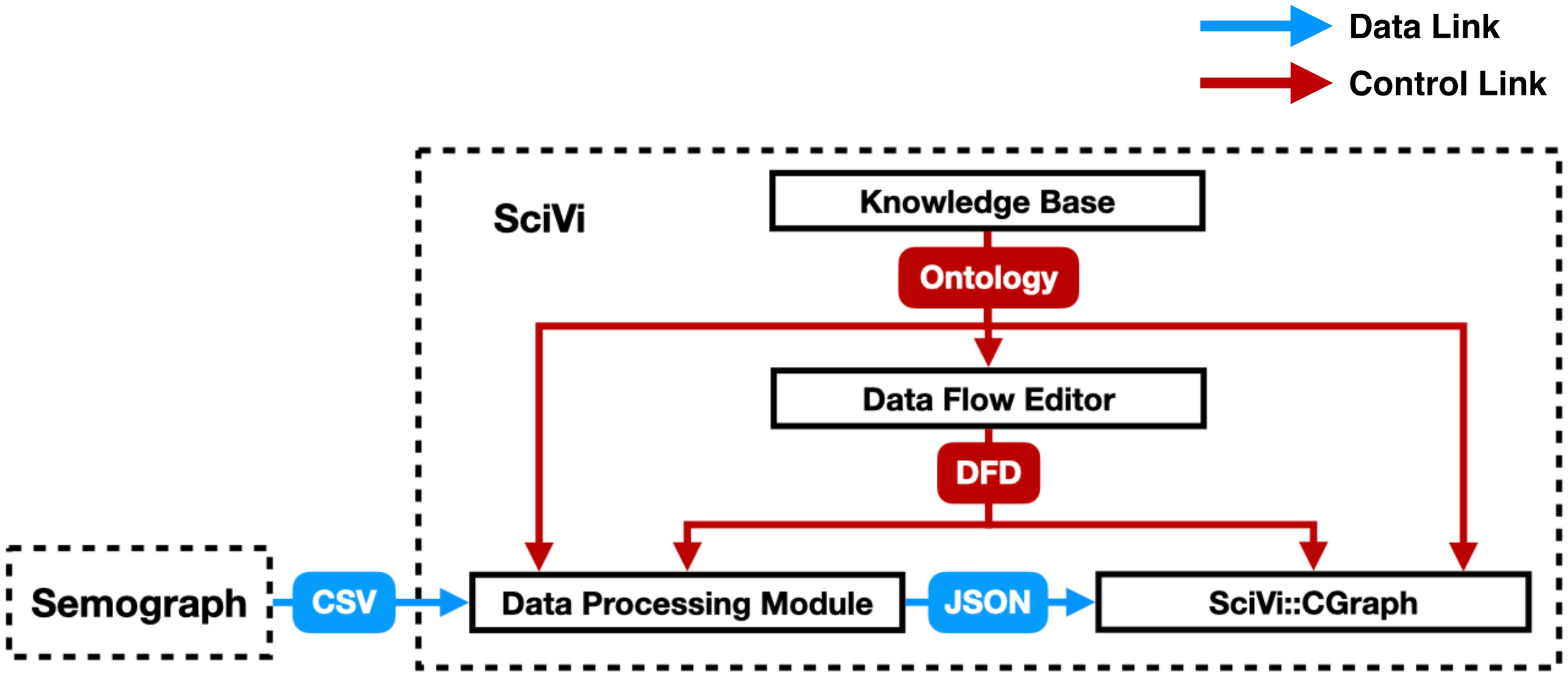
Digital Humanities deals with wide variety of data

Digital Humanities is all about humans

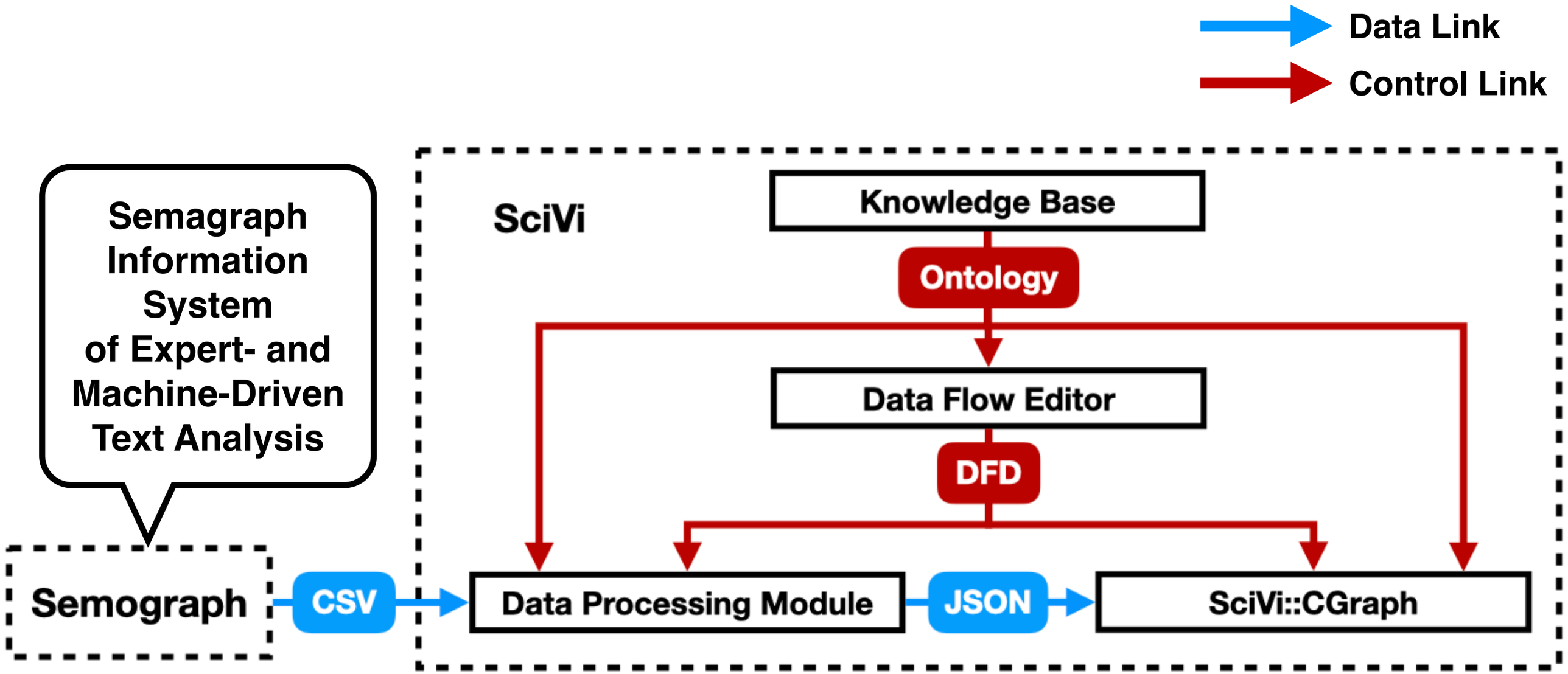


Digital Humanities deals with wide variety of data


Knowledge about Humans
Computational Linguistics
Digital Humanities



Ryabinin, K., Belousov, K., Baranov, D. Integration of Semograph Information System and SciVi Visualizer for Solving the Tasks of Lingual Content Expert Analysis // Scientific Visualization. 2017. Q. 4, Vol. 9, No. 4. PP. 67–77. DOI: 10.26583/sv.9.4.07.



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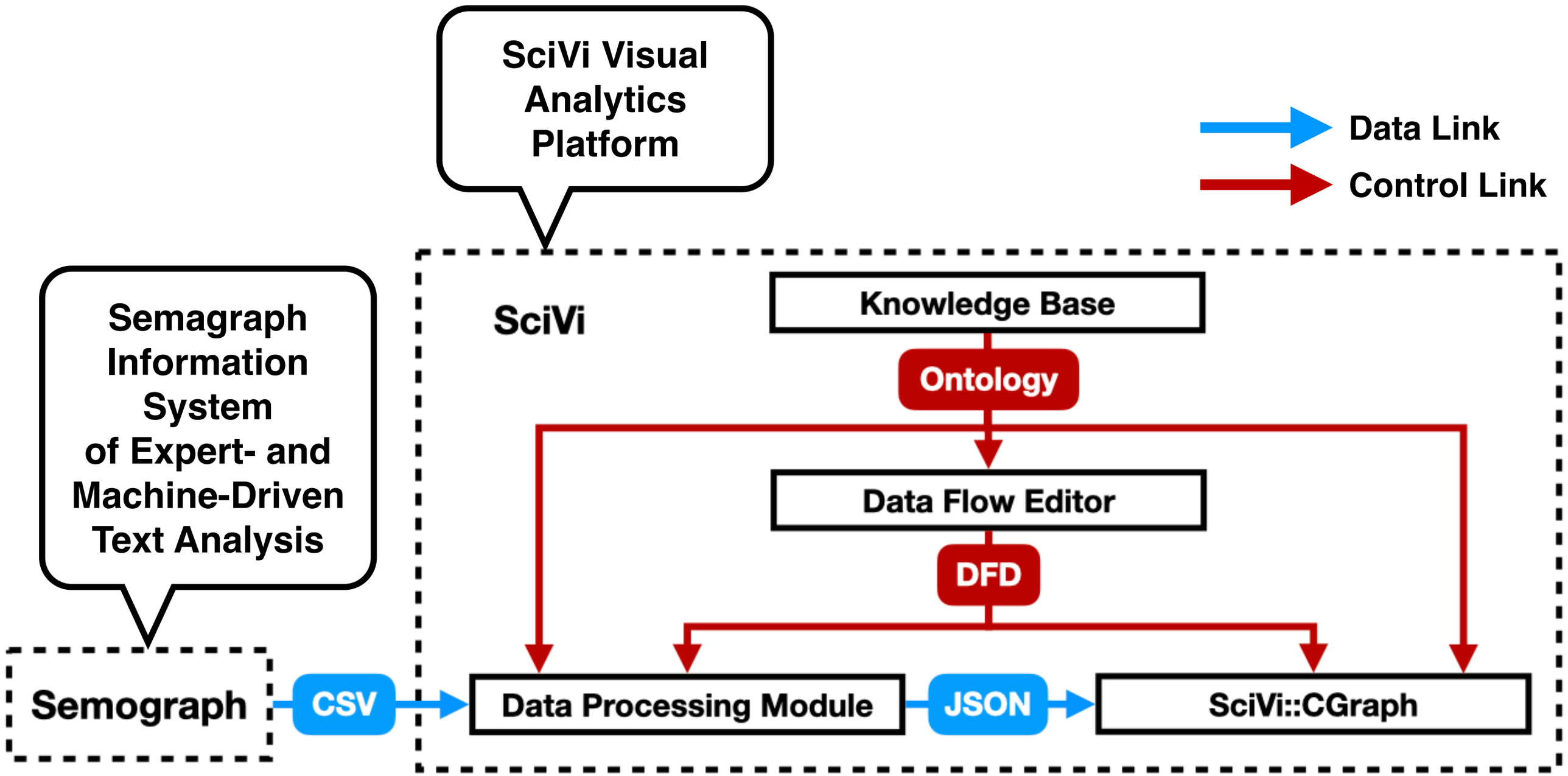

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Ontology – formal model of application domain (T.R. Gruber, 1993)

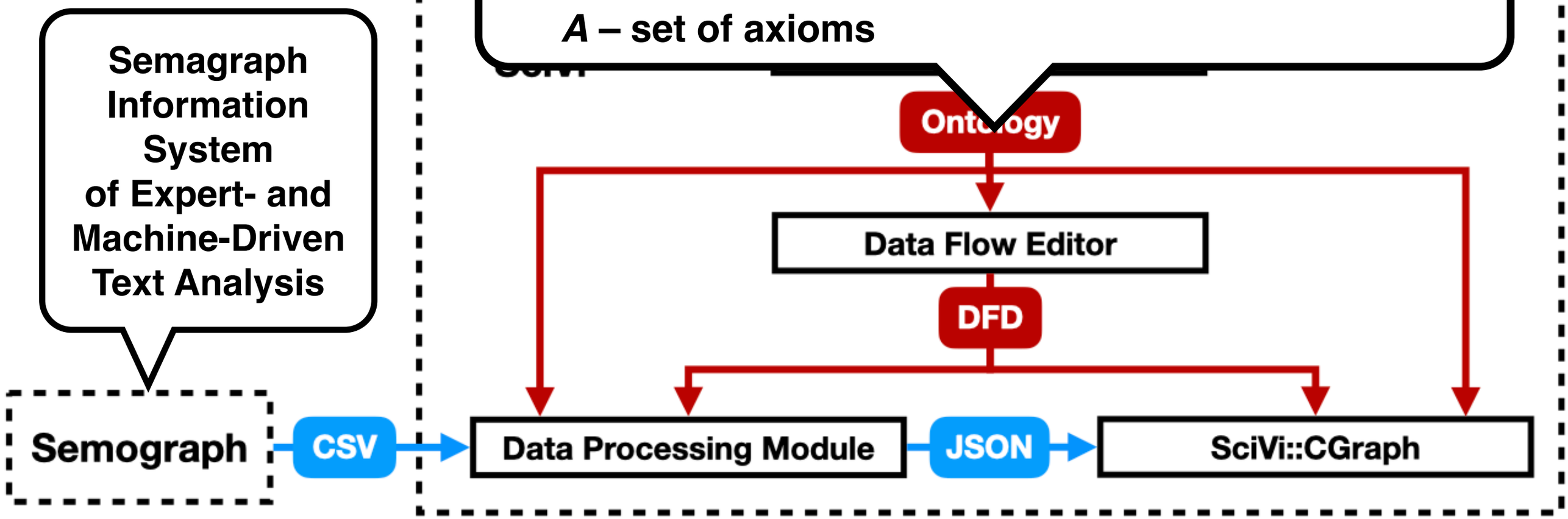
$O = \langle T, R, A \rangle$

T – thesaurus of application domain concepts

R – set of relations between concepts

A – set of axioms

Semagraph Information System of Expert- and Machine-Driven Text Analysis



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Semagraph Information System of Expert- and Machine-Driven Text Analysis

Ontology

Ontologies are created / edited within ONTOLIS
(special editor that is ontolgy-driven itself)

Semograph → CSV → Data Processing Module → JSON → SciVi::CGraph

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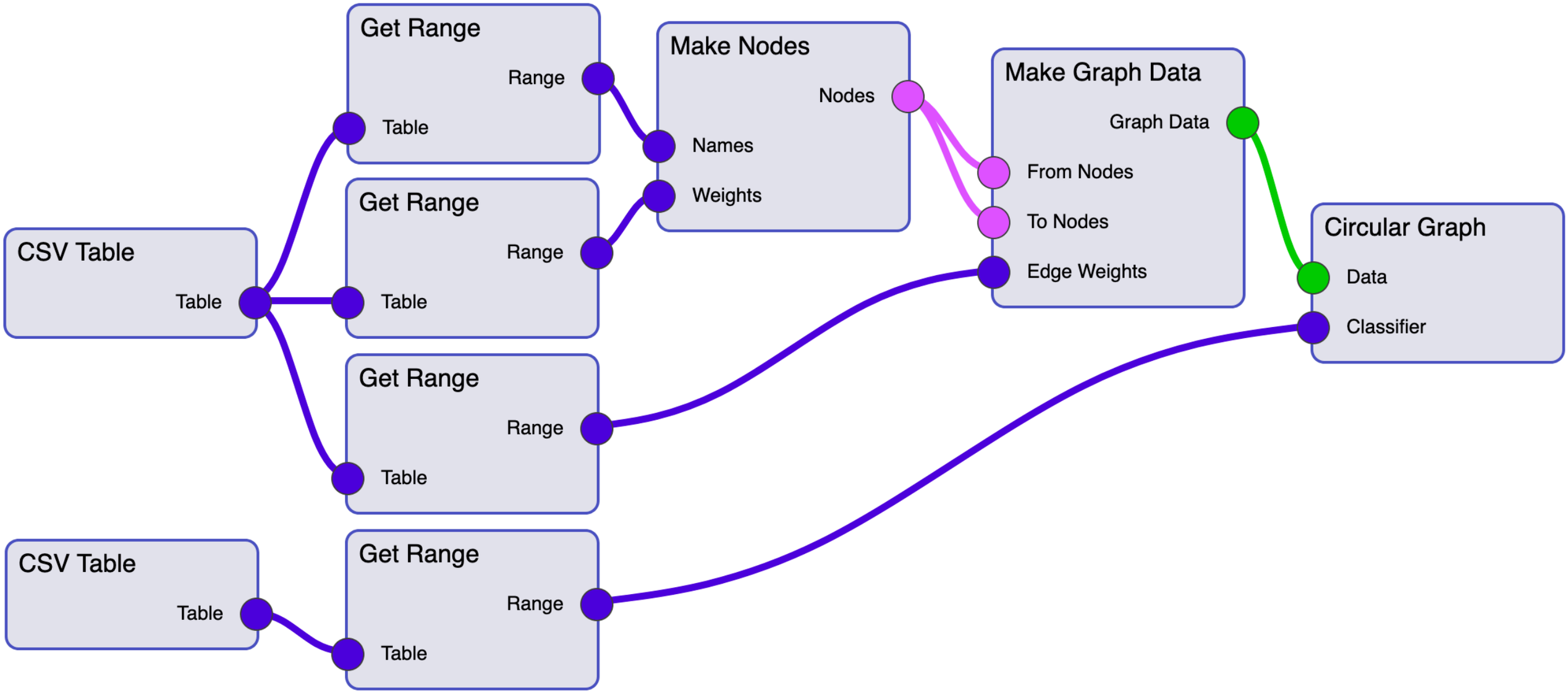
ETL in SciVi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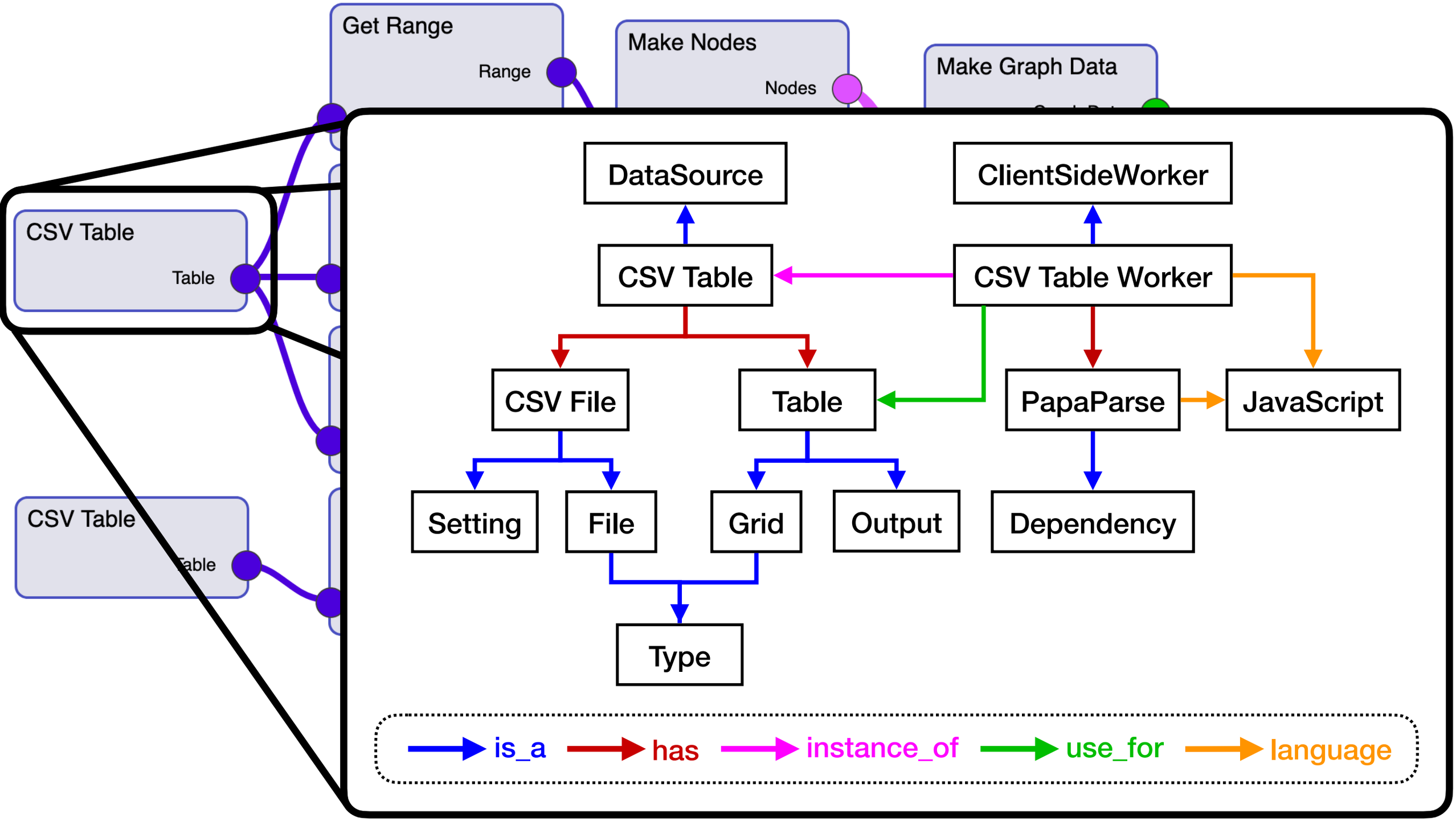
ETL in SciVi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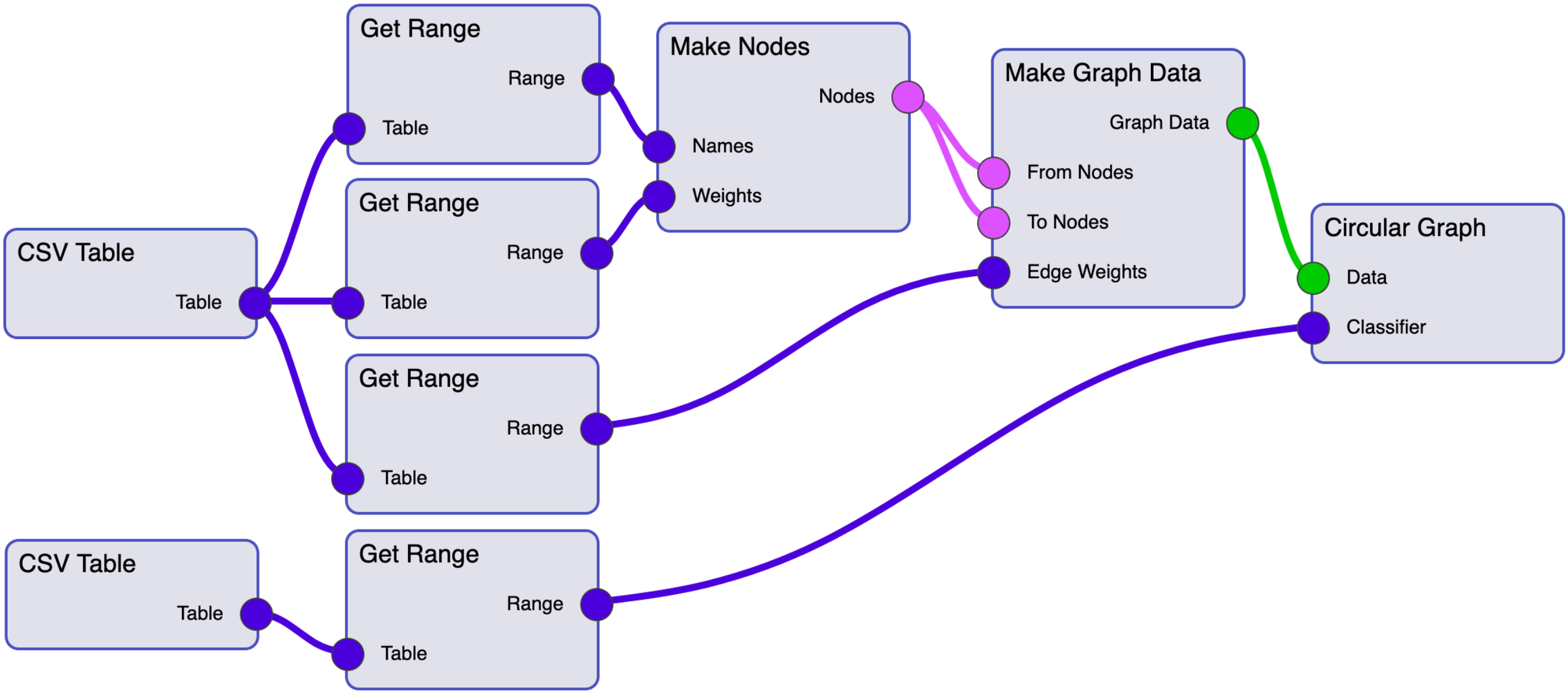
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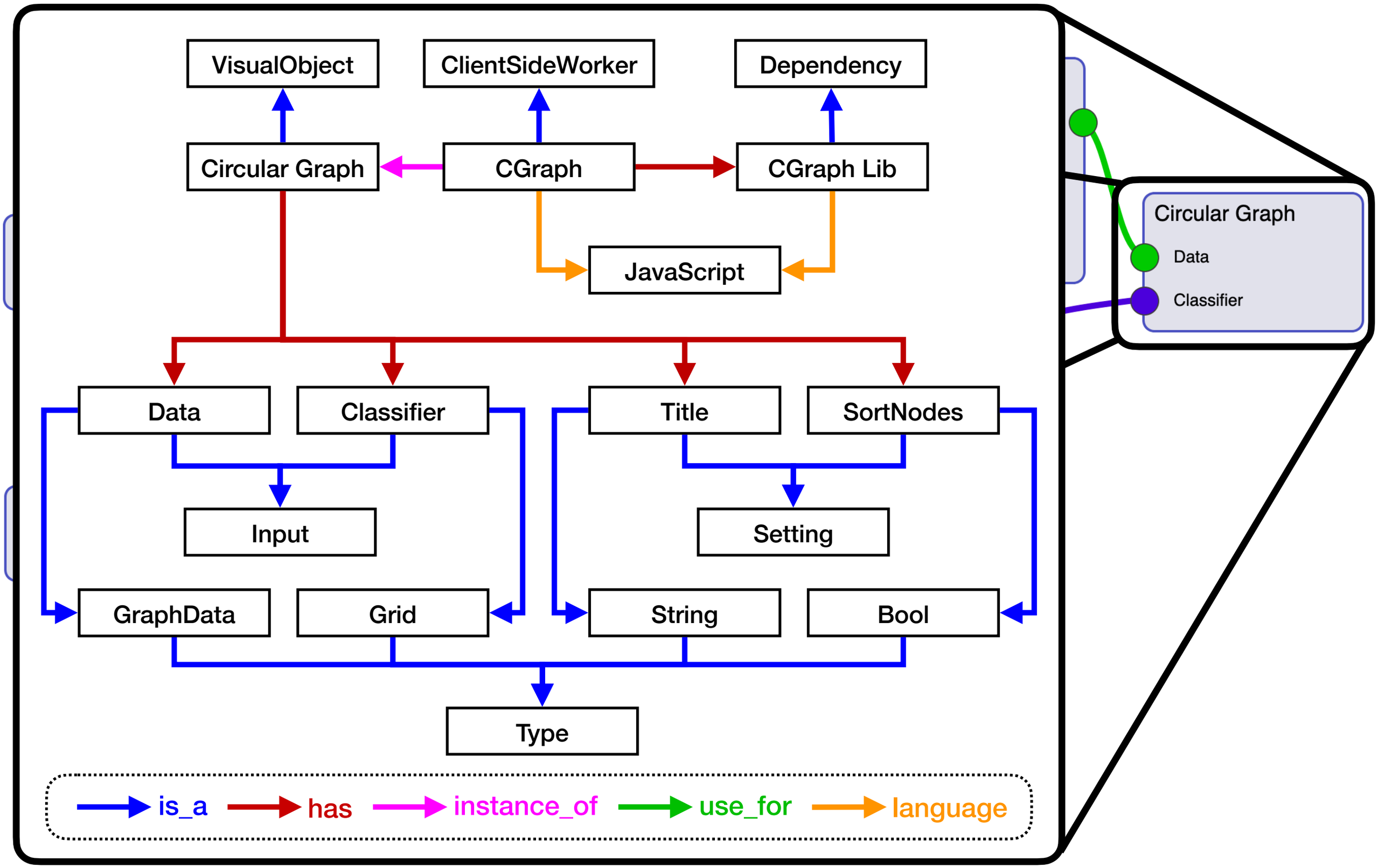
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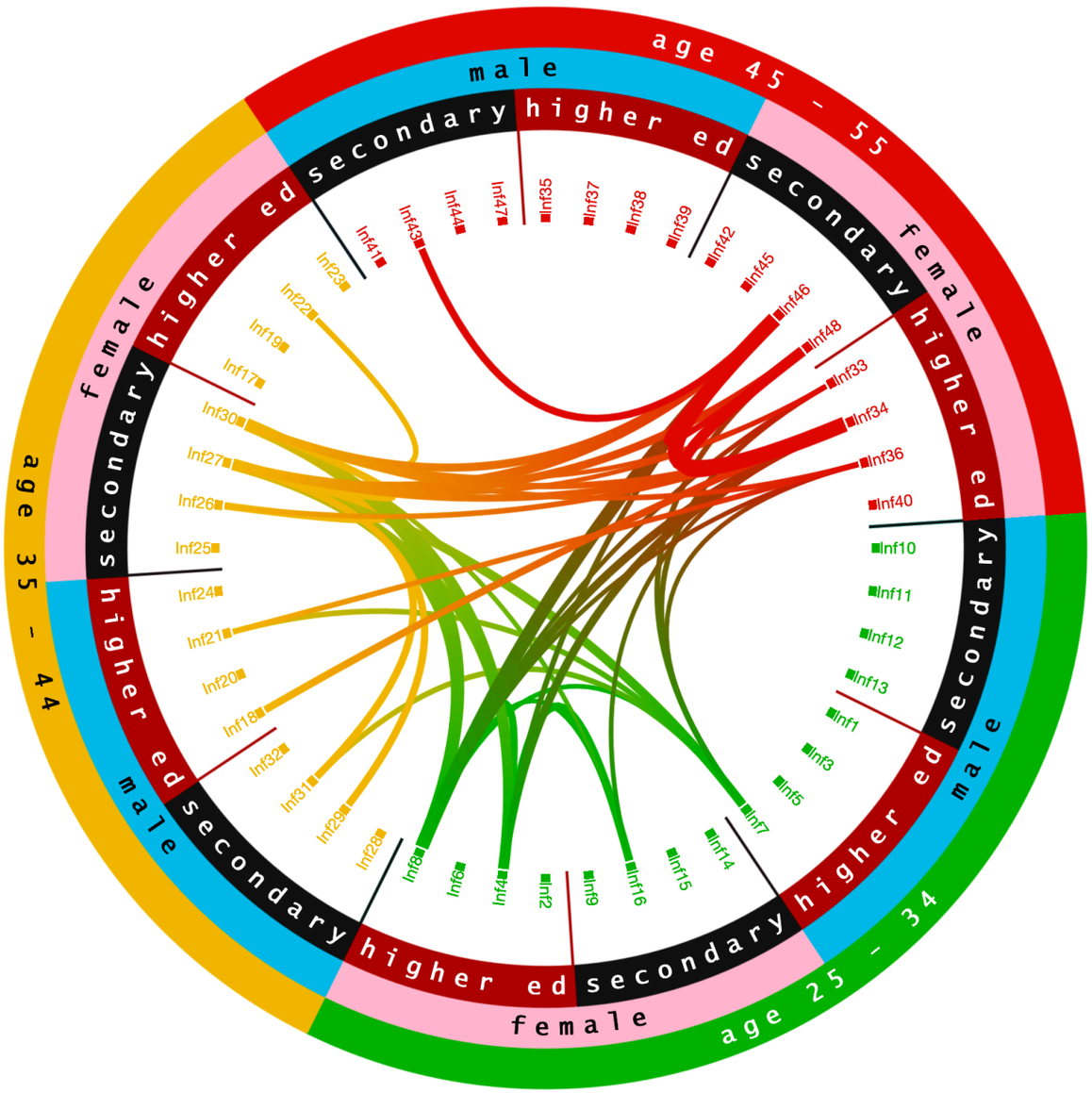
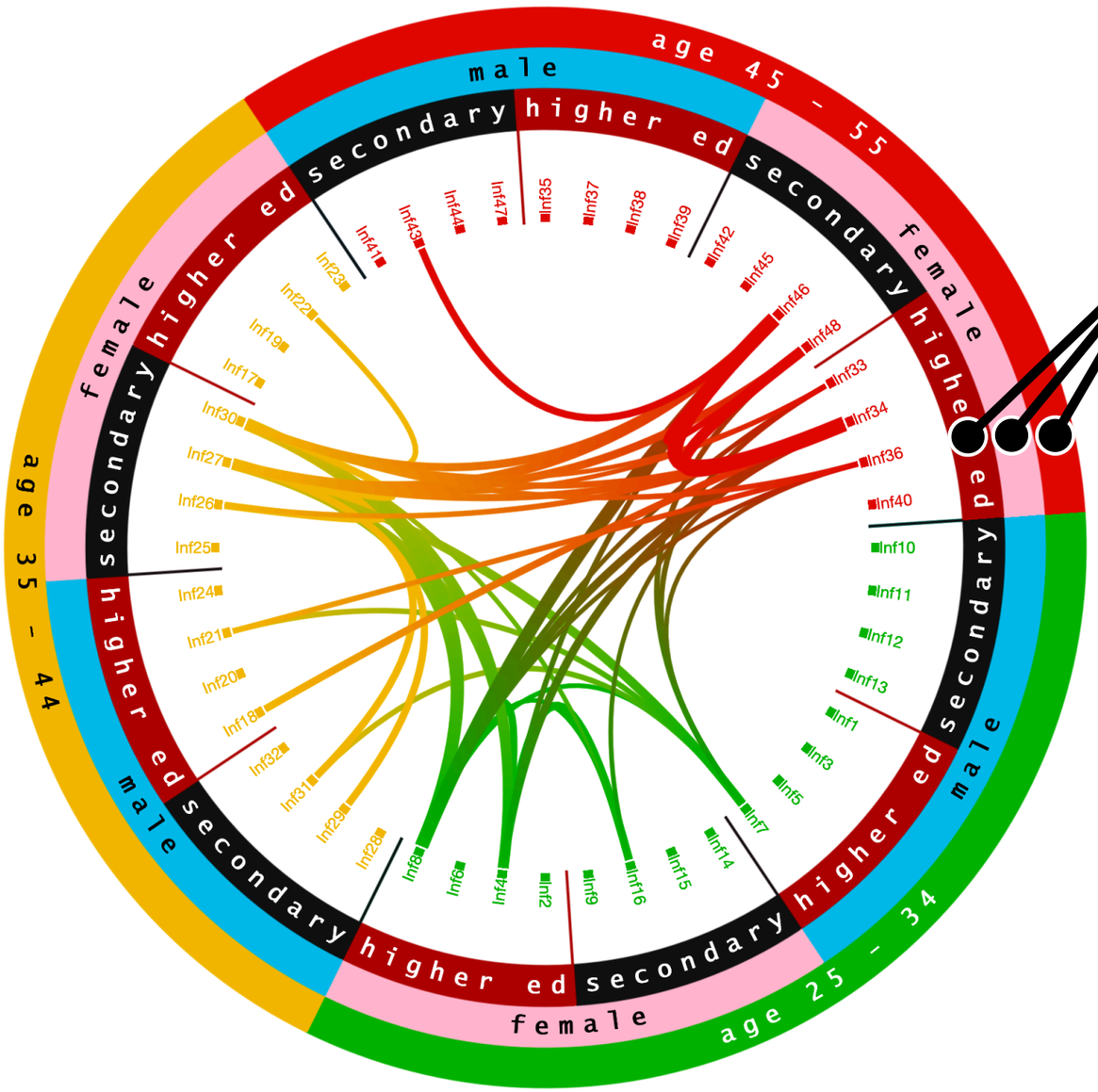
1. Multilevel Ring Scale
2. Equalizing Filter
3. Graph State Calculator
4. Sync with a Geographic Map

Multilevel Ring Scale

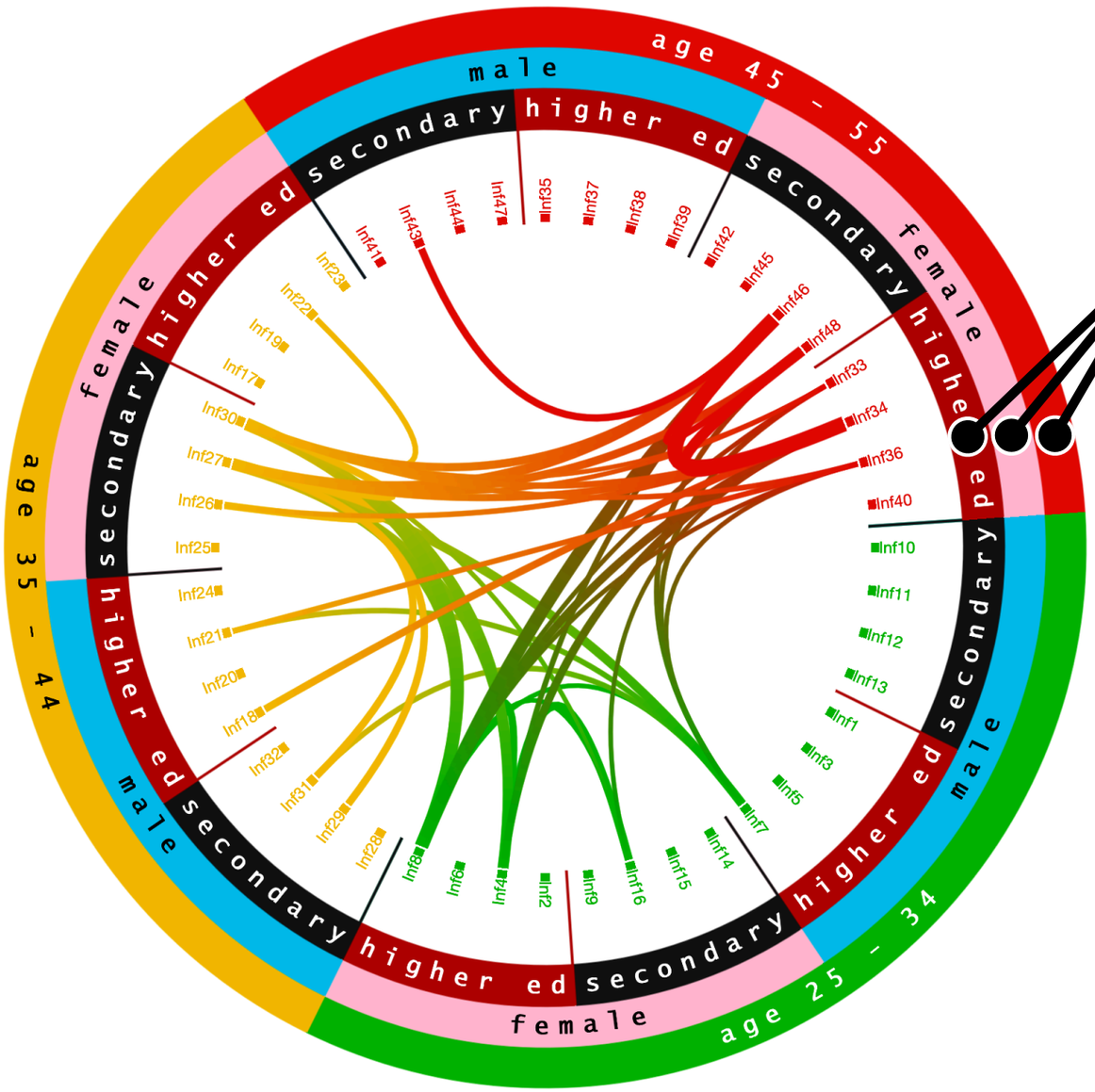


Multilevel Ring Scale



Changeable order of rings + sortable nodes

Multilevel Ring Scale



Changeable order of rings + sortable nodes

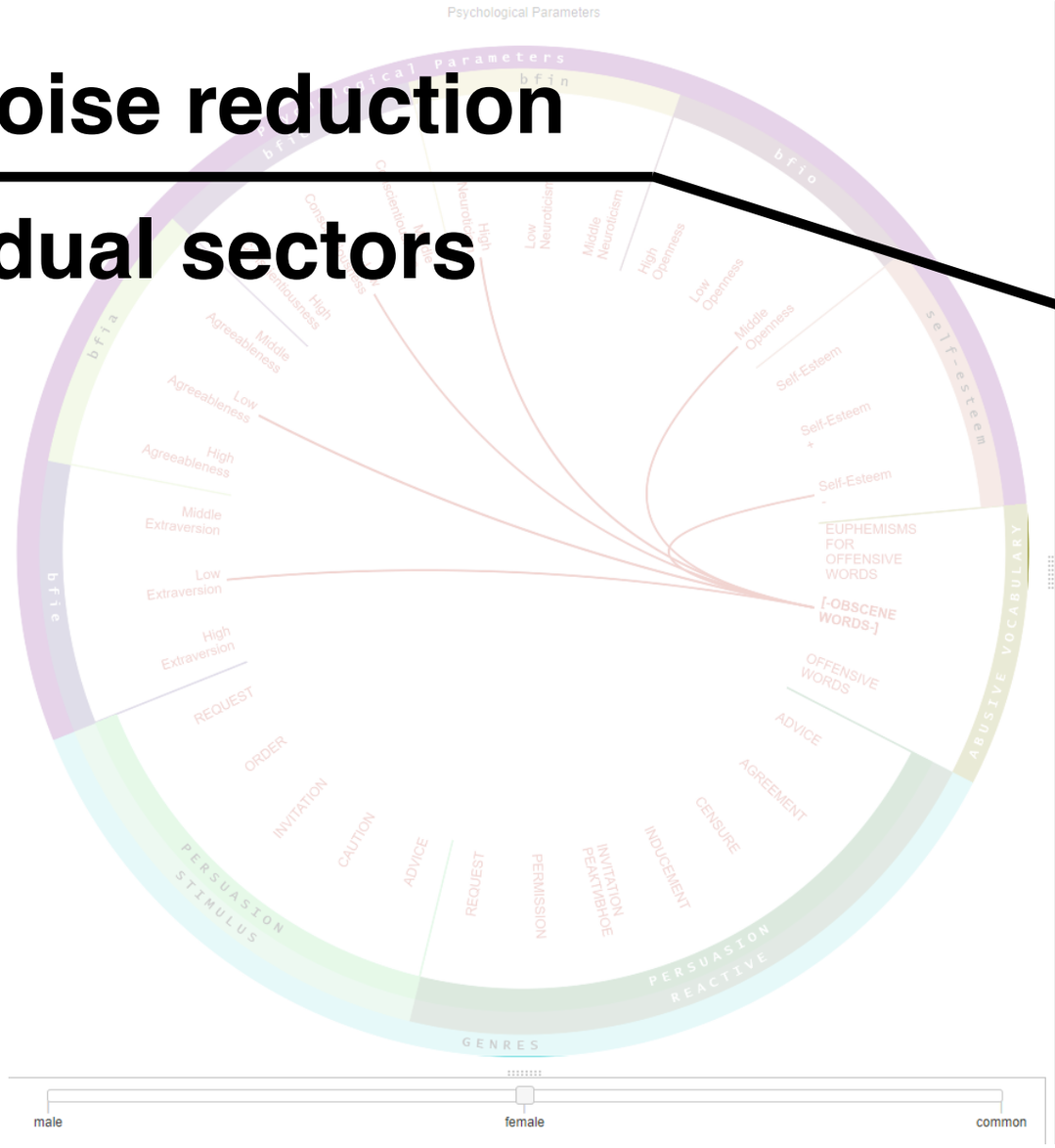
Sample Task:

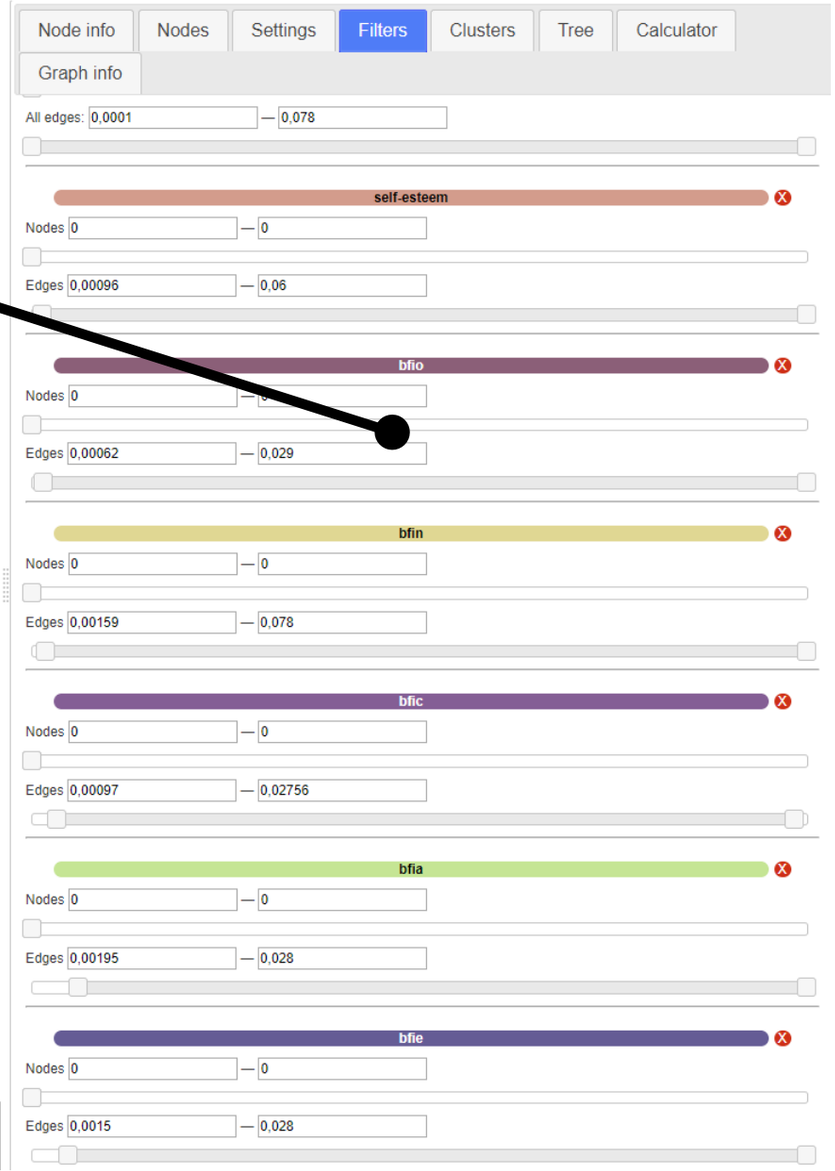
- Correlation analysis of 38 topics extracted from 48 stories told by informants as self-presentation
- Informants balanced by sex, age, and education level
- Which parameter dominates by grouping the informants together?

Equalizing Filter

Equalizing Filter

Fine-tune noise reduction for individual sectors





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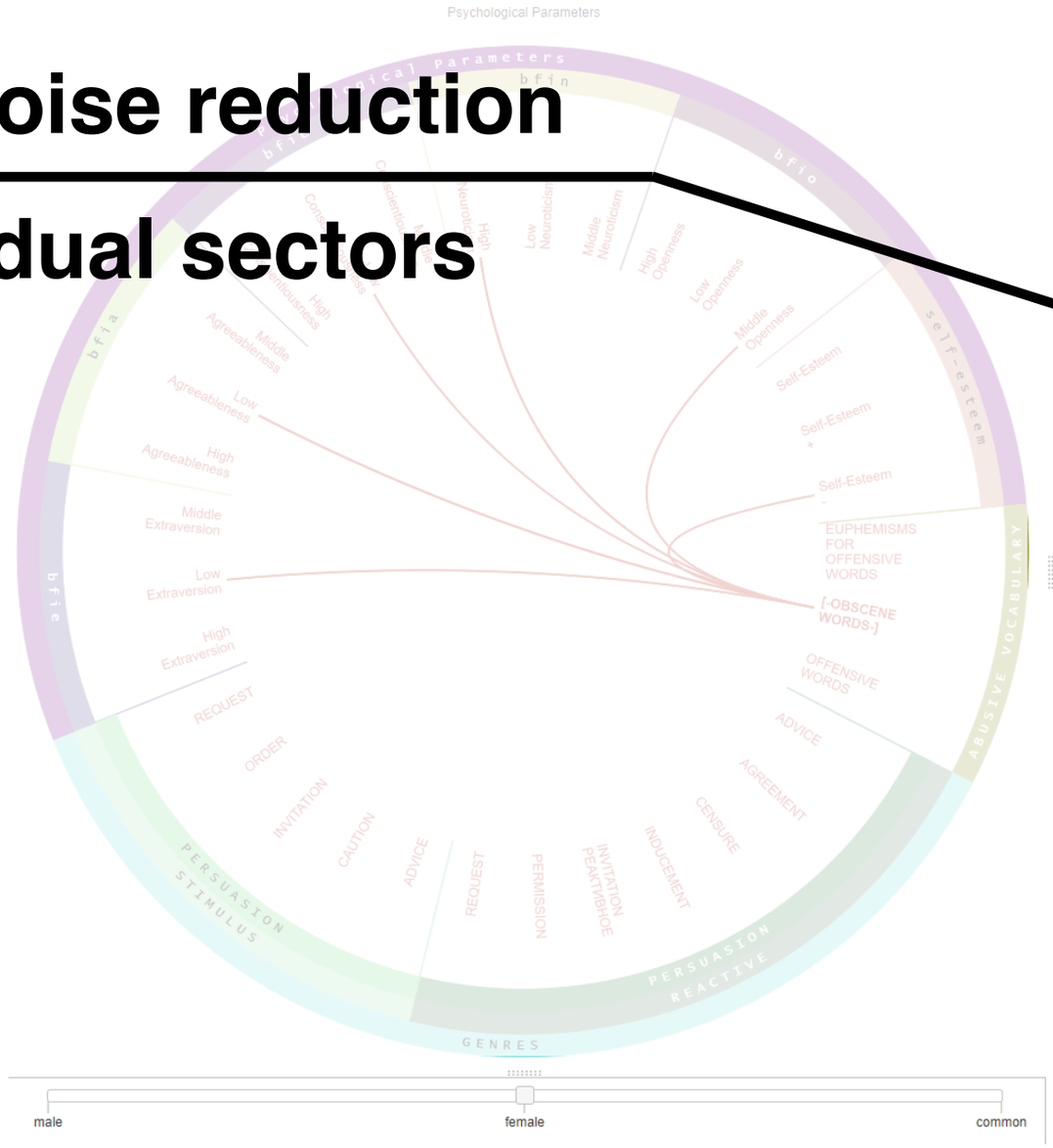
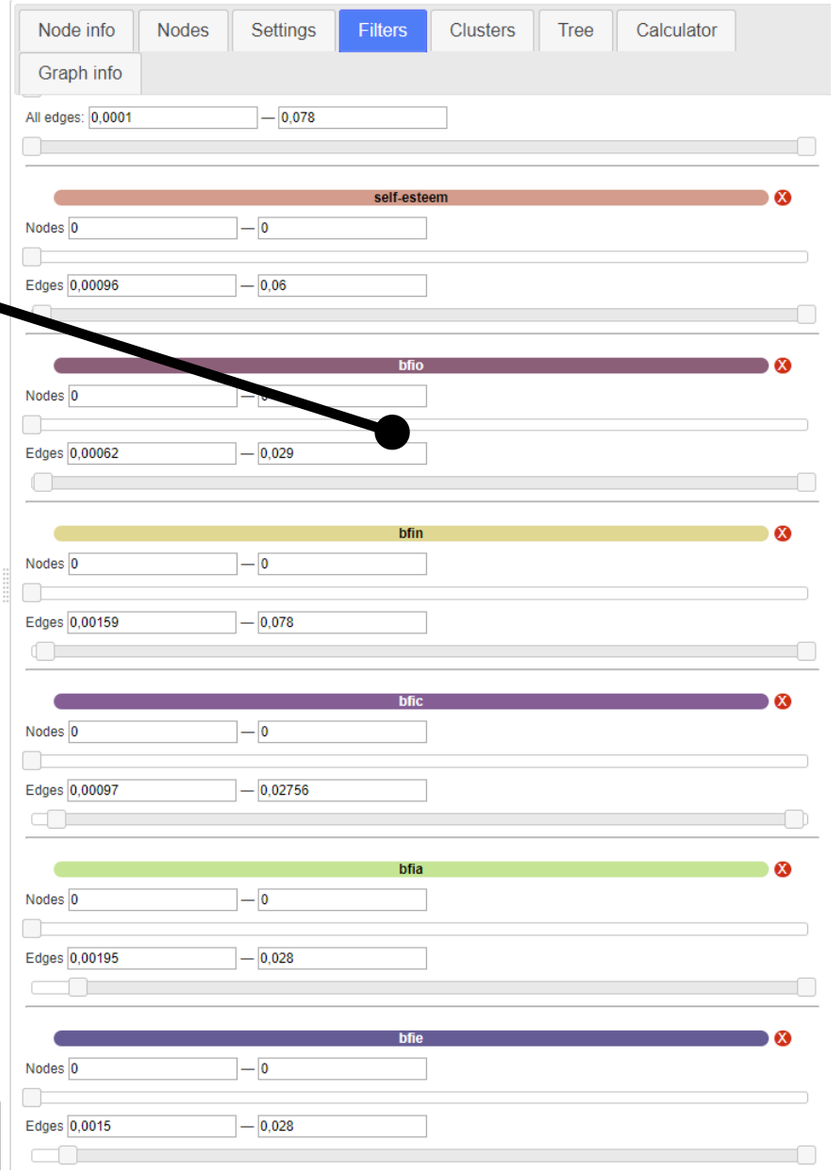
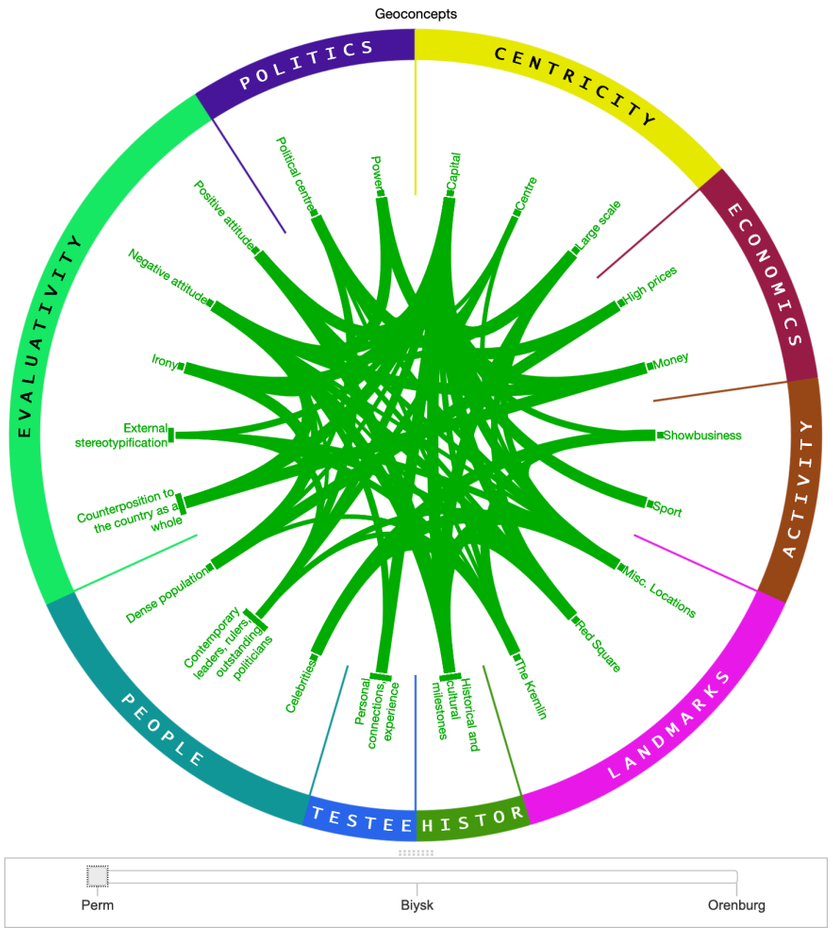


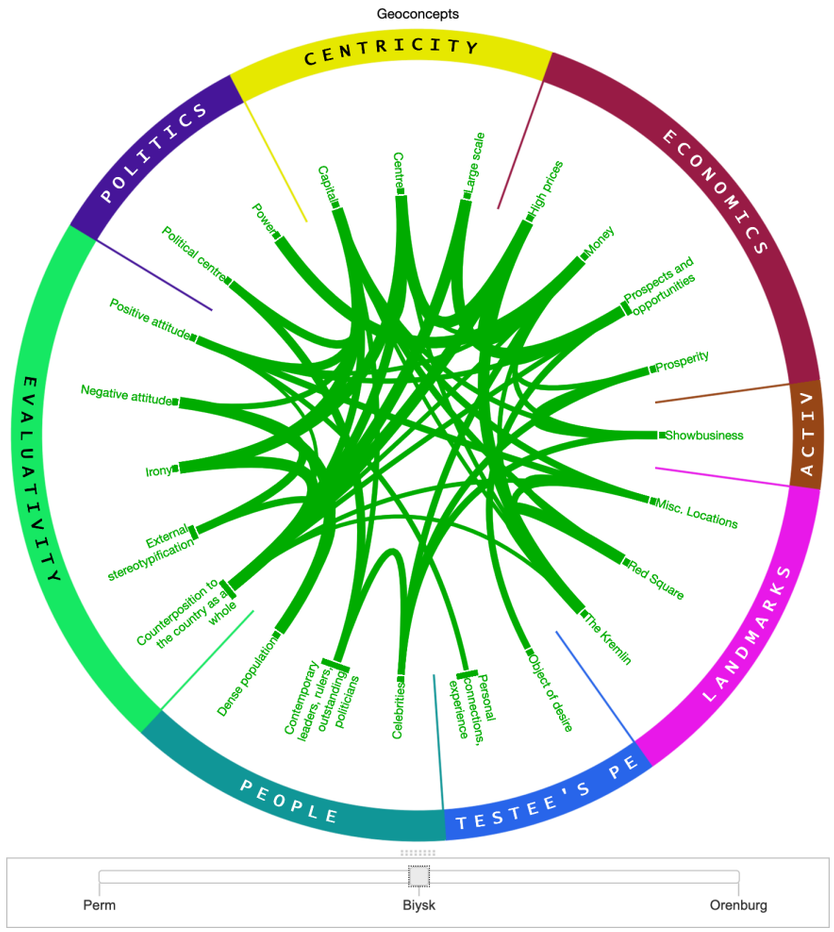


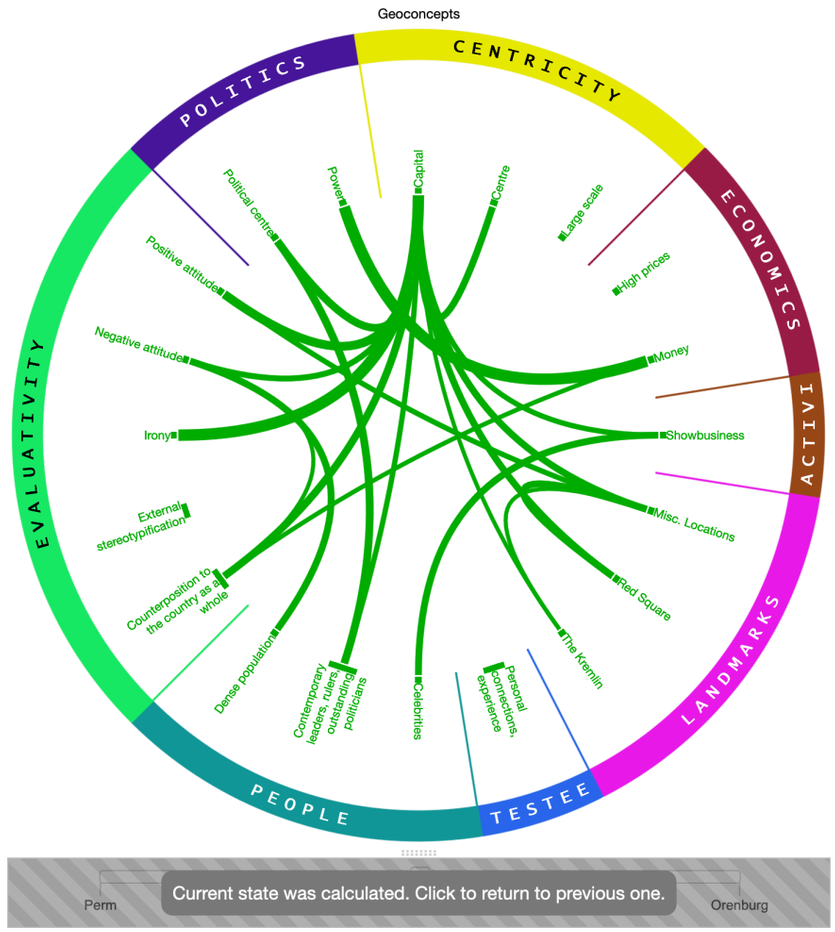
Sample Task:

- Psychological parameters of social network users revealed from questionary
- Verbal behavior revealed by linguistic analysis of their posts
- Each psychological parameter has its own statistical features (minimum, maximum, average, standard deviation)
- What are the relations between verbal behavior and psy?

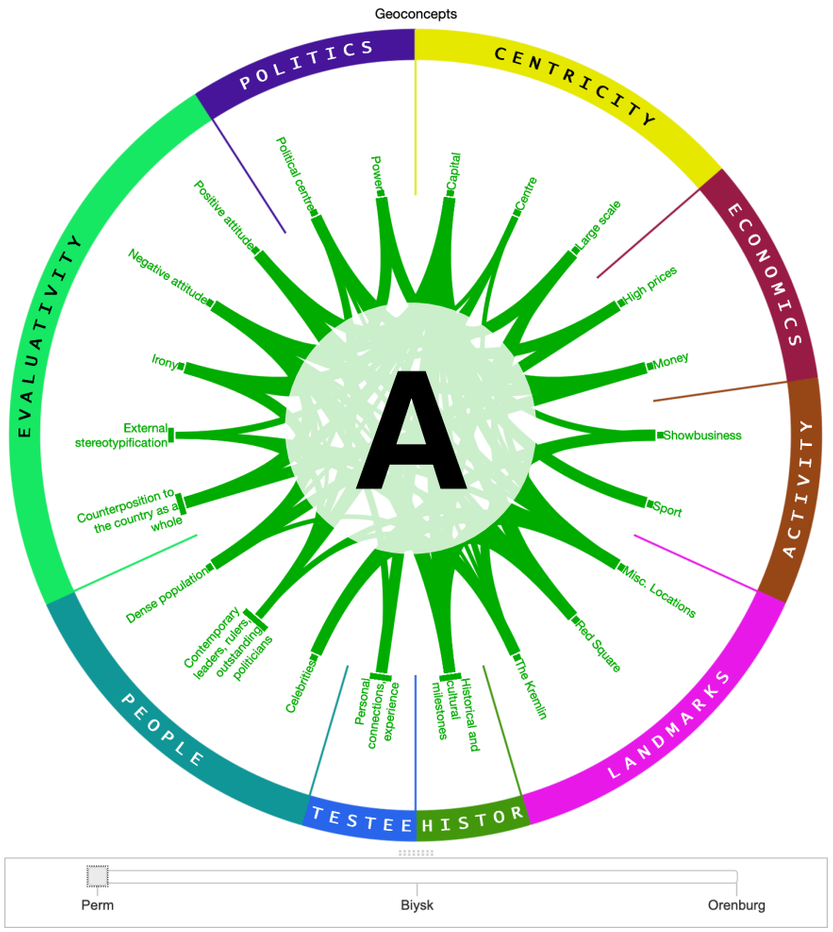
Graph State Calculator

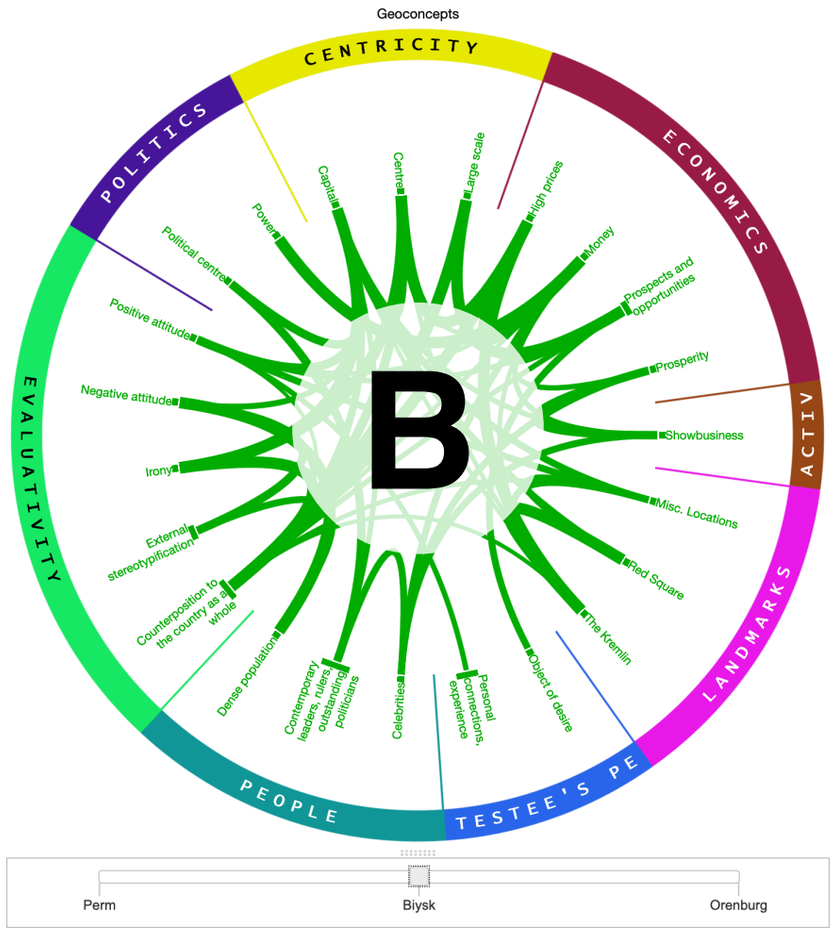


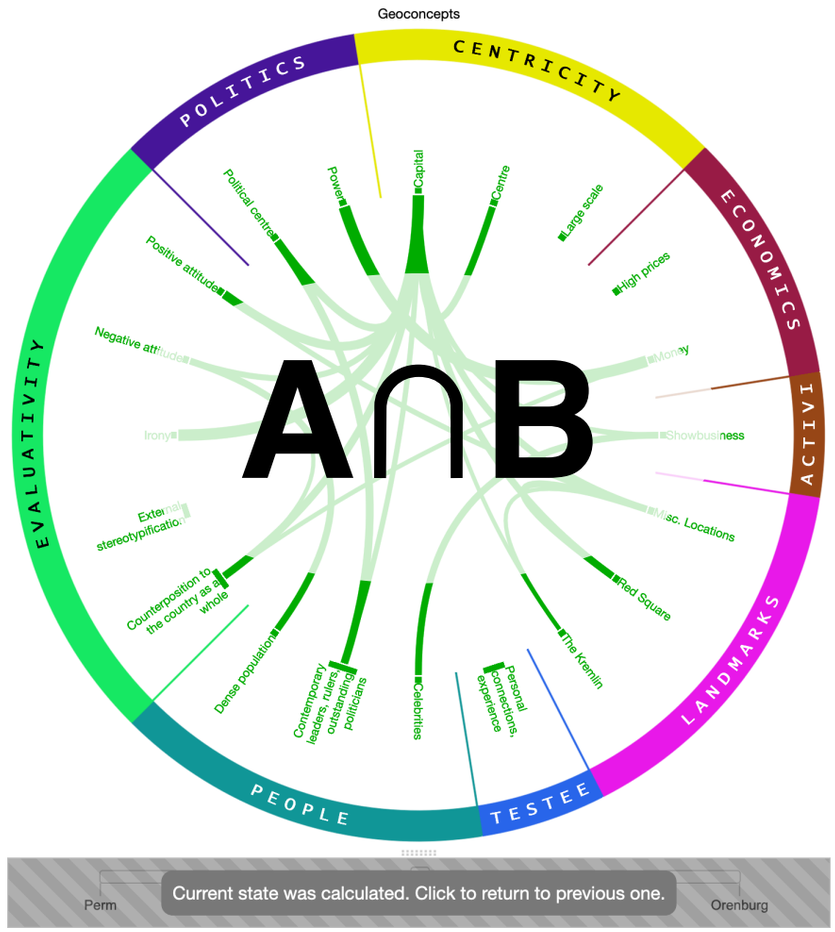




Perform set algebra operations on the graphs

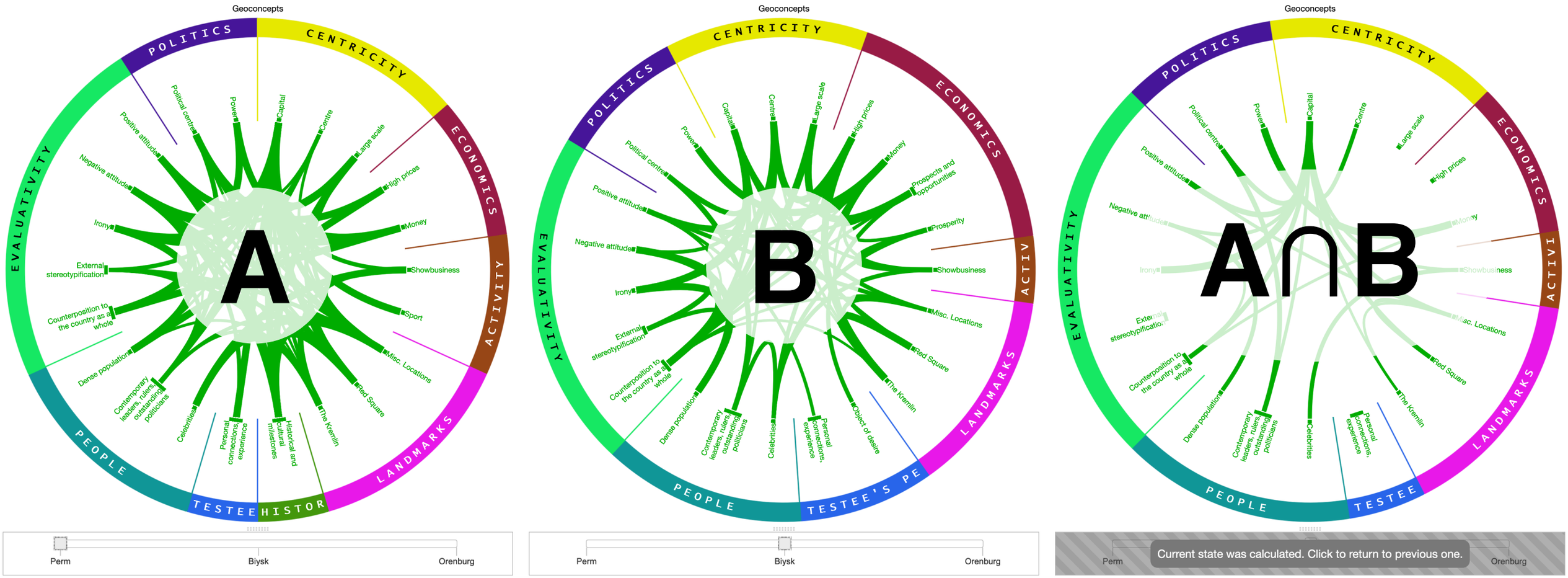






Graph State Calculator

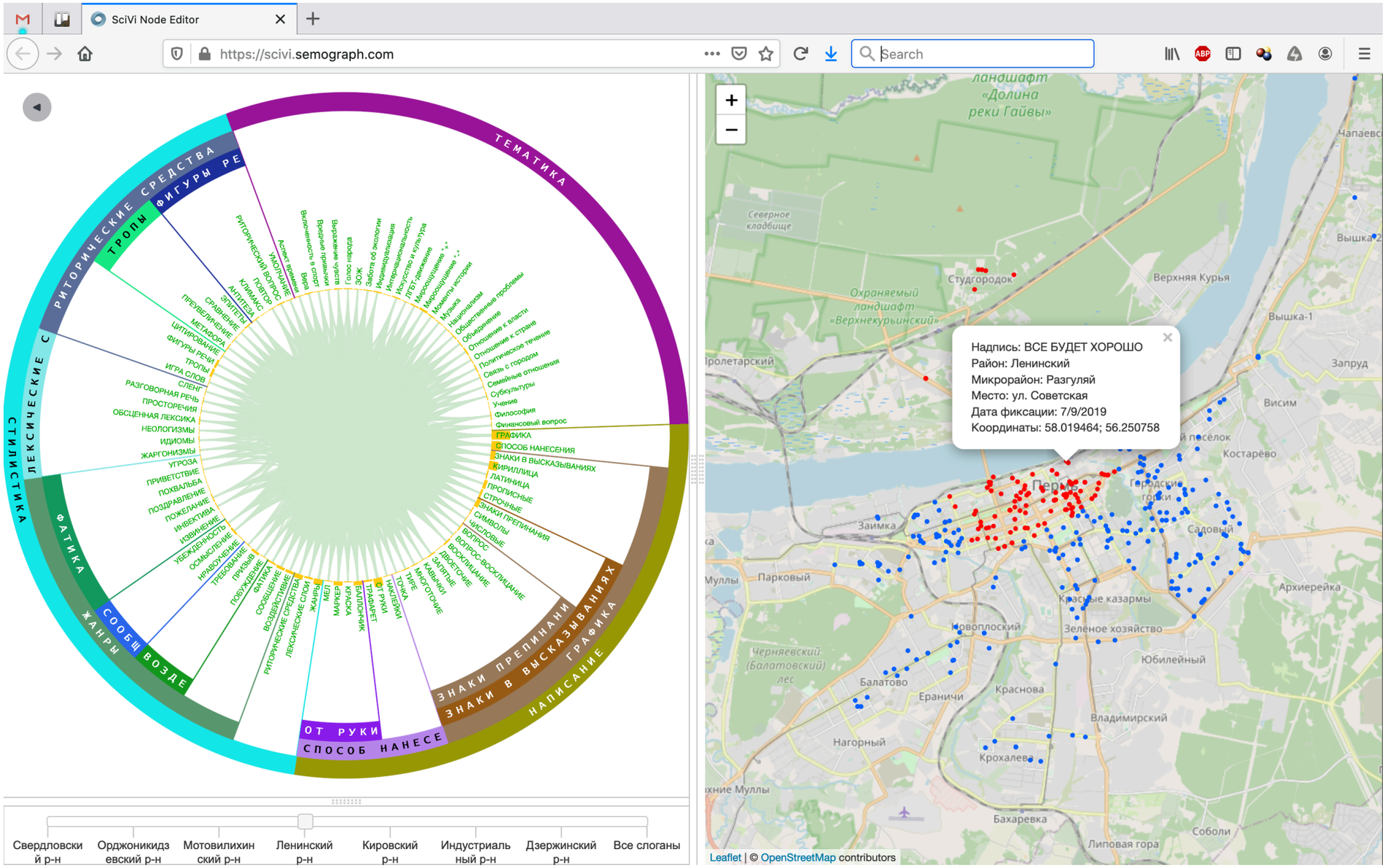
Perform set algebra operations on the graphs



Sample Task:

- **Informants' associations with geoconcept "Moscow" grouped in semantic categories**
- **Co-presence of categories derived from the associations, group of informants came up with**
- **How similar / different are the associations in different regions?**

Sync with a Geographic Map



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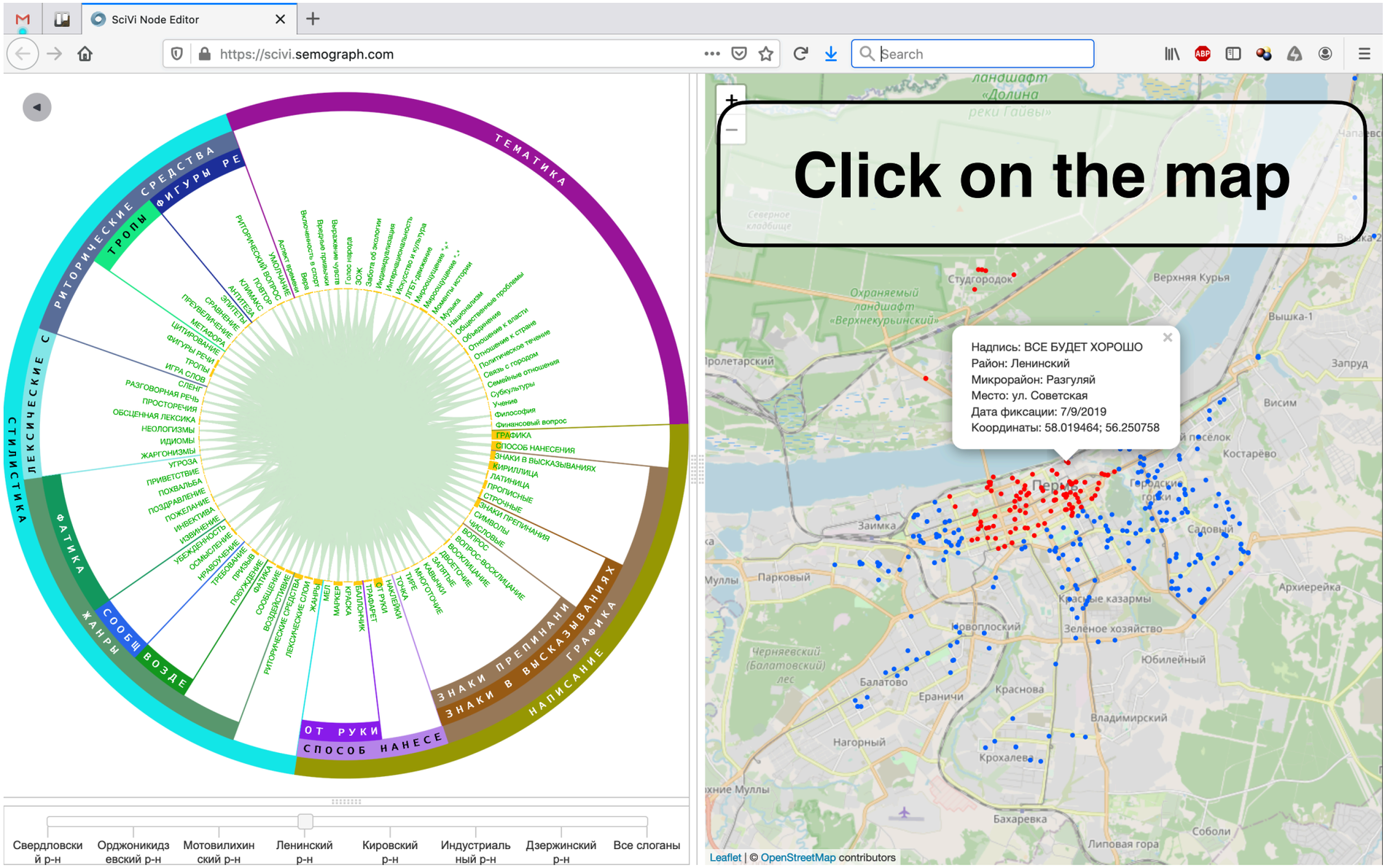

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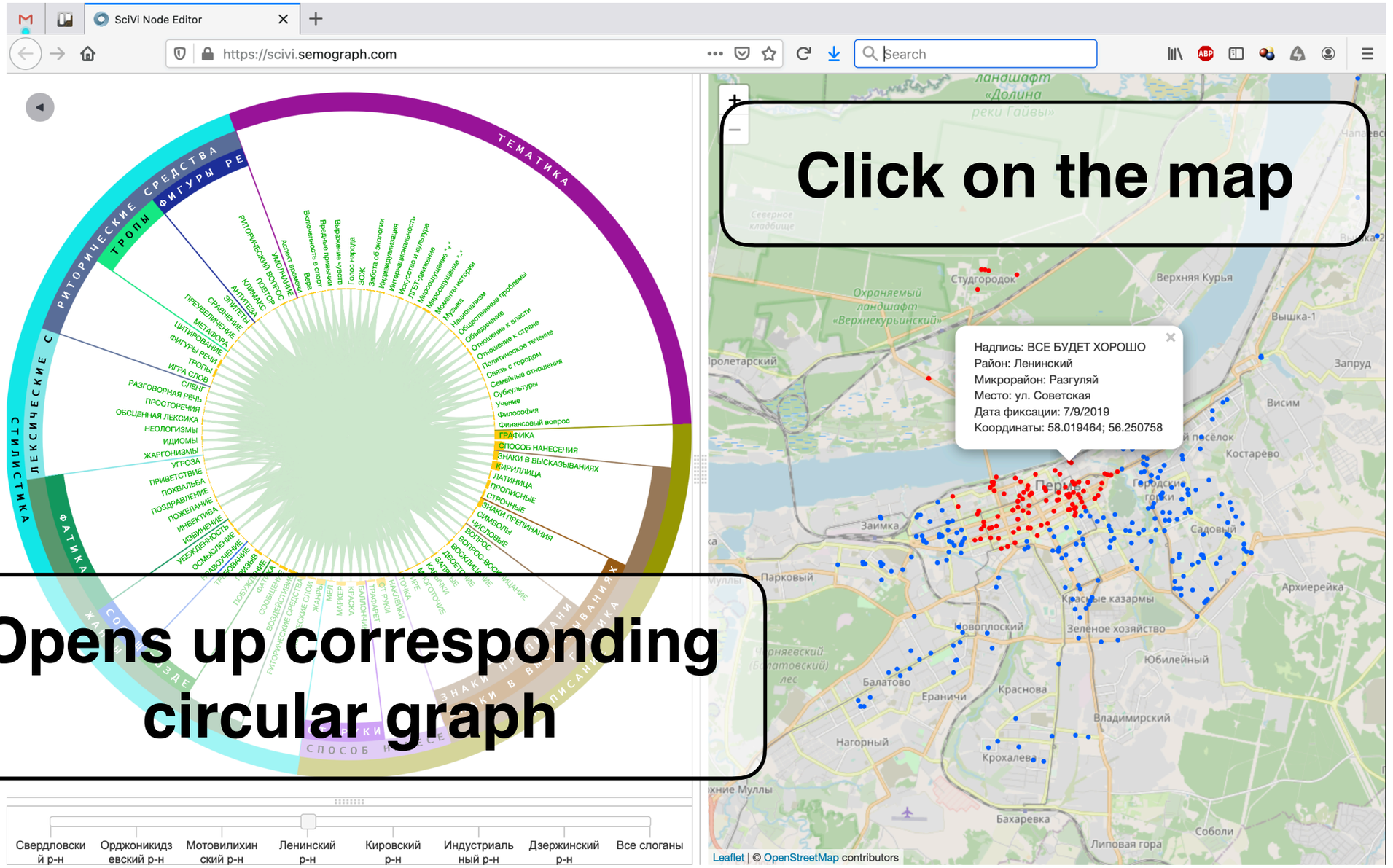

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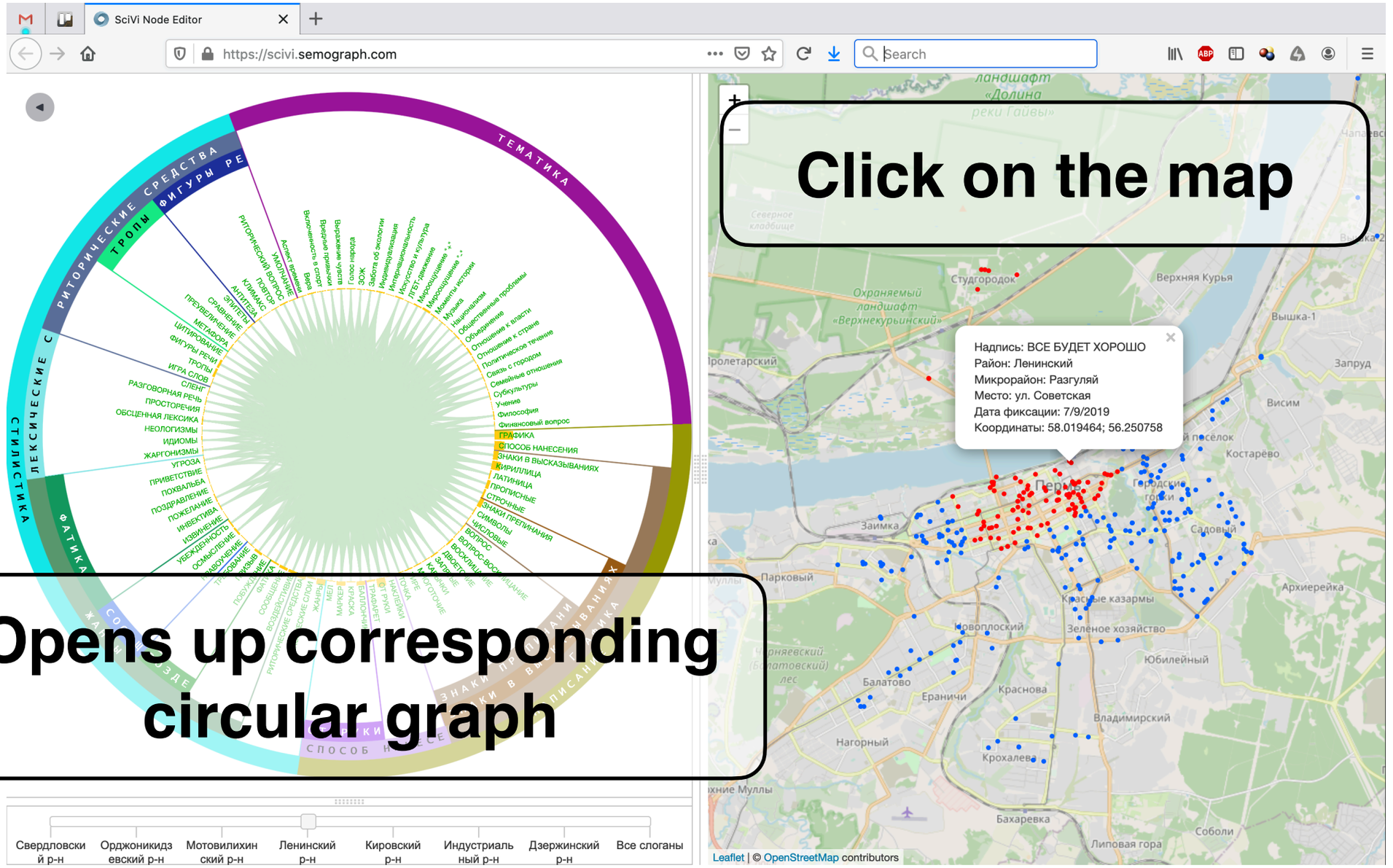

Sample Task:

- Slogans written on the walls in Perm assembled with their geo-locations
- Topic, style and writing features of slogans revealed and classified
- Which distinctive slogan features has each district of Perm?

Conclusion

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Features implemented allow advanced interactive visual analytics of interconnected data in Digital Humanities

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https://github.com/scivi-tools/scivi.graph

Conclusion

Features implemented allow advanced interactive visual analytics of interconnected data in Digital Humanities

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SciVi::CGraph is being used:

- **In the Perm State University supported by Ministry of Education and Science of the Russian Federation, state assignment No.34.1505.2017/4.6**
- **In Sirius education center, project “Images of Large Russian Cities in the Linguistic Consciousness of Senior Schoolchildren”**

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Thank you for attention!

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Saint Petersburg – 2020