2nd International Symposium - Digital Humanities: Empowering Visibility of Croatian Cultural Heritage
University of Zadar, Department of Information Sciences, Zadar, Croatia, November 6 - 7, 2017

Developing an ontological model for the research and representation of Commemoration Speeches in Croatia using a graph property database (Neo4j)

Benedikt Perak

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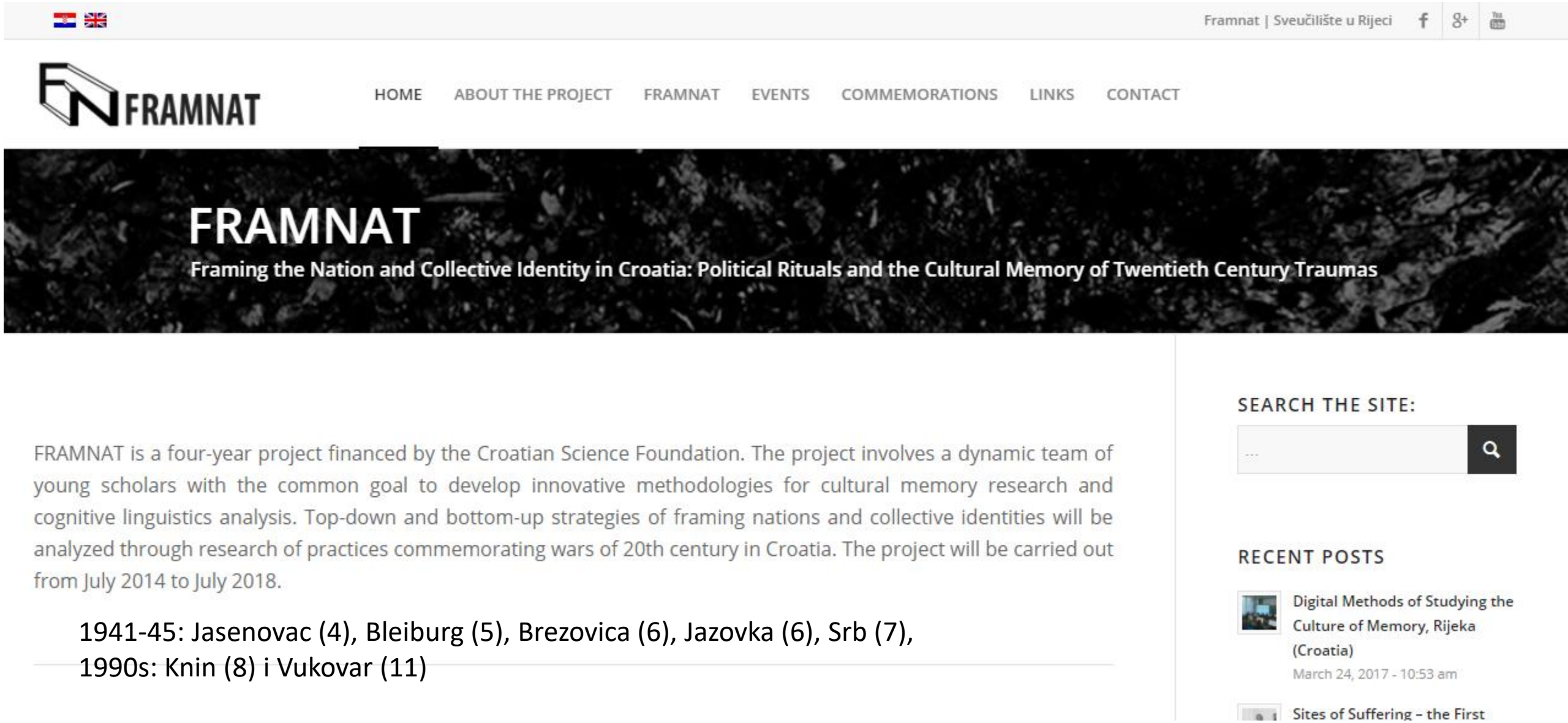
CULTURAL STUDIES

hrzz
Hrvatska zaklada za znanost



1941-45: Jasenovac (4), Bleiburg (5), Brezovica (6), Jazovka (6), Srb (7),
1990s: Knin (8) i Vukovar (11)

http://framnat.eu/?lang=en

SRB

Do 1991. godine, 22. lipnja se u Srbu obilježavao Dan ustanka naroda i narodnosti SR Hrvatske, čije je obilježavanje odredio ZAVNOH na svojoj posljednjoj sjednici u kolovozu 1945. godine.

U samostalnoj Hrvatskoj, na taj datum se obilježava Dan antifašističke borbe, jer je na taj dan 1941. godine osnovan Prvi sisački partizanski odred.

BREZOVICA

Spomen park Brezovica je memorijalna park-šuma u kojoj je 22. lipnja 1941. godine osnovan Prvi sisački partizanski odred, prvi partizanski odred u okupiranoj Jugoslaviji.

Ovaj dio šume je poslije rata uređen, a u spomen parku je 1981. godine podignut monumentalni spomenik.

JASENOVAC

Jasenovac je bio ustaški koncentracijski logor osnovan radi zatvaranja desetaka tisuća Srba, Roma, Židova, Hrvata, Muslimana i drugih, a velik broj osoba je i ubijen. Logor je miniran, spaljen i uništen. Krajem pedesetih godina 20.st. poduzeti su prvi koraci za obilježavanje prostora bivšeg logora, dok je spomenik žrtvama svečano otkriven 4. srpnja 1966. Nakon toga izgrađen je i Memorijalni muzej Spomen područja Jasenovac.

BLEIBURG

Komemoracija u Bleiburgu predstavlja podsjećanje na događaje koji su uslijedili nakon 2. svjetskog rata, kada su deseci tisuća vojnika i civila povezanih sa fašističkim vlastima nasilno vraćeni u zemlje Jugoslavije. Tisuće osoba ubijeno ili prebačeno u radničke kampove.

Komemoracija se održava u austrijskom gradu Bleiburgu, gdje se većina repatrijacije dogodila.

JAZOVKA

Jazovka je naziv za jamu u žumberačkom području, u kojoj su ostavljeni ostaci stotine vojnika NDH i civila nakon 2. svjetskog rata. Komemoracija se održava od kad je početkom 1990-tih otkrivena jama, a za datum održavanja je odabran 22. lipanj (isti dan kada se slavi antifašistička borba).

KNIN

Dan pobjede i domovinske zahvalnosti i Dan hrvatskih branitelja slavi se u Hrvatskoj 5. kolovoza svake godine kao spomen na pobjedu u Domovinskom ratu.Na taj datum 1995. Hrvatska vojska je oslobodila okupirani grad Knin u vojno-redarstvenoj operaciji Oluja.

VUKOVAR

Hrvatski sabor donio je 29. listopada 1999. Odluku o proglašenju dana sjećanja na žrtvu Vukovara 1991. godine, kako bi se dostojanstveno i primjereno odala počast svim sudionicima obrane Vukovara, grada – simbola hrvatske slobode.

YouTube HR

framnat

Jazovka 2016

FRAMNAT - 1 / 9

Jazovka 2016 1/9
FRAMNAT

2 Jazovka 2016 2/9
FRAMNAT

3 Jazovka 2016 3/9
FRAMNAT

4 Jazovka 2016 4/9
FRAMNAT

Jazovka 2016 1/9

28 prikaza

0 0 PODIJELI

Jazovka 2016 2/9
FRAMNAT

https://www.youtube.com/channel/UCjarsad6jWsKPi4Z7CdK5Wg

Research: Cognitive functions of the discourse

Discourse in the commemorations (political speeches, political ritual and media coverage) is the key component of:

Recreating the affective component of the individual traumatic events.

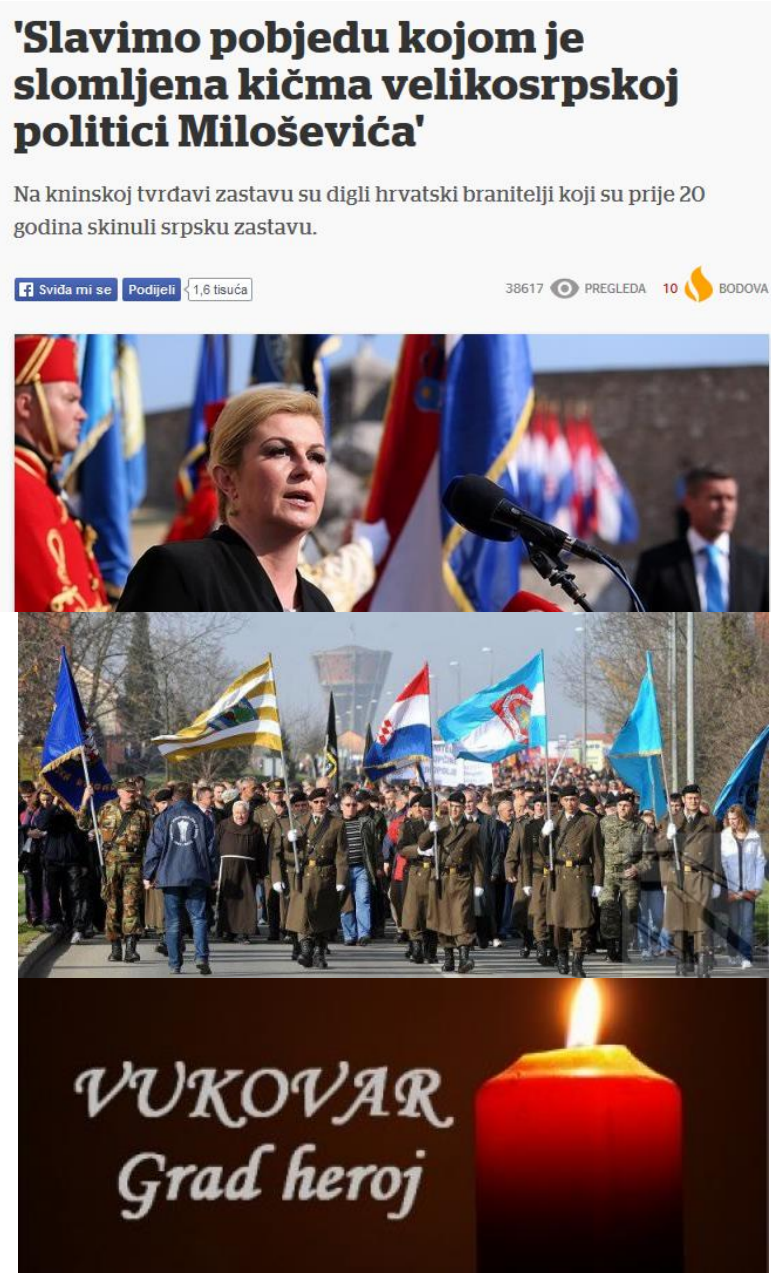
- Engages emotions of the participants in the commemoration
- Uses emotion for reinforcement of conceptual modeling

Creating the conceptual construction of the national identity

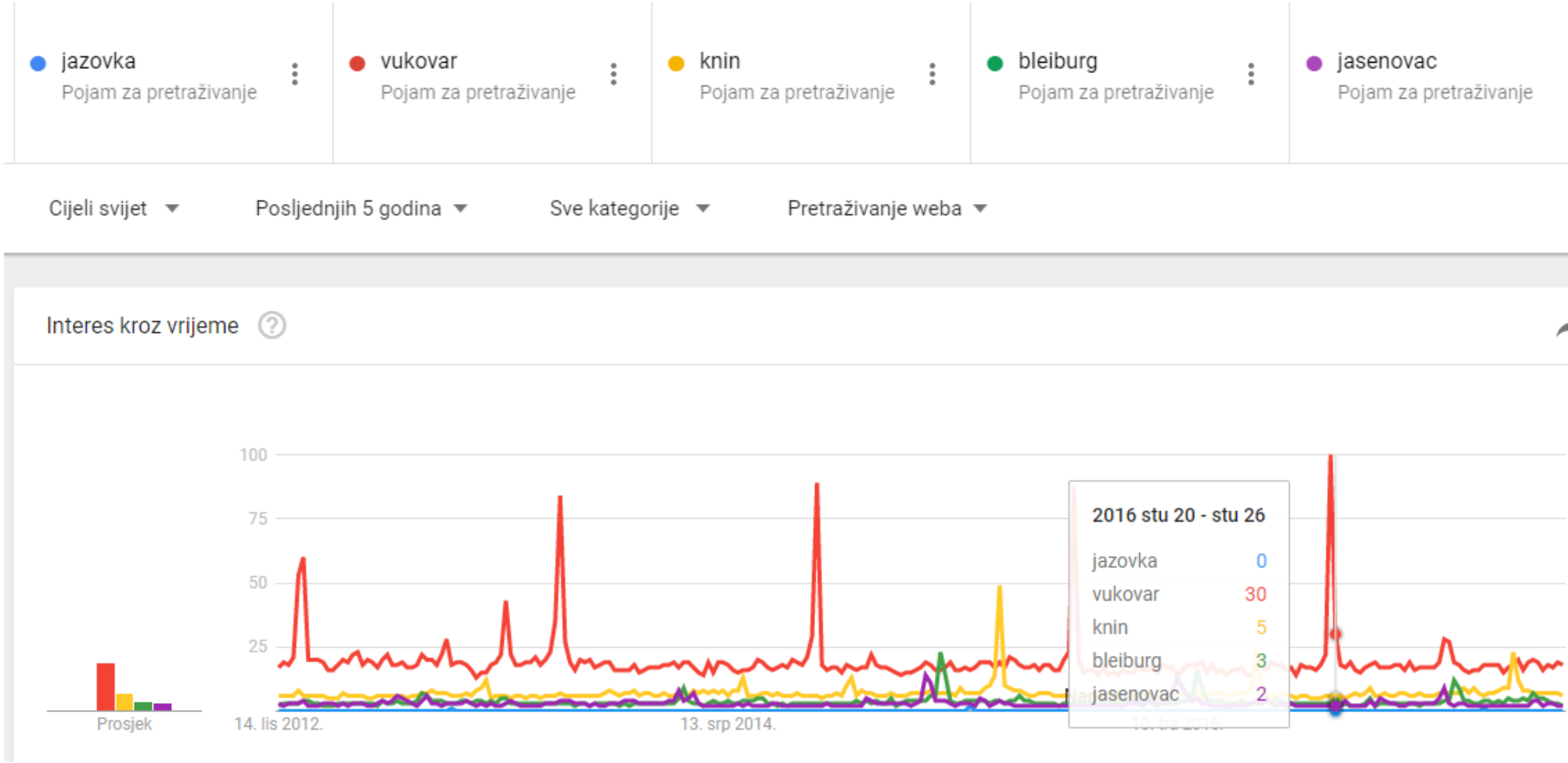
- Categorization of the in-/out-group, socio-political entitles based on the certain features.
- Frames the conceptualization of the collective identity / nation for the purpose of motivating appropriate action.

Multimodal instrument of the cognitive entrenchment of the cultural memory and cultural models

- Representing and reinforcing typical world view, frames, narratives.



Discourse in media: Dissemination of patterns



Cognitive Discourse Analysis

Cognitive discourse analysis of the commemorations includes linguistic (and multimodal) research on:

- the process of the building the national identity concepts
- activation of the emotional experiences (how does the discourse arouse the emotions?)

Levels of analysis:

- **Individual political speeches delivered at the commemorations**
- Media coverage of the commemoration event, statements from politicians, commentators
- Large corpus of text in .hr domain related and nonrelated to the commemoration events

Intersubjective Communication in political speeches - activation of the commensurable conceptual networks

The experience of the subject (S1) is inaccessible to the experience of the subject (S2)

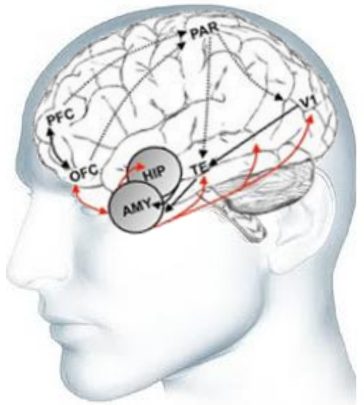
S2

S1

I feel fear

My body shakes

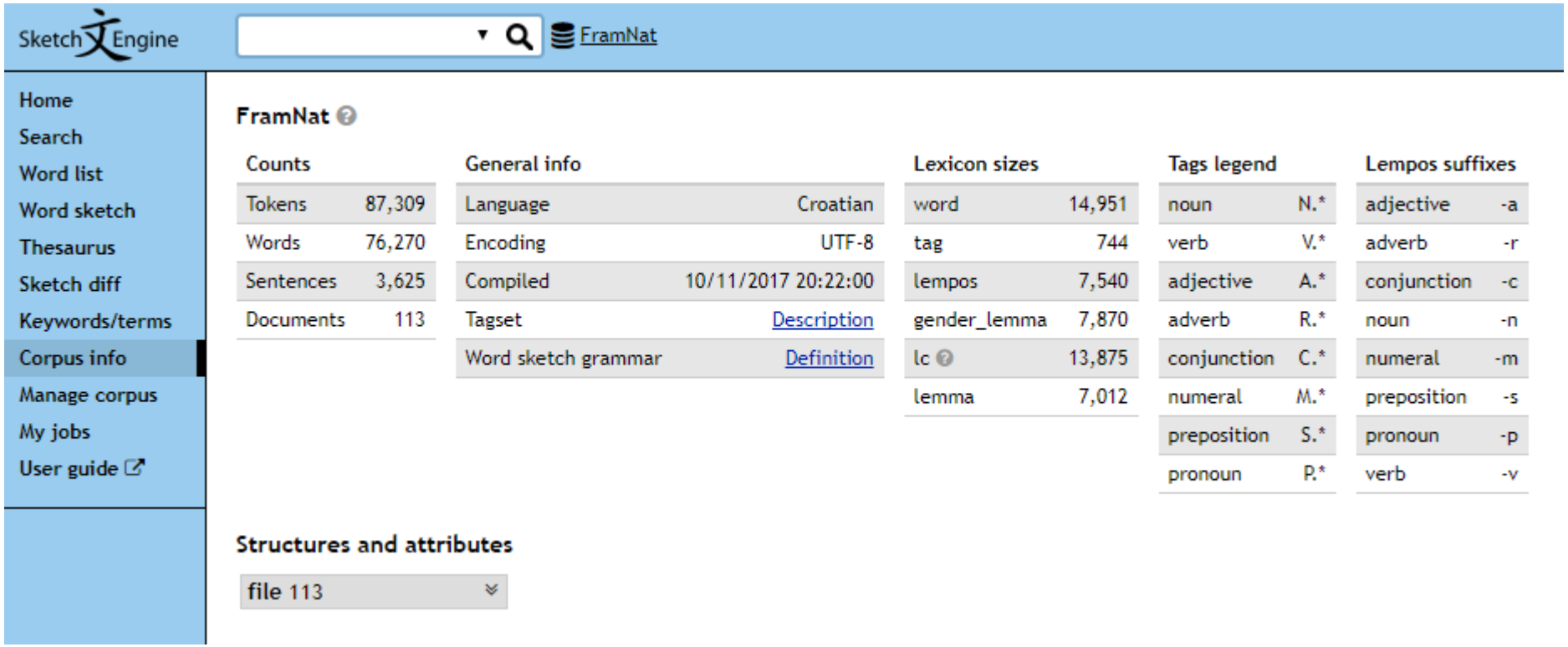
They bombed Vukovar



The linguistic coding of salient components bridges intersubjective gap – simulation of experience, construction of the meaning (in others) by activation of the cognitive and affective content.

Corpus Discourse Analysis – individual political speeches

- Individual political speeches delivered at the commemorations



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Besic_bl_2014
bozanic_bl_2015
covic_bl_2014
covic_bl_2015
Esih_bl_2015
Esih_jz_2015
gamulin_br_2014
habulin_js_2015
habulin_sr_2015
hasanovic_bl_2015
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kabulin_br_2015
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Kutleša_bl_2014
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serbedjija_br_2014
sopta_bl_2015
surla_sr_2015
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Uzinic_bl_2014
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Wilczynski_jz_2014
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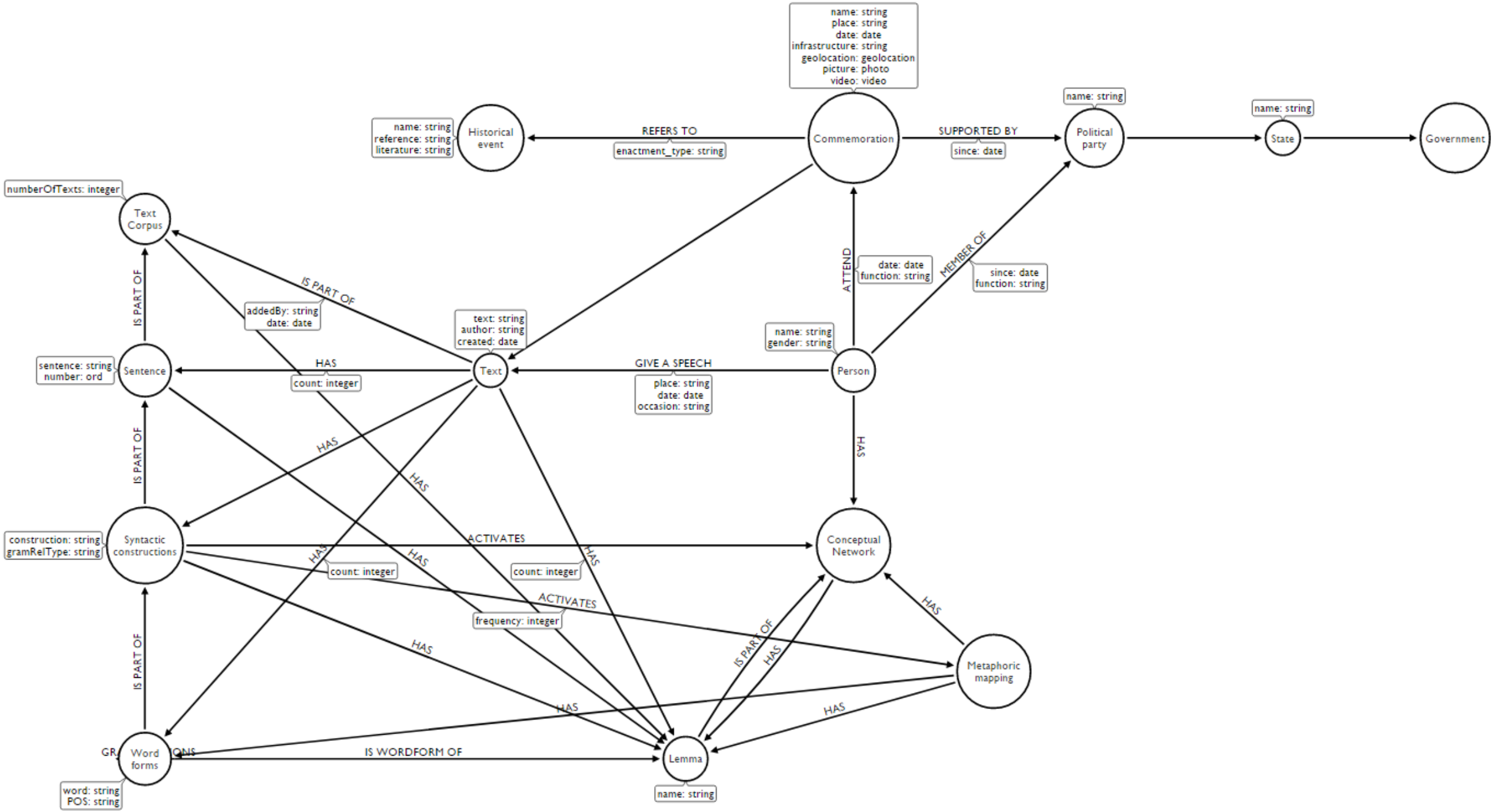
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infrastructure: string
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video: video
Commemoration
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reference: string
literature: string
Historical event
REFERS TO
enactment_type: string
SUPPORTED BY
since: date
name: string
Political party
name: string
State
Government
numberOfTexts: integer
Text Corpus
IS PART OF
addedBy: string
date: date
text: string
author: string
created: date
Text
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date: date
function: string
name: string
gender: string
Person
MEMBER OF
since: date
function: string
sentence: string
number: ord
Sentence
HAS
count: integer
GIVE A SPEECH
place: string
date: date
occasion: string
construction: string
gramRelType: string
Syntactic constructions
ACTIVATES
Conceptual Network
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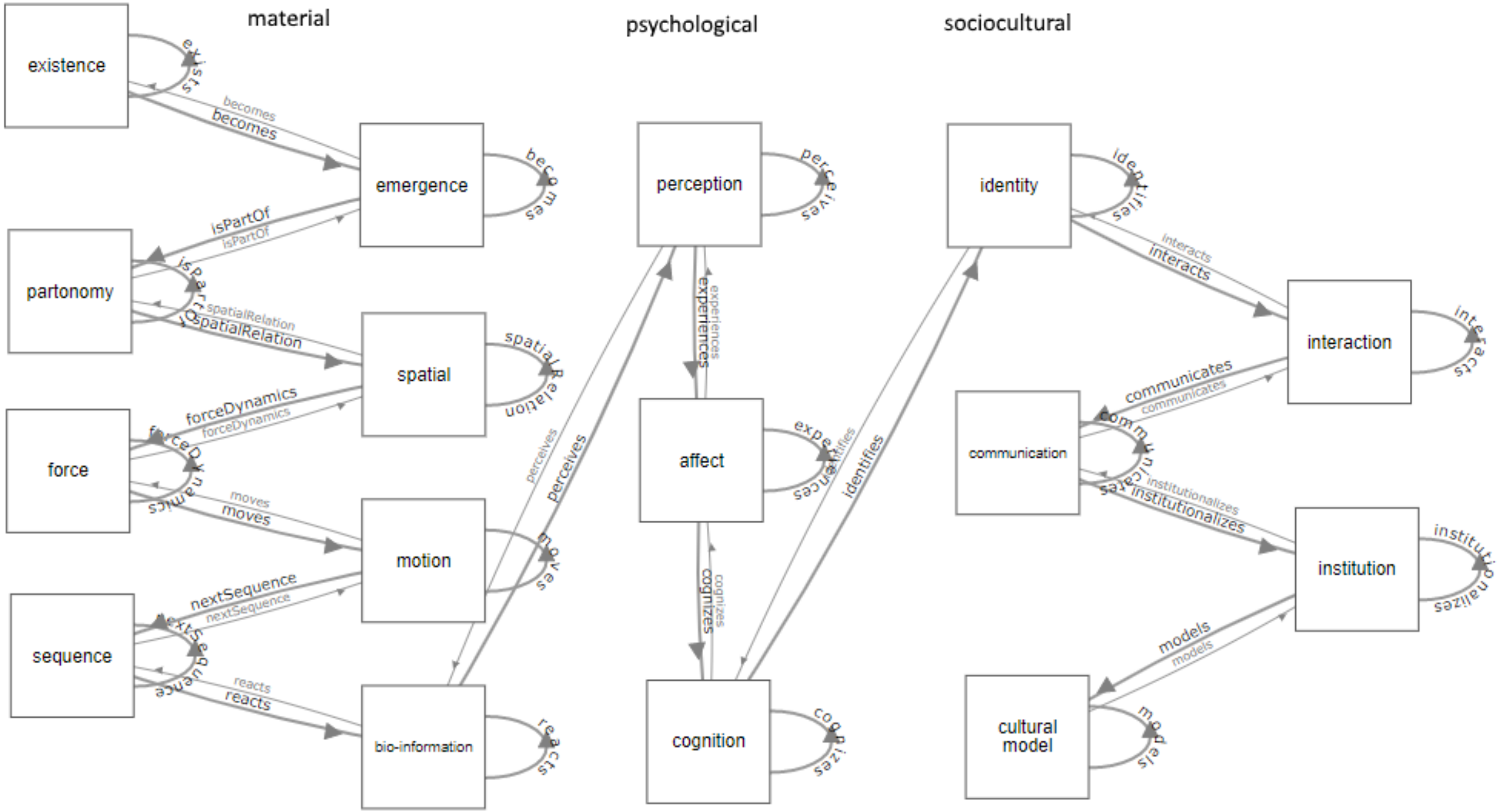
Metaphoric mapping
Word forms
IS WORDFORM OF
Lemma
word: string
POS: string
name: string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sociocultural
existence
emergence
partonomy
spatial
force
motion
sequence
bio-information
perception
affect
cognition
identity
interaction
communication
institution
cultural model
exists
becomes
isPartOf
spatialRelation
forceDynamics
moves
nextSequence
reacts
perceives
experiences
cognizes
identifies
interacts
communicates
institutionalizes
models

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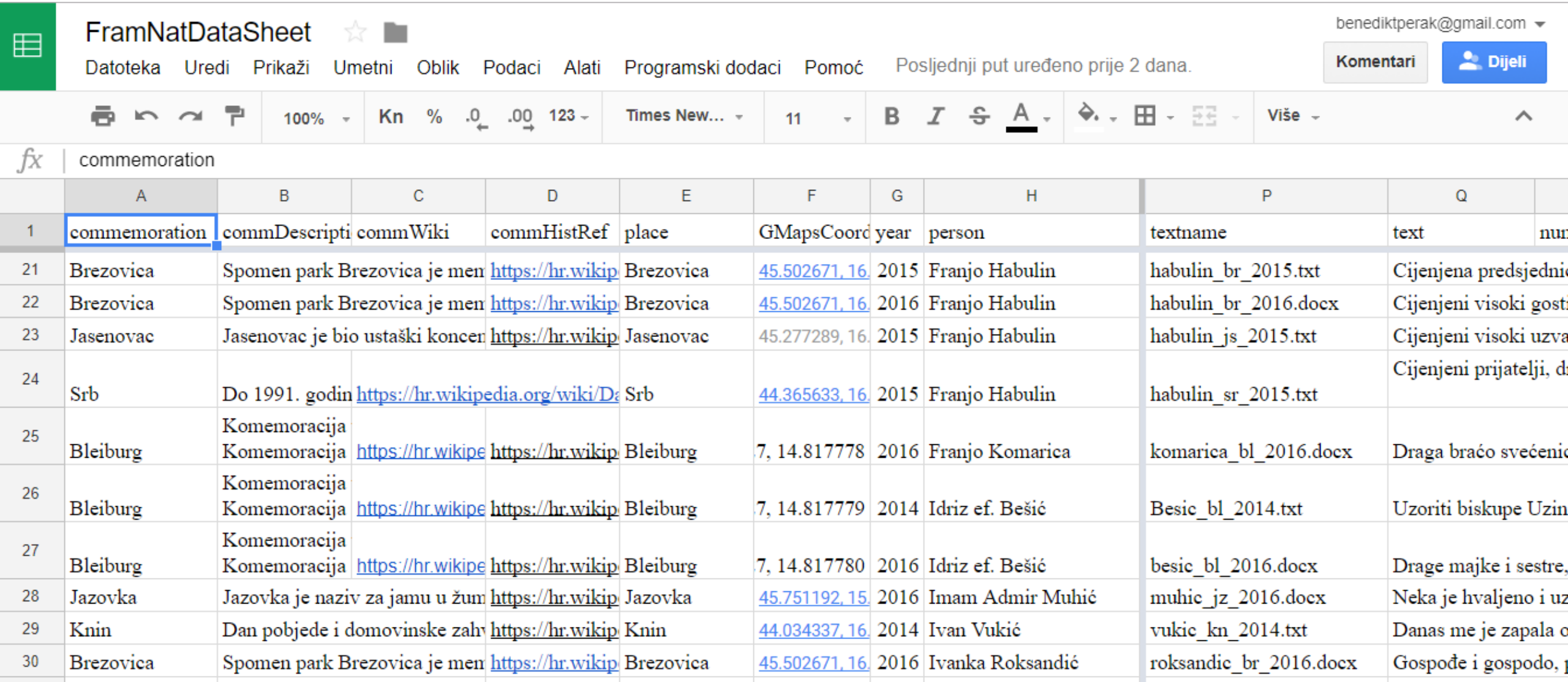

FramNatDataSheet

benediktperak@gmail.com

Datoteka Uredi Prikaži Umetni Oblik Podaci Alati Programski dodaci Pomoć Posljednji put uređeno prije 2 dana.

Komentari Dijeli

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fx commemoration

	A	B	C	D	E	F	G	H	P	Q
1	commemoration	commDescripti	commWiki	commHistRef	place	GMapsCoord	year	person	textname	text
21	Brezovica	Spomen park Brezovica je men		https://hr.wikip	Brezovica	45.502671, 16.	2015	Franjo Habulin	habulin_br_2015.txt	Cijenjena predsjednic
22	Brezovica	Spomen park Brezovica je men		https://hr.wikip	Brezovica	45.502671, 16.	2016	Franjo Habulin	habulin_br_2016.docx	Cijenjeni visoki gost
23	Jasenovac	Jasenovac je bio ustaški koncen		https://hr.wikip	Jasenovac	45.277289, 16.	2015	Franjo Habulin	habulin_js_2015.txt	Cijenjeni visoki uzva
24	Srb	Do 1991. godin	https://hr.wikipedia.org/wiki/Da		Srb	44.365633, 16.	2015	Franjo Habulin	habulin_sr_2015.txt	Cijenjeni prijatelji, d
25	Bleiburg	Komemoracija Komemoracija	https://hr.wikipe	https://hr.wikip	Bleiburg	7, 14.817778	2016	Franjo Komarica	komarica_bl_2016.docx	Draga braćo svećenic
26	Bleiburg	Komemoracija Komemoracija	https://hr.wikipe	https://hr.wikip	Bleiburg	7, 14.817779	2014	Idriz ef. Bešić	Besic_bl_2014.txt	Uzoriti biskupe Uzin
27	Bleiburg	Komemoracija Komemoracija	https://hr.wikipe	https://hr.wikip	Bleiburg	7, 14.817780	2016	Idriz ef. Bešić	besic_bl_2016.docx	Drage majke i sestre,
28	Jazovka	Jazovka je naziv za jamu u žum		https://hr.wikip	Jazovka	45.751192, 15.	2016	Imam Admir Muhić	muhic_jz_2016.docx	Neka je hvaljeno i uz
29	Knin	Dan pobjede i domovinske zahv		https://hr.wikip	Knin	44.034337, 16.	2014	Ivan Vukić	vukic_kn_2014.txt	Danas me je zapala o
30	Brezovica	Spomen park Brezovica je men		https://hr.wikip	Brezovica	45.502671, 16.	2016	Ivanka Roksandić	roksandic_br_2016.docx	Gospođe i gospodo,

CSV

To

Neo4j

Via

Py2Neo

```
#%% Inserting
query="""
LOAD CSV WITH HEADERS FROM "https://docs.google.com/spreadsheets/d/1rXV9x9-Jdpw84nmc0TEJBHnd-S5nu7-YDYk8zj06sN8
AS row FIELDTERMINATOR '\u0009'
MERGE (speaker:Speakers{name:row.person})
ON CREATE SET speaker.function = row.function+" "+row.year
ON MATCH SET speaker.function = speaker.function+", "+row.function+" "+row.year
ON CREATE SET speaker.wikipage = row.personWiki
ON MATCH SET speaker.wikipage = speaker.wikipage + ", "+row.personWiki
ON CREATE SET speaker.media = row.media
ON MATCH SET speaker.media =  speaker.media+ ", "+row.media
ON CREATE SET speaker.pictureLink = row.pictureLink
ON MATCH SET speaker.pictureLink =  speaker.pictureLink+ ", "+row.pictureLink
ON CREATE SET speaker.gender = row.gender
ON MATCH SET speaker.gender =  row.gender
"""
print (graph.run(query))
```

```
#%% merge Speakers to Texts
query="""
LOAD CSV WITH HEADERS FROM "https://docs.google.com/spreadsheets/d/1rXV9x9-Jdpw84nmc0TEJBHnd-S5nu7-YDYk8zj06sN8
AS row FIELDTERMINATOR '\u0009'
MATCH (a:Speakers{name:row.person})
MATCH (b:Texts{sourceFile:row.textname})
MERGE (a) - [r:DELIVERED_SPEECH]-> (b)
SET r.year= row.year
SET r.commemoration=row.commemoration
SET r.speakerFunction=row.function
"""
data =graph.run(query)
print(data)
```

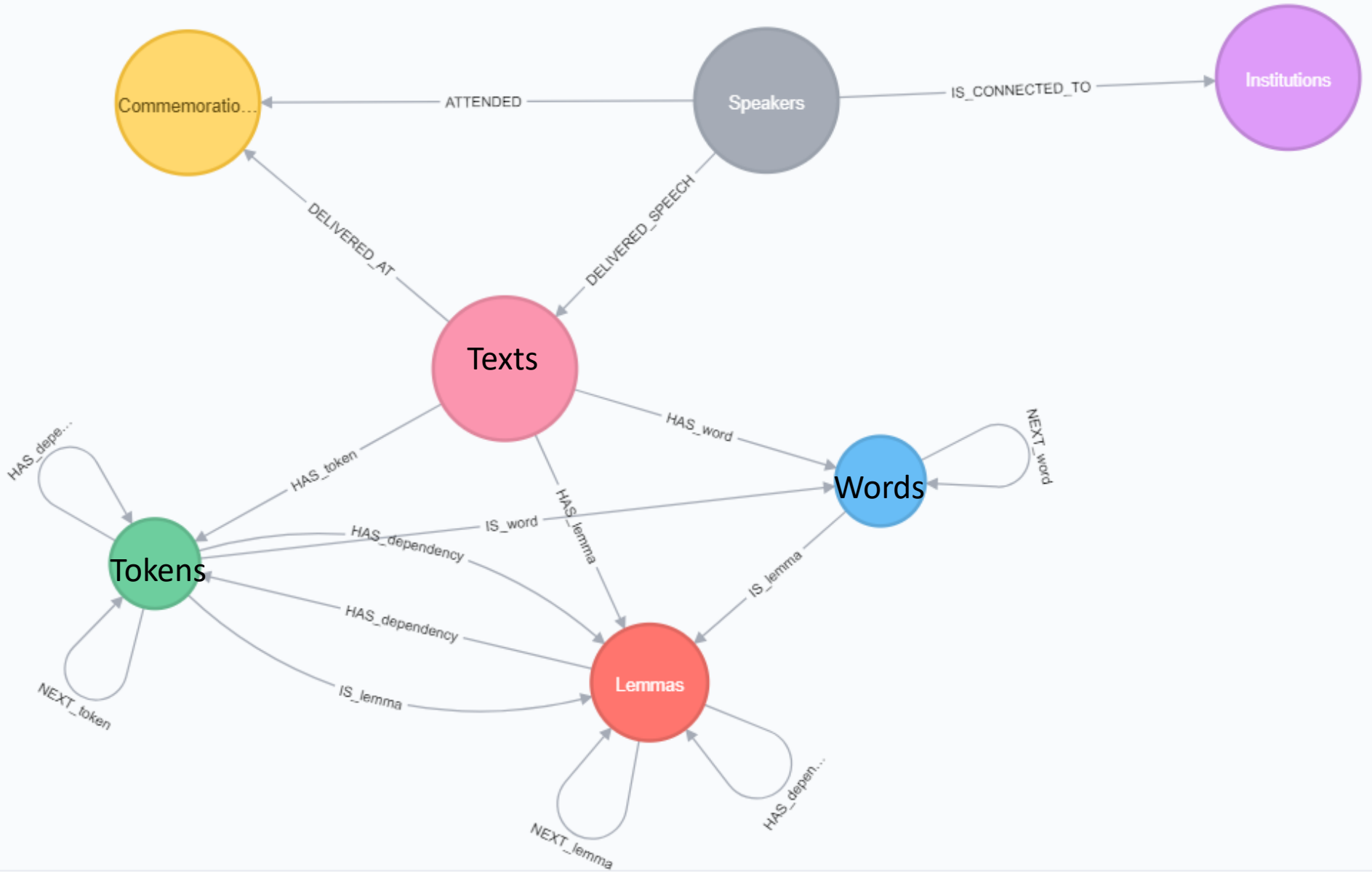
```
#%% insert institutions
query="""
LOAD CSV WITH HEADERS FROM "https://docs.google.com/spreadsheets/d/1rXV9x9-Jdpw84nmc0TEJBHnd-S5nu7-YDYk8zj06sN8
AS row FIELDTERMINATOR '\u0009'
MERGE (a:Institutions{name:row.institution})
SET a.wikipediaLink=row.institutionWiki
"""
data =graph.run(query)
```

$ call db.schema

Graph | Table | Text | Code

*(9) | POStags(1) | DependencyFunction(1) | Words(1) | Texts(1) | Lemmas(1) | Speakers(1) | Commemorations(1) | Institutions(1) | Tokens(1)

*(17) | IS_word(1) | ATTENDED(1) | IS_lemma(2) | HAS_lemma(1) | NEXT_word(1) | HAS_word(1) | NEXT_token(1) | DELIVERED_SPEECH(1) | HAS_token(1) | HAS_dependency(4)



Database Information

Node Labels

* Commemorations DependencyFunction Institutions Lemmas POStags Speakers Texts Tokens Words

Relationship Types

* ATTENDED DELIVERED_AT DELIVERED_SPEECH HAS_dependency HAS_lemma HAS_token HAS_word IS_CONNECTED_TO IS_lemma IS_word NEXT_lemma NEXT_token NEXT_word

Property Keys

ID POS POStag author

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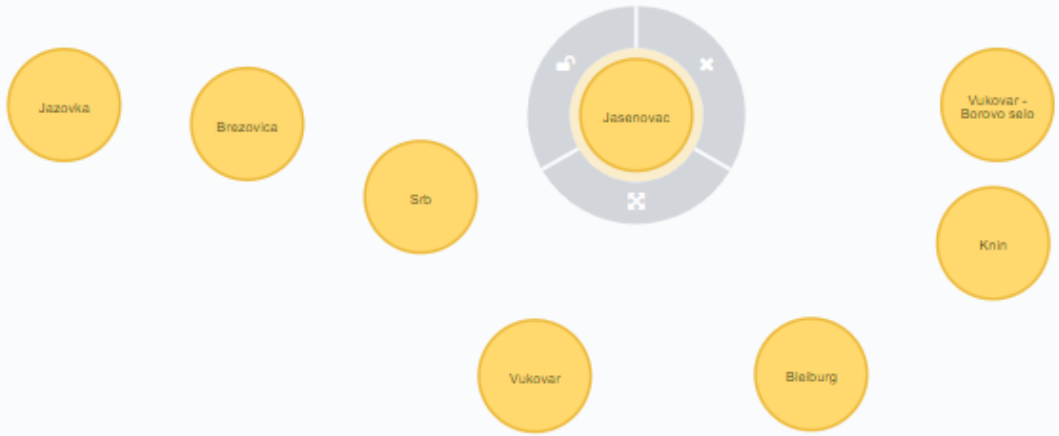
$ MATCH (n:Commemorations) RETURN n LIMIT 25
```

$ MATCH (n:Commemorations) RETURN n LIMIT 25

Graph Table Text Code

*(8) Commemorations(8)



Commemorations **<id>:** 109541

commDescription:

Jasenovac je bio ustaški koncentracijski logor osnovan radi zatvaranja desetaka tisuća Srba, Roma, Židova, Hrvata, Muslimana i drugih, a velik broj osoba je i ubijen. Logor je miniran, spaljen i uništen. Krajem pedesetih godina 20.st. poduzeti su prvi koraci za obilježavanje prostora bivšeg logora, dok je spomenik žrtvama svečano otkriven 4. srpnja 1966. Nakon toga izgrađen je i Memorijalni muzej Spomen područja Jasenovac.

commHistRef: https://hr.wikipedia.org/wiki/Sabirni_logor_Jasenovac **coordinates:** 45.277289, 16.922350 **name:** Jasenovac

place: Jasenovac

Database Information

Node Labels

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* ATTENDED DELIVERED_AT DELIVERED_SPEECH HAS_dependency HAS_lemma HAS_token HAS_word IS_CONNECTED_TO IS_lemma IS_word NEXT_lemma NEXT_token NEXT_word

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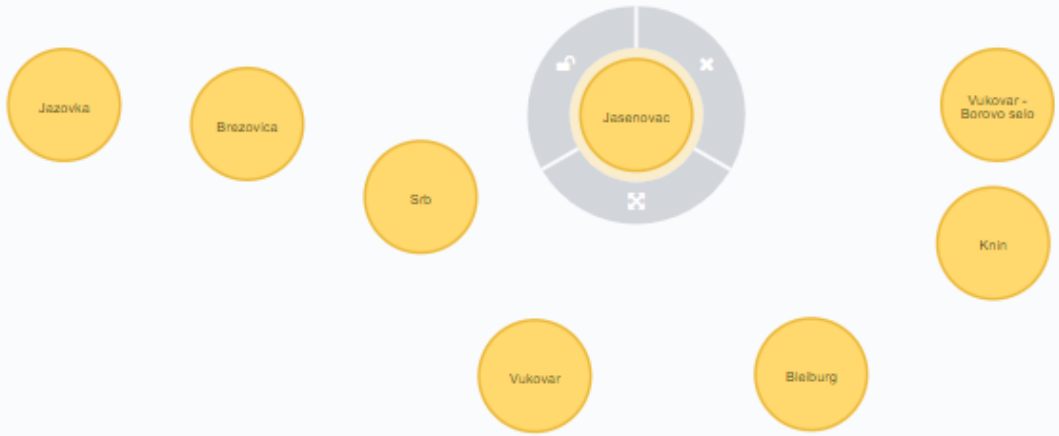

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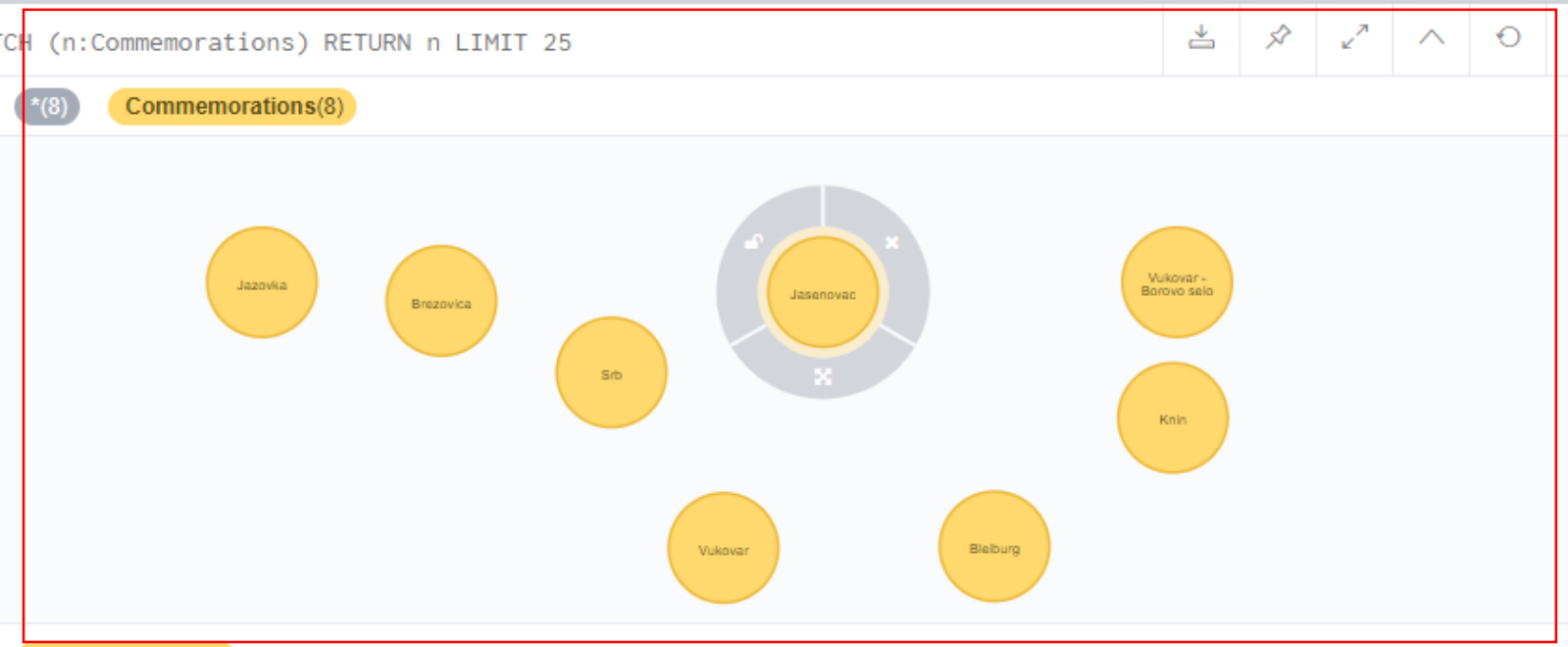

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commDescription:

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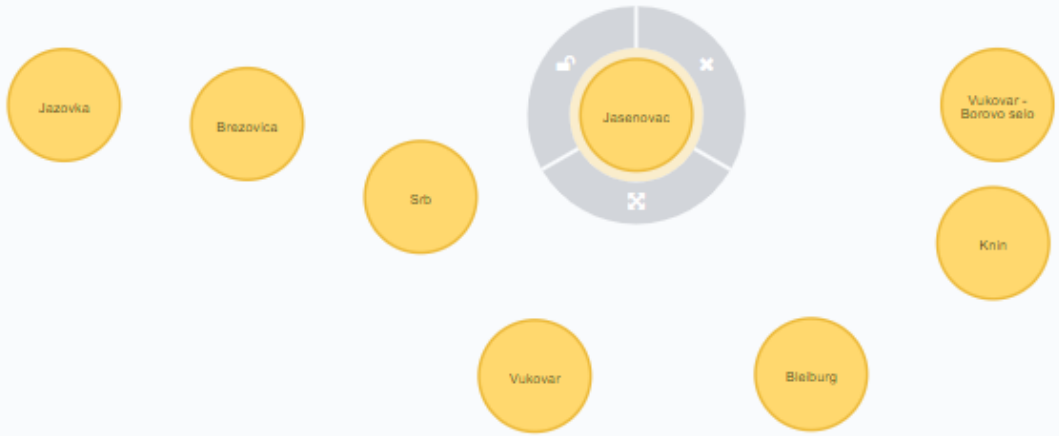

Commemorations **<id>:** 109541

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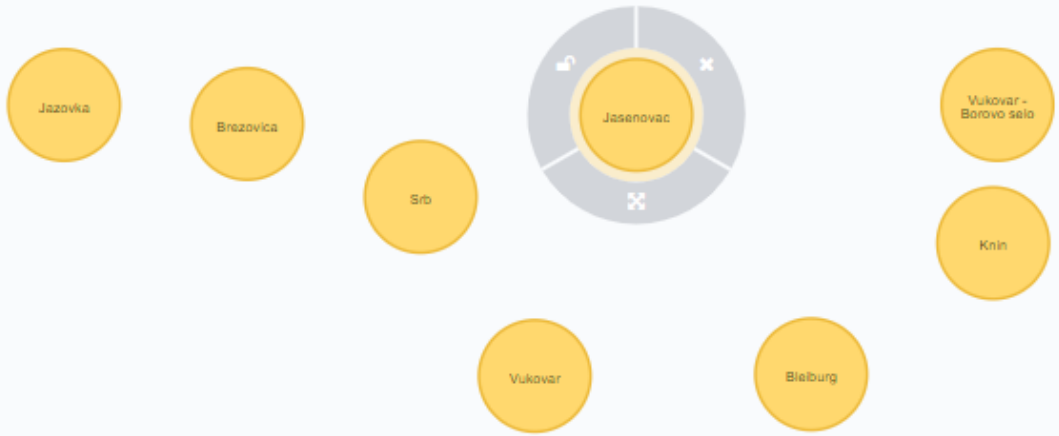


Commemorations **<id>:** 109541

commDescription:

Jasenovac je bio ustaški koncentracijski logor osnovan radi zatvaranja desetaka tisuća Srba, Roma, Židova, Hrvata, Muslimana i drugih, a velik broj osoba je i ubijen. Logor je miniran, spaljen i uništen. Krajem pedesetih godina 20.st. poduzeti su prvi koraci za obilježavanje prostora bivšeg logora, dok je spomenik žrtvama svečano otkriven 4. srpnja 1966. Nakon toga izgrađen je i Memorijalni muzej Spomen područja Jasenovac.

commHistRef: https://hr.wikipedia.org/wiki/Sabirni_logor_Jasenovac **coordinates:** 45.277289, 16.922350 **name:** Jasenovac

place: Jasenovac

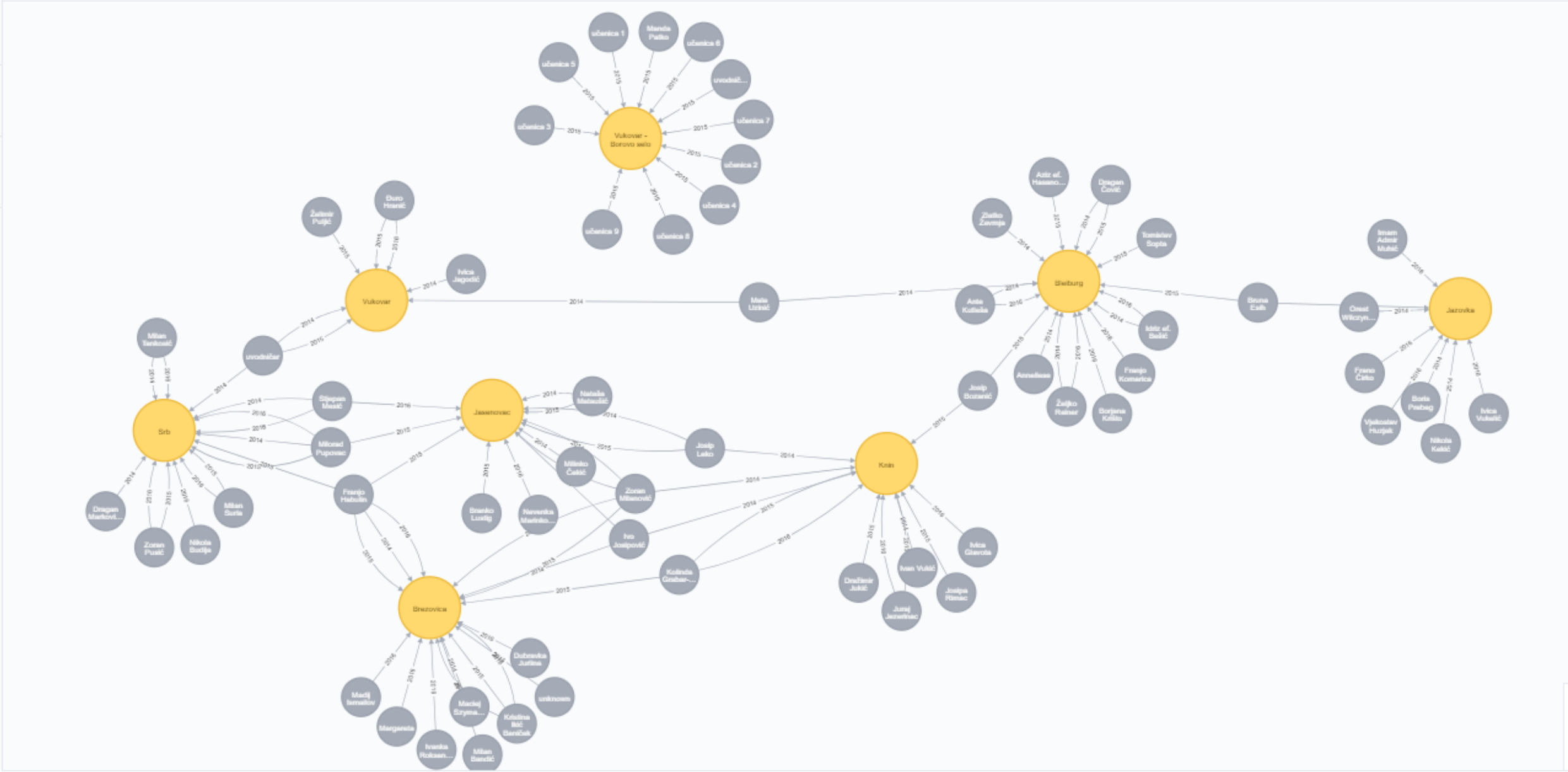
$ MATCH p=()-[r:ATTENDED]->() RETURN p

Graph
Table
Text
Code

*(72) Speakers(64) Commemorations(8)

*(100) ATTENDED(100)

Who attended what commemoration ?



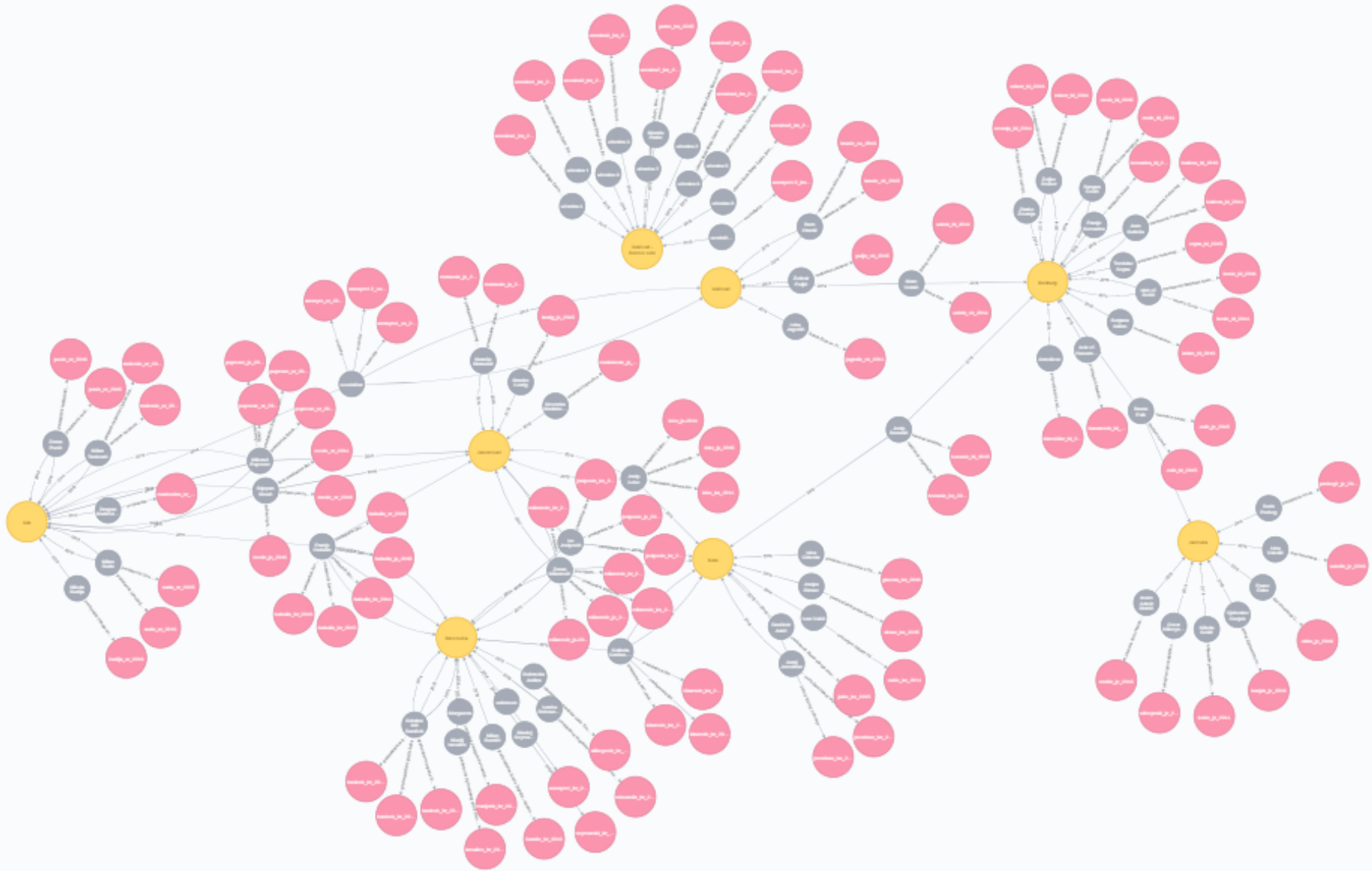
```
$ MATCH p=(:Texts)<-[:DELIVERED_SPEECH]-(:Speakers)-[r:ATTENDED]->(:Commemorations) RETURN p
```

Graph | Table | Text | Code

*(170) Texts(99) Speakers(63) Commemorations(8)

*(198) DELIVERED_SPEECH(99) ATTENDED(99)

Who delivered speech ?
Where?

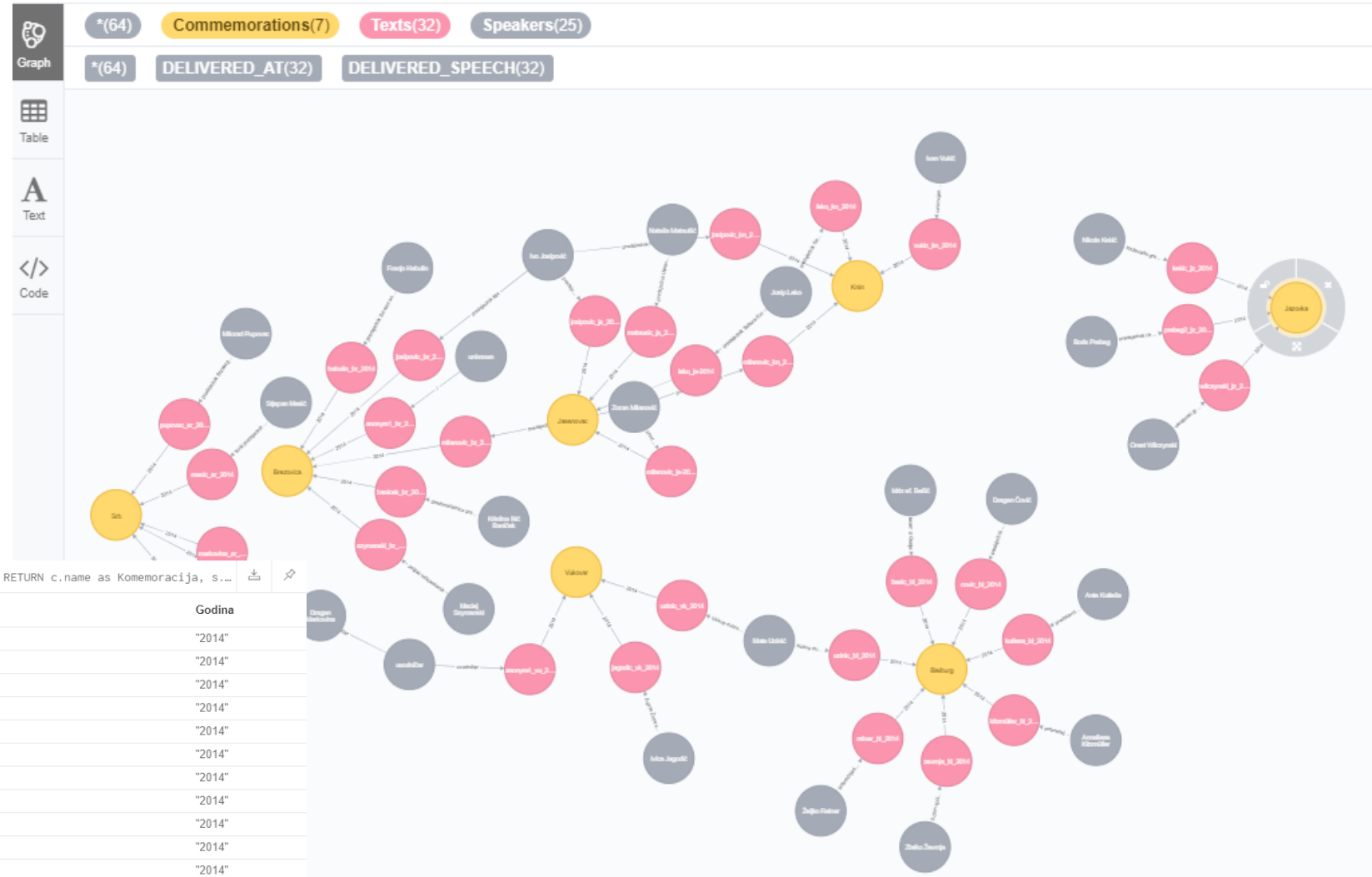


Node Labels

* Commemorations DependencyFunction Institutions Lemmas POStags Speakers Texts Tokens Words

Relationship Types

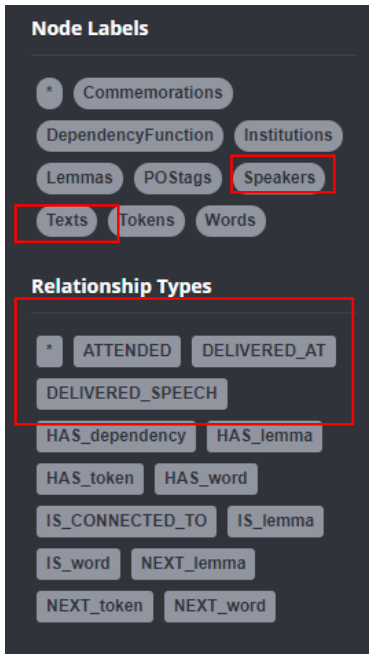
* ATTENDED DELIVERED_AT DELIVERED_SPEECH HAS_dependency HAS_lemma HAS_token HAS_word IS_CONNECTED_TO IS_lemma IS_word NEXT_lemma NEXT_token NEXT_word




```
$ MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH{year:'2014'}]-(s:Speakers) RETURN c.name as Komemoracija, s.…
```

Komemoracija	Govornik	Godina
"Bleiburg"	"Anneliese Kitzmüller"	"2014"
"Bleiburg"	"Ante Kutleša"	"2014"
"Jazovka"	"Boris Prebeg"	"2014"
"Bleiburg"	"Dragan Čović"	"2014"
"Srb"	"Dragan Markovina"	"2014"
"Brezovica"	"Franjo Habulin"	"2014"
"Bleiburg"	"Idriz ef. Bešić"	"2014"
"Knin"	"Ivan Vukić"	"2014"
"Vukovar"	"Ivica Jagodić"	"2014"
"Jasenovac"	"Ivo Josipović"	"2014"
"Brezovica"	"Ivo Josipović"	"2014"
"Knin"	"Ivo Josipović"	"2014"
"Jasenovac"	"Josip Leko"	"2014"
"Knin"	"Josip Leko"	"2014"
"Brezovica"	"Kristina Ikić Baničck"	"2014"
"Brezovica"	"Maciej Szymanski"	"2014"
"Vukovar"	"Mate Uzinić"	"2014"
"Bleiburg"	"Mate Uzinić"	"2014"
"Srb"	"Milan Tankosić"	"2014"
"Srb"	"Milorad Pupovac"	"2014"
"Jasenovac"	"Nataša Mataušić"	"2014"
"Jazovka"	"Nikola Kekić"	"2014"
"Jazovka"	"Orest Wilczynski"	"2014"
"Srb"	"Stjepan Mesić"	"2014"

Who delivered speech 2014 ?
Where?



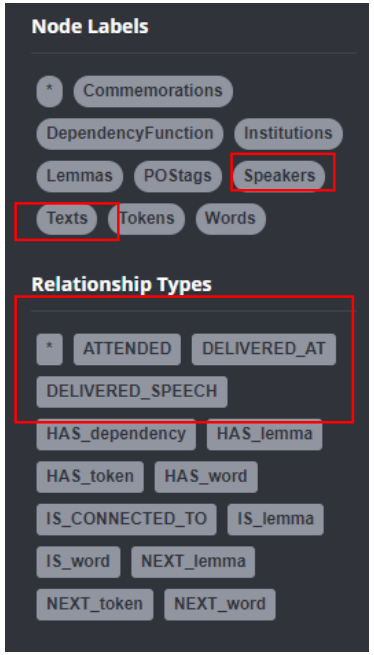

```
1 //3.3 Number of speeches on a commemoration
2 MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH]-
(s:Speakers) RETURN c.name as Komemoracija, count(t.name) as
NumberOfSpeechesSum order by NumberOfSpeechesSum desc
```

$ MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH]-(…

Table | Text | Code

Komemoracija	NumberOfSpeechesSum
"Brezovica"	17
"Bleiburg"	17
"Srb"	15
"Knin"	12
"Jasenovac"	12
"Vukovar - Borovo selo"	11
"Jazovka"	8
"Vukovar"	7

Started streaming 8 records after 2 ms and completed after 2 ms.



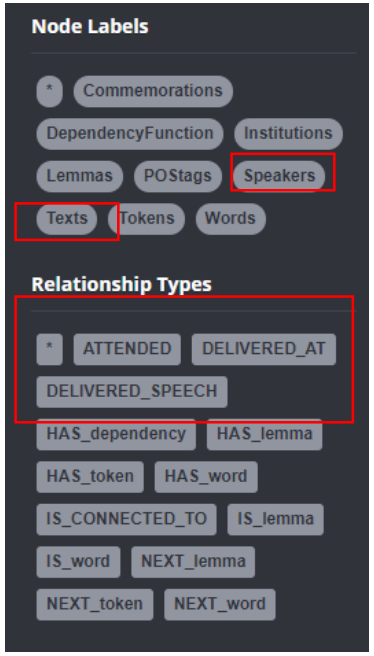

```
1 //3.4 Number of speeches on a commemoration per year
2 MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH]-
(s:Speakers) RETURN c.name as Komemoracija,
count(t.name)/count(distinct(da.year)) as NumberOfSpeechesSum order by
NumberOfSpeechesSum desc
```

$ MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH]-(…

Table | Text | Code

Komemoracija	NumberOfSpeechesSum
"Vukovar - Borovo selo"	11
"Srb"	5
"Brezovica"	5
"Bleiburg"	5
"Knin"	4
"Jasenovac"	4
"Vukovar"	2
"Jazovka"	2

Started streaming 8 records after 2 ms and completed after 2 ms.




```
1 //3.4 Speakers on Commemorations
2 MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH]-
(s:Speakers) RETURN s.name as Govornik, count(da.year) as Broj_govora order by
Broj_govora desc
```

$ MATCH p=(c:Commemorations)<-[da:DELIVERED_AT]-(t:Texts)<-[ds:DELIVERED_SPEECH]-(…

Table | Text | Code

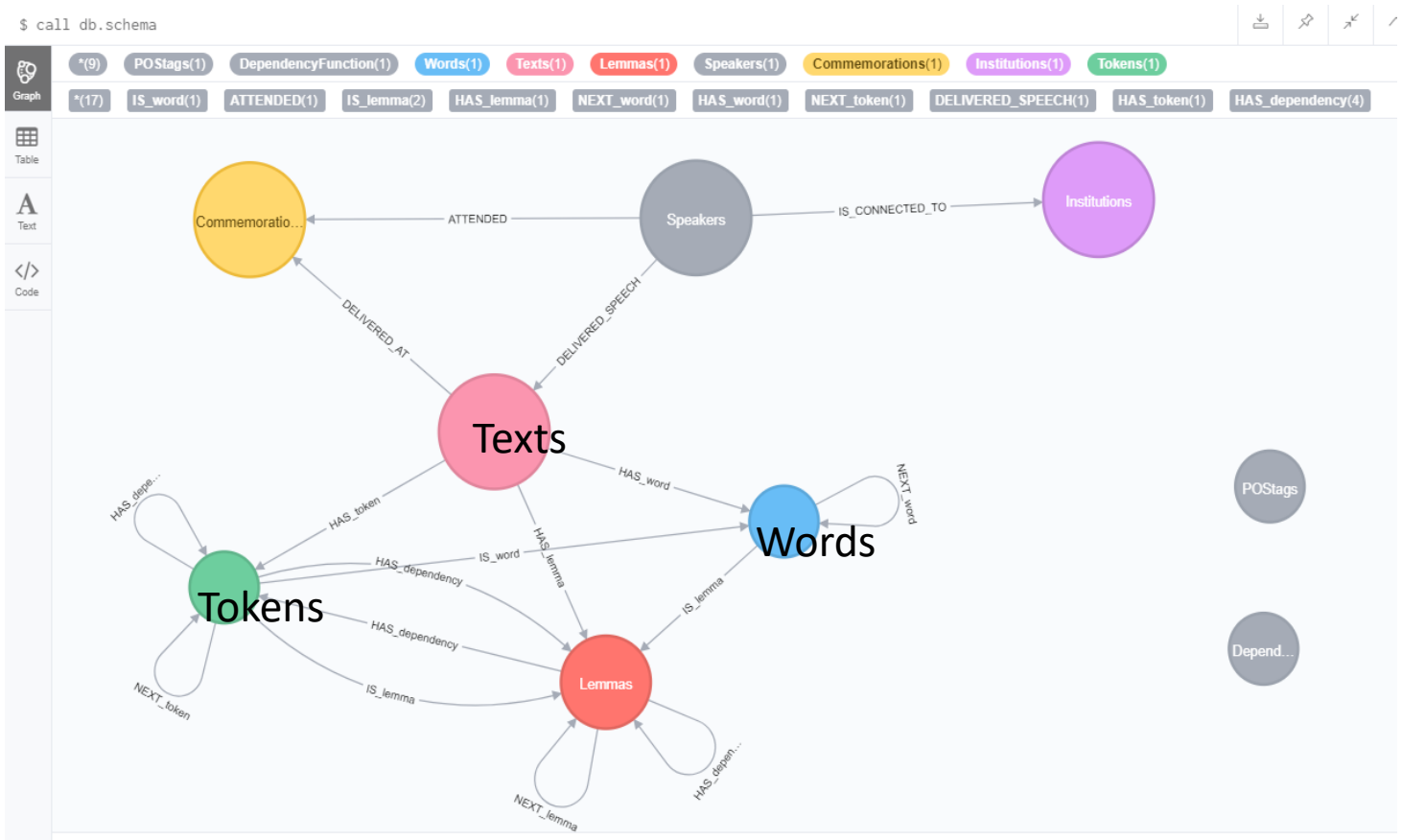
Govornik	Broj_govora
"Franjo Habulin"	5
"Zoran Milanović"	5
"Milorad Pupovac"	4
"Stjepan Mesić"	3
"Kristina Ikić Baniček"	3
"Kolinda Grabar-Kitarović"	3
"Josip Leko"	3
"Ivo Josipović"	3
"uvodničar"	3
"Josip Bozanić"	2
"Nataša Mataušić"	2
"Bruna Esih"	2
"Zoran Pusić"	2
"Mate Uzinić"	2
"Željko Reiner"	2

Node Labels

* Commemorations
DependencyFunction Institutions
Lemmas POStags Speakers
Texts Tokens Words

Relationship Types

* ATTENDED DELIVERED_AT
DELIVERED_SPEECH
HAS_dependency HAS_lemma
HAS_token HAS_word
IS_CONNECTED_TO IS_lemma
IS_word NEXT_lemma
NEXT_token NEXT_word



Texts

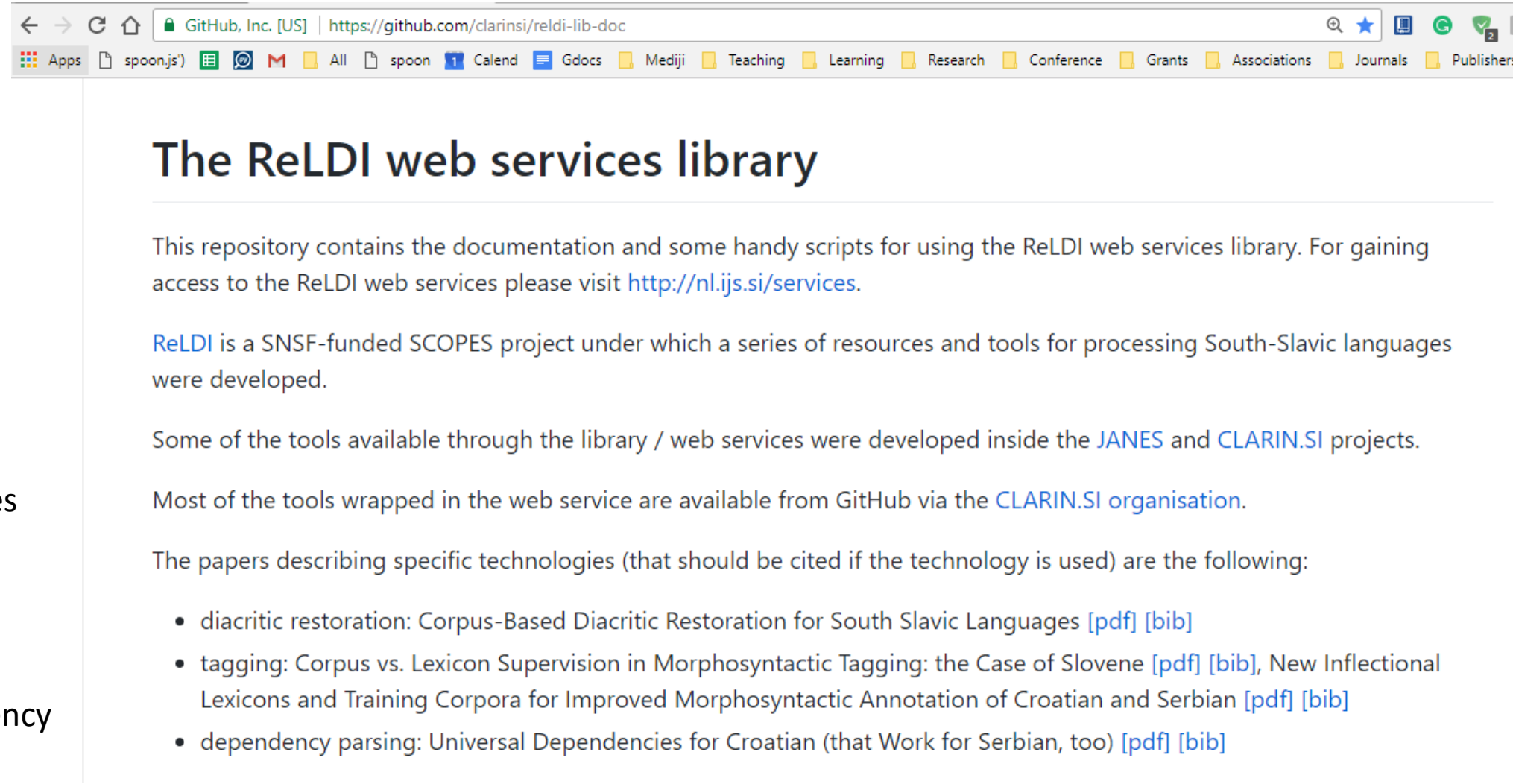
To

Tokens (POStag)

Sentences

Lemmas

Dependency



https://github.com/clarinsi/reldi-lib-doc

Node Labels

* Commemorations DependencyFunction Institutions Lemmas POStags Speakers Texts Tokens Words

Relationship Types

* ATTENDED DELIVERED_AT DELIVERED_SPEECH HAS_dependency HAS_lemma HAS_token HAS_word IS_CONNECTED_TO IS_lemma IS_word NEXT_lemma NEXT_token NEXT_word

```
$ MATCH (tok:Tokens) RETURN count(tok) as TokensAll
```

Table

TokensAll
80236

```
$ MATCH (w:Words) RETURN count(w) as WordsAll
```

Table

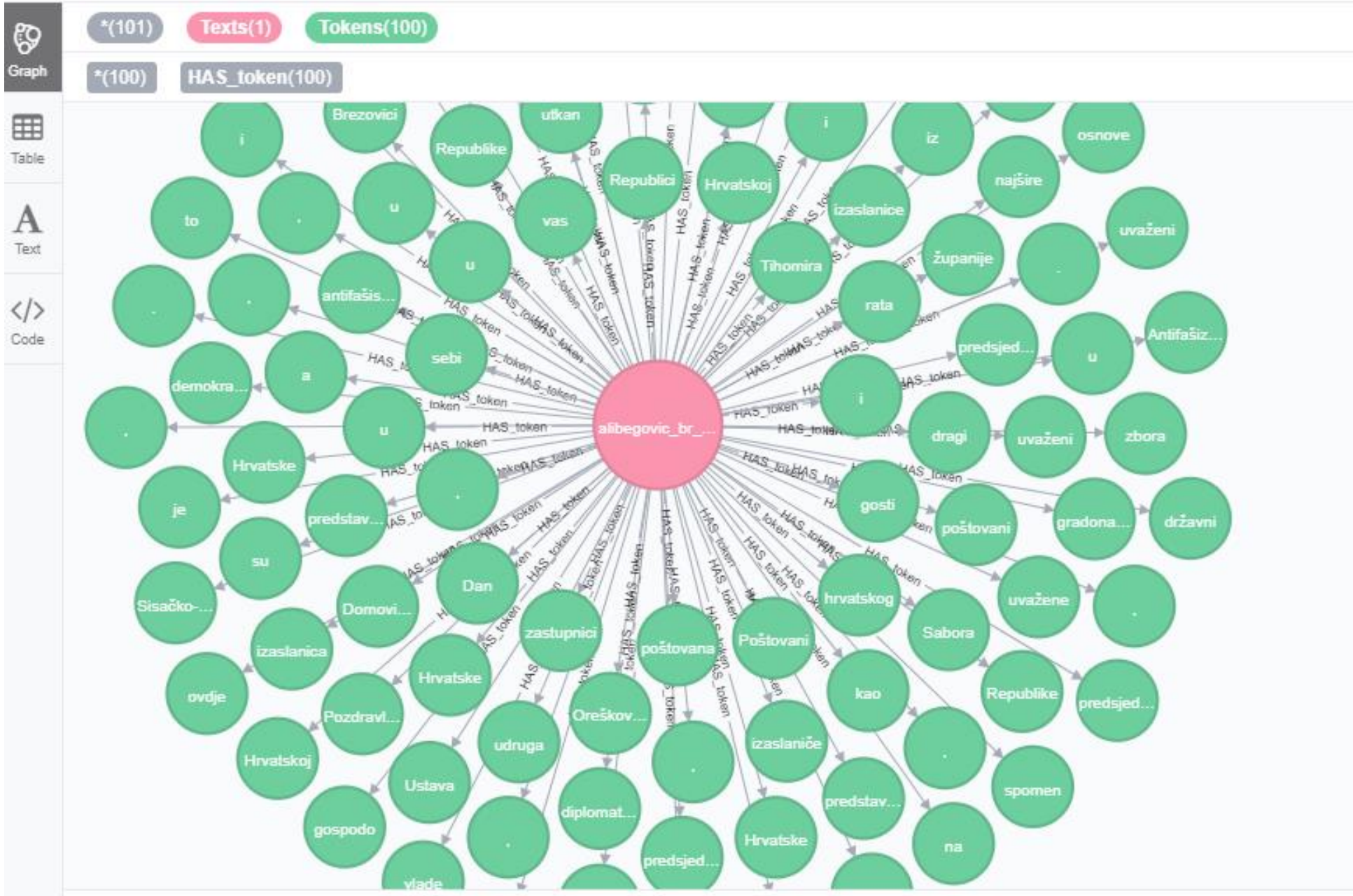
WordsAll
16727

```
$ MATCH (l:Lemmas) RETURN count(l) as LemmasAll
```

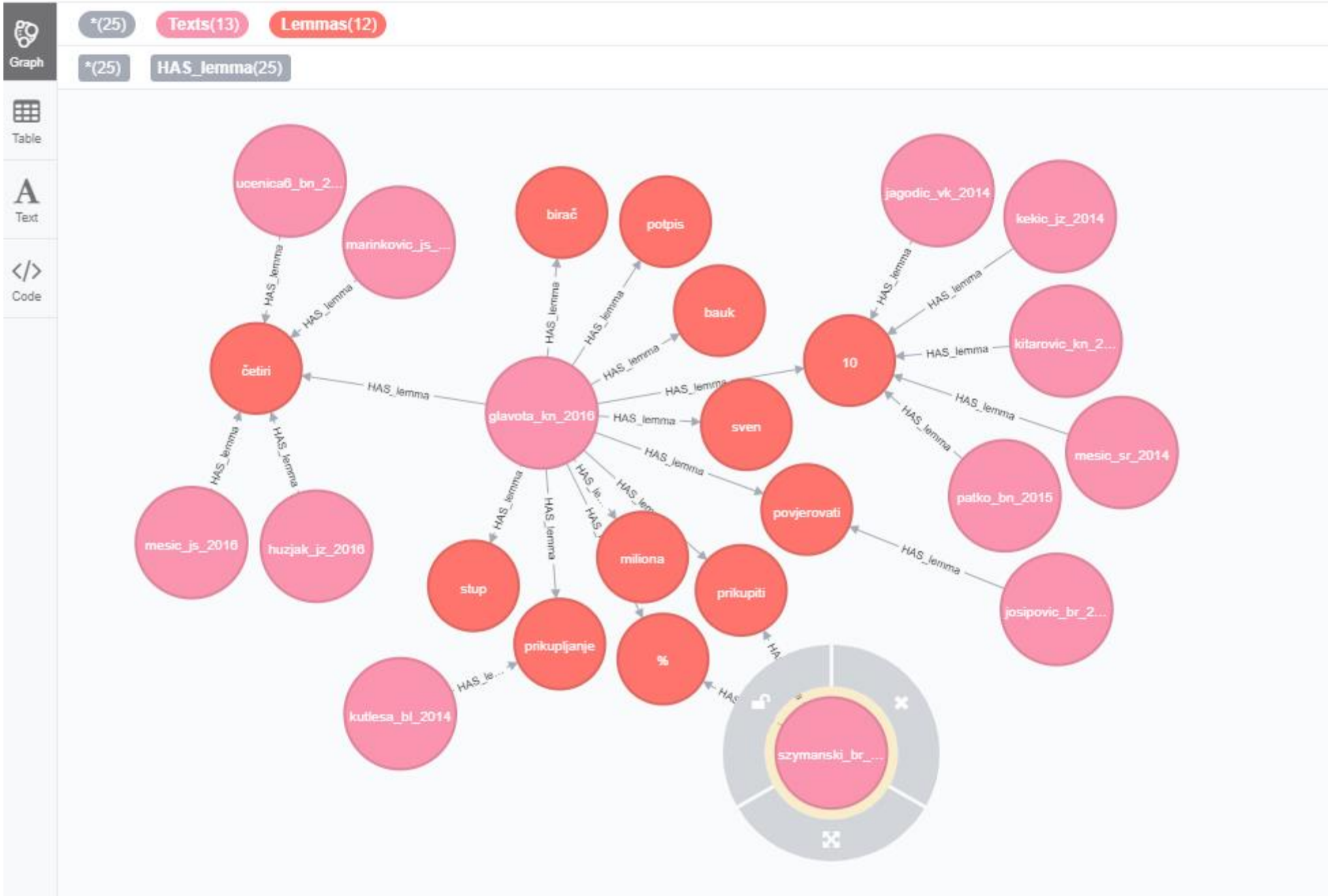
Table

LemmasAll
7687

```
$ MATCH p=()-[r:HAS_token]->() RETURN p LIMIT 100
```



```
$ MATCH p=()-[r:HAS_lemma]->() RETURN p LIMIT 25
```



```
//Number of Tokens per Texts
MATCH (t:Texts)-[r:HAS_token]->(tk:Tokens)
RETURN count(tk.word) as TokenSum, t.name order by TokenSum desc
```

```
//Number of Lemma per Texts
MATCH (t:Texts)-[r:HAS_lemma]->(l:Lemmas)
RETURN count(l.lempos) as LemmaSum, t.name order by LemmaSum desc
```

TCH (t:Texts)-[r:HAS_token]->(tk:Tokens) RETURN count(tk.word) as TokenSum, t.. $ MATCH (t:Texts)-[r:HAS_lemma]->(l:Lemmas) RETURN count(l.lempos) as LemmaSum, t....

Table
Text
Code

TokenSum	t.name
4206	"Jazovka 2016 Vjekoslav Huzjak"
3423	"Bleiburg 2016 Franjo Komarica"
2302	"Bleiburg 2015 Josip Bozanić"
2252	"Knin 2015 Josip Bozanić"
2164	"Vukovar 2014 Mate Uzinić"
1896	"Jazovka 2014 Nikola Kekić"
1887	"Bleiburg 2014 Mate Uzinić"
1839	"Vukovar 2015 Želimir Puljić"
1700	"Srb 2014 Stjepan Mesić"
1599	"Knin 2016 Kolinda Grabar-Kitarović"
1420	"Srb 2016 Milorad Pupovac"
1408	"Srb 2014 Milorad Pupovac"
1375	"Knin 2016 Ivica Glavota"
1329	"Srb 2016 Nikola Budija"
1278	"Jasenovac 2016 Stjepan Mesić"
1222	"Srb 2016 Stjepan Mesić"

Started streaming 100 records after 1507 ms and completed after 1507 ms.

LemmaSum	t.name
1051	"Bleiburg 2016 Franjo Komarica"
804	"Knin 2015 Josip Bozanić"
780	"Jazovka 2016 Vjekoslav Huzjak"
773	"Bleiburg 2015 Josip Bozanić"
727	"Vukovar 2015 Želimir Puljić"
708	"Jazovka 2014 Nikola Kekić"
645	"Knin 2016 Kolinda Grabar-Kitarović"
616	"Bleiburg 2014 Mate Uzinić"
606	"Vukovar 2014 Mate Uzinić"
605	"Srb 2014 Stjepan Mesić"
568	"Knin 2016 Ivica Glavota"
549	"Srb 2016 Nikola Budija"
499	"Brezovica 2015 Kolinda Grabar-Kitarović"
479	"Jazovka 2014 Boris Prebeg"
475	"Jasenovac 2014 Milinko Čekić"
464	"Srb 2016 Stjepan Mesić"

Started streaming 100 records after 92 ms and completed after 92 ms.

```
//Number of Lemma žrtva 'victim' per Speaker
MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEE
(s:Speakers)-[ri:IS_CONNECTED_TO]->(i:Institutions)
RETURN s.name as name, sum(c.lemmaCountInFile) as count
order by count desc
```

```
//Number of Lemma žrtva 'victim' per Speaker per Year
MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-
(s:Speakers)-[ri:IS_CONNECTED_TO]->(i:Institutions)
RETURN r.year as year, s.name as name, sum(c.lemmaCountInFile) as count
order by count desc
```

$ MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-(s…

Table | Text | Code

name	count
"Bruna Esih"	18
"Franjo Habulin"	16
"Dragan Čović"	15
"Stjepan Mesić"	14
"Kolinda Grabar-Kitarović"	13
"Zlatko Ževrnja"	12
"Juraj Jezerinac"	12
"Josip Leko"	12
"Josip Bozanić"	10
"Vjekoslav Huzjak"	9
"Nataša Matašić"	8
"Kristina Ikić Baniček"	8
"Aziz ef. Hasanović"	7
"Franjo Komarica"	7
"Mate Uzinić"	7
"Željko Reiner"	7

Started streaming 44 records after 2 ms and completed after 2 ms.

$ MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-(s…

Table | Text | Code

year	name	count
"2015"	"Bruna Esih"	18
"2016"	"Stjepan Mesić"	14
"2014"	"Zlatko Ževrnja"	12
"2016"	"Juraj Jezerinac"	12
"2015"	"Dragan Čović"	11
"2015"	"Franjo Habulin"	11
"2015"	"Josip Bozanić"	10
"2016"	"Vjekoslav Huzjak"	9
"2015"	"Kolinda Grabar-Kitarović"	8
"2014"	"Mate Uzinić"	7
"2016"	"Franjo Komarica"	7
"2015"	"Aziz ef. Hasanović"	7
"2014"	"Ivo Josipović"	7
"2014"	"Orest Wilczynski"	6
"2015"	"Tomislav Sopta"	6
"2016"	"Nevenka Marinković"	6

Started streaming 59 records after 10 ms and completed after 11 ms.

```
//Number of Lemma žrtva 'victim' per Institution
MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-(s:Speakers)-[ri:IS_CONNECTED_TO]->(i:Institutions)
RETURN i.name as name, sum(c.lemmaCountInFile) as count
order by count desc
```

ATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-(s…

name	count
"katolička crkva u Hrvatskoj"	43
"predsjednik Republike Hrvatske"	38
"Savez antifašističkih boraca i antifašista RH"	23
"N/A"	19
"sabor Republike Hrvatske"	19
"Mešihat Islamske zajednice u Hrvatskoj"	16
"vlada Federacije Bosne i Hercegovine"	15
"Županija splitsko-dalmatinska"	12
"Počasni blajburški vod"	12
"grad Sisak"	8
"Javna ustanova Spomen-područja Jasenovac"	8
"Udruženje 6. lička"	7
"katolička crkva u Bosni"	7
"Hrvatski Obredni Zdrug Jazovka"	7
"grkokatolička crkva u Ukrajini"	6
"Vojni ordinarijat u Republici Hrvatskoj"	6

Started streaming 29 records after 2 ms and completed after 2 ms.

```
//Number of Lemma žrtva 'victim' per Institution per Year
MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-(s:Speakers)-[ri:IS_CONNECTED_TO]->(i:Institutions)
RETURN r.year as year, i.name as name, sum(c.lemmaCountInFile) as count
order by count desc
```

$ MATCH (a:Lemmas{name:'žrtva'})<-[c:HAS_lemma]-(t:Texts)<-[r:DELIVERED_SPEECH]-(s…

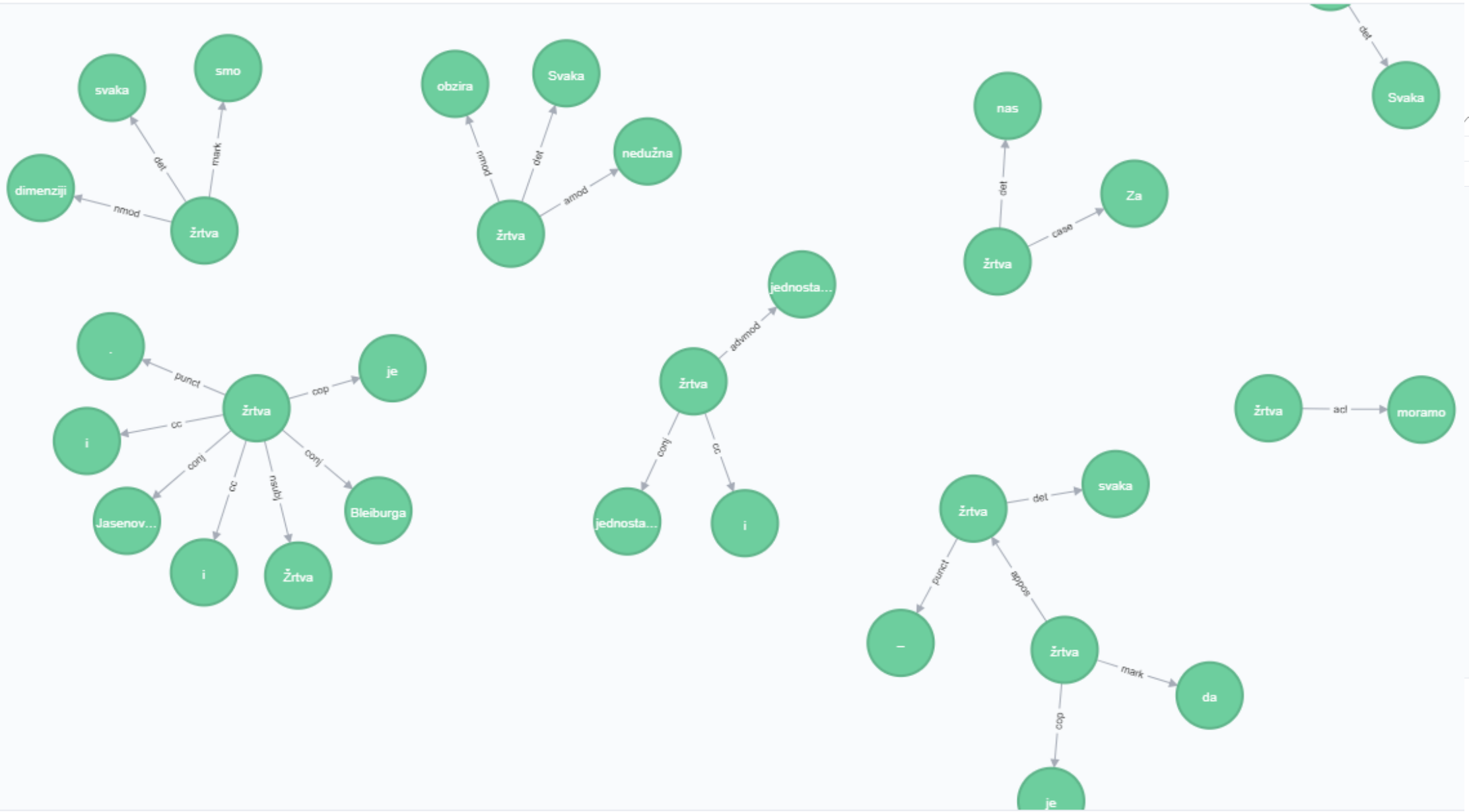
Table
Text
Code

year	name	count
"2015"	"predsjednik Republike Hrvatske"	26
"2015"	"katolička crkva u Hrvatskoj"	19
"2016"	"katolička crkva u Hrvatskoj"	16
"2016"	"N/A"	13
"2014"	"Županija splitsko-dalmatinska"	12
"2015"	"vlada Federacije Bosne i Hercegovine"	11
"2015"	"Savez antifašističkih boraca i antifašista RH"	11
"2016"	"Savez antifašističkih boraca i antifašista RH"	9
"2014"	"katolička crkva u Hrvatskoj"	8
"2014"	"predsjednik Republike Hrvatske"	7
"2015"	"Mešihat Islamske zajednice u Hrvatskoj"	7
"2014"	"sabor Republike Hrvatske"	7
"2016"	"katolička crkva u Bosni"	7
"2016"	"sabor Republike Hrvatske"	6
"2015"	"sabor Republike Hrvatske"	6
"2015"	"Počasni blajburški vod"	6

$ MATCH p=(n:Tokens{word:'žrtva'})-[:HAS_dependency]->() RETURN p

Graph
Table
Text
Code

*(50) Tokens(50)
*(34) HAS_dependency(34)

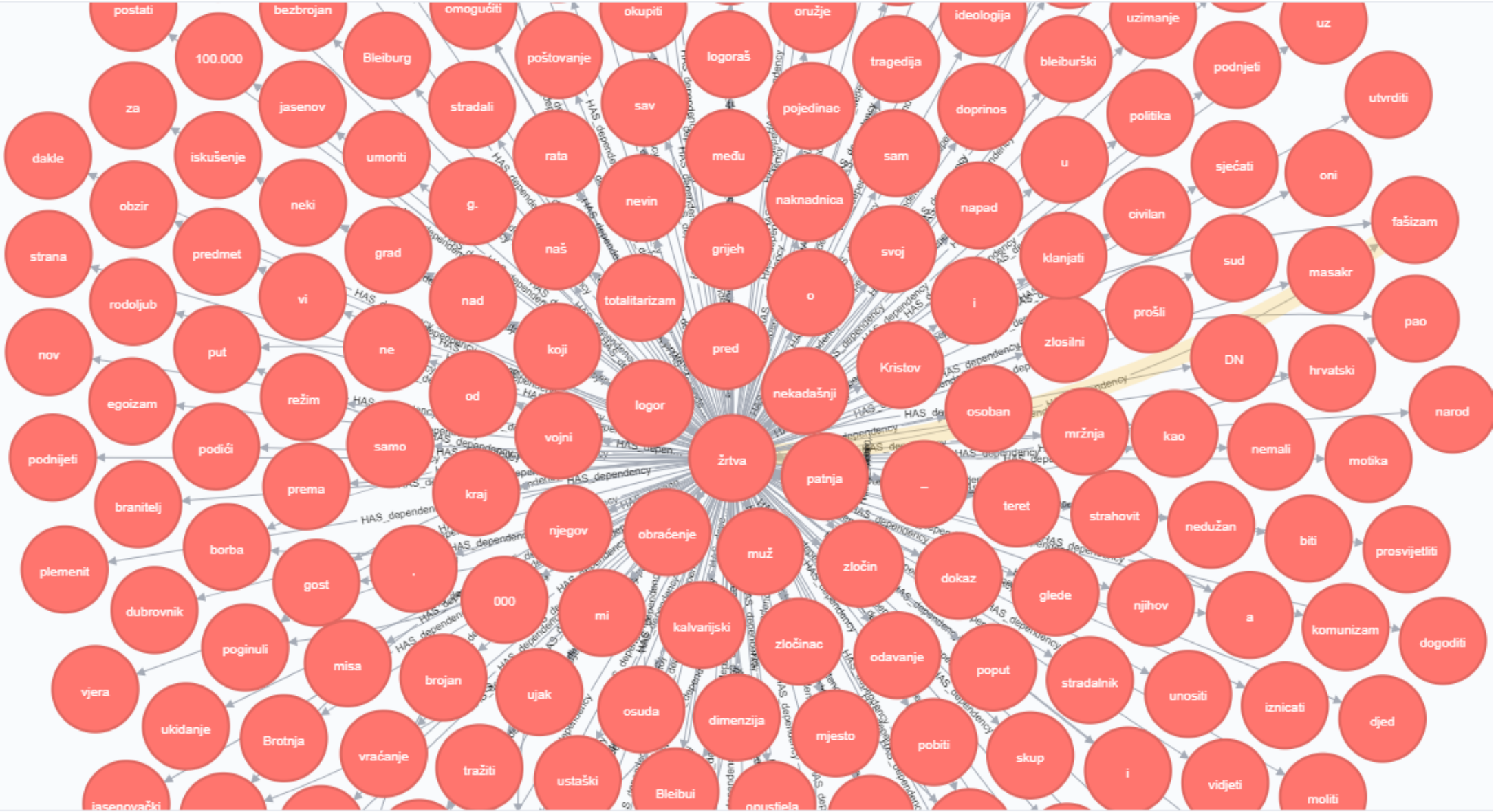


$ MATCH p=(n:Lemmas{lempos:'žrtva-n'})-[:HAS_dependency]->() RETURN p

Graph
Table
Text
Code

*(213) Lemmas(213)

*(241) HAS_dependency(241)

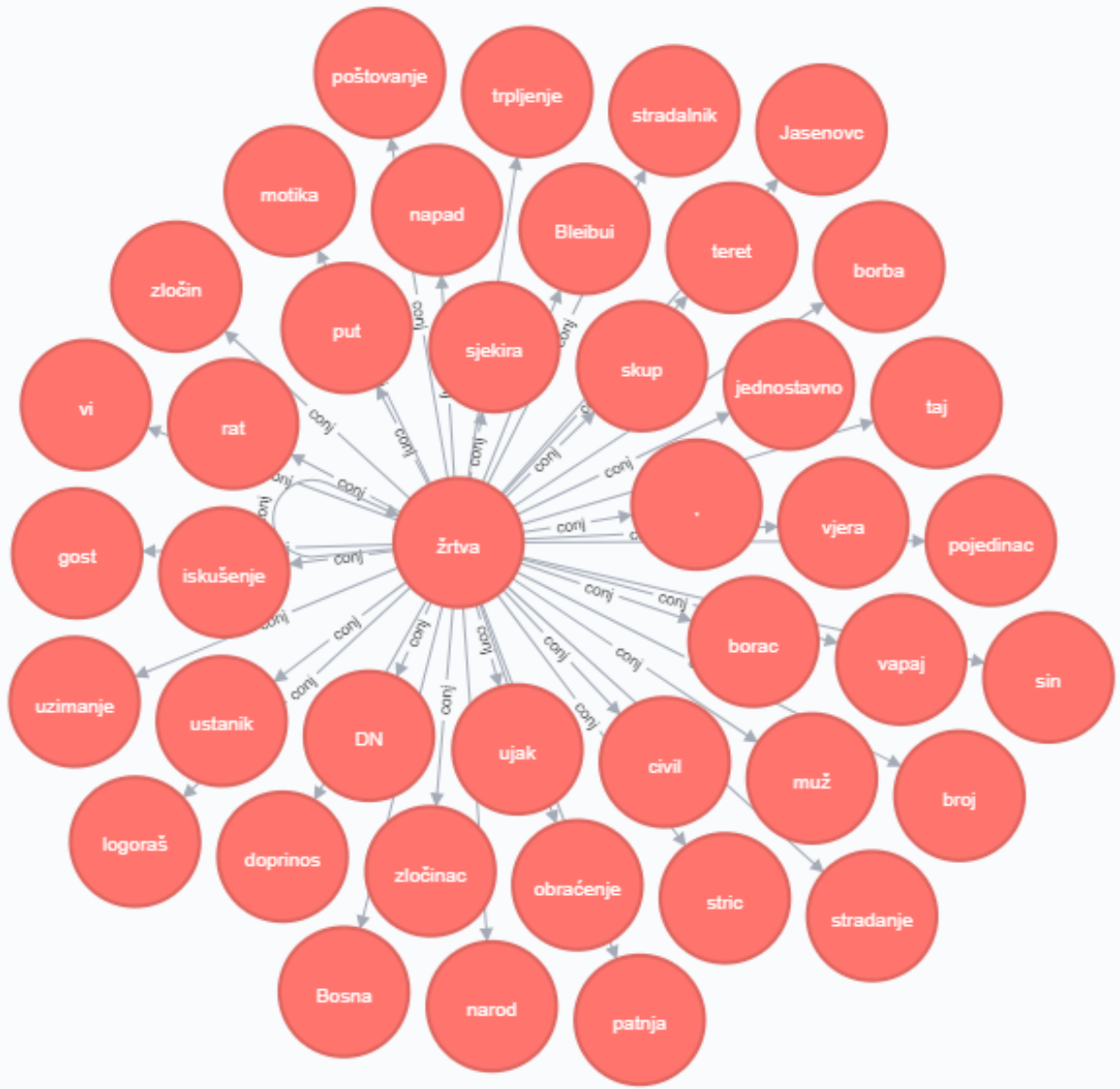


```
$ MATCH p=(n:Lemmas{lempos:'žrtva-n'})-[:HAS_dependency{function:'conj'}]->() RETURN p
```

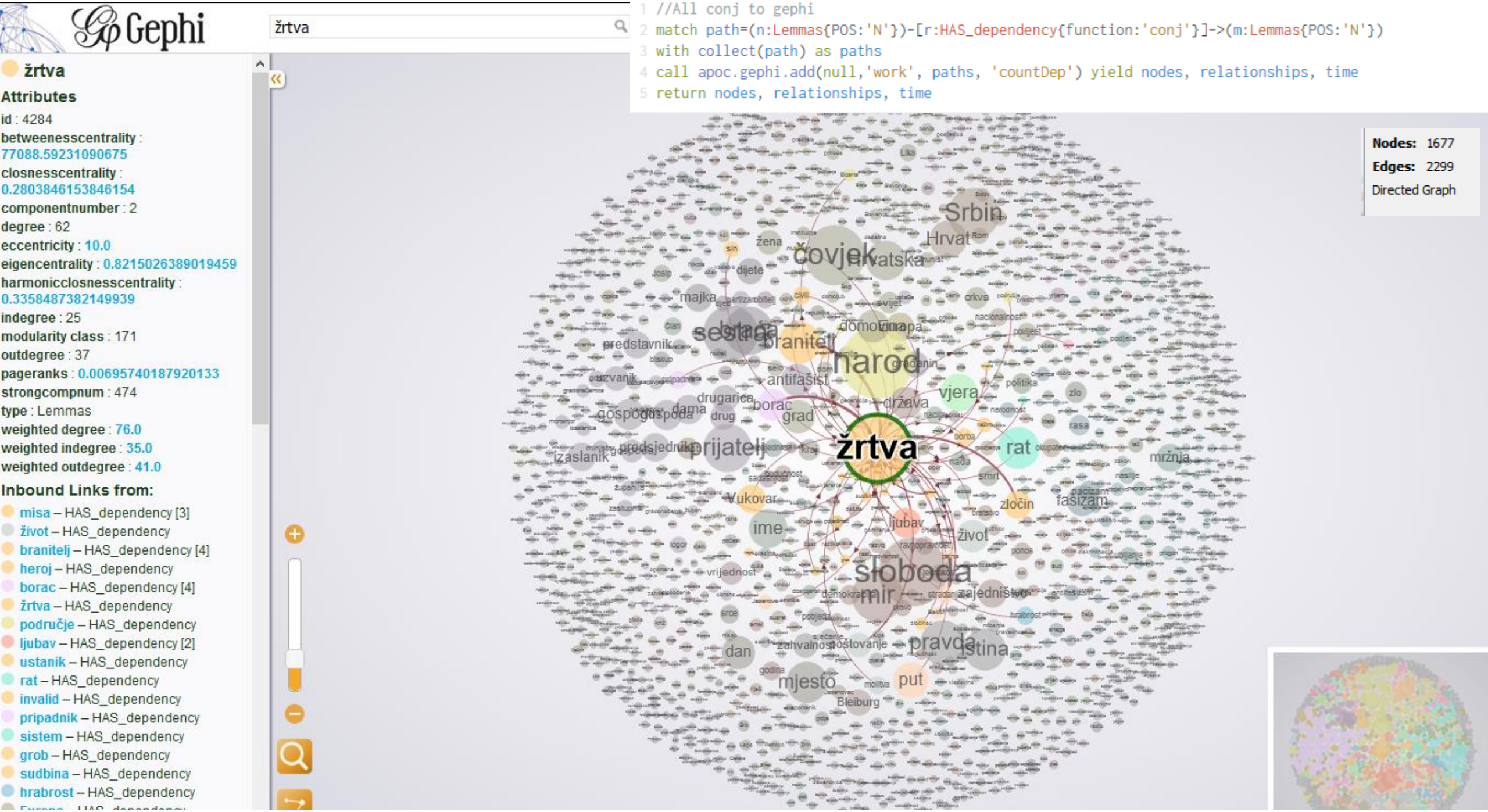
Graph | Table | Text | Code

*(42) Lemmas(42)

*(42) HAS_dependency(42)



```
//All conj to gephi
match path=(n:Lemmas{POS:'N'})-[r:HAS_dependency{function:'conj'}]->(m:Lemmas{POS:'N'})
with collect(path) as paths
call apoc.gephi.add(null,'work', paths, 'countDep') yield nodes, relationships, time
return nodes, relationships, time
```



Conclusions

- FRAMNAT project produces resources for cognitive discourse analysis that can help to explain the cognitive mechanisms of conceptualizing traumas in the 20th century and using history discourse for creation of collective identity through discourse.
- The value of this ontological model is in fostering interdisciplinary approach through contextualization of data and targeted usage of digital resources. The contextualization of the data enables the holistic insight into dynamics of the cultural memory practices and its political implications for the contemporary culture. The usage of the digital methods allows for a fine grained quantitative analysis that, due to the graph property organization of the model continues to be qualitatively expressive, flexible and non-reductive (syntetic not just analytic).