Federated queries over heterogeneous IGT collections

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Outline

1. Background: IGT and Linked Data

2. Ligt vocabulary

3. Using Ligt

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What is IGT

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Motivation

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- From 2006 to 2010 nominalisation strategy in Ossetian spoken in Dargavs changed according to fieldworkers' memory.
- Although it was impossible to check the data and make a reliable conclusion.

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- Careful checking require going through a lot of data, often in different formats, etc.

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$$gathering \rightarrow filtering \rightarrow using$$

Challenges (IGT as data)

- No fixed set of layers
- Alternative analyses
- Multiple different (partly incompatible) formats

$\Rightarrow$ Leads to separate silos of data

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  - And on support of off-the-shelf tools

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There is a technology that provides most of the requirements out of the box

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3. Useful information about what a name identifies should be provided through open standards such as RDF, SPARQL, etc.

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Basically, it entails a **highly standartised text format(s)** with a
tool stack (but conceptually datasets are a multigraph)

Linked Data: Pros and cons

+ It is based on text files, so it does not depend on a platform / technological stack / etc.
+ Allows connecting datasets to each other, breaking silos and making data accessible
+ Promotes rigid vocabularies and standards making data interoperable (for the most part)
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+ A lot of off-the-shelf tools allowing storing, searching, retrieving data
- Very steep learning curve, especially when things come to using the off-the-shelf tools
- Rigid vocabularies often lead to hacky modelling which decreases interoperability
- Slow for complex use-cases
- Relatively obscure which means less support

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Basic idea
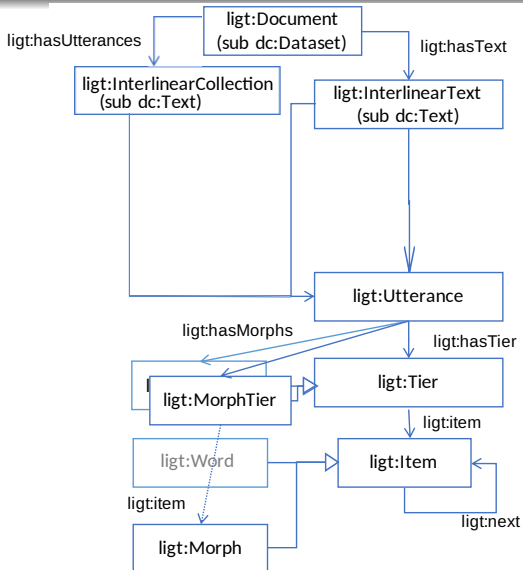
Simple example

https://s.zazuko.com/qD7XtT

Simple example

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.2#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
SELECT (COUNT(?lang) as ?n_lang) ?val
WHERE {
  ?morph ligt:gloss ?val ;
         rdfs:label ?label .

  BIND(LANG(?label) as ?lang)
  FILTER(?val = UCASE(?val) && ?lang != '')
} GROUP BY ?val ORDER BY DESC(?n_lang)
```

Marker	#
3SG	2650
1SG	2397
NEG	1400
2SG	1306
PST	1099

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  - Converting datasets
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- ⇒ **on-the-fly conversion** via a service

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On-the-fly conversion

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- Ligt users do not need to worry about licensing and storing the data since potentially it is possible not to store the converted version
- It can even be done on the frontend with JS, no server required

Example: querying examples in cldf datasets

- `examples.csv` ususally have the examples available in the dataset
- *Grambank* does not have this table, but there are examples in the text:

Example: extracting 1SG morphs for several unconverted datasets

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.3#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT ?gram ?lang
{
  ?s a ligt:Morph ;
     rdfs:label ?gram ;
     ligt:gloss "1SG"@en .

     BIND(LANG(?gram) AS ?lang)
} LIMIT 10

***

./comunica-sparql-file \
https://converter/cldf/https://github.com/cldf-datasets/apics/
  .../cldf/examples.csv \
https://converter/cldf-md/https://github.com/cldf-datasets/grambank/
  .../cldf/features.csv \
-f get-grams.rq
```

Example: extracting all possible causatives for each language

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.3#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT DISTINCT (group_concat(?gram; separator=" | ") as ?grams) ?morph_val ?la
{
  ?doc a ligt:Document ;
       ligt:hasUtterances/ligt:utterance/ligt:hasMorphs/ligt:item ?s .
  ?s a ligt:Morph ;
     rdfs:label ?gram ;
     ligt:gloss ?morph_val .

     BIND(LANG(?gram) AS ?lang)
     FILTER(REGEX(?morph_val, "CAUS"))
} GROUP BY ?lang ?doc ?morph_val LIMIT 100

***

./comunica-sparql-file ./apics ./grambank.ttl -f get-caus.rq
```

LLOD advantages: Mapping annotations

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- In practice, this means adding one line for each mapping:

```
<http://purl.org/olia/unimorph.owl#ABL> apics:hasValue "ABL"@en .
<http://purl.org/olia/unimorph.owl#ABS> apics:hasValue "ABS"@en .
<http://purl.org/olia/unimorph.owl#ACC> apics:hasValue "ACC"@en .
<http://purl.org/olia/unimorph.owl#ACT> apics:hasValue "ACT"@en .
<http://purl.org/olia/unimorph.owl#ADJ> apics:hasValue "ADJ"@en .
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  <http://purl.org/olia/unimorph.owl#ACC> apics:hasValue "ACC"@en .
  <http://purl.org/olia/unimorph.owl#ACT> apics:hasValue "ACT"@en .
  <http://purl.org/olia/unimorph.owl#ADJ> apics:hasValue "ADJ"@en .
  ```
- After this process we can operate with concepts: case, gender, aspect instead of strings

Lists of cases in different languages in APiCS

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.2#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX apics: <http://purl.org/liodi/ligt/apics/>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX mmcore: <http://mmoon.org/core/>
PREFIX unimorph: <http://purl.org/olia/unimorph.owl#>

SELECT (GROUP_CONCAT(DISTINCT ?case; SEPARATOR=", ")
        AS ?cases) ?lang
WHERE {
  ?morph ligt:gloss ?case ;
         rdfs:label ?label .
  ?tag apics:hasValue ?case .
  { ?tag rdfs:subClassOf+ mmcore:Case . }
  UNION
  { ?tag rdfs:subClassOf+ unimorph:Case . }


  BIND(LANG(?label) as ?lang)
  FILTER(?lang != '')
} GROUP BY ?lang
```

Lists of cases in different languages in APiCS

Cases	Language code
LOC, COM, INS, DAT, TEMP	rop-x-krio1252
LOC, INS, ABL, BEN, ALL, ACC, GEN	mue-x-medi1245
LOC, COM, INS, MOD, ABL, ALL, DAT, ERG	gjr-x-guri1249
INS	gcf-x-guad1242
LOC, VOC, GEN	kcn-x-nubi1253
LOC, VOC, MOD	jam-x-jama1262
COM, INS, VOC	pov-x-uppe1455
LOC, VOC, MOD	srm-x-sara1340
LOC	fpe-x-fern1234
LOC, COM, INS	bah-x-baha1260
VOC	lou-x-loui1240
...	

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- Adding intermediate annotations: annotate what you found to find it easier next time
- When dealing with remote data (or converted remote data), it is possible to add and save annotations **locally**, keeping some notes, alternative annotations, etc.

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- ? What could be potential queries that make linguistic sense?
- ? What potential linguistic use-cases this can be used for?
- ? Should I change `ligt:Word`?

`https://github.com/max-ionov/ligt`